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UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Upper Peninsula Power Company — Project No. 10855-002, Michigan

Marquette Board of Light and Power — Project No. 2589-024, Michigan

# NOTICE OF AVAILABILITY OF DRAFT ENVIRONMENTAL ASSESSMENT

(April 30, 2002)

In accordance with the National Environmental Policy Act of 1969 and the Federal Energy Regulatory Commission's (Commission) regulations contained in the Code of Federal Regulations (CFR) (18 CFR Part 380 [FERC Order No. 486, 52 F.R. 47897]), the Office of Energy Projects Staff (Staff) has reviewed the application for an initial license for the Dead River Project and a new license for the Marquette Project, both located on the Dead River in Marquette County, Michigan, and has prepared a draft environmental assessment (DEA) for the projects. In this DEA, the Staff has analyzed the potential environmental effects of the existing projects and has concluded that licensing the projects, with staff's recommended measures, would not constitute a major federal action significantly affecting the quality of the human environment.

Copies of the DEA are available for review in the Public Reference Branch, Room 2-A, of the Commission's offices at 888 First Street, N.E., Washington, D.C. 20426. This DEA may also be viewed on the Internet at http://www.ferc.gov using the "RIMS" link, select "Docket#" and follow the instructions. Please call (202) 208-2222 for assistance.

Any comments should be filed within 45 days from the date of this notice and should be addressed to Magalie R. Salas, Secretary, Federal Energy Regulatory Commission, 888 First Street, N.E., Washington, D.C. 20426. Please affix "Dead River Project No. 10855-002" and/or "Marquette Project No. 2589-024," as appropriate, to all comments. For further information, please contact Lee Emery at (202) 219-2779.

Comments, may be filed electronically via the Internet in lieu of paper. See 18 CFR 385.2001(a)(1)(iii) and the instructions on the Commission's web site at http://www.ferc.gov under the "e-Filing" link.

Magalie R. Salas
Secretary

# DRAFT ENVIRONMENTAL ASSESSMENT FOR HYDROPOWER LICENSE

Dead River Hydroelectric Project
FERC Project No. 10855-002

Marquette Hydroelectric Project
FERC Project No. 2589-024

Michigan

**Federal Energy Regulatory Commission**
**Office of Energy Projects**
**Division of Environmental and Engineering Review**
**888 First Street, NE**
**Washington, D.C. 20426**

**April 2002**

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ACHP | Advisory Council on Historic Preservation |
| ADA | Americans with Disabilities Act |
| AIR | additional information request |
| APE | area of potential effect |
| BEPP | Bald Eagle Protection and Management Plan |
| EC | degrees Celsius |
| CFR | Code of Federal Regulations |
| cfs | cubic feet per second |
| CLMP | Comprehensive Land Management Plan |
| Commission | Federal Energy Regulatory Commission |
| Corps | U.S. Army Corps of Engineers |
| CPUE | catch-per-unit-effort |
| CRMP | Cultural Resources Management Plan |
| CWA | Clean Water Act |
| CZMP | Coastal Zone Management Plan |
| DEA | draft environmental assessment |
| DO | dissolved oxygen |
| DRCI | Dead River Campers, Inc. |
| DRSB | Dead River storage basin |
| EPA | Environmental Protection Agency |
| ESA | Endangered Species Act |
| º F | degrees Fahrenheit |
| ESCP | Erosion and Sediment Control Plan |
| FERC | Federal Energy Regulatory Commission |
| FPA | Federal Power Act |
| FWS | U.S. Fish and Wildlife Service |
| HRMP | Historic Resources Management Plan |
| IFIM | instream flow incremental methodology |
| Interior | U.S. Department of the Interior |
| KBIC | Keweenaw Bay Indian Community |
| kV | kilovolt |
| kW | kilowatt |
| kWh | kilowatt-hour |
| MAIN | Mid America Interconnected Network |
| MBLP | Marquette Board of Light and Power |
| MDEQ | Michigan Department of Environmental Quality |

| | |
|---|---|
| MDNR | Michigan Department of Natural Resources |
| MDPH | Michigan Department of Public Health |
| mg/kg | milligrams per kilogram |
| mg/L | milligrams per liter |
| MHRC | Michigan Hydro Relicensing Coalition |
| MSB | McClure storage basin |
| MW | megawatts |
| MWh | megawatt-hours |
| NCTA | North Country Trail Association |
| NERC | North American Electric Reliability Council |
| NEPA | National Environmental Policy Act |
| NGVD | National Geodetic Vertical Datum |
| NHPA | National Historic Preservation Act |
| NPS | National Park Service |
| NRHP | National Register of Historic Places |
| NWF | National Wildlife Federation |
| NWI | National Wetland Inventory |
| O&M | operation and maintenance |
| ORV | off-road vehicle |
| PA | Programmatic Agreement |
| PCB | polychlorinated biphenyl |
| PHABSIM | Physical Habitat Simulation Program |
| REA | Ready for Environmental Analysis |
| RM | river mile |
| ROR | run-of-river |
| RV | recreational vehicle |
| SD1 | scoping document 1 |
| SHPO | State Historic Preservation Officer |
| SLSB | Silver Lake storage basin |
| Staff | Federal Energy Regulatory Commission staff |
| SWQD | Surface Water Quality Division of MDEQ |
| TDS | total dissolved solids |
| UPPCO | Upper Peninsula Power Company |
| USGS | U.S. Geological Survey |
| WMP | Wildlife Management Plan |

| | |
|---|---|
| WPSC | Wisconsin Public Service Corporation |
| WQC | Water Quality Certification |
| WQMP | Water Quality Monitoring Plan |
| YOY | young-of-the-year |

## SUMMARY

On April 22, 1994, Upper Peninsula Power Company (UPPCO), a subsidiary of Wisconsin Public Service Corporation (WPSC), filed an application with the Commission for an initial license for its operating, unlicensed 15.5-megawatt (MW) Dead River Hydroelectric Project, FERC No. 10855, located on the Dead River in Marquette County, Michigan. The project is located between river miles (RM) 11.3 and 34.0 and does not occupy any federal lands. The project includes two powerhouses. The estimated average annual generation at the Hoist powerhouse for the period 1983-1992 was 15,643 megawatt-hours (MWh). The estimated average annual generation at the McClure powerhouse for the same period was 48,452 MWh. UPPCO does not propose any new capacity or new construction. UPPCO proposes to continue operating the project in a peaking mode, but with reductions in the maximum drawdowns in the three project reservoirs, and establishment of minimum flows below the two powerhouses and in the McClure bypassed reach.

On July 29, 1999, the Marquette Board of Light and Power (MBLP) filed an application for a new license for its 3.9-MW Marquette Hydroelectric Project, FERC No. 2589, located on the Dead River in the city of Marquette, Marquette County, Michigan. The project is located between RM 1.0 and 8.0, and does not occupy any federal lands. The project includes two powerhouses. The estimated average annual generation at the No. 2 powerhouse for the period 1988-1997 was 13,110 MWh. The estimated average annual generation at the No. 3 powerhouse for the same period was 3,570 MWh. MBLP does not propose any new capacity or new construction. MBLP proposes to continue project operations with reduced reservoir drawdowns, establishment of minimum flows below the No. 2 powerhouse and in the No. 2 development bypassed reach, and re-regulation of flows at the No. 3 development.

The Michigan Department of Environmental Quality (MDEQ) issued state Water Quality Certification (WQC), pursuant to Section 401 of the Clean Water Act (CWA), for the Dead River Project on February 24, 1999, and for the Marquette Project, on February 29, 2000.

In this draft environmental assessment (DEA), we analyze the effects of continued operation of the projects and recommend conditions for an original license for the Dead River Project, and a new license for the Marquette Project. Based on our analysis, we recommend licensing the projects as proposed by UPPCO and MBLP, with additional staff-recommended measures. Our staff recommendations include or are based, in part,

on recommendations made by federal and state resource agencies that have an interest in the resources that may be affected by the continued operation of the projects.

The additional measures we recommend for the Dead River Project include: developing a project recreation plan and a cultural resources management plan; continuing operation and maintenance of recreational facilities currently managed by UPPCO; increasing the target start of the month water level at the Dead River storage basin (DRSB) to 1,341.0 feet National Geodetic Vertical Datum (NGVD) for the period June to November, and the minimum water level to 1339.5 feet NGVD for the period July to November; constructing, operating and maintaining a no-fee, barrier-free fishing pier, birdwatching, and aesthetic viewing access at the Hoist tailrace, including landscaping of the area; and providing signs for river access near the McClure powerhouse.

The additional measures we recommend for the Marquette Project include: developing a recreation plan; and continuing operation and maintenance of recreational facilities currently managed by MBLP.

We recommend these additional measures for both projects to protect and enhance water quality, fisheries, terrestrial, land use, aesthetics, recreational, and cultural resources. In addition, the electricity generated from the projects would be beneficial, because it would continue to reduce the use of fossil-fueled, electric generating plants; conserve nonrenewable energy resources; and continue to reduce atmospheric pollution.

Section 10(j) of the Federal Power Act (FPA) requires the Commission to include license conditions based on recommendations provided by the federal and state fish and wildlife agencies. We have addressed the concerns of the state and federal fish and wildlife agencies and made recommendations, twenty of which are inconsistent with those of the agencies. We are making a preliminary determination that twenty of the recommendations made by the Michigan Department of Natural Resources (MDNR) and the U.S. Fish and Wildlife Service (FWS) conflict with the public interest standard of Section 4(e) and the comprehensive planning standard of Section 10(a) of the FPA (see section VIII and tables 22 and 23 of this document).

Under Section 18 of the FPA, the U.S. Department of the Interior (Interior) requested that the Commission reserve authority for Interior to request fishways at these projects as may be necessary during the term of any licenses issued. Consistent with Commission policy, we recommend including in any licenses issued for the two project, a reservation of authority for Interior to request fishways.

On the basis of our independent analysis, we conclude that issuance of an initial license for the Dead River Project and a new license for the Marquette Project, with the additional staff-recommended measures, would not constitute a major federal action significantly affecting the quality of the human environment.

# DRAFT ENVIRONMENTAL ASSESSMENT

**Federal Energy Regulatory Commission**
**Office of Energy Projects**
**Division of Environmental and Engineering Review**
**Washington, D.C.**

**DEAD RIVER HYDROELECTRIC PROJECT**
**FERC Project No. 10855-002-MICHIGAN**

**MARQUETTE HYDROELECTRIC PROJECT**
**FERC Project No. 2589-024-MICHIGAN**

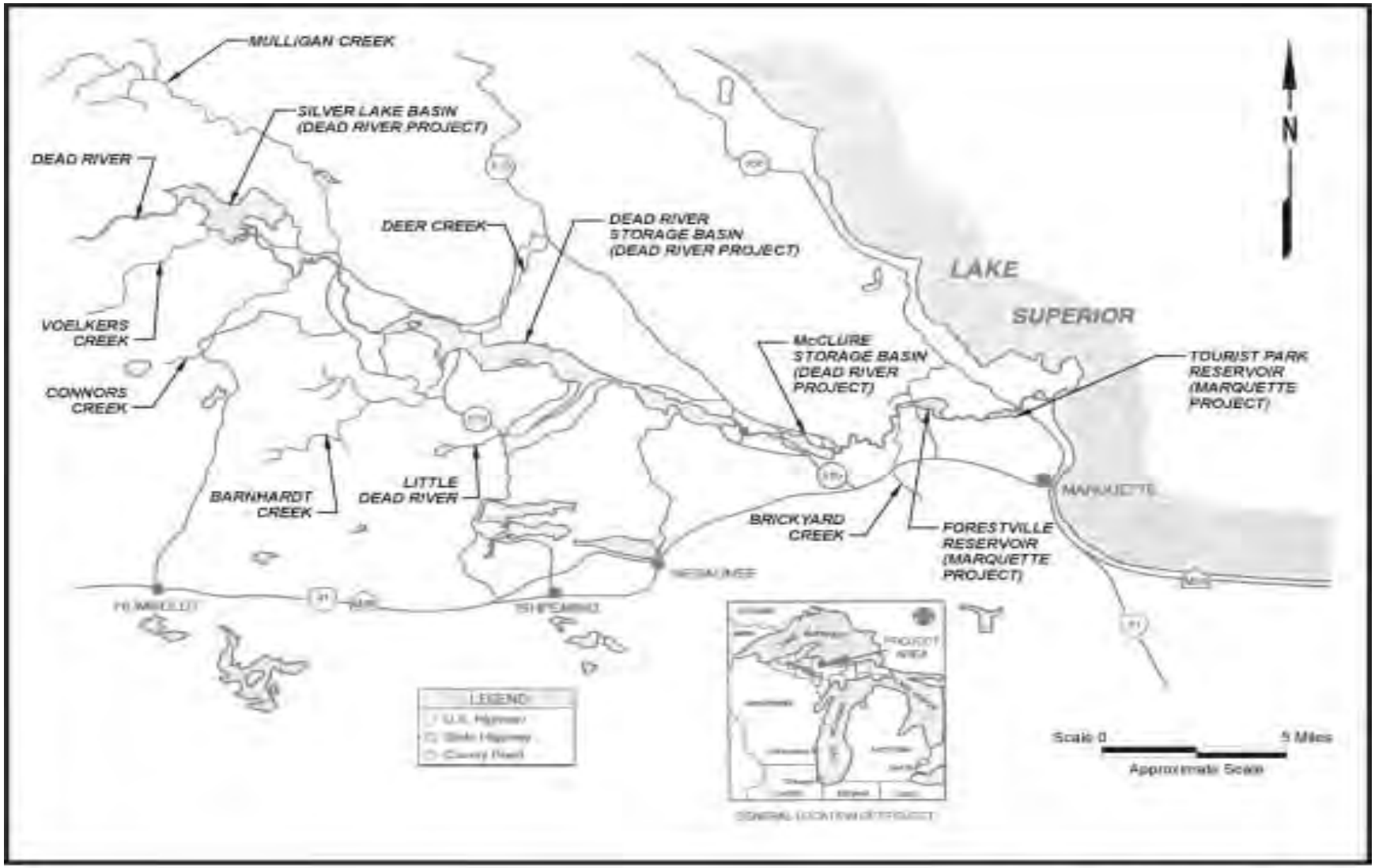
## I. APPLICATIONS

### A. Dead River Project

On April 22, 1994, Upper Peninsula Power Company (UPPCO), a subsidiary of Wisconsin Public Service Corporation (WPSC), filed an application with the Commission for an initial license for its operating, unlicensed 15.5-megawatt (MW) Dead River Hydroelectric Project, FERC No. 10855, located on the Dead River in Marquette County, Michigan. The project is located between river miles (RM) 11.3 and 34.0 (figure 1) and does not occupy any federal lands. The project includes two powerhouses. The estimated average annual generation at the Hoist powerhouse for the period 1983-1992 was 15,643 megawatt-hours (MWh). The estimated average annual generation at the McClure powerhouse for the same period was 48,452 MWh. UPPCO does not propose any new capacity or new construction.

### B. Marquette Project

On July 29, 1999, the Marquette Board of Light and Power (MBLP) filed an application for a new license for its 3.9-MW Marquette Hydroelectric Project, FERC No. 2589, located on the Dead River in the city of Marquette, Marquette County, Michigan (figure 1). The project is located between RM 1.0 and 8.0 and does not occupy any federal lands. The project includes two powerhouses. The estimated average annual generation at the No. 2 powerhouse for the period 1988-1997 was 13,110 MWh. The estimated average annual generation at the No. 3 powerhouse for the same period was 3,570 MWh. MBLP does not propose any new capacity or new construction.




(SOURCE: UPPCO, 1994 as modified by staff.)

Figure 1. Locations of Dead River and Marquette Projects.

## II. PURPOSE OF ACTION AND NEED FOR POWER

### A. Purpose of Action

The Commission must decide whether to issue an initial license to UPPCO for the Dead River Project and a new license to MBLP for the Marquette Project and what, if any, conditions should be placed on any licenses issued. Issuing an initial license to the Dead River Project and a new license to the Marquette Project would allow UPPCO and MBLP to generate electricity at the projects for the term of an initial or new license, respectively, and make electric power from a renewable resource available to their customers.

This draft environmental assessment (DEA) assesses the effects associated with operation of the projects and alternatives to the proposed projects, and makes recommendations to the Commission on whether to issue licenses for the projects, and if so, recommends terms and conditions to become part of any licenses issued. In deciding whether to issue a license for a hydroelectric project, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing the waterway. In addition to the power and developmental purposes for which a license is issued (e.g., power generation, flood control, irrigation, and water supply), the Commission must give equal consideration to the purposes of energy conservation, the protection, mitigation of damage to, and enhancement of fish and wildlife (including related spawning grounds and habitat), protection of recreational opportunities, and preservation of other aspects of environmental quality.

In this DEA, we assess the environmental and economic effects of continuing to operate the projects: (1) as proposed by UPPCO and MBLP; (2) the proposed action with staff-recommended measures, and (3) the no-action alternative. Issues that are addressed include: water quality, aquatic resources, fish passage, minimum flows below powerhouses and in the bypassed reaches, removal of a remnant dam, protection of the federally-listed bald eagle and its habitat, control of nuisance plants, historical and cultural resource management and protection, and recreational enhancements.

### B. Need for Power

UPPCO provides power for 100 communities and adjacent mining and rural locations at retail rates, and furnishes electrical energy wholesale to five municipalities, two rural electrification associations, and the Wisconsin Electric Power Company. The

Dead River Project is operated as an integral part of UPPCO's power system, which covers an area of approximately 4,450 square miles in all or part of 10 counties located in the Upper Peninsula of Michigan.

MBLP is a municipal utility. Power generated by the Marquette Project is delivered to the MBLP's distribution system for supply of electrical energy to its municipal customers in the city of Marquette.

The Dead River Project and Marquette Project are located in the Mid America Interconnected Network (MAIN) of the North American Electric Reliability Council (NERC). NERC annually forecasts electrical supply and demand in the nation and the region for a 10-year period. According to NERC, the demand for electric energy in the MAIN will grow at an average rate of 1.5 percent annually (from 243 billion kilowatt-hours [kWh] to 278 billion kWh during the period 2000 to 2009) (NERC, 2000). The Dead River Projects, which together produce approximately 81 million kWh annually (0.03 percent of system generation), could displace existing and planned nonrenewable fossil-fueled electrical generation facilities that produce nitrogen oxides and sulfur oxides, which contribute to air pollution. Therefore, these hydroelectric generation facilities would contribute to diversification of the generation mix in the MAIN region.

By producing hydroelectricity, these projects displace the need for other power plants to operate, thereby avoiding some fossil-fuel power plant emissions and creating an environmental benefit. If the electric generating capacity of these projects were replaced with other fuels, greenhouse gas emissions could potentially increase by about 22, 600 metric tons of carbon per year. In the MAIN reliability region where these projects are located, the capacity mix includes a proportionately small amount of hydropower, relative to other parts of the country.

We conclude that the electrical power produced by these facilities contributes to a diversified generation mix, and helps meet a need for power in the projects' area.

## III. PROPOSED ACTION AND ALTERNATIVES

In the following sections, we describe the proposed action and alternatives for the two projects.

### A. Dead River Project

## 1. Proposed Action

a. Project Facilities:

The Dead River Project consists of three separate developments: the Silver Lake development, the Dead River (Hoist) development, and the McClure development. The Silver Lake development, which is the furthest upstream, consists of the following existing facilities: (1) a 1,500-foot-long, 30-foot-high earth embankment dam; (2) a 100-foot-long, 7.7-foot-high concrete ogee crest spillway; (3) a 15-foot-long, 34-foot-high concrete gravity low-level outlet structure; (4) four earthen saddle dikes: (a) 200-foot-long, 5-foot-high dike 1; (b) 370-foot-long, 7-foot-high dike 2; ©) 170-foot-long, 6-foot-high dike 3; and (d) 290-foot-long, 5-foot-high dike 4; (5) the Silver Lake storage basin (SLSB) having a surface area of 1,464 acres with a storage capacity of 33,513 acre-feet, and a normal water surface level at 1,486.25 feet National Geodetic Vertical Datum (NGVD). The outlet structure is aligned along the original river flow line and discharges into the natural river channel below the dam. There are approximately 5.4 miles of the Dead River between Silver Lake dam and the upper reaches of the Dead River storage basin (DRSB). Currently, there is no generating facility at this development and none is proposed; this development stores water for release for power generation at UPPCO's two downstream developments.

The Dead River (Hoist) development consists of the following existing facilities: (1) a 4,602-foot-long concrete gravity Hoist dam with sections varying in height from 6 to 63 feet; (2) a reservoir, DRSB, having a surface area of 3,202 acres with a storage capacity of 46,998 acre-feet, and a normal water surface elevation of 1,347.5 feet NGVD; (3) a 34-foot-long, 23-foot-wide, and 68-foot-high intake structure; (4) a 342-foot-long, 9-foot-wide, 10-foot-high rock tunnel; (5) a 193-foot-long, 7-foot-diameter riveted steel penstock; (6) a powerhouse containing 3 Francis-type generating units with a total installed capacity of 5.5 MW; (7) a tailrace; (8) a 33-kilovolt (kV) substation; and (9) appurtenant facilities. The tailrace discharges approximately 1,000 feet downstream from the dam. There is approximately 0.4 mile of free-flowing river, including the tailrace, between the Hoist powerhouse and the McClure storage basin (MSB).

The McClure development consists of: (1) an existing 1,874-foot-long, earth embankment and concrete gravity McClure dam varying in height from 22 to 51.4 feet; (2) existing reservoir, MSB, having a surface area of 95.9 acres with a storage capacity of 1,870 acre-feet, and a normal water surface elevation of 1,196.4 feet NGVD; (3) a 99-foot-long, 10-foot-wide, and 28-foot-high existing intake structure; (4) an existing

13,302-foot-long, 7-foot-diameter steel, wood, and concrete penstock; (5) an existing 40-foot-high, 30-foot-diameter concrete surge tank; (6) an existing powerhouse containing two Francis-type generating units with a total installed capacity of 10 MW; (7) an existing tailrace; (8) an existing 33-kV substation; and (9) appurtenant facilities. McClure powerhouse discharges directly into the backwaters of Forestville reservoir of the Marquette Project. Approximately 6.1 miles of the Dead River is bypassed by the project. UPPCO does not propose any new capacity at the facility.

b. Existing and Proposed Project Operations:

Currently, SLSB releases are controlled by manual adjustment of a slide gate at the outlet structure. Both Hoist and McClure developments have been manually operated in a peaking mode to match electrical loads of the UPPCO system. The system peaking hours fall between 7:00 a.m. and 11:00 p.m.. UPPCO recently completed (2000) automating operation of the Hoist and McClure powerhouses. UPPCO has the capability, at its control center in Ishpeming, Michigan to remotely place on-line or trip off-line the two powerhouses from its system. There are no proposals to automate releases from the SLSB.

UPPCO proposes to continue to operate the Dead River Project in a peaking mode with the SLSB serving as a storage basin for generation at its two downstream developments. UPPCO estimates that under proposed operations the annual generation would be 15,765 MWh at the Hoist powerhouse, and 46,492 MWh at the McClure powerhouse. UPPCO proposes to continue to operate SLSB similar to its operation since 1988, when UPPCO purchased the development from the Cleveland-Cliffs Iron Company. UPPCO proposes to maintain SLSB levels between 1,483.5 feet and 1,475 feet NGVD. Prior to the UPPCO purchase of the development, normal drawdown at SLSB was to elevation 1,465 feet NGVD. The SLSB is drawn down primarily during January through March to allow continuous power generation at the Hoist and McClure powerhouses, and the capture of as much of the spring snowmelt runoff as possible for generation. During June through January, UPPCO proposes to maintain a 2-foot drawdown range. Typical releases from the low-level intake at the SLSB average 15 to 20 cfs in the summer, and 80 to 90 cfs during the winter. Historically, discharge from SLSB was occasionally curtailed to conserve water. However, UPPCO proposes to provide a minimum continuous discharge from SLSB of 8 cfs, which is estimated to be the minimum natural inflow to SLSB.

UPPCO proposes to operate the Dead River (Hoist) development with a maximum drawdown of 7 feet between elevation 1,342.0 and 1,335.0 feet NGVD) in the late-winter period. After a quick refill period in spring, UPPCO proposes to maintain a relatively constant target water level of 1,342.0 feet NGVD for the remainder of the year. Historically (pre-1988), maximum drawdown at the DRSB was to elevation 1,330.0 feet NGVD.

UPPCO proposes to maintain a relatively constant water level in the MSB at approximately 1,195.8 feet NGVD at all times, except during the fall, when the reservoir may occasionally be allowed to fill up to 1,196.4 feet NGVD and spill over the dam crest, to flush out leaves and debris. Currently, UPPCO operates MSB between elevation 1,195.1 feet and 1,197.0 feet NGVD.

Historically, Hoist and McClure powerhouses have been shut down routinely during periods of low electrical demand (summer, weekends, and nights), resulting in no downstream flow releases. UPPCO proposes to release a continuous minimum flow of 100 cfs from the Hoist powerhouse and 72 cfs from the McClure powerhouse. These flows approximate the hydraulic capacity of one unit at each powerhouse.

Currently, UPPCO does not release any flows to the 6.1 mile-long McClure bypassed reach and does not propose to do so. However, UPPCO estimates that the average flow in the bypassed reach would be as much as 17 cfs, with the tributary streams (Peters, Midway, and Brickyard Creeks) contributing 14 cfs and leakage from the McClure dam and the penstock contributing 2-3 cfs.

c. Applicant's Proposed Environmental Measures:

UPPCO proposes the following environmental measures, in addition to the operational measures described above:

- Conduct annual cleanups of the existing informal McClure bypassed reach trail above the McClure powerhouse;
- Provide a vault toilet facility at the McClure powerhouse parking lot to avoid potential sanitation problems along the existing informal McClure bypassed reach trail;
- Provide directional signage at the junction of the access site road with County Road 573;
- Develop and implement a Shoreline and Bank Erosion Control Plan;

- Develop and implement a Natural Organic Debris Maintenance Plan;
- Develop a Wildlife Management Plan (WMP);
- Develop and implement a Bald Eagle Protection Plan (BEPP);
- Develop and implement a Nuisance Plant Control Plan; and
- Develop and implement a Comprehensive Land Management Plan (CLMP).

### 2. Proposed Action with Additional Staff-Recommended Measures

The staff's preferred alternative would include UPPCO's proposed environmental measures, and operation of the SLSB, DRSB, and the MSB in accordance with the state WQC, in addition to the measures recommended by staff, as described below.

Operational measures required by the WQC, include the following:

- Restrict SLSB drawdown to an annual maximum of 4.5 feet and DRSB drawdown to an annual maximum of 3.5 feet; maintain specified monthly minimum water levels, and strive to maintain target monthly start levels at both reservoirs; in addition, daily drawdowns are to be limited to 0.5 feet in all months;
- Restrict overall MSB fluctuation to 1.6 feet, with not more than 1.0-foot daily fluctuation; and
- Maintain seasonal minimum flows downstream of SLSB ranging from 10 to 25 cfs, a continuous minimum flow of 100 cfs from Hoist powerhouse, a minimum flow of 80 cfs from McClure powerhouse when sufficient water is available, and a continuous minimum flow of 20 cfs in the McClure bypassed reach.

Staff also recommends that UPPCO provide the following additional environmental measures:

- Develop a Recreation Plan for the project in consultation with the MDNR and interested parties;
- Continue operation and maintenance (O&M) for all recreational facilities currently managed by UPPCO;
- Increase target start of the month water level at the DRSB to 1,341 feet NGVD for the period June to November, and the minimum water level to 1,339.5 feet NGVD for the DRSB for the period July to November;
- Construct, operate, and maintain a no-fee, barrier-free fishing platform, birdwatching and aesthetic viewing access at the Hoist tailrace area, including landscaping of the area; vehicle parking, and

- Provide signs for river access near the McClure powerhouse.

### 3. No Action

Under the no-action alternative, UPPCO would continue to operate the Dead River Project as it currently is, and no new environmental protection, mitigation, or enhancement measures would be implemented. Any ongoing effects of the project would continue. We use the no-action alternative to establish the baseline environmental conditions for comparison with other alternatives.

## B. Marquette Project

### 1. Proposed Action

a. Project Facilities:

The Marquette Project consists of the No. 2 (Forestville) development, the No. 3 (Tourist Park) development, and the remnant No. 1 dam.

The No. 2 development, which is immediately downstream of the Dead River Project's McClure development, consists of the following existing facilities: (1) a 202-foot-long, 62-foot-high concrete-capped cyclopean masonry dam (No. 2 dam) comprising a 197-foot-long concrete retaining wall, a 75-foot-long training wall, and a 33-foot-wide intake for the penstock; (2) one 90-inch-diameter, wood-stave penstock that is approximately 4,200 foot-long and conveys water from the intake structure to a concrete surge tank; (3) two 440-foot-long, 78-inch-diameter steel penstocks that convey water from the surge tank to the No. 2 powerhouse; (4) No. 2 powerhouse, a 40-foot by 96-foot reinforced concrete and brick structure that contains two turbines with a combined capacity of 3.2 MW; (5) a 110-acre reservoir; and (6) appurtenant facilities. The masonry dam functions as an uncontrolled spillway when extremely high flows raise water levels to elevation 771.0 feet NGVD. Generation from the project is directly fed into MBLP's 12.5-kV electrical distribution system. The tailrace discharges approximately 0.5 mile upstream of the backwaters of Tourist Park reservoir. Approximately 1 mile of the Dead River is bypassed by the project.

The No. 3 development consists of the following existing facilities: (1) a dam (No. 3 dam) that includes (looking from left to right downstream): (a) a 37-foot-long spillway left dike that has a crest elevation of 642.82 feet NGVD, and a reinforced

concrete core wall with a top elevation of 641.84 feet NGVD; (b) a concrete ogee uncontrolled spillway that is 80 feet long and has a crest elevation of 638.84 feet NGVD (its maximum height is 21 feet above the streambed); ©) a spillway section that contains two10-foot-high by 10-foot-wide Taintor gates (rollway crest beneath gates is at elevation 629.84 feet), and electric hoists; (d) a 758-foot-long spillway right dike that has a crest elevation of 642.84 feet NGVD and a reinforced concrete wall (crest width of 13.5 feet); and (e) a reinforced concrete intake structure that has a single 20-foot-wide by 17-foot-high bay, inclined trash racks, and a horizontally hinged gate with a dedicated electric hoist; (2) one 8-foot-diameter, 150-foot-long steel penstock that is supported on nine reinforced-concrete pedestals, and conveys water from the intake to the No. 3 powerhouse; (3) No. 3 powerhouse, a 28-foot-by 40-foot-reinforced-concrete and brick structure containing one 700-kW vertical generating unit; (4) a 100-acre reservoir; and (5) appurtenant facilities. Generation from the project is directly fed into MBLP's 12.5-kV electrical distribution system. The tailrace discharges directly into the Dead River. Approximately 600 feet of the Dead River is bypassed by the project.

The remnant No.1 dam (also referred to as the 1897 Forestville Dam) is located in the Forestville bypassed reach of the Dead River, approximately 2,800 feet downstream from No. 2 dam and within the project boundary. It is an abandoned structure that is about 200 feet long that sits atop a natural waterfall about 50 feet upstream from where the elevated penstock crosses the original Dead River channel. A twelve to fifteen foot wide section of the dam has been partially breached by man to a point about five feet above the natural riverbed and functions as the only outlet. Water behind the remnant dam creates a small impoundment with a maximum depth of 5 feet. The pool is about 300 feet wide near the dam and narrows as it extends upstream to a point about 500 feet below the No. 2 dam and near where Bancroft Creek enters the pool. In its June 20, 1997, Order for the Marquette Project, the Commission deferred taking any action concerning the disposition of the remnant dam until relicensing occurred for the Marquette Project.

b. Existing and Proposed Project Operations:

Currently, MBLP operates the Marquette Project[1] in a modified peaking mode that uses the storage capacity of the Forestville reservoir between elevation 767.98 feet and 769.98 feet NGVD, and Tourist Park reservoir between elevation 636.86 feet and 638.86

[1] The current license for the project expired on July 31, 2000. On August 10, 2001, the Commission issued an annual license for the project.

feet NGVD to moderate discharge fluctuations caused by peaking operation from the upstream Dead River Project. Both the powerhouses are remotely operated from MBLP's Shiras steam station, located approximately 5 miles from No. 2 powerhouse. Turbines at No. 2 and No. 3 developments can also be manually adjusted in their respective powerhouses.

The WQC was issued for the Marquette Project on February 29, 2000, and MBLP now proposes to operate the project according to the terms of the WQC. Thus, MBLP proposes to maintain water levels in Forestville reservoir between elevation 769.50 feet to 771.0 feet NGVD, except during events beyond MBLP's control, such as during high-flow or low-flow periods. The No. 2 powerhouse would operate so that the No. 3 powerhouse could re-regulate flows into the lower Dead River. During ice-free periods, MBLP proposes to release a continuous minimum flow of 20 cfs or inflow, if less, to the bypassed reach below No. 2 dam. River flow in excess of 20 cfs would be directed through the power plant. When the river inflow exceeds the hydraulic capacity of the plant (approximately 460 cfs), plus the minimum bypassed reach flow, the reservoir level would rise to the point where excess flow would pass over the spillway. During ice-in periods, the priority of flow releases would be the same as above, except when river inflow is 100 cfs or less. During such periods, MBLP proposes to consult with the MDNR and upstream dam owner, to explore options to increase inflow. If an increase in inflow is not feasible, MBLP would divert 40 cfs through each of the powerhouse turbines to prevent freeze-up. Any excess available flow would be released to the bypassed reach. Currently, MBLP does not release any flows to the Forestville 1-mile-long bypassed reach. MBLP estimates that the average existing inflow to the bypassed reach is up to 13 cfs from groundwater, one unnamed tributary stream, and leakage from the Forestville dam and penstock.

MBLP proposes to operate the No. 3 development in a re-regulation mode to moderate or normalize fluctuation in flow releases to the Dead River below No. 3 dam. To the extent possible, the No. 3 development would be operated to discharge average daily inflow, while maintaining the Tourist Park reservoir level, behind the No. 3 dam, between elevation 636.70 feet and 637.70 feet NGVD, except during events beyond MBLP's control.

c. Applicant's Proposed Environmental Measures:

MBLP proposes the following measures to protect and enhance environmental resources, in addition to the operational measures described above:

- Perform minor manipulation of existing streambed materials and the placement of small gravel in the river reach bypassed by the No. 2 penstock (as required by the Commission's June 1997 order)[2] ;
- Construct two osprey platforms, six wood duck boxes, and four mallard nesting structures in the project reservoirs;
- Develop and implement a Water Quality Monitoring Plan (WQMP) as required under WQC conditions;
- Provide signage for the portage route around the No. 2 dam;
- Provide signage that informs users of existing pedestrian access routes in the bypassed reach;
- Develop a Historic Resources Management Plan (HRMP), in consultation with the Michigan SHPO, to provide protection for cultural resources that may be affected by the project;
- Develop a Shoreline and Bank Erosion Control Plan;
- Develop a Natural Organic Debris Maintenance Plan;
- Develop a WMP;
- Develop a plan to monitor the occurrence of nuisance plants in project waters;
- Remove remnant No.1 dam per agreement to be developed with the MDEQ, within 18 months of license issuance, if approved by the Commission;
- Develop and implement a BEPP; and
- Develop a CLMP.

### 2. Proposed Action with Additional Staff-Recommended Measures

The staff's preferred alternative would include MBLP's proposed environmental measures and our additional staff-recommended measures. Our staff-recommended measures include provisions for the following:

- Develop a Recreation Plan in consultation with MDNR and interested parties;
- Continue O&M of recreational facilities currently managed by MBLP.

### 3. No Action

Under the no-action alternative, the Marquette Project would continue to operate under the terms and conditions of the existing license, and no new environmental

[2] Design was elated by the commission's March 8, 2000 order.

protection, mitigation, or enhancement measures would be implemented. Any ongoing effects of the project would continue. We use the no-action alternative to establish the baseline environmental conditions for comparison with other alternatives.

### C. Alternatives Considered but Eliminated from Detailed Study

As part of the National Environmental Policy Act (NEPA) scoping process, the staff considered, but eliminated from detailed study several alternatives to the licensing proposal, because they are not reasonable under the circumstances of this proceeding. These alternatives included: (1) federal takeover of the Dead River and Marquette Projects; (2) issuing a non-power license for either of the projects; and (3) retirement of either of the projects.

#### 1. Dead River Project

Federal takeover, pursuant to Section 14 of the FPA may be applicable to a licensed project. The Dead River Project is not yet licensed, so federal takeover is not applicable.

A non-power license, pursuant to Section 15 of the FPA may be applicable to a licensed project. Because the Dead River Project is not yet licensed, a non-power license is not applicable.

Project retirement could be accomplished in two ways, with or without dam removal. Either alternative would involve issuance of the initial license for the Dead River Project, and then termination of the license, with appropriate conditions. If the Commission were to deny the initial license, it would no longer have jurisdiction over the site, and could not require project retirement. The project retirement alternative, if ordered, could involve dam removal, or retaining the dam and only disabling or removing equipment used to generate power. Project works could remain in place and could be used for historic or other purposes. This alternative would require us to identify another government agency with authority to assume regulatory control and supervision of the remaining facilities. No agency has stepped forward, and no participant has advocated this alternative, although Keneenaw Bay Indian Community (KBIC) and MDNR have suggested a plan be prepared for the Dead River and Marquette Projects that evaluates partial and complete removal, including costs for these measures, and that this plan be developed 12 months after issuance of a license for the Dead River and Marquette Projects.

KBIC or MDNR have not established a good basis for the retirement study, and we have found no reason for recommending such a study. In its letter to the Commission dated July 15, 1999, UPPCO stated that any project retirement issue would be addressed through due process by UPPCO and the Commission. Without a planned project retirement schedule, any dedicated funding would unnecessarily increase the cost of electricity to the consumers. If during the term of a new license, project retirement is to be revisited, the Commission's procedures for surrendering a license would require UPPCO to address any licensee's responsibilities at that time.

Project retirement is not a reasonable alternative because the Dead River Project is viable, safe, and contributes to renewable, non-polluting energy sources in the project area. The potential loss of environmental enhancement measures from project retirement does not warrant the project benefits as operated. The project contributes to the local economy by providing local employment, taxes, recreational opportunities on project lands, erosion control and wildlife management measures on project lands.

**2. Marquette Project**

We do not consider federal takeover to be a reasonable alternative. Federal takeover and operation of the Marquette Project would require congressional approval. While that fact alone would not preclude further consideration of this alternative, there is currently no evidence showing that federal takeover should be recommended to Congress. No party has suggested that federal takeover would be appropriate, and no federal agency has expressed interest in operating the Marquette Project.

A non-power license is a temporary license the Commission would terminate whenever it determines that another governmental agency would assume regulatory authority and supervision over the lands and facilities covered by the non-power license. At this point, no agency has suggested a willingness or ability to do so. No party has sought a non-power license, and we have no basis for concluding that the Marquette Project should no longer be used to produce power. Thus, we do not consider a non-power license a realistic alternative to relicensing.

MDNR had requested that the applicant, 12 months after issuance of a new license, begin consulting with the MDNR on a plan for studying the costs of: (a) permanent non-power operation; (b) partial project removal; or ©) complete project removal of the Marquette Project. The MDNR requested that upon MDNR and Commission acceptance of the study findings, the applicant post a cash bond or establish a payment schedule for

meeting the cash bond requirements for the amount deemed necessary from the study. Further, MDNR stated that their request for the study should not be construed as creating any obligation on the part of the applicant to retire the project, or not to seek additional relicensing of the project.

MDNR has not established a good basis for the retirement study, and we have found no reason for recommending such a study. In its letter to the Commission dated November 20, 2000, MBLP states it has no plans to retire the project and objects to the concept of establishing a payment schedule or cash bond to pay for retirement. Without a planned project retirement schedule, the funding would unnecessarily increase the cost of electricity to the consumers. If during the term of a new license, project retirement is proposed by MBLP, the Commission's procedures for surrendering a license would require MBLP to address future project responsibilities. We do not, however, consider project retirement to be a reasonable alternative, and do not further discuss this alternative within this DEA. The potential loss of environmental enhancement measures from project retirement does not warrant the project benefits as operated. The project contributes to the local economy by providing local employment, taxes, recreational opportunities on project lands and erosion control and wildlife management measures on project lands.

## IV. CONSULTATION AND COMPLIANCE

### A. Consultation

The Commission's regulations contained in the Code of Federal Regulations (CFR) (18 CFR Section 4.38 and 16.8) require that applicants consult with appropriate resource agencies and other entities before filing an application for a license. This consultation is the first step in complying with the Fish and Wildlife Coordination Act, the Endangered Species Act (ESA), the National Historic Preservation Act (NHPA), and other federal statutes. Pre-filing consultation must be completed and documented according to the Commission's regulations, before the Commission can accept an application for a license.

#### 1. Scoping

Before preparing this DEA, we conducted scoping for each of the projects to determine what issues and alternatives should be addressed.

a. Dead River Project:

A scoping document (SD1) for the Dead River Project was distributed to interested agencies and others on October 9, 1996. Two scoping meetings were held on October 29 and 30, 1996, in Marquette, Michigan, to request oral comments on the project. A court reporter recorded all comments and statements made at the scoping meetings, and these are part of the Commission's public record for the project. In addition to comments provided at the scoping meetings, the following entities provided written comments on scoping:

| Commenting Entities | Date of Letter |
|---|---|
| U.S. Department of Interior (Interior) | November 25, 1996 |
| U.S. National Park Service (NPS) | November 22, 1996 |
| Michigan Department of Natural Resources(MDNR) | December 9, 1996 |
| Keweenaw Bay Indian Community (KBIC) | November 25, 1996 |
| Raymond Weglarz | November 30, 1996 |
| Dead River Campers, Inc. (DRCI) | November 18, 1996 |
| M.M. Parkkonen | December 2, 1996 |

Subsequent to the Dead River Project scoping meeting, the Commission decided to include the Marquette Project in an EA that would address both projects located on the Dead River. The scoping meeting for the Marquette Project (see (b) below) also requested scoping comments concerning cumulative effects for the Dead River Project.

b. Marquette Project:

An SD1 for the Marquette Project was distributed to interested agencies and others on May 24, 2000. Two scoping meetings were held on June 6, 2000 in Marquette, Michigan, to request oral comments on the project. A court reporter recorded all comments and statements made at the scoping meetings, and these are part of the Commission's public record for the project. In addition to comments provided at the scoping meetings, the following entities provided written scoping comments for the Marquette Project:

| Commenting Entities | Date of Letter |
|---|---|
| MDNR | June 29, 2000 |
| Carl Lindquist | June 30, 2000 |

Michigan Hydro Relicensing Coalition[3] (MHRC) . . . . . July 3, 2000

**2. Interventions**

a. Dead River Project:

On April 2, 1999, the Commission issued a notice that UPPCO had filed an application for an initial license for the Dead River Project. This notice set June 1, 1999, as the deadline for filing protests and motions to intervene. In response to the notice, the following entities filed motions to intervene:

| Interveners | Date of Letter |
|---|---|
| MDNR | May 27, 1999 |
| KBIC | June 1, 1999 |
| MHRC | June 1, 1999. |

We address intervener and other concerns in the environmental analysis section (section V.C.) of this DEA.

b. Marquette Project:

On January 19, 2000, the Commission issued a notice that MBLP had filed an application for a new license for the Marquette Project. This notice set March 20, 2000, as the deadline for filing protests and motions to intervene. In response to the notice, the following entities filed motions to intervene in the proceeding:

| Interveners | Date of Letter |
|---|---|
| MDNR | March 6, 2000 |
| Anglers of Ausable, Inc., et al. | March 15, 2000 |

[3] Michigan Hydro Relicensing Coalition consists of five member organizations: (1) the Anglers of the Ausable; (2) the Great Lakes Council, Inc.; (3) the Federation of Fly Fishers, Inc.; (4) the Michigan United Conservation Clubs; and (5) the Michigan Council of Trout Unlimited.

We address intervener and other concerns in the environmental analysis section (section V.C.) of this DEA.

### 3. Comments on the Applications

a. Dead River Project:

On April 2, 1999, the Commission issued a public notice indicating that the license application for the Dead River Project was Ready for Environmental Analysis (REA) and solicited comments, recommendations, terms and conditions and prescriptions. In response to the public notice, the following entities filed comments:

| Commenting Agencies and other Entities | Date of Letter |
|---|---|
| Interior | May 24, 1999 |
| MDNR | May 25 and 28, 1999 |

The applicant responded to these comments by letter dated July 15, 1999. In addition, subsequent to the notice of the REA, the staff decided to prepare one EA that included both the Dead River and Marquette Projects. In making their recommendations for the Dead River Project, the MDNR had requested that an Environmental Impact Statement be prepared for the Dead River Project that included the Marquette Project. By preparing this EA, that includes both projects, staff believes that the intent of the MDNR's recommendation has been satisfied.

b. Marquette Project:

On August 11, 2000, the Commission issued an REA notice for the project, and solicited comments, recommendations, terms and conditions and prescriptions. In response to the public notice, the following entities filed comments:

| Commenting Agencies and other Entities | Date of Letter |
|---|---|
| MDNR | September 27, 2000 |
| FWS | October 5, 2000 |
| National Wildlife Federation (NWF) | October 13, 2000 |

The applicant responded to all these comments by letter dated November 20, 2000.

## B. Compliance

### 1. Water Quality Certification

a. Dead River Project:

Under Section 401 (a)(1) of the Clean Water Act (CWA), license applicants must obtain either state certification that any discharge from a project would comply with applicable provisions of the CWA, or a waiver of certification by the appropriate state agency.

UPPCO applied to the MDEQ for WQC for the Dead River Project on five occasions in 1994, 1995, 1996, 1997, and 1998. MDEQ denied the certification in 1994 and 1995 without prejudice. UPPCO withdrew its 1996 application and refiled in 1997 only to withdraw again. UPPCO filed its last application for the WQC on February 25, 1998, which was received by MDEQ on February 27, 1998. MDEQ granted the WQC for the Dead River Project on February 24, 1999.

The WQC for the Dead River Project specifies that UPPCO meet all the terms and conditions relating to water quality, as well as MDEQ's standard conditions for monitoring and protection of water quality under state regulations implementing Section 401. As required by the CWA, the Commission would include all WQC conditions as part of any license issued. The conditions of the Section 401 WQC, as issued by MDEQ, are listed below.

**Silver Lake Development**

(1) UPPCO shall maintain the SLSB at all times above the minimum elevations shown in table 1. UPPCO shall strive to operate the existing facilities in such a manner so as to achieve the start of month target elevations listed in table 1. The rate of lowering shall not exceed 0.5 feet per day.

(2) UPPCO shall, within one construction season of the FERC license issuance, install a calibrated staff gage in the SLSB at a location clearly visible to the public, as determined in consultation with the MDEQ and the MDNR. The storage basin level shall be recorded at least weekly when access is not prevented by snow or ice cover on the access road. If snow or ice prevents access to the gage, then the storage basin level shall be recorded monthly.

An annual report of all recorded water levels and all gate opening changes shall be submitted to the MDNR.

Table 1. WQC-prescribed water levels for Silver Lake storage basin. (Source: MDEQ, 1999)

| Month | Start of Month Target Elevation (feet NGVD) | Minimum Elevation (feet NGVD) |
|---|---|---|
| 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 |
| November | 1,479.0 | 1,478.5 |
| December | 1,479.0 | 1,478.5 |
| January | 1,479.0 | 1,477.5 |
| February | 1,477.5 | 1,477.0 |
| March | 1,477.5 | 1,477.0 |

(3) UPPCO shall maintain the following minimum flows from the Silver Lake dam to the Dead River: January through March - 15 cfs; April - 25 cfs or inflow, whichever is less; May - 20 cfs; June - 15 cfs; July through September - 10 cfs; and October through December - 15 cfs.

(4) UPPCO shall not discharge a flow from the SLSB in excess of 150 cfs when such discharges are under their control except that a flow up to 200 cfs may be discharged if necessary to prevent loss of service to customers,

or if necessary to maintain target elevations during extreme wet weather conditions.

(5) Within 1 year of FERC license issuance, UPPCO shall provide a plan for approval by MDEQ to monitor flow of the Dead River downstream of Silver Lake dam. This plan shall contain a timetable for implementation of the monitoring within one full construction season after plan approval, annual submission of summary results to the MDNR, and a provision for submission of all data upon request.

(6) During adverse conditions (including, but not limited to, electrical emergencies, droughts, and floods) when the above requirements cannot be met, UPPCO shall, within one business day after identifying the non-compliant condition, consult with the District Supervisor of the MDEQ, Surface Water Quality Division (SWQD) and the MDNR regarding emergency actions taken or planned.

**Dead River (Hoist) Development**

(4) UPPCO shall maintain the DRSB at all times above the minimum elevations shown in table 2. UPPCO shall also strive to operate the existing facilities in such a manner as to achieve the start of month target elevations listed in table 2 to minimize erosion due to high water levels. If natural conditions cause the DRSB to exceed an elevation of 1,340.5 feet NGVD, UPPCO shall take all reasonable steps to lower the impoundment to the target elevation. The rate of lowering shall not exceed 0.5 feet per day.

(2) During adverse conditions (including, but not limited to, electrical emergencies, droughts, and floods) when the above requirements cannot be met, UPPCO shall, within one business day after identifying the non-compliant condition, consult with the MDEQ and MDNR regarding emergency actions taken or planned.

**McClure Development**

(1) UPPCO shall maintain the MSB between elevation 1194.8 and 1196.4 feet NGVD and any fluctuation in storage basin water level shall not exceed 1.0 feet on any day. This condition does not apply to instances beyond

UPPCO's control including periods of high flow or if higher storage basin elevations are temporarily needed to pass organic debris over the spillway, or to pass flushing flows, consistent with the relevant WQC conditions regarding the need to pass organic debris over the spillway or to provide flushing flows.

Table 2. WQC-prescribed water levels for the Dead River storage basin. (Source: MDEQ, 1999)

| Month | Start of Month Target Elevation (feet NGVD) | Minimum Elevation (feet NGVD) |
|---|---|---|
| April | 1,337.5 | 1,337.0 |
| May | 1,340.0 | 1,339.0 |
| June | 1,340.5 | 1,339.0 |
| July | 1,340.5 | 1,339.0 |
| August | 1,340.5 | 1,339.0 |
| September | 1,340.5 | 1,339.0 |
| October | 1,340.5 | 1,339.0 |
| November | 1,340.5 | 1,339.0 |
| December | 1,339.0 | 1,338.5 |
| January | 1,339.0 | 1,337.5 |
| February | 1,337.5 | 1,337.0 |
| March | 1,337.5 | 1,337.0 |

(2) UPPCO shall, within one construction season of FERC license issuance, install a calibrated staff gage in the MSB near the dam at a location clearly visible to the public as determined in consultation with the MDEQ and the MDNR. The storage basin level shall be recorded hourly and an annual report of daily summary data and all gate opening changes shall be provided promptly to the MDNR upon request.

(3) Within 1 year of FERC license issuance, UPPCO shall provide for MDEQ approval, a plan including an implementation schedule, to provide a minimum instream flow of 20 cfs to the bypassed natural river channel immediately downstream of McClure dam, using a deepwater draw. This flow shall be provided as soon as practical following license issuance but in no case shall the implementation date extend beyond two construction seasons following license issuance. The compliance point shall be immediately downstream from the McClure dam. Beginning 12 years after license issuance, the MDEQ may re-evaluate the 20-cfs minimum flow release for the bypassed channel and re-open the WQC to make appropriate modifications of this section on the basis of convincing scientific evidence.

(4) When sufficient flow is available, UPPCO shall maintain a continuous streamflow in the Dead River downstream of the McClure powerhouse tailrace channel that is not less than 80 cfs.

(5) Within 1 year of FERC license issuance, UPPCO shall submit a plan for approval by the MDEQ, in consultation with the MDNR, to provide periodic flushing flows to the bypassed river channel downstream of the McClure dam. The amount and duration of these flows shall be designed to prevent injurious sedimentation of the channel and to provide for the natural movement of woody debris.

(6) Within 1 year of FERC license issuance, UPPCO shall provide a plan for approval by the MDEQ, to monitor flow of the Dead River in the bypassed channel downstream of the McClure dam and in the Dead River downstream of the McClure powerhouse tailrace channel. This plan shall contain a timetable for implementation of the monitoring within one full construction season of plan approval, annual submission of summary results to the MDNR and a provision for the submission of all data upon request.

(7) During adverse conditions (including, but not limited to, electrical emergencies, droughts, and floods) when the above requirements cannot be met, UPPCO shall, within one business day after identifying the non-compliant condition, consult with MDEQ and MDNR regarding emergency actions taken or planned.

b. Marquette Project:

On February 25, 1999, MBLP applied to MDEQ for a WQC for the Marquette Project; the application was received by MDEQ on March 2, 1999. MDEQ granted a WQC for the Marquette Project on February 29, 2000.

The WQC for the Marquette Project specifies that MBLP meet all the terms and conditions relating to water quality, as well as MDEQ's standard conditions for monitoring and protection of water quality under state regulations implementing Section 401. As required by the CWA, the Commission would include all WQC conditions as part of any license issued. The conditions of the Section 401 WQC, as issued by MDEQ, require the following:

**Forestville Development**

(1) MBLP shall maintain the Forestville reservoir at 770.25 feet NGVD. Any fluctuation shall normally not exceed +/- 0.75 feet except during events beyond the control of the city (MBLP), including periods of high and low flow.

(2) When sufficient water is available, MBLP shall maintain the following minimum flows from No.2 powerhouse to the Dead River:

| | |
|---|---|
| October 1 - November 15 | 40 cfs |
| November 16 - March 15 | 80 cfs |
| March 16 - April 30 | 40 cfs |

The Forestville development shall not be operated in a manner which prevents the re-regulation of streamflow at the Tourist Park development.

(3) MBLP shall, within one construction season of FERC license issuance, install a calibrated staff gage in the Forestville reservoir at a location clearly visible to the public as determined in consultation with the MDEQ and the MDNR. The reservoir level shall be recorded at least hourly. An annual report of daily summary data and all turbine-setting changes shall be submitted to the MDNR.

(4) MBLP shall maintain a minimum flow of 20 cfs to the bypassed natural river channel immediately downstream of the Forestville dam. This flow shall be provided in accordance with deadlines established by the FERC,

but in no case later than 1 year after FERC license issuance. Flow less than this may be temporarily discharged during low flow and cold temperature conditions if necessary to maintain sufficient flow through the Forestville turbines to prevent ice damage, and provided that MBLP has consulted with the MDNR and upstream dam owners (UPPCO) to explore all other possible options. The compliance point shall be immediately downstream from the Forestville dam.

(5) MBLP shall, within 1 year of FERC license issuance, provide a plan for approval by the MDEQ, in consultation with the MDNR, to monitor flow of the Dead River downstream of the No. 2 powerhouse and in the bypassed natural river channel downstream from the Forestville dam. This plan shall contain a timetable for implementation of the monitoring within one full construction season after plan approval, annual submission of summary results to the MDNR, and a provision for submission of all data upon request.

(6) A 3-year test period shall be used to determine MBLP's ability to comply with the conditions listed above in (1), (2), and (4). The test period shall begin after the flow monitoring plan described above in (5) is implemented, and after operations at the (UPPCO Dead River Project No. 10855) upstream dams have been implemented in a manner consistent with their FERC license.

(7) During adverse conditions (including, but not limited to, electrical emergencies, droughts, and floods) when the above requirements cannot be met, MBLP shall, within one business day after identifying the non-compliant condition, consult with MDEQ and MDNR regarding emergency actions taken or planned.

**Tourist Park Development**

(1) The Tourist Park development shall be operated in a non-peaking mode at all times. MBLP shall, to the extent practical, continuously release from the No. 3 powerhouse, the average daily Tourist Park reservoir inflow.

(2) MBLP shall maintain the Tourist Park reservoir at 637.2 feet NGVD. Any fluctuation shall normally not exceed +/- 0.5 feet except during events beyond the control of MBLP including periods of high and low flow.

(3) MBLP shall, within one construction season of FERC license issuance, install a calibrated staff gage in the Tourist Park reservoir near the dam at a location clearly visible to the public as determined in consultation with the MDEQ and MDNR. The reservoir level shall be recorded hourly and an annual report of daily summary data and all turbine setting changes shall be submitted to the MDNR. All recorded data shall be provided promptly to the MDNR upon request.

(4) MBLP shall prevent the stranding of fish in the Tourist Park bypass channel by the continued use of established procedures.[4] These procedures shall be described in a plan to be submitted to the MDEQ within six months of license issuance. If fish stranding in the bypass channel occurs, MBLP shall consult with the MDEQ, in consultation with the MDNR, to develop other measures to prevent fish stranding in the bypassed channel.

(5) MBLP shall, within 1 year of FERC license issuance, provide a plan for approval by the MDEQ, in consultation with the MDNR, to monitor flow of the Dead River downstream of the confluence with the No. 3 powerhouse channel.

(6) A 3-year test period shall be used to determine MBLP's ability to comply with the conditions listed above in (1), (2), and (4). The test period shall begin after the flow monitoring plan described above in (5) is implemented, and after operations at the (UPPCO Dead River) upstream dams have been implemented in a manner consistent with their FERC license.

(7) During adverse conditions (including, but not limited to, electrical emergencies, droughts, and floods) when the above requirements cannot be met, MBLP shall, within one business day after identifying the non-

[4] These procedures have included searching the reach for stranded fish after a flow event, and capturing and returning any live fish to the river.

compliant condition, consult with the MDEQ and MDNR regarding emergency actions taken or planned.

In their response in April 2000 to the Commission's additional information request (AIR) No. 1 (MBLP, 2000a), MBLP accepted all conditions of the WQC and revised its project proposal accordingly.

### 2. Section 18 Fishway Prescriptions

Section 18 of the FPA states that the Commission shall require a licensee to construct, operate, and maintain such fishways as may be prescribed by the Secretary of the Interior or the Secretary of Commerce, as appropriate.

Interior, by letters dated May 24, 1999, and October 5, 2000, requested that its reservation of authority to prescribe fishways under Section 18 of the FPA be included in any licenses issued for the Dead River and Marquette Projects, respectively. Interior stated that any fishways would be for existing riverine fish species and/or any fish species to be managed, enhanced, protected, or restored to the basin during the term of the license.

The Commission recognizes that future fish passage needs and management objectives cannot always be determined at the time of project licensing. Under these circumstances, and upon receiving specific prescriptions from Interior, we recommend that the Commission follow its practice of reserving the Commission's authority to require such fishways as may be prescribed by the Secretary of the Interior.[5]

### 3. Section 10(j) Recommendations

Under Section 10(j) of the FPA, each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project. The Commission is required to include these

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[5] The Commission has specifically sanctioned the reservation of fishway prescription authority at relicensing. See Wisconsin Public Service Corporation, 62 FERC ¶ 61,095 (1993); affirmed, Wisconsin Public Service Corporation v. FERC, 32 F.3d 1165.

conditions unless it determines that they are inconsistent with the purposes and requirements of the FPA or other applicable law. Before rejecting or modifying an agency recommendation, the Commission is required to attempt to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

The MDNR and Interior included 10(j) recommendations for the Dead River Project in their letters dated May 25, 1999, and May 24 1999, and for the Marquette Project in their letters dated September 27, 2000, and October 5, 2000. The agency-recommended measures include reservoir water level restrictions, minimum flow requirements, fish protection devices, fish passage measures, water quality plans, removal of remnant No. 1 dam, nuisance plant control, bald eagle protection plans and consultation requirements. Tables 22 and 23 in section IX list each of the recommendations subject to 10(j), and whether the recommendations are recommended for adoption under the staff alternative. Recommendations that we consider outside the scope of Section 10(j) have been considered under Section 10(a) of the FPA. All recommendations are addressed in the specific resource section (section V) of this DEA.

### 4. Coastal Zone Management Act

a. Dead River Project:

UPPCO applied for a determination of consistency with provisions of the state Coastal Zone Management Program (CZMP) by letter dated November 28, 1997. In their letter dated January 21, 1998, the MDEQ stated that a determination on UPPCO's application to review consistency of the Dead River Project with the Michigan CZMP would be deferred until after a WQC was issued for the project. Subsequently, MDEQ issued a WQC for the project on February 24, 1999. On February 13, 2001, UPPCO again requested that the MDEQ review the consistency certification for the Dead River Project. On April 10, 2001, the MDEQ granted a consistency certification for the project on condition that the project operate in a manner consistent with the WQC.

b. Marquette Project:

MBLP applied for a determination of consistency with provisions of the state CZMP by letter dated October 28, 1998. By a letter dated March 21, 2000, the MDEQ, determined that the Marquette Project would be consistent with the Michigan Coastal

Zone Management Program upon compliance with WQC conditions issued for the project.

### 5. Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of such species. In a letter dated October 5, 2000, Interior states that no federally listed species of fish or wildlife are known to occur in the vicinity of the Marquette Project. Four federally listed species may occur in the Dead River Project area: peregrine falcon, Kirtland's warbler, gray wolf, and bald eagle. Interior, in a letter dated May 24, 1999, states that licensing the Dead River Project would not affect the peregrine falcon and the Kirtland's warbler. An analyses of project-related effects on the remaining 2 out of 4 threatened or endangered species are presented in section V.C.6, and our recommendations regarding threatened or endangered species are included in section VII, *Comprehensive Development*.

## V. ENVIRONMENTAL ANALYSIS

This section presents a general description of the Dead River Basin, lists existing hydropower projects in the basin, and summarizes the potential for cumulative effects on environmental resources from the licensing and relicensing of the Dead River and Marquette Projects. We begin our detailed assessment of the potential environmental effects by describing the affected environment. Then, we use that baseline to measure and compare the environmental effects of UPPCO and MBLP's proposed licensing actions, other alternatives, and our recommendations on the affected resources. We include only resources that would be affected, or about which comments have been made by interested parties, for detailed analysis in this DEA. Unless otherwise noted, the sources of information are the license applications (UPPCO, 1994; MBLP, 1999) or other supplemental filings made by the applicant.

### A. General Description of the Dead River Basin

The Dead River drainage flows through the north-central portion of Michigan's Upper Peninsula. The Upper Peninsula is bounded on the east and north by Lake Superior, Lake George, and the Province of Ontario, Canada; on the south by Lake

Huron, Lake Michigan, and the Straits of Mackinac; and on the south and west by the state of Wisconsin.

The Dead River, also referred to as the Big Dead River, is the largest tributary to Lake Superior in Marquette County. It 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 the quiet waters of the SLSB formed by the Silver Lake dam (Dead River Project). The river is impounded downstream at the Dead River (Hoist) dam (Dead River Project), McClure dam (Dead River Project), Forestville reservoir (Marquette Project), remnant No. 1 dam (Marquette Project), and Tourist Park reservoir (Marquette Project). The Dead River discharges into Lake Superior in the city of Marquette, about one mile downstream from the eastern boundary of the Marquette Project and about 34 miles from its headwaters.

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 over 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 (EF), respectively; while those for January are 5E and 25EF.

The Dead River watershed, measuring approximately 158 square miles, lies entirely within Marquette County, where it receives inflow from numerous tributaries, including Wildcat Canyon, Mulligan, Connor, Boise, Barnard, Clark, Reaney, and Brickyard creeks, and the little Dead River. The U.S. Geological Survey (USGS) gaging station (04043800), located below McClure dam, has daily flow records from 1990. Because of the short period of flow records, UPPCO has estimated natural flows using a simulation model and records of power plant operations. MBLP had used plant operation data for their project flow estimates. Based on these data, the average annual river flow at the SLSB and Tourist Park development is estimated at 36 cfs and 240 cfs respectively. Flows as low as 8 cfs have been estimated at the SLSB. Usually the months of April and May have the highest river flows as a result of snow melt. October and November also see high river flows from fall rains.

Approximately 20 of the 34 miles of mainstem river length is occupied by the five impoundments created by both projects. The large usable storages at the SLSB (13,800 acre feet) and DRSB (29,200 acre-feet), make it possible to regulate almost the entire natural stream flow in the river for power generation. The 5.4-mile reach between Silver Lake dam and Hoist dam and the 6.1-mile bypassed river channel between McClure dam and the McClure powerhouse confluence account for a majority of the riverine habitat. River water quality is generally considered good.

Most of the Dead River is classified as a trout stream with the lowermost river reaches below the Forestville Road bridge classified as a warmwater stream. The SLSB is managed by the MDNR as a coldwater fishery, DRSB as a warm water fishery, and MSB as a mixed fishery. Below McClure dam, the Dead River is managed as a warm water fishery. Brook trout, yellow perch, cisco, pumpkinseed, and white sucker are relatively abundant.

Vegetation in the project area of the Upper Peninsula is generally described as mixed northern hardwood and coniferous forest. Dominant species include sugar maple, yellow birch, and eastern hemlock, with balsam fir, white and black spruce, and black and green ash dominating more poorly drained areas. Lands adjacent to the Dead River and Marquette Projects are dominated by deciduous and mixed deciduous-coniferous forests. Approximately 88 percent of all land in Marquette County is forested.

The Dead River Basin with its undeveloped headwaters, water resources (including waterfalls), and developed project-related recreational facilities offer a variety of passive and active recreational opportunities.

The city of Marquette, located on Lake Superior near the mouth of the Dead River, is the largest municipality in the basin, with 22,000 residents. Northern Michigan University is located in Marquette. West of Marquette are the cities of Nagano and Ishpeming, with populations of 5,200 and 7,000, respectively. The population of these cities has declined in recent years because of the closure of many mines and the K.I. Sawyer Air Force Base.

### B. Scope of the Cumulative Effects Analysis

According to the Council on Environmental Quality's regulations for implementing NEPA (§1508.7), a cumulative effect is the impact on the environment that results from the incremental impact of the action when added to other past, present, and

reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities (e.g., removal and replacement of the bridge on County Road 510 that crosses the western end of the MSB).

Our review of UPPCO's and MBLP's license applications and agency and public comments indicated that historical project operations with large reservoir drawdowns and a lack of minimum flows in the Dead River reaches between the impoundments could affect stream water quality, fish habitat, and recreation (sports fishery) in the entire Dead River basin, in combination with other past, present, and future activities. We evaluate the cumulative effects of the proposed actions and alternatives on stream water quality, fish habitat, and recreation (sport fishery) with regard to other existing and foreseeable development on the Dead River upstream and downstream from the projects.

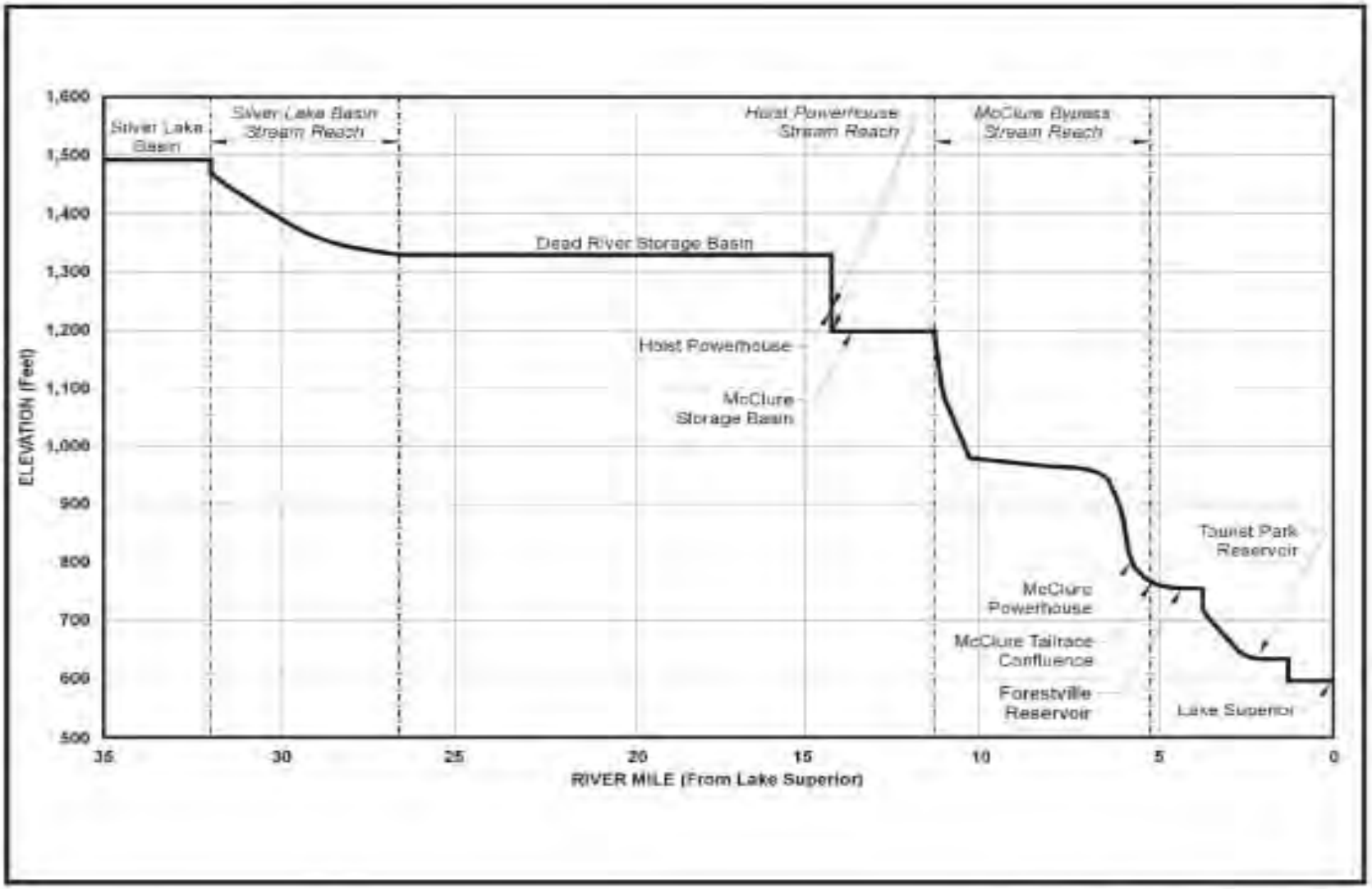
### 1. Geographic Scope

The geographic scope of the analysis defines the physical limits or boundaries of the proposed actions' effects on the resources. Because the proposed actions would affect the resources differently, the geographic scope for each resource may vary.

For water quality and quantity, fisheries, and recreational resources, the scope of our analysis encompasses the main stem of the Dead River from the upstream limit of the Dead River Project, located approximately at RM 34.0, downstream to its confluence with Lake Superior. We chose this geographic scope for these resources because the effects of project operations are limited to this area and, these resources are directly and indirectly affected by project operations. Table 3 lists the hydroelectric developments in the Dead River basin. Figure 2 shows a profile of the Dead River.

### 2. Temporal Scope

The temporal scope of our cumulative effects analysis includes a discussion of past, present, and future actions and their effects on each resource that could be cumulatively affected. Based on the license terms, the temporal scope looks 30 to 50 years into the future, concentrating on the effect on the resources from reasonably foreseeable future actions. The historical discussion is, by necessity, limited to the amount of available information for each resource. We identified the present resources based on the license applications, agency comments, and comprehensive plans.




(SOURCE: UPPCO, 1994 as modified by staff.)

Figure 2. Dead River profile.

Table 3. Hydroelectric developments on the Dead River. (Source: Staff)

| Project/ Development Name | FERC No. | Installed Capacity (kW) | Drainage Area (sq. mi.) | Surface Area (acres) | Approx RM at dam |
|---|---|---|---|---|---|
| Silver Lake | 10855 | 0 | 23.4 | 1,464 | 32 |
| Dead River | 10855 | 5,500 | 134.3 | 3,202 | 14.4 |
| McClure | 10855 | 10,000 | 137.2 | 96 | 11.3 |
| No. 2 (Forestville) | 2589 | 3,200 | 153.0 | 110 | 3.5 |
| No. 3 (Tourist Park) | 2589 | 700 | 158.0 | 100 | 1.0 |

### C. Proposed Action and Action Alternatives

In this section, we discuss the effects of the project alternatives on environmental resources. For each resource, we first describe the affected environment, which is the existing conditions and baseline against which we measure effects. We then discuss and analyze the specific environmental issues.

#### 1. Resources Not Analyzed in Detail

Only those resources that could be affected by the projects, and for which issues have been raised during scoping, are analyzed in detail in this section. We have eliminated aesthetic resources and socioeconomics from our detailed analysis for the following reasons:

Aesthetic Resources: The rich natural character of Marquette County is typical of the central Upper Peninsula. Marquette County is characterized by plains, low rolling hills, 1,800 inland lakes, 4,000 miles of streams, and more than 40 waterfalls. The diverse vegetation, landforms, and waterforms give the landscape high visual quality. From the rustic and somewhat pristine viewsheds near the SLSB, through a series of steep rock formations, plunge pools, and forested sideslopes near the McClure dam bypassed reach, to slow meandering riverine features near Tourist Park development, the river and the project structures offer a variety of visually pleasing experience.

Agencies and interested parties did not identify any significant issues with project operations that affect the aesthetics of the area. We have reviewed the proposed projects and the alternatives in relation to the aesthetic resources in the project area, particularly for the waterfalls in the bypassed reach of the Dead River above the McClure powerhouse, and have concluded that continued operation of the projects should not have any direct or indirect adverse environmental effects on these resources. In fact, the proposed reduction in reservoir level fluctuations and maintenance of stable and minimum flows in the river reaches below the dams should enhance aesthetic resources in the entire project area, particularly for the waterfalls in the bypassed reach of the Dead River above the McClure powerhouse.

Socioeconomics: UPPCO and MBLP are not major employers in Marquette County. The Dead River and Marquette Projects, however, contribute more than $1 million annually to the local economy through property taxes, O&M expenditures, and staff salaries. Existing project recreational facilities generate local expenditures from local and regional visitors. The Dead River Project is a small but important part of the UPPCO/WPSC system that supplies electrical energy to a sizable portion of Marquette County. The Marquette Project forms an important and lower-cost source of electrical energy for the city of Marquette. Proposed actions and alternatives for continued operation of the projects would not result in any substantial changes in the socioeconomic benefits to the community. No major construction activities or improvements are proposed; therefore, there would be minimal effects on employment, business, infrastructure, or tax revenues. The projects' continued use of water for electrical generation, with implementation of the proposed mitigative and environmental enhancement measures, would minimize any adverse effects on other water users of the river.

## 2. Geology and Soils

a. Affected Environment:

The Dead River and Marquette Projects lie in the Great Lakes Basin, a geologic feature of glacial origin covering much of the Michigan Upper Peninsula, and several surrounding states and provinces. Surficial geology in the project area includes large areas of Precambrian meta-igneous bedrock (schist and gneiss) and metamorphic bedrock (slate and chert). Other areas, particularly valley bottoms and wetlands, are dominated by Tertiary glacial/alluvial deposits (sands, gravels, and boulders). The topography and soils of the area have been derived from material deposited through continental glaciation.

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 land forms and bedrock types. Soils are relatively young, very complex, and intermingled. Drainage patterns are immature.

b. Environmental Effects and Recommendations:

The continued operations of the Dead River and Marquette Projects could affect the geology and soils of the project areas in several ways: Blasting, excavation, and construction of any new project structures and recreational facilities would disturb local geological features and soils. Soil disturbance could result from land use practices not associated with project operations (such as logging), with potential compaction, erosion, and sedimentation. Operation of the projects' reservoirs and riverine reaches could cause bank or shoreline erosion and sedimentation. Removal of the remnant dam no. 1 could cause short-term increases in sedimentation downstream from the dam.

**UPPCO and MBLP Proposals**

MBLP has proposed that the Commission include a license condition to remove the remnant No. 1 dam under an agreement between MBLP and the MDEQ. Both UPPCO and MBLP also propose to develop and implement a Shoreline and Bank Erosion Control Plans for their respective projects..

**Recommendations from Agencies and Interested Parties**

Agencies and interested parties did not identify any significant issues related to geology or soils resources, or make recommendations supplemental to those of the applicants. MDNR, Interior, NWF, and MHRC, however, concur with the MBLP recommendation to remove remnant No. 1 dam, primarily to improve fishery habitat (see section V.C.4). MDNR recommends that, within 36 months of license issuance, and in consultation with the resource agencies, UPPCO develop and implement a plan to inventory, control, and repair present and future shoreline erosion sites on the three reservoirs, and downstream of the dams and powerhouses in the zone influenced by the Dead River Project. MDNR and Interior recommend that MBLP develop and implement a plan to inventory, control, and repair present and future shoreline and bank erosion sites on Marquette Project lands; MDNR recommends the plan be developed within 36 months of license issuance.

*Our Analysis*

Construction of minimum flow maintenance facilities at McClure (Dead River Project) and Forestville (Marquette Project) developments would likely result in a minor temporary release of sediments to the river. The removal of the remnant No.1 dam would likely have minor, short-term adverse effects on river water quality, associated with erosion and siltation from demolition/removal activities, and the release of sediment currently deposited upstream of the dam in the small pond formed behind the partially breached dam. Staff based its finding on the fact that there is a small amount of sediment (about 1,500 cubic yards) and the likelihood these sandy sediments would pass quickly through the system. MBLP, however, has agreed to develop and implement erosion and sediment control plans in accordance with MDEQ requirements for all project construction activities, which would minimize any adverse effects on downstream water quality.

Both projects would reduce reservoir level fluctuations and increase bypassed reach minimum flows. The former should reduce whatever shoreline erosion is occurring as a result of current fluctuations in reservoir water levels. The proposed increases in minimum flows to bypassed reaches that historically received only leakage flows, would enhance aquatic habitat and would not be high enough to induce movement of currently stable bed materials. Temporary disturbance and downstream displacement of fines could be expected as flows are initiated, with stabilization within a very short period of time.

The Shoreline and Bank Erosion Control Plans proposed for development and implementation by both applicants, should address shoreline erosion issues, by: 1) identifying shorelines susceptible to erosion either due to slope, soil type and composition, or exposure to wind and/or wave action; 2) identifying shoreline and bank areas needing erosion control or protection measures; 3) identification and implementation of applicable control or protection measures; and 4) providing for follow-up inventories every 5 years.

Both UPPCO and MBLP propose at least some of the recreational enhancements recommended by the MDNR (see section V.C.8). The recommended recreational improvements generally include: construction, operation and maintenance of combinations of reservoir shoreline access (for fishing, birdwatching and viewing) with associated parking, sanitary facilities, hardened pathways, signage, fishing piers and/or boat launch facilities. Some minor and short duration localized erosion and sedimentation could occur with any clearing and grading associated with construction of

any facilities of this type. We would anticipate that the Shoreline and Bank Erosion Control Plans would be suitable for application to such construction activities by including provisions for: the avoidance of steep slopes; the minimization of soil disturbance; stabilization of exposed soils with mulch (using local materials where possible); and minimization of vegetation removal. The implementation of standard best management practices can also limit the potential for soil erosion and water quality degradation. For construction of any future recreational facilities not anticipated at the time of licensing, we recommend that the final design for each facility include site-specific erosion and sedimentation control measures where ground-disturbing activities are proposed.

Therefore, we recommend the preparation and implementation of Shoreline and Bank Erosion Control Plans at both the Dead River and Marquette Projects. For any new facilities, we recommend that, prior to commencement of any land-disturbing activities, the licensees file with the Commission, for approval, site-specific Erosion and Sediment Control Plans (ESCP) prepared in consultation with MDEQ, FWS, and the U.S. Army Corps of Engineers (Corps). This ESC should provide details of the soil erosion and sedimentation controls, and silt protection measures that would be implemented. Also, any site-specific ESC should address the need for contaminant screening of sediments prior to any removal and disposal.

c. Unavoidable Adverse Effects:

Construction of proposed recreational enhancements may result in minor, short-term increases in erosion and sedimentation.

Construction of minimum flow maintenance facilities at McClure (Dead River Project) and Forestville (Marquette) developments would likely result in minor temporary release of sediments. Removal of the remnant No. 1 dam would likely have minor, short-term adverse effects on river water quality because of siltation caused by removal activities and the release of any sediment currently deposited above the dam. Implementation of Shoreline and Bank Erosion Control Plans and ESCP's, in accordance with MDEQ requirements for all project construction activities, however, would minimize any adverse effects.

### 3. Water Resources

a. Affected Environment:

The annual hydrograph of the Dead River 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.

Historical water quantity (flow) records for the Dead River are minimal. The only stream gaging station USGS gaging station 04043800 located on the Dead River is in the McClure tailrace, and it has only been in operation since April 1990. Average annual flow for the period 1991-99 recorded at the gage is 173 cfs. Flows in March through June average 240 cfs. Average inflows in August and September drop to about 100 cfs. The lowest recorded monthly flow at the gage was 36 cfs in August 1991. During July and August of 1997, flows lower than 36 cfs were recorded, but these flows were the result of water being stored in the SLSB and DRSB to accommodate repair of a penstock rupture at the Hoist powerhouse.[6] There are a few months of USGS data from the early 1900's and 12 years of mean monthly discharge values from the previous project owner; however, no reliable long-term data are available to examine the historical occurrence of low flow sequences and floods in the Dead River.

The Dead River is not used as a potable water source. In the freshwater estuary downstream of the Tourist Park development, the Dead River provides cooling water for operations at the Presque Isle coal-fired power plant operated by the Electric Power

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[6] On June 30, 1997, the No. 3 steel penstock above the Hoist powerhouse ruptured and released flows of about 3,000 cfs downstream of the penstock. About 20 trees lining the tailrace were removed with the penstock failure and were carried with other sand, rocks, and debris into the Dead River. On July 1, 1997, restoration work was initiated to remove sediment from the stream channel and to restore the impacted area in consultation with the MDNR and Trout Unlimited. The penstock was repaired by February 1998 and the stream restoration efforts were successful.
On or about October 22, 1990, there was a failure of a clay tile drainage pipe below the toe of the main earthen dike of the Hoist dam. This failure caused the washout of an old logging road and the release of about 4,000 cubic yards of granular fill into the Dead River above where the tailrace meets the original Dead River channel. No storage of the upstream development was necessary during this failure and measures were taken by UPPCO to remove all sediments from the Dead River and restore the river to its natural state.

Company. There are no other significant consumptive uses of project waters or discharge of wastewater into the project watershed.

The water quality of the Dead River, its impoundments and tributaries, is a reflection of the mineral and organic composition of the soils and geologic materials in the watershed. The watershed soils are derived from moraine materials covered by glacial outwash. Therefore, they tend to be sandy and have relatively high organic matter and 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. Because of these soil and geologic factors, the waters of the Dead River exhibit low hardness (from 11.7 to 36.6 milligrams per liter [mg/L] of calcium carbonate), a slightly acidic to near neutral pH (from 6.3 to 7.7), and a slightly organic, tea-colored stain. The mining, metal refining activities, and naturally occurring deposits of mercury bearing ores and copper in the region also led to the presence of elevated levels of heavy metals and mercury in sediment samples collected from various sites on the Dead River in May 1992, but the MDNR considers them to be consistent with background levels for the region.

**Dead River Project**

Water Use and Quantity

Because of limited historical streamflow records available at the time of its application, UPPCO modeled the river hydrology to estimate inflows to its impoundments based on the 10-year period from 1983 to 1992. Estimated flow data are summarized in table 4. The staff analyzed the USGS gage data for the period April 1990 to September 2000 and calculated the average flow during the period to be 173 cfs, excluding leakage from McClure dam and penstock, as well as the tributary inflows in the McClure bypassed reach. This average flow compares well with the UPPCO model average discharge of 183 cfs from the MSB, suggesting that the model streamflow data, though only for short duration, is reasonable for our current analysis. The large usable storage at the SLSB and DRSB provides UPPCO the capability to regulate natural inflow to meet electrical needs. Table 4 provides an indication of the re-regulation potential of the project's impoundments.

Table 4. Estimated flows and reservoir parameters for Silver Lake, Dead River, and McClure storage basins (from data from April 1990 to September 2000). (Source: UPPCO, 1994, as modified by Staff)

| Parameter | Silver Lake storage basin | Dead River storage basin | McClure storage basin |
|---|---|---|---|
| Mean daily inflow (cfs) | 36 | 203 | 207 |
| Mean daily outflow (cfs) | 36 | 202 | 183[a] |
| Minimum daily inflow (cfs) | 8 | 46 | 101 |
| Minimum daily outflow (cfs) | 8 | 100 | 67 |
| Maximum daily inflow (cfs) | 587 | 2,795 | 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 |

[a] Because of dam leakage and penstock losses

*Silver Lake Development*

The SLSB is a natural water body that has been enhanced by the construction of the Silver Lake dam near the natural outlet from the lake. The reservoir is located about 32.1 miles upstream from the mouth of the Dead River at Marquette, Michigan. It has three tributaries emptying into it: Coles Creek; Wildcat Creek; and Voelkers Creek. The minimum inflow to the SLSB is estimated by UPPCO to be 8 cfs. There are no bypassed reaches or generating facilities associated with the Silver Lake development.

The SLSB serves as the storage basin for water released for power production at the downstream Dead River (Hoist) and McClure developments that comprise the Dead River Project. To support an historical (1916-1988) peaking mode of project operation, water was released from the SLSB throughout the year until the reservoir was drawn

down about 18 feet, on average, by late winter. Since 1988, UPPCO has reduced the average late winter drawdown to approximately 8.5 feet. Daily reservoir water level fluctuations caused by project operation, were historically, about 1 inch. Since 1988, these daily reservoir fluctuations have averaged about 0.6 inches. Typical low-level outlet releases from SLSB in the summer average 15 to 20 cfs and in the winter, average 80 to 90 cfs. Historically, discharges from the SLSB were occasionally curtailed to conserve water. During these occasions, flows in the 5.4-mile-long reach of the Dead River between the Silver Lake dam and the DRSB were reduced to leakage from the dam, natural runoff and groundwater sources, and discharges from an unnamed tributary, Conners Creek, and Mulligan Creek.

*Hoist Development*

The DRSB is a narrow, steep-sided, flat-bottomed impoundment formed by the Hoist dam. The reservoir is located about 14.4 miles upstream from the mouth of the river. It has an average depth of 15 feet and a maximum depth of 59 feet near the dam. The reservoir is about 12.3 miles long with a surface area of about 2,202 acres, and provides a storage capacity of about 46,998 acre-feet. Three main tributaries enter the reservoir, Clark Creek, Barnhardt Creek, and the Little Dead River. Seasonally, the DRSB is gradually drawn down for power generation, with the lowest level achieved in late winter. Over the period from 1916 to 1988, the DRSB was drawn down an average of 12 feet, but since 1988, the late winter drawdown has averaged 7 feet. Daily reservoir level fluctuations caused by project operation historically were approximately one inch. Since 1988, the daily reservoir fluctuations have averaged 0.8 inch.

A minimum flow of approximately 100 cfs is needed to operate one turbine at the Hoist powerhouse at the lowest setting. Although the maximum hydraulic capacity of the turbines at the Hoist powerhouse is approximately 410 cfs, the maximum releases are limited to 327 cfs to avoid spilling in the downstream McClure development. The Hoist powerhouse is routinely shut down during periods of low electrical demand and during periods of low availability of water, with no flow released to the 0.4-mile-long river reach between the tailrace and the backwaters of the MSB. There are no minimum flows released into the 1,000-foot-long bypassed reach of the Dead River at the Hoist development.

*McClure Development*

The MSB is a small, moderately deep impoundment that has an average depth of about 20 feet and maximum depth of about 53 feet near the dam. The reservoir is located approximately 11.3 miles upstream from the mouth of the Dead River. The MSB is about 1.5 miles long and has a surface area of about 96 acres and a maximum storage capacity of approximately 1,870 acre-feet. The MSB receives water from the DRSB, and inflows from natural runoff and groundwater sources; there are no tributary inflows. Water levels typically fluctuate less than one foot. Daily reservoir level fluctuations caused by project operation historically have averaged about 1.2 inches.

A minimum flow of approximately 72 cfs is needed to operate one turbine at the McClure powerhouse. The maximum hydraulic capacity of the McClure powerhouse is estimated at 310 cfs.

The McClure powerhouse operates in tandem with water releases from Hoist. The McClure powerhouse also routinely shuts down during periods of low electrical demand and during periods of low water availability. There are no minimum flows released below the powerhouse or into the 6.1-mile-long reach of the Dead River bypassed by the project's penstock. However, some water (approximately 1 cfs) enters the bypassed reach from seepage from the McClure dam, from natural runoff and groundwater sources, leakage from the penstock (approximately 1 to 2 cfs), and from flows from unnamed creeks, Peters, Midway, and Brickyard Creeks. Combined average annual flow from all these sources is estimated at 17 cfs.

Water Quality

Waters in the Dead River watershed, including the SLSB, the DRSB, and the MSB 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 the SLSB to the Forestville Road bridge, located downstream from the McClure powerhouse tailrace (MDNR, 1990). This stream reach includes the entire Dead River Project area. However, we note that 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 the MDNR's classification of the stream reach as a coldwater trout stream

Permitted monthly average maximum temperatures, in degrees Fahrenheit (EF) for coldwater fisheries in the designated portions of the Dead River as indicated in the WQC issued for the Dead River Project are:

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

Permitted monthly average maximum temperatures (EF) for warmwater fisheries in the designated portions of the Dead River as indicated in the WQC issued for the Marquette Project are:

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 38 | 38 | 41 | 56 | 70 | 80 | 83 | 81 | 74 | 64 | 49 | 39 |

The state standards specify levels of dissolved oxygen (DO) not less than 7 mg/L and 5 mg/L for coldwater and warmwater fisheries, respectively.

Water Quality Data

*Temperature and Dissolved Oxygen*

**Silver Lake Storage Basin and Stream Reaches Above the Reservoir and Below the Dam:** The SLSB is a cold, well-oxygenated, oligotrophic reservoir. Between October 1991, and October 1992, UPPCO collected water quality data from sites in the Dead River upstream from the SLSB, in the deep waters of the reservoir near the outlet structure, and from a site below the SLSB outflow. Continuous water temperature and DO levels were collected from sampling stations in the Dead River above and below the SLSB. Temperatures and DO for the SLSB generally met the state water quality standards for a coldwater fishery.

Temperature and DO levels measured in the Dead River upstream from the SLSB between May 1992 and October 1992 showed that these parameters were affected by warm summer air temperatures on several occasions. There were 12 incidents during the 5-month sampling period when temperatures exceeded the coldwater fishery standards for periods ranging from 2 to 12 hours. DO concentrations ranged from a high of 11.5 mg/L

to a low of 6.3 mg/L (i.e., below the state water quality standard for coldwater fishery), which occurred during portions of three days in July, 1992.

SLSB exhibits a modest temperature gradient in the top 20 feet during the period May through July. Measured temperature profiles at the SLSB indicate that in July water temperature varies from approximately 66EF (19 degrees Celsius [EC]) at the surface to about 58 EF (14EC) at 20 feet below the surface. The reservoir becomes nearly isothermal during the latter part of October. DO levels ranged from 7 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).

Water temperatures collected from the stream site below the SLSB slightly exceeded (by 0.5EF or 0.2EC) the state water quality standards for a coldwater trout stream on nine occasions during the five-month continuous sampling period; these violations were of short duration with the exception of September 1992 when temperatures exceeded the state standards for 52 hours. DO levels in the stream sampling site below the SLSB were generally good, ranging from 10.8 mg/L to 5.1 mg/L. However, there were a total of 38 days during the months of June, July, August, and September in 1992 when DO levels fell below the state standards. Some of the deviations in DO readings, however, appear to have been the result of instrument/equipment failure.

**Dead River Storage Basin and Stream Sites Above and Below the Reservoir and Powerhouse:** Water temperature and DO data were collected by UPPCO from sites in, above, and below the DRSB for the same time frames as for the SLSB and stream sites. Temperature data for the reservoir ranged from 31EF (-1EC) in January to 62.6EF (17EC) in July, meeting the state water quality standards for a coldwater fishery, although, for biological reasons (see section V.C.4), the reservoir is managed as a coldwater fishery. Most DO readings were above 7 mg/L (meeting state water quality standards for a coldwater fishery), with levels falling below 5 mg/L (the state water quality standard for a warmwater fishery) in the deeper portions of the hypolimnion (below 38 feet [11.5 meters] from the surface) in July. However, since most of the reservoir averages 15 feet in depth, those areas experiencing DO levels below 5 mg/L account for less than three percent of the total volume of the reservoir at normal elevation. Increased biological activity (respiration) most likely contributes to the reduction in oxygen concentration during the summer months in the reservoir.

DRSB exhibits a modest temperature gradient in the top 35 feet during the period May through July. Measured temperature profiles at the DRSB indicate that in July water

temperature varies from approximately 63EF (17EC) at the surface to about 56EF (13EC) at 35 feet below the surface. The temperature at the bottom of the reservoir (60 feet) drops to about 43EF (6EC). The reservoir becomes nearly isothermal during the latter part of October.

Water temperature in the river reach upstream from the DRSB ranged from a high of 71EF (21.5EC) in August to a low of 37EF (2.5EC) in October. Water temperatures exceeded the state water quality standards for a coldwater stream on nine occasions during the 5-month continuous sampling period. Most of these exceedances included water temperatures less than two degrees above the standard, and lasted from one to eleven hours.

The DO levels reported for the stream reach above the DRSB were mostly high, with daily averages well above the state water quality standard of 7 mg/L for a coldwater stream. DO levels ranged from a high of 12.1 mg/L in September to a low of 6.5 mg/L in August. DO levels fell below the 7 mg/L standard for portions of six days in June and August 1992.

Water temperatures in the tailrace below the Hoist powerhouse ranged from a high of 73EF (22.6EC) in September to a low of 35EF (1.4EC) in April. Periods when the water temperatures were higher than the state water quality standard for coldwater streams were often associated with powerhouse shutdowns, when flows in the tailrace dropped to near zero. The UPPCO generation records indicated that the Hoist powerhouse was shut down on eleven occasions during the August to October 1992 sampling period. With the exception of the project shutdowns, there were six other instances during the ten-month continuous sampling period when the water temperatures were higher than the state water quality standards for a coldwater stream. These instances were for short duration ranging from six to fifteen hours.

DO concentrations ranged from a high of 12.7 mg/L in September to a low of 6.1 mg/L in July. Numerous DO measurements from below the Hoist powerhouse appear questionable because of periodic shutdowns of the powerhouse. However, the average daily concentration of DO was well above the state standard for a coldwater stream when the project was operating.

**McClure Storage Basin and Sampling Site Below McClure Powerhouse:** The MSB exhibits a steep temperature gradient in the top 25 feet during the period May through July. Measured temperature profiles at the MSB indicate that in July water

temperature varies from approximately 63EF (17EC) at the surface to about 46EF (8EC) at 25 feet below the surface. The temperature at the bottom of the reservoir (50 feet from surface) drops to about 39EF (4EC). The reservoir becomes nearly isothermal during the latter part of October. DO levels reported for the MSB were typically above 7 mg/L. However, the formation of a thermocline in the summer shows strong stratification of DO as well. In the summer, the top 5 feet (1.5 meters) of the water column had DO readings above 7 mg/L, while all the epilimnion waters shallower than seven meters had readings above 5 mg/L. Waters in the hypolimnion were generally above 5 mg/L, with readings of less than 5 mg/L in the thermocline (at depths of 23 to 26 feet or 7 to 8 meters). The DO regimes at the MSB are adequate to maintain a mixed fishery.

UPPCO collected hourly readings of temperature and DO in the McClure tailrace during December 1991 through October 1992. The data showed great variability and unreliability because of project shutdowns, tampering, and vandalism of the monitoring equipment during late July and early August of 1992. Excluding these records, water temperatures ranged from a high of 72EF (22.4E) in August to a low of 35EF (1.7EC) in March. There were 19 occasions during the ten-month continuous sampling period when water temperatures were higher than the state water quality standards for a coldwater stream. The durations of these exceedances were relatively short, lasting between 2 and 17 hours. DO levels mostly ranged between 5 and 12 mg/L in the tailrace when the powerhouse was operating.

*Other Water Quality Parameters*

Quarterly water quality samples showed low concentrations of total dissolved solids (TDS) at all sampling stations. All TDS levels were well below the maximum concentration of 500 mg/L stipulated by MDNR for inland streams and impoundments. Dissolved chloride levels did not exceed concentrations that would threaten any designated water uses. The pH values in the Dead River system varied from 6.3 to 7.7, with most recorded values in the 6.5 to 7.3 range. The state standard for pH ranges from 6.5 to 9.0. Occasional acidic readings recorded below 6.5 probably result from runoff from surficial geology that includes large areas of Precambrian schist and gneiss. These barren soils leave the watershed susceptible for occasional acidic peaks because of the lack of buffering capacity in the watershed.

Heavy metals were detected in the water samples, but the occurrences of heavy metals were within background levels for waters in the Upper Peninsula. Fecal coliform counts at all sampling stations during each sampling event were below the state standard

of 200 counts per 100 milliliters (ml). No taste and odor producing substances that impair or could impair their use as public, industrial, agricultural, or recreational sources were found in the waters.

The Dead River is located in an area of Michigan's Upper Peninsula that has a history of mining, metal refining activities, and naturally occurring deposits of mercury-bearing ores (cinnabar) and copper. Fish are subject to contamination from these sources.

In response to public health concerns, the MDNR has maintained a fish contaminant monitoring program to quantitatively assess the degree of chemical contamination in fish from various waters throughout the state since 1984. The monitoring results have been used by the Michigan Department of Public Health (MDPH) since 1988 to issue fish consumption advisories for all inland lakes in the state.

In 1992, the applicant conducted a fish contaminant study to determine existing levels of heavy metals in resident fish populations collected from the SLSB, DRSB, and MSB. The fish contaminant study showed that all piscivorus fish species had detectable levels of mercury, copper, and zinc. Some fish tissues also showed lead contamination and one large fish had detectable levels of cadmium. No individuals of non-piscivorus fish species collected from any of the three Dead River reservoirs exceeded the action level of 0.5 milligrams per kilogram (mg/kg) of mercury. However, both individual and mean concentrations of mercury in piscivorus fish tissues frequently met or exceeded the threshold for mercury levels (for large fish such as splake, northern pike, and smallmouth bass). The MDPH has not issued a specific fish health advisory for Dead River fish species.

**Marquette Project**

Water Use and Quantity

Inflows to the Marquette Project (comprising Forestville and Tourist Park developments) are controlled by outflows from UPPCO's McClure powerhouse. Natural flows from tributaries below the McClure dam and leakage from the McClure dam and penstock account for approximately a 17-cfs flow (less than six percent of the flow from McClure powerhouse).

Because of a lack of long-term historical streamflow data, MBLP has developed monthly and annual inflow-duration values for the Marquette Project based on hourly

power plant operation records. As there is only a small additional drainage area between No. 2 dam and No. 3 dam, inflow-duration values at the two dams are assumed to be the same. Using MBLP's flow duration data, the staff estimates the average annual inflow to the Forestville reservoir at approximately 180 cfs. This compares well with the USGS gage data for the period 1991-1999 and UPPCO's modeling data, and hence, is considered acceptable for use in our analysis.

*No. 2 (Forestville) Development*

The Forestville reservoir is a small, moderately deep impoundment with an average depth of about 20 feet and maximum depth of about 60 feet near the dam. The reservoir is located approximately 2.5 miles upstream from the river mouth. The Forestville reservoir is about one mile long with a surface area of about 110 acres and a maximum storage capacity of approximately 2,900 acre-feet. MBLP historically operated the Forestville reservoir between elevations 767.98 and 769.98 feet NGVD. Because of the small live storage available for re-regulating flows from the upstream project, daily water level fluctuations in the reservoir have been as high as 2 feet.

A minimum flow of approximately 40 cfs is needed to operate each of the two turbines at the No. 2 powerhouse. In order to keep the single penstock feeding the two turbines from freezing in cold weather, a minimum of 80 cfs is required to keep the plant running. The maximum hydraulic capacity of the Forestville powerhouse is estimated at 440 cfs.

The remnant No.1 dam is located in the Forestville bypassed reach approximately 0.7 miles downstream from No.2 dam at the head of a natural falls. The dam has a man-made breach, approximately 15 feet wide to the depth of the natural falls. Water behind the remnant dam creates a small impoundment with a maximum depth of 5 feet. Original rock substrates are overlain by detritus, mud, silt, and sand. No significant sport fisheries exist in the ponded reach, although it is reportedly used by brook trout from the unnamed tributary that empties into it. Historically, no minimum flow has been released into this bypassed reach. Bancroft Creek joins the Dead River below remnant No.1 dam.

No. 2 powerhouse discharges into the Dead River approximately one-half mile above the Tourist Park reservoir. About 600 feet of this tailrace reach provides riverine habitat. When operation of the Forestville powerhouse is curtailed, this reach receives about 13 cfs from powerhouse leakage.

*No. 3 (Tourist Park) Development*

The Tourist Park reservoir is smaller than the Forestville reservoir. It is about one mile long and has a surface area of about 100 acres, a maximum storage capacity of approximately 875 acre-feet, with an average depth of about 15 feet and maximum depth of about 20 feet near the dam. The reservoir is approximately 1 mile upstream from the mouth of the river. MBLP has operated the reservoir to re-regulate inflows. Historically, MBLP has restricted the water level fluctuations in the reservoir to about two feet between elevations 636.86 and 638.86 feet NGVD. Because of the small live storage available for re-regulating flows from the upstream project, daily water level fluctuations in the lake could be as high as two feet.

A minimum flow of approximately 60 cfs is needed to operate the turbine at the No. 3 powerhouse. The maximum hydraulic capacity of the turbine is estimated at 320 cfs.

Approximately 600 feet of the Dead River is bypassed by the Tourist Park development. Historically, no minimum flow has been released in this bypassed reach. No.3 powerhouse discharges to the Dead River, which joins Lake Superior approximately one mile downstream.

Water Quality

The 1997 fishery survey conducted by MBLP indicated that the Forestville reservoir supports a mixed warmwater and coldwater fishery, while the Tourist Park reservoir supports a warmwater fishery. Michigan classifies the Dead River under warmwater fishery standards for water quality for the Forestville and Tourist Park reservoirs, the Dead River reach between the two reservoirs including the bypassed reaches, and the river reach downstream of Tourist Park reservoir to its confluence with Lake Superior.

Water Quality Data

In 1991-1992, UPPCO collected water quality data below the McClure powerhouse, which is located less than one-half mile upstream from the Forestville reservoir and which forms the primary water source for the Marquette Project. As discussed in section V.C.2.1, water entering the Forestville reservoir generally met the state water quality standards for designated uses. MBLP collected DO and lake

temperature profile data in the Forestville reservoir in 1990 and 1991. In 1998, MBLP conducted a survey at Forestville and Tourist Park reservoirs and the intervening river reach to collect DO, water temperature profiles, water chemistry, river sediment and fish contaminant data. The data indicated that this reach of the Dead River exhibits good chemical and biological quality and meets or exceeds state standards for designated uses.

*Temperature and Dissolved Oxygen*

From mid-April through mid-October, 1998, MBLP conducted continuous monitoring of DO and water temperature in the Forestville and Tourist Park reservoirs and in the Dead River below No. 2 powerhouse. Results of the study indicate that temperatures and DO concentrations were, with some exceptions, generally within the state standards for designated uses. However, instruments reportedly malfunctioned for over 11 percent of the time while recording temperature and DO. In addition, over 12 percent of recorded data indicated DO levels between 4 and 5 mg/L and another 12 percent recorded DO well above its saturation level (>15 mg/L), suggesting poor calibration of instruments. The staff took these factors into consideration in our review of the raw data collected, and estimated the monthly temperatures and range of DO concentrations (table 5), by review of other comparative data included in the license application.

Forestville reservoir exhibits a temperature gradient in the top 25 feet during the period May through August. The steepest temperature gradient of about 20EF over 25 feet occurs in July. The reservoir became nearly isothermal during the latter part of September. Tourist Park reservoir exhibits a temperature gradient in the top 12 feet. The steepest gradient of 16EF (9EC) over 12 feet, occurs in late June. The reservoir became isothermal during October.

Table 5. Marquette Project monthly average temperature and dissolved oxygen data for April 1998 to October 1998. (Source: MBLP, 1999, modified by staff)

| | Forestville reservoir | | No. 2 powerhouse tailrace | | Tourist Park reservoir | |
|---|---|---|---|---|---|---|
| Month | Temp. EF | DO mg/L | Temp. EF | DO mg/L | Temp. EF | DO mg/L |
| April | 48 | 10 | 45 | 6.5-12 | 45 | >8.5 |
| May | 56 | n/a | 57 | 5-10 | 58 | 5-10.5 |

| | Forestville reservoir | | No. 2 powerhouse tailrace | | Tourist Park reservoir | |
|---|---|---|---|---|---|---|
| Month | Temp. EF | DO mg/L | Temp. EF | DO mg/L | Temp. EF | DO mg/L |
| June | 61 | 8-11 | 62 | 5-10 | 64 | 5-10 |
| July | 68 | 5-8 | 70 | 4.5-9 | 72 | n/a |
| August | 69 | 4.5-10 | 70 | 4-9 | 71 | 5-11 |
| September | 64 | 4-10 | 65 | 7-10 | 65 | n/a |
| October | 57 | 7-9 | 56 | 7.5-11 | 55 | 5-8 |

n/a - Comparative data not available.

*Other Water Quality Parameters*

All sample stations in the 1998 survey recorded low TDS. All TDS levels were well below the maximum concentration of 500 mg/L stipulated by MDNR for inland streams and impoundments. Dissolved chloride levels were below concentrations that could threaten designated water uses. The pH in this section of the Dead River system varied from 6.8 to 7.5. Heavy metals, including cadmium, chromium, nickel, and zinc were detected in some water samples in concentrations below the Environmental Protection Agency's (EPA) chronic exposure levels. Silver, arsenic, copper, mercury, and lead were not detected in samples. Sediment samples taken at the two reservoirs showed no evidence of silver, mercury, or polychlorinated biphenyls (PCBs). These sediments, however, contained arsenic, cadmium, copper, chromium, lead, and zinc in concentrations below EPA standards for the designated water use. MBLP conducted contaminant analysis of typical fish caught in project reservoirs. Results indicated that total mercury concentration in fish analyzed were well below the one part per million threshold established by the U.S. Food and Drug Administration. The MDPH has not issued any specific fish advisories for fish caught in the Dead River.

b. Environmental Effects and Recommendations:

**Dead River Project**

During scoping, resource agencies and other interested parties identified minimum flow requirements, lake level management, and the effect of project operation on water

quality as important issues to be addressed in the environmental analysis. The agencies and interested parties provided a number of recommendations for reservoir levels and minimum flows at various river locations. Table 6 summarizes the minimum flow recommendations made by various entities.

Project Operation and Minimum Flows

*UPPCO Proposal*

UPPCO proposes to continue operating the Hoist and McClure powerhouses in a peaking mode. However, UPPCO proposes to reduce the maximum drawdown in SLSB from the historical average of 13 feet to 8.5 feet. UPPCO also proposes to restrict maximum drawdown in DRSB to 7 feet from a historical average of 12 feet. Because of the relatively small storage in MSB, UPPCO proposes to maintain the MSB at a target level of 1,195.8 feet NGVD instead of drawing the reservoir down two feet, as was the historical operation. UPPCO proposes to raise the pool level each fall by up to .6 feet to flush debris over the spillway.

UPPCO also proposes to maintain continuous minimum discharges of about 8 cfs, 100 cfs, and 72 cfs respectively below Silver Lake dam, the Hoist powerhouse, and the McClure powerhouse.

*Recommendations from Agencies and Interested Parties*

In the WQC, MDEQ prescribes minimum flows below each of the three impoundments and limitations on reservoir drawdown, but allows for continued peaking operation of the developments. The WQC restricts maximum drawdown to 4.5 feet at SLSB, 3.5 feet at DRSB, and 1.6 feet at MSB. The WQC also specifies target beginning-of-month water levels and minimum monthly water levels for SLSB and DRSB. Further, the WQC restricts daily water level fluctuations to 0.5 feet in SLSB and DRSB, and 1.0 feet in MSB. The WQC specifies seasonally varying minimum flows between 10 to 25 cfs at SLSB; a continuous minimum flow of 100 cfs below Hoist powerhouse; and a minimum flow of 80 cfs below McClure powerhouse whenever sufficient water is available. The WQC also requires a continuous minimum release of 20 cfs in the bypassed river channel below McClure dam through a deepwater draw.

MDNR's recommendations for reservoir level restrictions are the same as the WQC conditions. MDNR recommends that UPPCO maintain minimum flows below the

Silver Lake dam for the period April-September of 5 cfs above those specified by the WQC; a continuous flow of 120 cfs below Hoist powerhouse; and a continuous flow of 80 cfs below McClure powerhouse. MDNR also recommends: a minimum continuous flow of 40 cfs in the McClure bypassed channel; a maximum flow of 100 cfs from SLSB when flows are under control of the applicant; and that Hoist powerhouse be operated in non-peaking mode from March 15 to June 15.

Interior recommends that the Dead River Project be operated in a non-peaking mode with reservoir water level fluctuations no greater than +/- 0.5 feet. The MHRC recommends a run-of-river (ROR) operation of the project. Both Interior and MHRC recommend a minimum flow of 40 cfs in the McClure bypassed reach.

KBIC recommends that UPPCO operate the project in a ROR mode and that a minimum of 40 cfs be maintained in the McClure bypassed reach.

Mr. Weglarz has suggested that a minimum flow of 15 cfs be maintained below Silver Lake dam, that both Hoist and McClure powerhouses be operated in a ROR mode, and that a minimum flow of 25 cfs be provided in the McClure bypassed reach.

Table 6. Summary of flow recommendations (in cfs), reservoir levels (in NGVD) and WQC requirements, provided by various entities for the Dead River Project. (Source: Staff)

| Location | Month | UPPCO | WQC | MDNR | Interior | KBIC | MHRC | Weglarz | Menard | DRCI |
|---|---|---|---|---|---|---|---|---|---|---|
| Silver Lake dam - minimum flow | | | | | | | | | | |
| | Jan-Mar | 8 | 15 | 15 | | ROR | ROR | 15 | | |
| | Apr | 8 | 25 [4] | 30 | [1] | ROR | ROR | 15 | | |
| | May | 8 | 20 | 25 | [1] | ROR | ROR | 15 | | |
| | Jun | 8 | 15 | 20 | [1] | ROR | ROR | 15 | | |
| | Jul-Sep | 8 | 10 | 15 | [1] | ROR | ROR | 15 | | |
| | Oct-Dec | 8 | 15 | 15 | [1] | ROR | ROR | 15 | | |
| Silver Lake - maximum controlled release | | none | 150 (200) [2] | 100 | none | ROR | ROR | none | | |
| Hoist powerhouse - minimum flow | | | | | | | | | | |
| | Jan 1-Mar 14; Jun 16 -Dec 31 | 100 | 100 [5] | 120 [5] | [1] | ROR | ROR | ROR | | |
| | Mar 15-Jun 15 | 100 | 100 | 120 (Non-peaking) | [1] | ROR | ROR | ROR | | |
| McClure powerhouse | | 72 | 80 [3] | 80 | [1] | ROR | ROR | ROR | | |
| McClure bypassed reach | | 0 | 20 | 40 | 40 | 40 | 40 | 25 | | |
| Reservoir Elevations | | | | | | | | | | |
| Silver Lake | | 1483.5'-1474.0' 8.5' | 1481.5'-1477' 4.5' (daily .5') | 1481.5'- 1477' 4.5' (daily .5') | no elevation 1.0' | None | None | None | None | None |
| Dead River | | 1342'-1335' | 1340.5'-1337' | 1340.5'- 1337' 3.5' (daily .5') | no elevation 1.0' | None | None | None | 1341.5' (summer target) | 1341.0' (summer target) |
| McClure | | 1195.8'-1194.4' .6' (for fall debris flush) | 1196.4'-1194.8' 1.6' (daily 1') | 1196.4'-1194.8' 1.6' (daily 1') | no elevation 1.0' | None | None | None | None | None |

[1] Interior recommends that UPPCO operate the projects impoundments in a non-peaking mode with reservoir level fluctuation no more than +/- 0.5 foot.

[2] During conditions outside UPPCO control.

[3] Flow maintained when water is available.
[4] Or inflow, whichever is less.
[5] Year-round minimum flow

Mr. Menard, Mr. Parkkonen, and DRCI have expressed concerns with the summertime (June through November) start-of-the-month target elevation of the DRSB specified in the WQC. To enhance boating opportunities in the west end of the DSRB, Mr. Menard requests that the target elevation during summer be raised from 1,340.5 feet to 1,341.5 feet NGVD. Mr. Parkkonen expresses concern that a target level of 1340.5 feet and minimum level of 1,339.0 feet NGVD during summer would result in some of his property being exposed. DRCI requests that the target water level for the period June to November be raised to 1,341.0 feet NGVD, and that the minimum water level be raised by 0.5 feet to 1,339.5 feet NGVD, for the period July to November.

*Our Analysis*

We have grouped our analysis by issues to simplify and avoid duplication in addressing the various related issues.

Reservoir Water Levels: Reduction in reservoir level fluctuations could conflict with maintenance of minimum flows from the Dead River Project, particularly during dry years. Potential benefits of reservoir level restrictions to water quality are addressed separately.

Using streamflow data modeled in UPPCO's license application (UPPCO, 1994), the staff reviewed UPPCO's ability to meet both minimum flow requirements and reservoir operation requirements for SLSB that were specified in the WQC. Our analysis indicates that the specified minimum flows required by the WQC would make it difficult to fill the SLSB between May and June and could lead to noncompliance with the minimum reservoir elevation criteria during the summer months (1 year in May, 7 years in June, 3 years in July, and 1 year in August) for the 10 years that data were analyzed (1983-1992). The WDEQ appears to anticipate this situation and provides in the WQC for consultation with them and MDNR in case of noncompliance. The minimum flow regime recommended by MDNR would result in drawdowns below the minimum elevation for 1 year in May, 8 years in June, 5 years in July, and 3 years in August, out of the 10 years analyzed. The continuous minimum flows from SLSB of 8 cfs proposed by UPPCO and the 15 cfs requested by Mr. Weglarz would result in drawdowns in at least 4 out of 10 years, in June. In the DRSB, we estimate the potential non-compliance with minimum level to be in 1 year during August. We recognize that the WQC conditions are mandatory. However, from a compliance perspective, we are concerned that the proposed WQC conditions may cause a number of minimum level noncompliance events. As further discussed under compliance monitoring, we recommend UPPCO, in

consultation with the resource agencies and the MDEQ, evaluate streamflow data and reservoir levels during the first 3 years following issuance of any license for the Dead River Project. The evaluation should focus on whether any operational changes need to be made to ensure compliance with the license and the WQC conditions.

Interior recommends that the water level fluctuations be restricted to +/- 0.5 feet. in all the Dead River Project reservoirs. Limiting reservoir fluctuations to this narrow range would significantly reduce UPPCO's ability to re-regulate inflows for power generation. We further address this issue, along with the ROR operation recommended by the MHRC and KBIC, in fisheries section V.C. 3.

Reservoir level restrictions and minimum flow requirements of the WQC significantly reduce the energy generation and power benefits of the project. Therefore, we discuss the our recommendations and economic effects of such restrictions in section VI. We address the request from DRCI, Mr. Parkkonen, and Mr. Menard for increased summer water level in DRSB separately in the recreation section V.C.7.

Water Quality and Quantity: Water quality surveys performed by UPPCO have not identified any significant water quality issues in the SLSB, DRSB, or MSB resulting from historical project operations. Historically, Silver Lake dam, Dead River (Hoist) powerhouse, and McClure powerhouse have each periodically provided no flow to their respective downstream reaches. Water quality surveys indicate that the few instances of noncompliance with state DO and fishery-related temperature standards in the river reaches often coincided with periods of low streamflows. However, because of leakage from the dams and powerhouses and tributary inflows, historical project operations have not resulted in any substantial water quality issues.

WQC restrictions in SLSB and DRSB drawdown levels during late winter would result in a reduction of approximately 4,200 acre-feet (45 percent from current level) and 7,000 acre-feet (50 percent) of currently used live storage in the SLSB and DRSB, respectively. These proposed restrictions in SLSB and DRSB operating levels would not result in any substantial change in water quality of reservoir releases. Because of relatively minor storage in the MSB, operation of MSB under the WQC conditions would also not likely affect the water quality conditions downstream of the McClure powerhouse. However, beneficial effects for the fishery, shoreline vegetation, and lake recreation would likely occur, and are discussed in the respective resource sections. We, therefore, generally concur with and recommend the WQC conditions for reservoir level

restrictions, with the exception of increasing the target start-of-month elevation of DRSB, which is discussed below.

Maintaining the minimum flows prescribed in the WQC would help to minimize occurrence of high temperature events that result from zero or low releases from the reservoirs. Minimum flows prescribed in the WQC are somewhat higher than natural summer flows in all the river reaches below Silver Lake dam. These higher minimum flows are likely to result in cooler water temperatures in the riverine sections and would likely improve the DO regime and enhance habitat conditions for fish.

The WQC requires that a 20 cfs minimum flow be provided in the McClure bypassed reach using a deepwater draw for source water. We assume that MDEQ's requirement for a deepwater draw is to provide lower water temperatures in the Dead River below the project, than currently occurs. There is, however, no low level outlet at MSB, although water enters the penstock from a low intake in the reservoir. The staff considers modification to this penstock outlet, to provide minimum releases to the bypassed reach, to be feasible but not cost-effective. UPPCO had studied an alternative siphon outlet for releasing the minimum flow from the MSB to the bypassed reach. Such a facility would release water from the upper 5-10 feet of the reservoir. Measured temperature profiles at the MSB indicate that water temperature in the top 10-12 feet of the reservoir reach a maximum of approximately 63EF during late-July. In the next 10-12 feet, the water temperature falls to about 45EF. The staff concludes that a siphon-type outlet installed to withdraw water from between the surface and 10 feet below the surface, would provide minimum flows with water temperatures low enough to meet coldwater fishery standards for the river reach downstream of the MSB during the critical summer months, which are required to be no higher than 68EF for June, July and August. Also, such a surface outlet would result in higher DO levels in the releases, because DO is higher in the upper water column of the reservoir than at the lower levels. We, therefore, recommend that UPPCO consult with MDEQ on the design of the minimum release structure, and develop a plan to provide the minimum 20 cfs flow in the McClure bypassed reach, within 180 days of license issuance.

Minimum and Maximum Flows: Maintaining minimum flows in the river reaches would improve water quality and enhance fishery resources and other designated uses.

MDNR, Interior, MHRC, KBIC, and Mr. Weglarz's recommendations for minimum flows are based on fishery requirements. MDNR's recommendations for

limiting the maximum discharge from SLSB at 100 cfs, as well as operating the Hoist powerhouse in a non-peaking mode between March 15 and June 15, are to provide fishery enhancement. Thus, we analyze these recommendations in section V.C.4.

Operational Compliance Monitoring

*UPPCO Proposal*

UPPCO has not proposed any measures to monitor operational compliance.

*Recommendations from Agencies and Interested Parties*

MDNR recommends that a gaging and compliance plan be developed and implemented in consultation with Interior, USGS, MDNR, and MDEQ. Components of the recommended plan include continuous recording of flows at various locations, funds for operation of the USGS gage No. 04043800, and calibrated staff gages at each of the reservoirs, to record water levels weekly at SLSB and hourly at DRSB and MSB. MDNR also recommends that the data collected be made available over the telephone or Internet.

Interior also recommends that UPPCO develop a compliance plan, requiring UPPCO funding of installation and operation of USGS flow gaging stations downstream from each of the three project dams, with automatic sensors to provide continuous, telemetered readings of head and tailwater levels.

The WQC requires UPPCO to develop a plan to monitor streamflows below SLSB, Hoist and McClure powerhouses, and in the McClure bypassed reach. The WQC also requires UPPCO to establish calibrated staff gages at the three dams, to monitor weekly water levels at SLSB and hourly levels at DRSB and MSB.

Both MDNR and Interior recommend that UPPCO maintain records of daily project operation and make the data available on request. MDNR also recommends that a 3-year test period be used to determine the ability of the licensee to maintain compliance standards for flows and reservoir levels. MDNR further recommends that UPPCO develop a schedule, in consultation with the MDNR, for payment of liquidated damages for violations of water quality standards.

MDNR and MDEQ have recommended that UPPCO notify them regarding operations during emergencies. MDNR recommends relaxation of reservoir level constraints during emergencies.

*Our Analysis*

UPPCO, as a condition of any license issued for the projects, should be required to develop and implement an operations monitoring plan, which would help to ensure that adequate measures are being taken to protect water quality and aquatic resources. The required components of such a plan should, at a minimum, include: impoundment elevation monitoring, project discharge monitoring, and tailwater elevation monitoring. Funding for installation of any new USGS gages on the Dead River, and for operating and maintaining the McClure gage, however, is not necessary, because streamflow gaging downstream from each project would be redundant and not a necessary component of a plan to monitor project operation. Under the WQC-mandated operations, releases from Silver Lake dam, Hoist powerhouse, and McClure powerhouse would be relatively predictable and stable in comparison to historical project operations. UPPCO is required to collect and maintain extensive operational data under the WQC conditions. Flow monitoring requirements mandated in the WQC would provide adequate information to assess project operational compliance. These data would be available to MDNR on request at any time. UPPCO would also be required, under the WQC, to submit summary records to the MDEQ and the MDNR on a regular basis. We, therefore, recommend that UPPCO develop a streamflow and water level monitoring program consistent with the requirements of the WQC, and file this plan for Commission's approval.

We agree with MDNR that a 3-year test period for the required minimum flows and reservoir level restrictions would be appropriate, to allow the applicant and the agencies to review potential compliance issues over a reasonable range of natural conditions. There may be compliance difficulties related to maintaining reservoir water levels and minimum flows at each of the project's developments (see previous discussion on Reservoir Water Levels). The MDEQ has required a similar 3-year test period for the Marquette Project, located below UPPCO's McClure development, to determine MBLP's ability to comply with reservoir level restrictions and minimum flows at that project's developments. The test period would not require additional effort from UPPCO in terms of compliance monitoring.

MDNR states that UPPCO should notify MDNR within 24 hours of any proposed or enacted emergency impoundment drawdowns, and that UPPCO consult with

the MDNR to determine appropriate response measures and resource damages. Following any emergency drawdowns, MDNR also recommends that UPPCO submit a report to MDNR detailing the nature of the emergency, action taken, proposed mitigation measures, and proposed measures to avoid future recurrences. MDNR further recommends that, prior to any planned impoundment drawdown in excess of 1 foot, UPPCO should obtain any necessary MDNR permits.

We recognize that in some instances it may not be possible for UPPCO to notify MDNR prior to an impoundment drawdown. However, we recommend that whenever possible, the licensee should notify MDNR within 24 hours of any proposed or already enacted emergency drawdown. UPPCO should not be required to prepare a separate written report for the MDNR describing the drawdown, proposed remedial measures, and proposed preventative measures for each emergency drawdown. Written notification to the Commission is already required under standard license articles for any modification of project operation, including emergency and planned impoundment drawdowns, so this requirement is already addressed via normal compliance activities. We recommend, however, that this report also be provided to MDNR at the time it is filed with the Commission.

We also recommend that prior to any planned, major impoundment drawdown (other than normal operations), UPPCO prepare, for Commission approval, an impoundment drawdown plan. This plan should be developed in consultation with MDNR, and should incorporate measures to minimize effects on water quality and fish and wildlife resources in the impoundment, including the timing, duration, and rate of drawdown. This plan would be in lieu of a requirement to obtain a permit from the MDNR for every drawdown greater than 1 foot.

Maintenance of State Water Quality Standards and Monitoring Requirements

*UPPCO Proposal*

UPPCO has not proposed any program for water quality monitoring for maintenance of state WQC standards in the Dead River.

*Recommendations from Agencies and Interested Parties*

MDNR recommends that UPPCO maintain state water quality standards for DO levels and water temperatures in the reservoirs and river reaches, and that UPPCO

develop and implement a water quality monitoring plan within 24 months from the issuance of a license for the Dead River Project. According to MDNR, the plan should include monitoring of water temperature in DRSB and MSB during May through October, DO monitoring during June through September, measuring temperature profiles during June through August, annual reporting, and compliance review procedures. MDNR also recommends that UPPCO develop a water/sediment/fish monitoring plan, and that UPPCO schedule and pay liquidated damages for violations of the state water quality standards.

Interior recommends that UPPCO develop a water quality monitoring plan for the Dead River Project, in consultation with the MDEQ. According to Interior, the plan should identify sampling locations and frequency for monitoring DO concentrations and temperatures upstream and downstream of each of the project developments, and operating procedures for mitigating any water quality deviations from established state standards. KBIC also recommends that UPPCO continue long-term water quality monitoring, but does not specify parameters for monitoring.

*Our Analysis*

Maintaining State Standards: MDNR recommends that UPPCO maintain a DO concentration of not less than 7.0 mg/L at all times below the Silver Lake and Hoist developments, and not less than 5.0 mg/L below McClure dam. WQC conditions specify that UPPCO not cause the DO to be less than 7.0 mg/L at any time below the Silver Lake and Hoist developments, and not less than 5.0 mg/L at any time below McClure dam.

UPPCO states that because of natural diurnal fluctuations in epilimnion DO levels, which are affected by epilimnial warming and biological rates of respiration and photosynthesis, MDNR's recommendation to maintain an instantaneous DO concentration of 7 mg/L in the project impoundments is unrealistic. However, UPPCO also states that under continuous powerhouse operation, it would be possible to achieve a daily average DO value of 7 mg/L in the downstream river reaches.

Even though a few short-term DO noncompliance events have been recorded on the Dead River, there is no evidence that local reductions in DO concentrations have had any significant adverse effect on biota or designated water uses. The MDEQ requires that UPPCO not cause any lowering of DO concentration in project releases, associated with its operations. Under historical operations with no minimum flows, DO in project releases was not a significant issue. With increased minimum flows as required in the

WQC, DO would likely be of even lesser concern. Minor changes in DO concentrations arising from natural causes such as epilimnial heating, should not affect water quality for designated uses of the Dead River, and the WQC conditions would adequately protect DO levels in project waters. We would require any license issued for the project to include the conditions specified in the WQC for DO discussed here and for temperature discussed below.

The MDNR recommends that UPPCO not warm the Dead River downstream of SLSB, DRSB, and MSB above state coldwater fishery standards, and similarly not above warmwater fishery standards downstream of MSB. WQC requirements are similar. MDNR also recommends that UPPCO not warm the Dead River below SLSB and DRSB compared to that upstream of each reservoir by more than 2EF, and by no more than 5EF below the McClure powerhouse. MDNR cites a "heat load" standard appropriate for point sources, not for reservoir outfalls. MDNR also has not substantiated the need for such restrictions based on water quality, fishery, or other requirements. We recognize that some water temperature increases could result from natural warming, leading to higher water temperatures than the state standards, but hydropower operations, by themselves, do not add any significant heat load to the water. These natural events would be beyond the control of UPPCO.

Impoundments are warmed by solar radiation. When water is impounded the velocity of water within the impoundment is reduced. Thus, solar radiation has a longer time to heat the water. Impounding water also creates a larger surface area on which the solar radiation can act. Finally, increasing the surface area of the water reduces the proportion of water shaded by shoreline vegetation compared to the proportion of water receiving direct sunlight. We consider this temperature effect of the impoundments part of the existing conditions associated with the project.

Operating the projects in accordance with the requirements of the WQC (minimum flows and reservoir levels), however, would adequately provide for compliance with state standards for designated uses in the Dead River, and provide the best conditions for also meeting the temperature requirements recommended by the MDNR. The MDNR recommendations concerning tailwater temperatures not be greater than 2E and 5E higher than water temperatures upstream of the reservoirs of the SLSB, DRSB and MSB, respectively, contains no evidence to support a determination that the differences in temperatures between these locations upstream of the reservoirs and downstream of the dams. Fish residing downstream of the developments are affected by the temperatures experienced in the reach in which they reside. Therefore, as long as

temperatures in the reach in which the fish reside are within suitable limits (meet state WQC standards), the temperature differences between locations is not important.

Monitoring Requirements: The WQC requires that water quality surveys be performed upstream of SLSB, downstream of the Silver Lake dam, upstream of DRSB, downstream of Dead River powerhouse, upstream of MSB, downstream of McClure powerhouse, and in the McClure bypassed reach, to monitor compliance with state water quality standards. The WQC also requires temperature and DO monitoring in the DRSB and MSB on a schedule recommended by MDNR. MDEQ prescribes specific methods by which to analyze temperature and DO for 1 year, after which the applicant could petition to alter the monitoring frequencies.

We find that the WQC requirements for water quality monitoring are comprehensive and would generally satisfy the recommendations of MDNR, Interior, and KBIC. The water quality monitoring requirements and parameters required by the MDEQ would ensure that the project would meet state water quality standards for temperature and DO, and additional monitoring programs would not be required. We recommend the WQC specifications for temperature and DO monitoring for the Dead River Project be incorporated into any license issued for the project.

Liquidated Damages: MDNR's recommends that UPPCO pay damages for each and every project-caused event that violates state water quality standards. The WQC for the projects does not require the payment of damages, rather it requires UPPCO to take reasonable actions to achieve compliance with state water quality standards and minimize impacts. Further, operating the project as required by the WQC would minimize any effects on coldwater and warmwater fisheries and other aquatic resources below each development. In conclusion, the Commission has no authority to order UPPCO to pay damages to the MDNR for state water quality violations and no recommendations would be made to that effect in any license issued for the Dead River Project.

**Marquette Project**

During scoping, resource agencies and other interested parties identified minimum flow requirements, lake level management, and the effect of project operation on water quality as important issues to be addressed in the environmental analysis. The agencies and interested parties provided a number of recommendations for reservoir levels and for minimum flows at various river locations. Table 7 summarizes the minimum flow recommendations made by the various entities.

Project Operations

*MBLP Proposal*

In its license application, MBLP first proposed to operate the Marquette Project developments similar to its current operations. MBLP proposed to maintain the Forestville reservoir water levels between elevations 767.98 and 769.98 feet NGVD, and the Tourist Park reservoir water levels between elevations 636.86 and 638.86 feet NGVD, except during high-flow and low-flow periods, when MBLP would have no control over project discharges. MBLP subsequently changed its proposed reservoir operating levels to agree with the WQC conditions for operation of the Marquette Project (MBLP, 2000a). Its revised proposal is to maintain Forestville reservoir levels at 770.25 +/- 0.75 feet NGVD, and Tourist Park reservoir levels at 637.2 feet +/- 0.5 feet NGVD, except during high and low-flow periods, when MBLP would have no control over project discharges. MBLP proposes to operate No. 2 Powerhouse in a modified peaking mode, with continuous minimum discharges of 80 cfs from November 16 to March 15, and 40 cfs from March 16 to April 30 and October 1 to November 15, when sufficient water is available. MBLP would operate No. 2 powerhouse so that the re-regulation of streamflow may continue at the downstream Tourist Park development. MBLP also proposes to maintain a minimum release of 20 cfs in the Forestville bypassed reach, except during emergency conditions such as low inflow and cold weather conditions, as defined by the WQC. MBLP proposes to operate No. 3 powerhouse in a reregulation mode and moderate fluctuation in flow releases to the downstream river. To the extent practicable, MBLP would operate No. 3 powerhouse to release the average daily inflow to the Tourist Park reservoir.

Table 7. Summary of flow recommendations (in cfs), reservoir levels (in NGVD), and WQC requirements, provided by various entities for the Marquette Project. (Source: Staff)

| Location | Period | MBLP | WQC | MDNR | Interior | MHRC, NWF, Carl Lindquist | FERC Order of June 1997 (Current Operation) |
|---|---|---|---|---|---|---|---|
| No. 2 Powerhouse [3] | Oct 1 - Nov 15 | 40 [1] | 40 [1] | 85 | ROR | 85 | None |
| No. 2 Powerhouse | Nov 16 - Mar 15 | 80 [1] | 80 [1] | 85 | ROR | 85 | None |
| No. 2 Powerhouse | Mar 16 - Apr 30 | 40 [1] | 40 [1] | 85 | ROR | 85 | None |
| No. 2 Powerhouse | May 1 - Sep 30 | None [1] | None [1] | 85 | ROR | 85 | None |
| Forestville Bypassed Reach | At all times | 20 | 20 | None | None | -- | 20 or Inflow (if less) [2] |
| No. 3 Powerhouse | Jan - Dec | Average Daily Inflow | Average Daily Inflow | Average Daily Inflow | ROR | ROR | -- |
| No. 3 Powerhouse | Sep - Apr | -- | -- | -- | -- | -- | 40 or Inflow (if less) |
| Tourist Park Bypassed Reach | At all times | None | None | 40 | 40 or fish barrier | 40 | None |
| Forestville reservoir | | 770.25' ± .75' 1.5' | 770.25' ± .75' 1.5' | 770.25' ± .75' 1.5' | Variance of ± .25' | none, none, Lindquist same as MDNR | 769.98'-767.98' 2.0' (peaking) |
| Tourist Park reservoir | | 637.2' ± .5' 1.0' | 637.2 ± .5' 1.0' | 637.2' ± .5' 1.0' | Variance of ± .25' | none, none, Lindquist same as MDNR | 638.86'-636.86' 2.0' (peaking) |

[1] Operation at Forestville will not impede the ability of the Tourist Park development to re-regulate inflows.

[2] In the winter, when 80 cfs is needed to prevent freezing of the penstocks or turbines, the minimum flow release of 20 cfs shall be made only after this 80 cfs is accommodated.

[3] The No. 2 Powerhouse is also known as the Forestville Powerhouse.

MBLP proposes to consult with the agencies regarding future emergency reservoir drawdowns. MBLP also proposes to remove the remnant No. 1 dam, which is located in the Forestville bypassed reach, under a future Commission-approved agreement between MBLP and MDEQ, which is the state permitting authority for such work.

*Recommendations from Agencies and Interested Parties*

MDNR recommends that MBLP maintain project reservoir water levels as required by the WQC. MDNR also recommends that MBLP operate No. 2 powerhouse such that it would allow No. 3 powerhouse to operate in a re-regulation mode, and recommends a minimum flow below No. 2 powerhouse of 85 cfs at all times. MDNR further recommends that MBLP maintain a minimum flow of 40 cfs in the Tourist Park bypassed reach, and operate the reservoir such that during drawdown and refill, reservoir outflows match inflows within 10 percent.

Interior recommends that the Marquette Project operate with water level fluctuations in the project impoundments no greater than +/- 0.25 feet, and that MBLP maintain a 40-cfs minimum flow in the Tourist Park bypassed reach, or provide a fish barrier to prevent fish from entering the bypassed reach. Interior also recommends that MBLP consult with the agencies if instantaneous ROR operation does not provide sufficient inflow to maintain minimum reservoir elevations.

MDNR and Interior recommend that during power plant outages, MBLP discharge all inflow to the reservoirs downstream, instantaneously or within a few minutes of occurrence of the outage. Interior also recommends that no planned outage should be carried out during April, May, and June to minimize effects on fish spawning.

MHRC and the NWF have the same recommendations as MDNR's operational recommendations for the Marquette Project, but do not recommend any minimum flow in the Forestville bypassed reach.

*Our Analysis*

Reservoir Water Levels: Restrictions in reservoir operating levels could limit MBLP's capability to re-regulate peaking discharges that enter the project from the upstream Dead River Project. During low and high flows in the river, MBLP would have limited or no flexibility to re-regulate downstream flows. Potential benefits of reservoir level restrictions to water quality is addressed separately.

While we recognize that WQC conditions are mandatory, from a compliance perspective, we are concerned that minimum flow requirements at the Forestville tailrace depend on releases from UPPCO's Dead River Project. We addressed our concerns regarding operational compliance for the Dead River Project in section V.C.2.b.1. Reservoir level restrictions and minimum flow requirements of the WQC significantly reduce the energy generation and power benefits of the Marquette Project. We discuss the economic effects of such restrictions in section VI.

Limiting outflows from the reservoir during normal operation to no more than a 10 percent difference from inflows, as recommended by the MDNR, or limiting reservoir fluctuations to +/- 0.25 feet, as recommended by Interior, would reduce MBLP's capability to re-regulate inflows from UPPCO's Dead River Project, and would conflict with the Interior and MDNR objective to provide normalized outflows below the reservoirs. The agencies have not identified or substantiated any site-specific additional benefits to fishery resources from such restrictions. We, therefore, do not recommend that UPPCO be required to meet these MDNR or Interior recommendations for reservoir level restrictions.

We analyzed the feasibility of instantaneously releasing inflows to the Marquette Project impoundments during powerhouse shutdowns. During planned maintenance, it would be feasible for MBLP to release instantaneous flows (with a short lag because of pond storage) by maintaining water level at the spillway crest elevation at Forestville reservoir, and by operating the Taintor gates at the Tourist Park reservoir. However, during unplanned outages and emergencies, instantaneous release of inflow or matching outflow to within 10 percent of inflow would not be feasible at all times. We, therefore, recommend that within 12 months of any license issued, MBLP develop, in consultation with the resource agencies, a plan for releasing flows during planned and emergency shutdowns, and file the plan with the Commission for approval. Such a plan should also address Interior's concern regarding any planned outages in the spring (April, May, and June).

Minimum Flows: MDNR, Interior, NWF, and MHRC have recommended minimum flows to be maintained below Forestville powerhouse and in the Tourist Park bypassed reach, primarily for fishery enhancement. We address these recommendations in section V.C.3.

Water Quality: Large fluctuations in reservoir levels with long drawdown periods may affect impoundment water quality because of potential shoreline erosion, turbidity, and temperature and DO degradation. Historical operations of the Forestville

and Tourist Park reservoirs, however, with small reservoir drawdowns, have not resulted in any significant water quality issues. The shoreline of these projects developments are stabilized, with little indication of significant erosion problems. Water quality surveys performed by MBLP have indicated only a few instances of noncompliance with state DO and fishery-related temperature standards in the reservoirs and downstream river reaches.

The staff-recommended operation of the upstream Dead River Project, in conjunction with WQC conditions, would likely improve the water quality of inflows to the Forestville reservoir. The minimum flows prescribed below Forestville tailrace in the WQC are generally higher than natural summer minimum flows in the river reaches below No. 2 dam. This would likely slightly lower water temperatures and enhance DO levels in the river reach below the powerhouse and into the Tourist Park reservoir. Further, the minimum flow to be maintained in the Forestville bypassed reach should also improve water quality in that reach.

We conclude that the WQC restrictions on reservoir operating levels would not likely produce any significant improvements in water quality. However, water quality in the Dead River above and below the Marquette Project would benefit from the requirements placed on the Dead River and Marquette Projects, including minimum flows to bypassed stream reaches, and from the removal of the remnant dam no. 1.

Compliance Monitoring

*MBLP Proposal*

The WQC requires that MBLP install a calibrated staff gage at each of the Marquette dams and develop a flow monitoring plan for approval by the MDEQ. MBLP proposes to demonstrate compliance with WQC operating conditions by means of a stream gaging plan filed with the Commission in June 1998. This plan proposed to generation data to estimate flow releases on a real-time basis. The Commission approved this plan March 23, 2001, specified in the requirements of Article 29 of the existing license. Gaging requirements recommended by the agencies for consideration under a new license are discussed below.

*Recommendations from Agencies and Interested Parties*

MDNR recommends that a gaging and compliance plan be developed and implemented in consultation with Interior, USGS, and MDNR. Components of the plan would include funding to establish, operate, and maintain a USGS gage below Tourist Park reservoir equipped with telemetry, continuous level recording devices with telemetry on project impoundments, and calibrated staff gages at each of the reservoirs to record maximum and minimum water levels.

Interior also recommends that MBLP develop a compliance plan requiring MBLP to fund installation and operation of USGS flow gaging stations downstream from each of the projects' two dams, equipped with telemetry, automatic sensors to provide continuous, telemetered readings of head and tailwater levels, and staff gages at each of the two dams.

The WQC requires MBLP to develop a plan to monitor streamflows below the project's powerhouses and in the Forestville bypassed reach. The WQC also requires MBLP to establish calibrated staff gages to monitor hourly reservoir levels.

Both MDNR and Interior recommend that MBLP maintain records of daily project operation and make the data available on request. MDNR also recommends that a 3-year test period be used to determine the ability of the licensee to maintain compliance standards for flows and reservoir levels.

MDNR and MDEQ recommend that MBLP notify them regarding operations during emergencies. MDNR recommends relaxation of their recommendation concerning reservoir level constraints during emergencies.

*Our Analysis*

MBLP, as a condition of any license issued for the projects, should be required to develop and implement an operations monitoring plan. Required components of such a plan should, at a minimum include: impoundment elevation monitoring, project discharge monitoring, and tailwater elevation monitoring. Funding for installation, operation, and maintenance of new USGS gages on the Dead River, however, is not necessary, because streamflow gaging downstream from each project would be redundant and not a necessary component of a plan to monitor project operation. Under the WQC mandated operations, releases from Forestville and Tourist Park powerhouses would be relatively predictable and stable, in comparison to historical project operations. MBLP is required to collect and maintain extensive operational data under the WQC

conditions. Flow-monitoring required by the WQC would provide adequate information to assess operational compliance. These data would be available to MDNR on request at any time. MBLP would also be required by the WQC to submit summary records to the MDEQ and the MDNR on a regular basis. We, therefore, recommend that MBLP develop a streamflow monitoring plan consistent with the requirements of the WQC, and file this plan for Commission's approval.

We agree with MDNR that a 3-year test period for the required minimum flows and reservoir level restrictions would be appropriate, to allow the applicant and the agencies to review potential compliance issues over a reasonable range of natural conditions particularly with changes in flow releases for the upstream Dead River Project.. MDEQ requires a similar 3-year test period to determine UPPCO's ability to comply with reservoir level restrictions and minimum flows at the Dead River Project. The test period would not require additional effort from MBLP in terms of compliance monitoring.

MDNR states that MBLP should notify MDNR within 24 hours of any proposed or enacted emergency impoundment drawdowns, and that MBLP consult with the MDNR to determine appropriate response measures and resource damages. Following any emergency drawdowns, MDNR also recommends that MBLP submit a report to MDNR detailing the nature of the emergency, action taken, proposed mitigation measures, and proposed measures to avoid future recurrences. MDNR further recommends that, prior to any planned impoundment drawdown in excess of 1-foot, MBLP should obtain any necessary MDNR permits.

We recognize that in some instances it may not be possible for MBLP to notify MDNR prior to an impoundment drawdown. However, we recommend that whenever possible, the licensee should notify MDNR within 24 hours of any proposed or already enacted emergency drawdown. MBLP should not be required to prepare a separate written report for the MDNR describing the drawdown, proposed remedial measures, and proposed preventative measures for each emergency drawdown. Written notification to the Commission is already required for any modification of project operation (the Commission's L-Form articles,) including emergency and planned impoundment drawdowns, so this requirement is already addressed via normal compliance activities and we would recommend to continue this requirement under any new license issued for the project. We recommend, however, that this report also be provided to MDNR at the time it is filed with the Commission.

We also recommend that prior to any planned, major impoundment drawdown (other than normal operations), MBLP prepare, for Commission approval, an impoundment drawdown plan. This plan should be developed in consultation with MDNR, and should incorporate measures to minimize effects on water quality and fish and wildlife resources in the impoundment, including the timing, duration, and rate of drawdown.

Maintenance of State Water Quality Standards and Monitoring Requirements

*MBLP Proposal*

MBLP has proposed to conduct water quality monitoring in accordance with the WQC requirements (MBLP, 2000a).

*Recommendations from Agencies and Interested Parties*

MDNR recommends that MBLP maintain state water quality standards for DO and water temperature in the reservoirs and river reaches when the river discharges are greater than or equal to 95 percent exceedance flow. MDNR recommends that MBLP develop and implement a water quality monitoring plan within six months from the issuance of a license for the Marquette Project, in consultation with MDEQ, MDNR, and Interior. According to MDNR, the plan should include year-round monitoring of water temperature and summer (June to September) DO monitoring, measuring temperature profiles at each of the reservoirs during June to September, annual reporting, and compliance review procedures. MDNR also recommends that MBLP develop a water/sediment/fish monitoring plan, and implement a schedule and pay liquidated damages for violations of the state water quality standards. MDNR recommends that MBLP conduct water quality monitoring for 2 years prior to requesting a change in frequency of monitoring.

Interior recommends that MBLP develop a water quality monitoring plan, in consultation with the MDEQ. According to Interior, the plan should include monitoring DO concentrations, temperatures, and other parameters deemed appropriate by the MDEQ. Interior also recommends that measures be developed in consultation with the MDEQ, to mitigate for water quality deviations from established state standards.

MHRC recommends that MBLP conduct long-term water quality monitoring.

*Our Analysis*

Maintaining State Standards: MDNR recommends that MBLP maintain a DO concentration of not less than 5.0 mg/L at all times below Forestville and Tourist Park powerhouses. The WQC conditions specify that MBLP not cause the DO to be less than 5.0 mg/L at any time below the project's powerhouses.

MBLP argues that the language difference between the MDNR recommendation and the WQC conditions could be significant in the event inflow to the project does not meet the DO criteria. This same issue is discussed earlier in DEA when the MDNR recommended UPPCO maintain DO concentrations of not less than 7 mg/l below the SLSB and not less than 5 mg/l below Hoist and McClure powerhouses and that UPPCO meet state water quality standards for temperature for the same stream reaches(see Our Analysis, UPPCO Proposal, "Maintenance of State Water Quality Standards and Monitoring Requirements").

Even though a few short-term DO noncompliance events have been recorded on the Dead River, there's no evidence that local reductions in DO concentrations have had any significant adverse effects on the biota or designated water uses. The MDEQ requires that UPPCO not cause any lowering of DO concentrations in project releases, associated with its operations. Under historical operations with no minimum flows, DO in project releases was not a significant issue. With increased minimum flows as required in the WQC, DO and temperature would likely be of even lesser concern. Minor changes in DO concentrations and temperatures arising from natural causes such as epilimnial heating, should not affect water quality for designated uses of the Dead River, and the WQC conditions would adequately protect DO levels in project waters. DO and temperature data collected at the project does not indicate a problem with either parameter under the current operational regime. We would require any license issued for the project to include the conditions specified in the WQC for DO and temperature.

Monitoring Requirements: The WQC requires that water quality surveys be performed upstream of Forestville reservoir, within Forestville reservoir, downstream of No. 2 powerhouse, in the Forestville bypassed reach, within the Tourist Park reservoir, and downstream of the Tourist Park development, to monitor compliance with state water quality standards. The WQC requires that MBLP measure water temperature and DO concentrations from June through September in the project reservoirs, and in the river reaches between the reservoirs and below the Tourist Park development, with temperature and DO profiles to be measured in the two reservoirs. MDEQ prescribes

specific methods for analyzing temperature and DO for 1 year, after which the applicant could petition the MDEQ to modify the monitoring methodology or frequency of sampling. MDEQ did not require year-round temperature monitoring as recommended by MDNR, nor did they require a 2-year minimum of monitoring prior to any changes in monitoring. We agree with MDEQ that year-round temperature monitoring would be unnecessary because most critical temperature violations would occur in the summer to early fall.

Because MBLP may petition for a modification of water quality monitoring frequency after 1 year of data have been collected, the MDNR could also petition MDEQ and the Commission, at that time, for continuation of data collection on a certain frequency or to justify why two years of sampling was needed. We agree with the MDEQ requirements for an initial 1-year monitoring period, followed by a review of the monitoring methodology and frequency and recommend those conditions become a part of any license issued for the project.

We find that the WQC requirements for water quality monitoring are comprehensive, and that these requirements would generally satisfy the recommendations of MDNR, Interior, and MHRC. These water quality monitoring conditions would ensure that the project meets state water quality standards. To ensure compliance with these standards, however, we recommend that MBLP develop a water quality monitoring plan that incorporates the MDEQ requirements, and that includes provisions for reporting monitoring results to the MDEQ, MDNR, and other agencies. This plan should be filed with the Commission 6 months after the date any license is issued, and should include documentation of consultation with the MDEQ, MDNR, Interior, and MHRC during the plan development.

Liquidated Damages: MDNR's recommendation that UPPCO pay damages for each and every project-caused event that violates state water quality standards. The WQC for the project does not require the payment of damages, rather it requires UPPCO to take reasonable actions to achieve compliance with state water quality standards and minimize any effects on cold water and warmwater fisheries and other aquatic resources below each development. In conclusion, the Commission has no authority to order UPPCO to pay damages to the MDNR for state water quality violations and no recommendations would be made to that effect in any license issued for the Dead River Project.

Remnant No. 1 Dam

*MBLP Proposal*

The issue of the removal of Remnant No.1 Dam would affect water quality and fishery resources. We defer discussion of this issue to the Section V.C.4., Aquatic Resources.

c. Cumulative Effects:

Limiting reservoir level fluctuations and requiring minimum flow releases in the Dead River from SLSB downstream to the Tourist Park reservoir, would likely improve the overall water quality and hence the health of the river-reservoir system for all designated uses. The overall cumulative effects on water quality and quantity from licensing the projects as proposed by the applicants, with implementation of additional staff recommended measures, would be beneficial.

d. Unavoidable Adverse Effects:

Although the WQC requirements for minimum flows and more stable reservoir levels would result in an overall enhancement of aquatic habitat conditions in the Dead River, continued operation of the Dead River and Marquette Projects would continue to cause some fluctuations in river discharges and reservoir levels. There may be occasional violations of state water quality standards under some combinations of weather conditions and project operations, but these violations are expected to be minor and limited in duration.

**4. Aquatic Resources**

a. Affected Environment:

**Dead River Project**

The Dead River Project extends over a 30-mile reach of the Dead River from the headwaters of SLSB to the McClure powerhouse tailrace. The SLSB, DRSB, and MSB (the project reservoirs) cover about 17 miles of this river reach. The remaining 13 miles of flowing river between the impoundments comprise four distinct river reaches: (1) the 5.4-mile stream reach between SLSB and DRSB, (2) a 1,000 foot bypassed reach below Hoist dam; (3) a 0.4 mile river reach between Hoist powerhouse and MSB, and (4) a 6.1-mile bypassed reach between McClure dam and the McClure powerhouse

tailrace. The MDNR classifies the Dead River as a trout stream from its headwaters above SLSB to the Forestville Road bridge, downstream of the McClure tailrace.

Silver Lake Storage Basin

The SLSB is a cold, well-oxygenated, oligotrophic reservoir. The reservoir contains a diverse mixture of aquatic habitats capable of supporting a vigorous reservoir sport fishery. The reservoir contains a mixed coldwater/coolwater/warmwater fish community, consisting of deepwater salmonids and coregonid fishes, along with good numbers of coolwater and warmwater species (Cole, 1983). The impoundment is managed by the MDNR, however, as a coldwater fishery, with regular stocking of lake trout and brook trout since 1985. Splake (a hybrid cross between brook trout and lake trout) were first stocked in 1987, with about 12,000 splake yearlings now stocked annually. In an effort to manage the coldwater fishery in the impoundment, the MDNR also conducted operations to remove white suckers and yellow perch between 1984 and 1987, although it appears from recent catch data that both species are again increasing in abundance in the impoundment.

Cooperative fishery surveys of the impoundment were conducted jointly by the MDNR and the applicant in 1992. The following 10 fish species were captured during the survey: splake, brook trout, lake trout, smallmouth bass, yellow perch, cisco, white suckers, creek chub, pumpkinseed, and pearl dace. White sucker and yellow perch were the most abundant species captured in the 1992 surveys. Comparison of 1992 survey data to that collected by the MDNR in 1985 and 1987, indicates 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. The salmonids may be declining due to competition with yellow perch. Fraser (1978) found that yellow perch reduced the survival of stocked brook trout, splake, and rainbow trout in a small Canadian lake.

Dead River Reach below Silver Lake Dam

The Dead River flows for 5.4 miles between the Silver Lake reservoir and the DRSB. This reach is considered a headwater stream with a relatively narrow width of between 15 and 25 feet. The upper 2.3 miles of the reach, to the confluence with Conners Creek, are moderately steep (average slope of 37 feet per mile). The next 1.6 miles, from Conners 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 occur as self-sustaining populations in this reach, although MDNR sampling data for the period 1989 through 1991 indicates low population densities for trout and other species, for the reach between the Conners Creek confluence and County Road 573 Bridge (located about one-half mile downstream from the Mulligan Creek confluence). The MDNR continues to enhance the trout fishery in the lower part of this reach by stocking 1,500 brown trout and 1,350 brook trout yearlings annually. Little is known about harvest rates or annual survival rates of trout stocked in this stream reach. MDNR has indicated that the heaviest fishing pressure occurs in the half-mile reach between Mulligan Creek and the County Road 573 Bridge.

Dead River Storage Basin

The DRSB is a cool, well-oxygenated, mesotrophic reservoir that is managed by the MDNR as a warmwater fishery. The reservoir contains extensive shallow water aquatic habitat capable of supporting a thriving sport fishery. The impoundment contains a percid fish community typical of many northern lakes, which typically have 10 to 20 fish species. Similar to the SLSB, fisheries data were collected for the DRSB jointly by UPPCO and the MDNR in 1992, with the results compared to MDNR sampling data from 1982 and 1985.

Ten species were collected from the impoundment in 1992: northern pike, walleye, yellow perch, white sucker, smallmouth bass, pumpkinseed, black bullhead, golden shiner, creek chub, and common shiner. Several of these species (northern pike, walleye, yellow perch, and white sucker) are considered typical components of a northern percid fish community (Ryder and Kerr, 1978).

The MDNR currently manages the reservoir for walleye, smallmouth bass, and yellow perch, although a decade ago managed the reservoir as a coldwater, salmonid fishery. Brown trout were collected in the reservoir in 1982 and 1985, but were not collected in 1992. The MDNR stocks 50,000 walleye spring fingerlings every 2 years. Northern pike, walleye, and smallmouth bass are the primary predators in the existing fish community.

In the late 1970's, when northern pike first appeared in the reservoir (perhaps as a result of unauthorized stocking), their populations expanded quickly and the brown

trout population, which were regularly stocked in the reservoir at that time, decreased in abundance. Since 1985, the northern pike population appears to have stabilized. The smallmouth bass population, however, has increased in abundance, and the fishery is the best it has been in years, offering excellent angling opportunities for the public. Walleye abundance also has increased since 1982, but the yellow perch population (both in numbers and average size) has continued to decline during the past decade, possibly the result of increased predation from other species.

Bypassed Reach Below Hoist Dam

About 1,000 feet of the original Dead River channel (which was a steep cascade) is bypassed by the Hoist development. This reach has not received a minimum flow because of limited habitat value, and is wetted only during high-flow periods, when spillage occurs at the Hoist dam. The reach does not support a fishery, and no fish collections have been made in this reach.

Dead River Reach below Hoist Powerhouse

The reach downstream of the Hoist powerhouse tailrace, is a short, 0.4-mile-long channel to the upper reaches of the MSB. The stream gradient in this reach is moderate at around 12 feet per mile. Habitat conditions are dominated by shallow riffles and runs, with some minor pool development. Bottom substrates are a mixture of glacial outwash gravel, cobble, and sand. Most instream cover for fish is provided by depth, turbulence, and substrate roughness. Fish species, including northern pike, walleye, smallmouth bass, brown trout, yellow perch, and pumpkinseed, which all occur in the MSB, are also found in this reach. Anglers regularly fish this reach for brown trout, brook trout, and some northern pike. Walleye and white suckers have been recorded in the Hoist tailrace channel during the spring, both ascending from the MSB. Walleye are known to spawn in the tailrace. Brown trout and yellow perch have also been observed in the draft tube pit and tailrace channel.

This short river reach supports a high-quality trout fishery, and maintenance and enhancement of this fishery is an objective of the MDNR and local fishermen. Below the Hoist powerhouse, the MDNR stocks 5,500 brown trout and 1,000 rainbow trout yearlings annually.

McClure Storage Basin

The MSB is a cold, well-oxygenated, mesotrophic reservoir that is managed by the MDNR as a coldwater fishery. The reservoir supports a mixed warmwater and coldwater fishery. The fish community of the MSB is similar to that in the DRSB. However, the MSB has less diverse aquatic habitat for resident fish than the upstream SLSB and DRSB, primarily because there is less woody debris and other submerged structures, less submerged aquatic vegetation, and fewer shallow-water areas.

The MDNR conducted fishery surveys on the reservoir in 1988. Six species of fish were captured during the survey: northern pike, walleye, smallmouth bass, brown trout, yellow perch, and pumpkinseed. Yellow perch, pumpkinseed, and smallmouth bass were the most abundant species captured. Northern pike, smallmouth bass, and walleye are the primary predator species, likely foraging on yellow perch and pumpkinseed.

Bypassed Reach Below McClure Dam

The McClure bypassed reach is a 6.1-mile-long river channel between the McClure dam and powerhouse. The reach can be divided into three segments. The first segment extends 2.1-miles between the McClure dam and the confluence with Midway Creek. There is little fishery habitat in this segment, because the gradient is very steep (244 feet per mile), there are many small waterfalls, and the substrate is predominantly exposed bedrock. Approximately 2,900 feet of this segment, however, has a moderate gradient and contains the best trout habitat in the entire bypassed reach. The second segment is also 2.1 miles long, has a low-gradient (5.33 feet per mile), and provides pool-type habitat between the confluence of Midway Creek and Brickyard Creek, but limited spawning habitat potential. The third segment is a 1.9-mile-long reach similar to Segment 1. The lower 1.4 miles of this segment slopes steeply (138 feet per mile), traverses a narrow canyon with numerous stair-stepped cascades and waterfalls, and has a predominantly bedrock substrate. The upper 0.5 mile of this segment has a lower gradient and better habitat potential.

Currently, UPPCO does not release any minimum flows to the McClure bypassed reach and does not propose to do so. However, UPPCO estimates that the average flow in the bypassed reach could be as much as 17 cfs, with the tributary streams (Peters, Midway, and Brickyard Creeks) contributing 14 cfs, and leakage from the McClure dam and penstock contributing 2-3 cfs. Local anglers fish for brown trout at the confluences of tributary streams entering this bypassed reach.

Dead River Reach Below McClure Powerhouse

The McClure tailrace extends approximately 1,200 feet from the powerhouse to the confluence with Dead River, and discharges directly into the backwaters of MBLP's Forestville reservoir.

Local anglers fish for brown trout in the powerhouse tailrace. The MDNR annually stocks 4,200 brown trout yearlings downstream of McClure tailrace in the headwaters of Forestville reservoir.

Target Sportfishing Species

Fishing pressure on the Dead River and its impoundments can generally be described as low to moderate, but some areas are known to be heavily fished. Informal interviews with recreationists conducted by UPPCO during a ground survey in 1992, yielded general fishing information. Brown trout and brook trout are targeted by anglers in the riverine reaches of the Dead River. For reservoir anglers, smallmouth bass, splake, and brook trout are the popular game fish in SLSB; northern pike and walleye are sought in DRSB; and brown trout and northern pike are the target species in MSB. Yellow perch are also popular in all three impoundments, and these impoundments support ice fishing for these same species during the winter season.

Threatened and Endangered Aquatic Species

No threatened or endangered aquatic species are known to be present within the Dead River or its impoundments.

Fish Contaminants

The Dead River is located in an area of Michigan's Upper Peninsula that has a history of mining and metal refining due to abundant deposits of mercury and copper. Fish are subject to contamination from these natural and anthropogenic sources of metal contamination.

In response to public health concerns, the MDNR has maintained a fish contaminant monitoring program to quantitatively assess the degree of chemical contamination in fish from various waters throughout the state since 1984. The monitoring results have been used by the Michigan Department of Public Health

(MDPH) since 1988 to issue fish consumption advisories for all inland lakes in the state. The MDPH fish consumption advisory levels are used to set "restricted consumption" or "no consumption" advisories. The trigger levels set by the MDPH for issuing a health advisory for mercury levels in fish is 0.5 milligram per kilogram (mg/kg) of body weight. Northern pike, largemouth bass, and walleye have been the fish species most frequently exceeding the 0.5 mg/kg levels of mercury, based on data collected from the entire state (MDNR, 1991a). The EPA and the U.S. Food and Drug Administration have not established initial body burden or action levels for copper, lead, zinc, or cadmium levels for food or human consumption.

In 1992, the applicant conducted a fish contaminant study to determine existing levels of heavy metals in resident fish populations collected from the Silver Lake, Dead River, and McClure reservoirs. The fish contaminant study showed that all piscivorous species (predators such as northern pike, smallmouth bass, walleye, and brown trout) had detectable levels of mercury, copper, and zinc. Some fish tissues also showed lead contamination, and one large fish had detectable levels of cadmium. No individuals of non-piscivorous fish, such as yellow perch, collected from any of the three Dead River reservoirs, exceeded the action level of 0.5 mg/kg of mercury. However, both individual and mean concentrations of mercury in piscivorous fish species tissues frequently met or exceeded the threshold level for mercury (for large fish such as splake, northern pike, and smallmouth bass). The MDPH, however, has not issued a health advisory for Dead River fish species.

**Marquette Project**

The Marquette Project extends over a 4-mile reach of the Dead River from the headwaters of Forestville reservoir to the No. 3 powerhouse tailrace. The Forestville and Tourist Park reservoirs extend over approximately 2.5 miles of this reach. The remaining 1.5 miles of flowing river segment between the impoundments comprise two distinct reaches: (1) a one-mile bypassed reach below No. 2 dam, and (2) a 2,600-foot-long reach from No. 2 powerhouse tailrace to the headwaters of Tourist Park reservoir. The No. 3 powerhouse discharges into a riverine reach that flows into the estuary of Lake Superior, located about one mile downstream. The Dead River is classified as a warmwater fishery from the head of Forestville reservoir to below No.3 powerhouse. MBLP conducted a study in September 1997, to characterize the fisheries in the project reach. MDNR performed fishery surveys in October 1989 in the Forestville reservoir, and in 1982 in the Tourist Park reservoir.

Forestville Reservoir

Smallmouth bass, yellow perch, white sucker, and walleye were the four most common species collected in 1997 in Forestville reservoir, and comprised 95 percent of the total catch.

Multiple age classes for many of these species were collected, although legal size smallmouth bass (>14 inches) and walleye (>15 inches) were uncommon. Although other game/pan fish species, such as brown trout, northern pike, green sunfish, pumpkinseed, and bluegill were collected, their numbers were low. Young-of-the-year (YOY) specimens were collected for seven of the 12 species (i.e., northern pike, white sucker, pumpkinseed, bluegill, smallmouth bass, yellow perch, and walleye), which indicates successful reproduction of these species in the Dead River system. Gillnetting data from the 1997 MBLP study were compared to the results of the MDNR survey in October 1989 (Madison et al., 1989). The results from these two studies were similar, in that they showed similar species composition and relative abundance. However, brown trout and longnose sucker constituted a greater percentage of the catch in 1989 than in 1997.

Bypassed Channel Below No. 2 Dam

During infrequent, very high flows, the No.2 dam spills water into the one-mile-long bypassed channel. During non-spill periods, the bypassed reach receives leakage from the dam and penstock, from groundwater inflows, and tributary inflow from an unnamed creek. These inflows, estimated to average 13 cfs, support a naturally reproducing brook trout population in the bypassed reach, even though the Dead River is classified as a warm water stream from below the Forestville Road Bridge to its mouth..

In 1992, MBLP filed the results of a study required under Article 29 of the current project license. Article 29 required MBLP to consult with resource agencies and conduct a study to determine the minimum flow releases, if any, needed at the project to protect and enhance fish and wildlife resources. Based on instream flow studies and analysis conducted by MBLP and MDNR, consultations with MDNR and Interior, and the agreement reached by all parties, the Commission issued a June 1997 Order requiring MBLP to release a minimum flow of 20 cfs, or inflow, whichever is less, into the bypassed reach. In the winter, when 80 cfs is needed to prevent freezing of the penstock, the Order requires that MBLP make the minimum 20-cfs release after first satisfying the 80-cfs requirement. The Order also requires MBLP to provide some habitat

enhancement in this reach, by minor manipulation of the stream bed and placement of gravel, after consultations with the MDNR. The Commission deferred a request from the agencies to remove the remnant No.1 dam, which is located in this bypassed reach (made as part of the discussions leading up to the 1997 Order), for consideration during project relicensing. Currently, MBLP is developing a design for a structure to release minimum flows into the Forestville bypassed reach.

MBLP sampled the bypassed reach in 1997, both upstream and downstream of the remnant No.1 dam. This segment produced the only specimens of brook trout, fathead minnow, longnose dace, brook stickleback, and Iowa darter collected from the entire Marquette Project area. It also produced higher electrofishing catch rates for white sucker, johnny darter, and mottled sculpin than other segments of the Dead River. The brook trout ranged in size from three to ten inches, indicating the presence of multiple age classes, harvestable size classes, and natural reproduction.

Upstream of the remnant No.1 dam, the habitat is primarily pool-type. Substrate consists of gradually sloping banks with muck, detritus, boulders, cobble, and bedrock. Instream cover is extensive in the narrow channel in the upper half of this section, but sparse in the broader pools of the lower reach near the dam. Downstream of the remnant No.1 dam, substrate consists of cobbles and boulders. Instream cover is moderate to extensive, consisting of shallows and deep pools. Because of different habitat conditions and probable differences in water temperatures above and below the remnant No.1 dam, the fish communities are distinctly different upstream and downstream of the breached dam. For example, all brook sticklebacks and Iowa darters, as well as nearly all fathead minnows and brook trout were collected upstream of the breached dam. In contrast, all longnose dace, johnny darters, and logperch were collected downstream of the breached dam.

Dead River Below No. 2 Powerhouse

About 600 feet of this reach is a riffle/run section, where the catch during the 1997 MBLP survey was dominated by logperch (45 percent of catch). The remaining approximately 2,000 feet of the reach forms part of the headwaters of the Tourist Park reservoir. The catch in this segment was dominated by small yellow perch (average length of two inches), which is a dominant species in the downstream Tourist Park reservoir. This reach accounted for 97 percent of the YOY yellow perch collected from the Dead River between No. 2 dam and the Tourist Park reservoir. Catch-per-unit-effort (CPUE) for logperch in the riffle/run segment (93/hr) was similar to that observed

downstream of the remnant No.1 dam (83/hr), and downstream of No. 3 powerhouse (99/hr), which collectively accounted for 98 percent of the catch.

Tourist Park Reservoir

Tourist Park reservoir supports a large population of small yellow perch that accounted for about 63 percent of the total catch in 1997, out of the eleven species collected. The mean length of yellow perch was 3 inches, with a range of from 2 to 8 inches. Smallmouth bass was the second most common species collected in 1997. Although multiple age classes of smallmouth bass were present, including several legal size (> 14 inches) fish, YOY accounted for 86 percent of the smallmouth bass catch. Collectively, yellow perch and smallmouth bass comprised 76 percent of the total catch.

Northern pike were collected in relatively low numbers in Tourist Park reservoir (2.6 percent of the catch), although higher than the numbers collected in Forestville reservoir (0.9 percent of the catch). This may reflect better habitat for this species in Tourist Park reservoir. No legal size (>24 inches) northern pike, however, was collected from either reservoir. Other game/pan fish collected in Tourist Park reservoir included relatively low numbers of rock bass, pumpkinseed, bluegill, and walleye. YOY fish were collected for 7 of the 11 species (i.e., northern pike, white sucker, pumpkinseed, bluegill, smallmouth bass, johnny darter, and yellow perch), indicating successful reproduction of those species. No cyprinids (minnows) were observed.

Comparison of netting data from this study with data collected by MDNR in 1982 (Peterson and Leonardi, 1982), suggests that the fish community in Tourist Park reservoir has changed little over the past 15 years. For example, small yellow perch continue to dominate the fishery. Although both studies indicated multiple year classes of smallmouth bass, the population has consisted primarily of individuals less than 6 inches in length. Both studies showed that northern pike were present in low to moderate numbers.

Bypassed Channel Below No. 3 Dam

Approximately 600 feet of the Dead River is bypassed by the No. 3 development. This reach was not included in the MBLP study conducted in 1992 under Article 29 of the existing license. There is currently no minimum flow released to this bypassed reach. The upper 200 feet of the reach is mostly bedrock, while the lower 400-foot portion of the reach has a rock-cobble substrate similar to that in the No. 3

powerhouse tailrace. This reach is considered to have minimal fishery habitat, and no fish surveys have been conducted in the reach.

Dead River Downstream of No. 3 Powerhouse

The No. 3 powerhouse tailrace discharges into a 250-ft-long riverine reach that flows into the Lake Superior Estuary. This short reach supports seasonal spawning runs of chinook and coho salmon in the fall, and runs of steelhead in spring. The Commission's June 1997 Order requires that MBLP continue to coordinate with the MDNR and release 40 cfs or inflow, whichever is less, to the Dead River below No.3 powerhouse between September and April, to promote spawning of migratory salmonids from Lake Superior.

The catch from this segment during MBLP fishery surveys was dominated by logperch, smallmouth bass, and rock bass. Most smallmouth bass and rock bass collected were small (average length of 3 inches). Lake Superior sea lamprey also occurred within this reach. There is no modern or historical record of lake sturgeon use of the Dead River. Staff was unable to confirm recent reports by MDNR that lake sturgeon had been observed in the Dead River below Tourist Park.

Fish Contaminants

In 1997, MBLP conducted a fish contaminant study to determine existing levels of mercury in resident fish populations collected from the Forestville and Tourist Park reservoirs. Mean concentration was 0.29 mg/kg in nine yellow perch from Forestville, and 0.33 mg/kg in ten smallmouth bass from the Tourist Park reservoir. A single walleye from the Forestville reservoir contained 0.61 mg/kg of mercury, and one smallmouth bass from Tourist Park contained 0.63 mg/kg. All other fish tested were below 0.5 mg/kg, indicating that mercury contamination is not a major issue in the project reservoirs.

b. Environmental Effects and Recommendations:

**Dead River Project**

During scoping, resource agencies and other interested parties identified minimum flow requirements, lake level management, and the effect of project operation on fishery resources as important issues to be addressed in the environmental analysis.

The agencies and interested parties provided a number of recommendations for reservoir level restrictions and for minimum flows at various project locations (table 6).

Project Operation Restrictions

*UPPCO Proposal*

As described in section V.C.2, UPPCO proposes to continue operating the Hoist and McClure powerhouses in a peaking mode, with reduced drawdowns of 8.5 feet in SLSB, 7 feet in DRSB, and a near-constant level at MSB. UPPCO also proposes to maintain continuous minimum discharges of 8 cfs, 100 cfs, and 72 cfs below SLSB, the Hoist powerhouse, and the McClure powerhouse, respectively.

*Recommendations from Agencies and Interested Parties*

As described in section V.C.3, the WQC prescribes minimum flows below each of the three impoundments, and limitations on reservoir drawdown, but allows for continued peaking operation. The WQC restricts maximum drawdown to 4.5 feet at SLSB, 3.5 feet at DRSB, and 1.6 feet at MSB, and prescribes target beginning-of-month water levels and minimum monthly water levels for SLSB and DRSB. Further, the WQC restricts daily water level fluctuations to 0.5 feet in SLSB and DRSB, and 1.0 foot in MSB. The WQC specifies seasonally varying minimum flows between 10 and 25 cfs at SLSB; a continuous minimum flow of 100 cfs below Hoist powerhouse; and a minimum flow of 80 cfs below the McClure powerhouse, whenever sufficient water is available. The WQC also requires a continuous minimum release of 20 cfs in the bypassed reach below McClure dam.

MDNR's recommendations for reservoir level restrictions are the same as the WQC conditions. Further MDNR recommends a 5-cfs increase in monthly seasonal minimum flows above those specified by the WQC below Silver Lake dam, a continuous flow of 120 cfs below Hoist powerhouse, and a continuous flow of 80 cfs below McClure powerhouse. In addition, MDNR recommends a minimum continuous flow of 40 cfs in the McClure bypassed reach. The MDNR also recommended that the maximum flow from SLSB be restricted to 100 cfs, when flows are under control of the applicant. In addition, the MDNR recommends that Hoist Powerhouse be operated in non-peaking mode from March 15 to June 15.

Interior recommends that the Dead River Project be operated with reservoir water level fluctuations no greater than +/- 0.5 feet. The MHRC recommends run-of-river (ROR) operation of the project. Both Interior and MHRC recommend a minimum flow of 40 cfs in the McClure bypassed reach.

KBIC recommends that UPPCO operate the project in a ROR mode and that a minimum of 40 cfs be maintained in the McClure bypassed reach.

Mr. Weglarz has suggested that a minimum flow of 15 cfs be maintained below Silver Lake dam.

*Our Analysis*

Reservoir Level Restrictions: Large fluctuations in reservoir levels with long drawdown periods may affect the impoundment fishery because of potential dewatering and abandonment of fish spawning nests or redds, exposure of aquatic macroinvertebrates and aquatic plants, and stranding of fish. There is no existing information on the effect of historical reservoir fluctuations on these impoundment fisheries, and likewise none of the agencies present site-specific data to support their recommendations for reservoir level restrictions. Nevertheless, there are benefits to reducing the depth and duration of reservoir level drawdowns, as well as the frequency and depth of daily fluctuations. Littoral zone aquatic habitat would benefit from reduced and less frequent drawdowns, because less habitat would be dewatered, which would reduce adverse effects (dessication, direct mortality, or stranding) on aquatic macroinvertebrates, aquatic plants, and fish that typically utilize this habitat. The WQC conditions for reservoir level restrictions appear to be a good "compromise" between the applicant's proposal and the recommendations made by Interior, MDNR, and MHRC. UPPCO would be able to continue limited peaking operations, while littoral zone habitat would be afforded protection by reduced reservoir level drawdowns and daily fluctuations. We recommend that the WQC conditions for reservoir level restrictions be included in any license issued.

SLSB Minimum Flow Release: Fish habitat data collected by UPPCO (UPPCO, 1994) was re-analyzed by MDNR using the HABTAV model routine from the Physical Habitat Simulation Program (PHABSIM) modeling package, which is part of the Instream Flow Incremental Methodology (IFIM). MDNR's results indicate that the higher minimum flows recommended by MDNR in the river below SLSB would provide some benefits for three of the species' life stages analyzed, while five species' life stages

would see reductions in habitat, and four species' life stages would experience minimal changes in habitat. Both the MDNR flow recommendations and WQC minimum flow requirements would provide more habitat for all species for at least part of the year, compared to the continuous minimum flows proposed by the applicant (8 cfs) or by Mr. Weglarz (15 cfs).

A review of the various fish habitat flow decision matrices and discussions in UPPCO (1994), indicates that no single set of project discharges provides excellent or optimal habitat for all life stages of all stream-dwelling fish species in the Dead River below Silver Lake dam. The native brook trout requires shallower depths and lower velocities than the larger and non-native brown trout. Hence, brook trout requirements for all life history stages are more easily met by minimum flows required in the WQC. A minimum flow in the range of 10-25 cfs provides good to excellent habitat suitability for all life stages of brook trout. Habitat suitability for brown trout life stages, however, is less than optimum at these minimum flows, although suitability is higher than at the minimum flow proposed by the applicant (8 cfs). Suitability does not significantly or consistently improve for some brown trout life stages by the additional 5-cfs minimum flow recommended by the MDNR, and would appear to provide little additional enhancement of brown trout habitat. The 10-25 cfs minimum flow required by the WQC would provide a balance of nearly optimal habitat for the native brook trout, and some enhancement of brown trout habitat suitability. Since brook and brown trout have self sustaining populations i this river reach below SLSB, the added flows required by the WQC should provide enhancement beyond the 8 cfs proposed by the applicants and the various flows recommended by the MDNR. Thus, we recommend that UPPCO maintain minimum flows in the Dead River below Silver Lake dam consistent with the requirements of the WQC.

ROR Operation of SLSB: Non-peaking operation of SLSB with a maximum fluctuation of only 0.5 feet, along with releases from the dam equal to inflow to the basin, would resemble a natural stream flow regime. The staff-recommended monthly minimum flows, however, are generally higher than minimum flows that have historically occurred during the spring and summer months below the SLSB, and would enhance fishery habitat in the river reach below the SLSB. While ROR operations may benefit aquatic resources under some operational scenarios, the storage capacity of the SLSB, which would act to store low runoff during the drier months of the year (under ROR operation), would likely result in lower flows below the SLSB, than under the staff-recommended minimum flow schedule. Aquatic habitat in the downstream reach may actually be reduced under a ROR operation of SLSB. Imposition of a non-peaking

operation would also reduce UPPCO's capability to meet its peak demand needs, by reducing the releases from storage for downstream power production. Operation of the SLSB with seasonally varying minimum flows as required by the WQC, and recommended by staff, would provide a more balanced alternative to competing resource uses, while protecting aquatic resources. Our recommendation of ROR operation involves costs and thus is deferred to Section VII.Comprehensive Development and Recommended Alternatives.

SLSB Maximum Flow Release: The WQC restricts the maximum outflow from SLSB to 150 cfs during normal operations, and to 200 cfs under conditions beyond UPPCO's control, which would include high inflows. This maximum flow release restriction and that recommended by MDNR (100 cfs) would reduce flow fluctuations in the Dead River below SLSB. Such a reduction would likely result in improved aquatic habitat in the river reach below SLSB, because this habitat would experience less variability in wetted area, depth, and velocities. The results of the instream flow studies (UPPCO, 1994) indicate that habitat suitability in the Dead River below Silver Lake dam was in the "good" range (75 percent or greater of the maximum habitat value) for nine species' life stages at flows between 85 and 120 cfs. Habitat suitability was at maximum for six species' life stages at 120 cfs, although a gradual decrease in habitat suitability occurred below the Connors Creek confluence for all species and life stages, as flows increased above 100 cfs. Neither the MDNR nor UPPCO modeled flows above 120 cfs, to assess potential reduction in habitat value at higher flows. However, the staff's review of the instream flow study results indicates that there would be little reduction in habitat suitability resulting from a 150-cfs discharge from the SLSB, compared to a discharge of 100 cfs.

UPPCO's operations modeling indicates that outflows from SLSB greater than 100 cfs would likely occur from January through June, and in November. Outflows from the SLSB are controlled manually by setting the opening of a slide gate at the low level outlet, which occurs 2-4 times per month. The staff-recommended restrictions for reservoir level fluctuations would reduce the planned withdrawal from the SLSB, and would likely require more frequent operation of the slide gate at the SLSB outlet. Such operation would likely reduce the frequency of high-volume outflows from the SLSB.

UPPCO's modeled outflows from SLSB during the period April through September have averaged approximately 20 cfs. With the staff-recommended drawdown and minimum flow restrictions, we anticipate the number of hours of flows above 100

cfs would be limited during these months, and would mostly result from high natural inflows.

Based on the available information, it appears that high-volume outflows from SLSB would be infrequent, and that when they do occur, there would be little difference in effects on habitat suitability between 100 and 150 cfs. Therefore, any license issued should include a maximum outflow restriction consistent with the requirements of the WQC (150 cfs).

Hoist Powerhouse Minimum Flow Release: MDNR recommends a 120-cfs continuous minimum flow from DRSB, instead of the 100 cfs required by the WQC. MDNR recommends this increase for the enhancement of 0.4 mile of riverine habitat between Hoist powerhouse and the MSB, which supports a good quality trout fishery. The habitat is primarily shallow riffles and runs with minor pool development.

The MDNR stocks brown trout and rainbow trout yearlings in this river reach. UPPCO's instream flow studies (UPPCO, 1994) suggest that adult brown trout habitat in this reach is maximized at less than 100 cfs, and the habitat value decreases somewhat with flows above 100 cfs, for all life stages except fry. For brown trout fry, the increase in habitat is minor from 100 cfs to 120 cfs. Brook trout habitat in this reach is maximized in the 15-50 cfs range for all life stages, and starts to decrease when flows exceed 50 cfs. Thus, there would be little benefit to brook trout with a higher minimum flow from the Hoist powerhouse, as recommended by MDNR.

MDNR notes the potential value of the tailwaters of the Hoist powerhouse for walleye spawning in the month of May (UPPCO, 1994). This species is a targeted management species for the DRSB and MSB project waters. UPPCO's operations modeling indicates that the average monthly outflow in May and June from the DRSB (primarily through Hoist powerhouse) would be around 230 cfs, which would provide excellent habitat for walleye spawning. Outflows would generally range from 100 to 400 cfs under the WQC operating conditions. This range of flows provides fair to excellent habitat suitability for walleye, and an increase in the minimum flow from 100 to 120 cfs would likely result in little improvement in walleye spawning habitat. As noted above, a minimum flow greater than 100 would decrease habitat suitability for brook trout and some life stages of brown trout.

Implementation of a continuous minimum flow as required by the WQC, would significantly reduce flow fluctuations in the Dead River below Hoist powerhouse, and

would provide improved habitat suitability for walleye, brown trout, and other fish species. Minimum flows higher than that required by the WQC (100 cfs), however, would decrease the habitat suitability for brook trout, which supports an important sport fishery in the reach. There appears to be a conflict within the MDNR management goals for fish species below the Hoist powerhouse. Trout stocking continues in the area that has historically been a popular trout recreational fishery. Management of walleye also appears to be a MDNR objective for this reach. We believe the WQC minimum flow requirements offer a reasonable balance in minimum flows but, because flow releases affect project economics, we make our final recommendations for all resource protection and enhancement measures in section VII, *Comprehensive Development*.

Hoist Powerhouse Peaking Operations: MDNR recommends non-peaking (ROR) operation of the Hoist powerhouse from March 15 to June 15 to protect any YOY fish in this 0.4-mile-long reach. Brook trout and brown trout fry emerge in April or early May. Walleye spawn in May, with hatching of fry into June. The staff-recommended operation would result in Hoist powerhouse outflows in the range 100 cfs to 320 cfs during the March to June period. Water level fluctuations in the Hoist tailrace are less than 0.8 feet. for this range of powerhouse flows, and velocity does not fluctuate significantly in the tailrace. As noted above, there is no single flow range that would provide good habitat suitability during this period for all species. ROR operation of the Hoist powerhouse would not provide significant enhancement of habitat suitability for fry, or other life stages, compared to the continued peaking operation, with a 100-cfs minimum flow, during the period of March 15 to June 15. As stated above, because the flow releases affect project economics, we make our recommendations in section VII Comprehensive Development.

McClure Powerhouse Minimum Flow Release: Operation of the McClure powerhouse is largely controlled by outflows from the Hoist powerhouse. The McClure powerhouse discharges directly into MBLP's Forestville reservoir of the Marquette Project. Water levels in McClure tailrace drop less than 1.5 feet when generation flow is reduced from a maximum of 310 cfs to a minimum of 80 cfs. When generation completely ceases, water level may drop an additional 1.5 feet, depending on the water level at the downstream Forestville reservoir. However, the tailrace is not totally dewatered because of the backwater effect of the Forestville reservoir. Thus, there have been instances in the past when the project was not operating and the riverine habitat downstream from the McClure powerhouse was greatly reduced. However, the tailrace reach supports a fishery for brown trout. The MDNR recommends a continuous

minimum flow of 80 cfs below McClure powerhouse, and similarly the WQC prescribes a minimum flow of 80 cfs below the powerhouse, whenever sufficient water is available.

The staff-recommended alternative for the upstream Hoist powerhouse would require a continuous minimum outflow from the powerhouse of 100 cfs. UPPCO's modeling of river hydrology suggests that this minimum discharge would generally be achievable, except during extreme low-flow years. If UPPCO is able to maintain this outflow from the upstream Hoist powerhouse under normal operations, UPPCO should in turn be able to maintain 80 cfs from the McClure powerhouse, with one unit operating normally, assuming relatively stable reservoir levels, and also maintain a minimum flow of 20 cfs in the McClure bypassed reach (see below).

No minimum flow study was conducted in the reach immediately below the McClure powerhouse, because of the limited riverine habitat in that reach. As noted above, however, the reach does support a fishery for brown trout, and a continuous minimum flow would enhance habitat for brown trout, by maintaining depth and velocities more suitable for trout, compared to project shutdown conditions, where the reach becomes a backwater from the downstream Forestville reservoir. Continuous releases would also ensure more suitable water quality for trout, by discharging well-oxygenated waters from upstream, and preventing stagnation or warming due to the backwater effect from Forestville reservoir. The 80-cfs minimum release recommended by the MDNR, and required by the WQC, would likely provide enhancement of aquatic habitat in this reach. However, because flow releases affect project economics, we make our final recommendations for all resource protection and enhancement measures in section VII, *Comprehensive Development*.

Minimum Flows in McClure Bypassed Reach: UPPCO does not propose to release any minimum flow into the McClure bypassed stream reach.

MDNR, Interior, MHRC, and KBIC recommend a minimum flow of 40 cfs in the McClure bypassed reach, while the WQC requires a minimum flow of 20 cfs. MDNR supports its recommendation with an analysis of habitat simulation data from the UPPCO instream flow studies. MDNR used the HABTAV model from the PHABSIM modeling package of the IFIM. MDNR modeled several potential benefits of an instream flow, including fish species-life stages for a coldwater community, macroinvertebrates, and recreational uses (wading fishing and canoeing). The MDNR fisheries analysis indicated that brook trout habitat for most life stages is optimized in this reach at a flow of about 20 cfs. Brown trout are known to occur in this reach near

the confluences with the tributary streams (Midway and Brickyard creeks). Brown trout habitat for spawning and fry reach good to excellent suitability at flows around 20 cfs. Habitat improves significantly for brown trout juveniles and adults with flows above 10 cfs, but do not reach "good" suitability until about 50-75 cfs.

A minimum release of 20 cfs into the bypassed reach, in conjunction with natural tributary flows and dam and penstock leakage, would result in a minimum flow in the reach in the range of about 26 to 37 cfs. Flows in this range would be adequate for native brook trout (although slightly higher than the optimum flows), and would considerably improve habitat suitability for brown trout. Release of a minimum flow into the bypassed reach would also act to reduce current water temperatures in the upper reach, and help to maintain the reach as coldwater fisheries habitat. A 20-cfs minimum flow release, would be consistent with the WQC requirements, offers improved conditions for fishery resources over what currently occurs in this reach, and we recommend it should be made a condition of any license issued.

The MDEQ, as part of the WQC, also has reserved the right to review the minimum flow requirement in the McClure bypassed reach beginning 12 years after license issuance. Such a review could provide an opportunity to reassess the minimum flow requirement, after an extended period of operational experience. Because flow releases affect project economics, however, we make our final recommendations for all resource protection and enhancement measures in section VII, *Comprehensive Development*.

Upstream Fish Passage

*UPPCO Proposal*

UPPCO does not propose any fish passage at the project's facilities.

*Recommendations from Agencies and Interested Parties*

The MDNR recommends that language be included in any order issuing a license for the Dead River Project, that clearly states that the standard re-opener can be used for fish passage. The MDNR was not specifically requesting upstream passage at the project at this time, but wanted to be assured that provisions for future fish passage were provided in any license issued.

Interior requests that the Commission reserve its authority under Section 18 of the FPA, to prescribe fishways as a condition in any licenses issued.[7]

KBIC recommends development of both upstream and downstream fish passage at all dams, if the resource agencies develop a river management plan that determines a need for fish passage.

*Our Analysis*

The Commission recognizes that future fish passage needs and management objectives cannot always be determined at the time of project licensing. Under these circumstances, and upon receiving a specific request from Interior, we recommend that the Commission follow its practice of reserving the Commission's authority to require such fishways as may be prescribed by the Secretary of the Interior.

The MDNR's recommendation that any license issued for the project contain a standard reopener license article that can be used to specifically address upstream fish passage at the project's dams would be recommended for adoption by the Commission. This issue would be addressed by the use of standard L-form articles that would be attached to any license issued by the Commission for the Dead River Project. However, it should be noted that there is no specific Ll-form article that specifically addresses fish passage, rather there are L-form articles that are much broader in coverage including one that would provide for the general conservation and development of fish and wildlife resources at the project as may be ordered by the Commission upon its own motion or upon the recommendations of state fish and wildlife agencies, afer notice and opportunity for hearing. Thus, in effect, if the need for fish passage were to arise at the project in the future, the MDNR could petition the Commission to re-open the license to address their concerns about this issue and a standard L-form article would be used to facilitate the request.

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[7] Section 18 of the FPA provides that "the Commission shall require construction, maintenance, and operation by a licensee at its own expense of such fishways as may be prescribed by the Secretary of Commerce or the Secretary of the Interior, as appropriate."

KBIC's concerns about fish passage would also be addressed by our recommendations for the Commission to reserve Interior's Section 18 authority and by the use of standard L-form articles in any license issued for the project.

Downstream Fish Passage and Protection

*UPPCO Proposal*

UPPCO states that based on its field study (RMC, 1993a; RMC, 1993b), estimated fish entrainment mortality through the Hoist and McClure powerhouses is minor and would not result in any adverse effects to the fish populations in the project reach of the Dead River. Hence, UPPCO does not propose any fish protection measures.

*Recommendations from Agencies and Interested Parties*

MDNR recommends that the applicant prepare a fish protection plan in consultation with the agencies, within 12 months of issuance of a license. According to MDNR, components of the plan should include provisions for the selection of a consultant, and the design, installation, and maintenance of fish protection devices, within 5 years of license issuance. In addition, the MDNR recommends that any entrainment protection devices installed at the projects be evaluated for effectiveness, after they are placed into operation. Following completion of the effectiveness study, MDNR recommends that additional measures be required, or that UPPCO conduct a fisheries damage assessment, to compensate for any residual fish mortality. If no fish protection devices are deemed to be economically feasible at this time, MDNR recommends that UPPCO establish an escrow account, with annual contributions, such that protection and downstream passage at the Hoist and McClure powerhouses could be accomplished at a later time, but within 20 years of license issuance.

Interior recommends development and implementation of a fish protection plan that evaluates a range of protective measures. Interior states that turbine mortality of fish should be avoided by the applicant, and unavoidable losses compensated. Interior also recommends that UPPCO develop a plan to install protective devices in intake areas, and compensate the State of Michigan for any residual fish losses caused by the project.

KBIC recommends that UPPCO provide for protection of fish species from turbine mortality, and that restitution be made only when losses cannot be avoided.

*Our Analysis*

The species that exist within the impoundments of the Dead River Project are resident and generally non-migratory species. These fisheries are intensively managed by supplemental stocking of hybrids and other native and non-native species by the MDNR. Most of the common native species, however, maintain self-supporting populations, with all life history stages found in the project reservoirs. Many of the native species are so abundant (e.g., yellow perch), that removal programs have been an active component of the reservoir management programs. Fish population sampling and the active sport fishery suggest an abundance of fish are available for recreational harvest. Although the species composition, relative abundance, and distribution may have changed over the past 20 years, the changes are likely related more to active management activities and harvest, as opposed to population changes caused by the continued operation of the Dead River Project. Large-scale environmental factors are more likely to affect fish population levels than the localized influence of turbine entrainment mortality.

The potential effects of fish entrainment and mortality at the Hoist and McClure powerhouses were investigated by UPPCO by conducting fish entrainment and turbine mortality studies at both powerhouses. At the Hoist powerhouse, the discharge from Unit #3 was sampled by full recovery tailrace nets, while at the McClure powerhouse the exit of the common draft tube of the two units was sampled. The nets were sampled once every two hours over a 72-hour sample period at both the projects, once in December 1991 and November 1992, and twice per month during April through October 1992 (RMC, 1993a; RMC,1993b). Entrainment was estimated from the net catch after adjusting for net efficiency, and the ratio of time sampled to time of unit operation. Net efficiency was measured as a function of fish length, body shape (fusiform or laterally compressed), and condition (alive or dead).

Of the 2,754 fish collected during sampling in the Hoist tailrace, walleye accounted for 90 percent of the catch. About 92 percent of the walleye were caught in June and July 1992 and 82 percent of these were YOY fish that were less than about 3 inches in total length. MDNR had previously stocked about 1 million walleye eggs earlier that year and it is likely that the high catch rate of YOY walleye was the result of the MDNR stocking and YOY dispersal. Yellow perch were the second most frequently captured fish with the remaining 6 percent of species captured distributed among 13 other species.

UPPCO estimated the annual entrainment for the Hoist powerhouse to be about 25,600 fish composed of 83 percent walleye, 12 percent yellow perch, and 5 percent other species. UPPCO estimated a turbine mortality rate of about 46 percent for walleye, and 6 percent for yellow perch.

Of the 1,000 fish collected during sampling in the McClure tailrace, walleye accounted for 53 percent of the catch. About 99 percent of these walleye were caught in June and July 1992, and over 98 percent of them were YOY. Brown trout accounted for 16 percent of the fish catch. Entrainment of brown trout, however, began four days after MDNR stocked 6,500 brown trout in the upstream Hoist tailrace, and may reflect that stocking. Smallmouth bass accounted for 15 percent of the catch and yellow perch 8 percent with most of these fish being YOY.

UPPCO estimated the annual entrainment for the McClure powerhouse to be about 6,600 fish, composed of 42 percent walleye, 19 percent smallmouth bass, 16 percent brown trout, 14 percent yellow perch, and 9 percent other species. UPPCO estimated a turbine mortality rate of about 40 percent for walleye, 2 percent for smallmouth bass, 10 percent for brown trout, and 4 percent for yellow perch.

Natural mortality rates for the first 2 years of life for many fish species are generally high, as reported in the literature for: walleye (Elrod et al., 1987; Forney, 1976; Mitzner, 1992); yellow perch (Forney, 1971; Neilson, 1980; Nelson and Walburg, 1997; Post and Evans, 1989; Vogel and June, 1987); largemouth bass (Miranda et al., 1984; Shirley and Andrews, 1977); and smallmouth bass (Clady, 1975; Funk, 1975; Paragamian and Coble, 1975; Pflieger, 1966; Shuter et al., 1980). This indicates that, even without turbine passage, the natural mortality rates for these species is relatively high over the first two years of life.

We acknowledge that entrainment estimates, including those empirically derived, at best, provide only a general indication of actual numbers of fish entrained at hydro projects (FERC, 1995). We therefore consider the estimate of entrainment loss of fish at the Hoist and McClure Developments to provide a general ballpark view of entrainment effects, especially when taking into consideration fish stocking made in the reservoirs shortly before the entrainment studies were conducted. The overall numbers of fish entrained at both developments were relatively low compared to entrainment estimates for other Upper Peninsula hydropower projects in Michigan and Wisconsin. For example, the Prickett (FERC Project No. 2402 in MI), White Rapids (FERC Project No. 2357 in WI), and Brule (FERC Project No. 2431 in WI) hydropower projects had

annual entrainment estimates of 100,000, 145,000, and 42,000 fish respectively (RMC 1991, 1992a, and 1992b). We find the estimated entrainment mortality rates for the Dead River developments to be unusually high based on the type of generating facilities (i.e., Francis turbines having relatively slow blade rotations) and the species and year classes. Extensive sampling has shown that the majority of fish entrained at hydropower projects are small (less than eight inches) and that naturally entrained fish tend to experience low mortality from turbine passage, about 6 percent (EPRI, 1992). We would expect this level of entrainment for the Dead River developments. We suspect that the stress of handling, combined with the collection technique and turbine passage (and in some cases, stocking) inflated the estimates of mortality rates. The party conducting the entrainment studies admitted they had difficulty with fish mortality rates for walleye because of the fragile nature of the YOY fish and from the long residence time fish spent in the collecting nets.

MDNR, Interior, and KBIC recommend that UPPCO provide for fish protection by preparing and implementing a fish protection plan that would eventually result in the installation of fish protective measures at the Hoist and McClure powerhouses. Although no specific designs were recommended, typical fish protective measures designed for resident species at hydroelectric projects elsewhere in the U.S. usually involve the installation of narrow-spaced trashracks (typically 1-inch clear spacing between the bars), to prevent fish from entering the turbines, with an associated sluiceway bypass. Other more "experimental" measures have been tested at some projects ("behavioral" devices such as lights, sound, bubble curtains, etc.), but the overall success of these measures has been mixed. Even the more typical narrow-spaced trashrack installations, however, have shown mixed success rates, or have not been sufficiently evaluated. In fact, Interior, in its October 5, 2000, letter of comment on the Marquette Project, stated "...state-of-the-art fish protection technology for riverine fish species indigenous to the Dead River is presently not sufficient to provide assurance that any fish protection measure(s) that could be installed at this time would be highly effective biologically."

Other project owners elsewhere in the U.S. have similarly investigated the feasibility of installing fish protection for resident species. Studies conducted on several hydroelectric projects in New York State (Sabattis et al., 1997) estimated that 1-inch bar racks (trashrack bar spacing at the Dead River Projects is 2 inches) would cost twice as much as the replacement value of the fish lost to entrainment, and because the 1-inch racks would still allow 94 percent of the fish to be entrained, they concluded that these

devices do not show reasonable cost effectiveness. The current technology for fish protection of resident species has not shown consistent success.

Given that many of the fish entrained at the Dead River developments were YOY fish and that these fish have high natural mortality rates, we don't anticipate any adverse effects on the fish communities from entrainment and turbine mortality. In addition, the project reservoirs support health fish populations and active sport fisheries, with no indication that historical project operations have adversely affected the reservoir fisheries. Therefore, we conclude no measures to minimize entrainment or to provide other compensatory measures are warranted at this time. The staff-recommended reservoir level constraints and minimum flow releases should provide some enhancement to the project area fisheries and offset any minor losses from turbine mortality.

Requiring either escrow accounts for future fish protective measures or monetary compensation for fish losses or fish damage assessments, as recommended by the MDNR, are also not warranted at this time. Available information indicates that entrainment mortality is not resulting in significant adverse effects on project area fish populations, and therefore, there is no need to establish a fund for future installation of fish protective measures. We are also not recommending fisheries damage assessments. The majority of fish killed are YOY and are a life stage that experiences relatively high natural mortality, even without being affected by project operations. Furthermore, payment of damages to the state for fish entrainment is outside the Commission's regulatory authority. Therefore, we do not recommend payment for fisheries losses or escrow accounts for future fish protective measures against entrainment as a term or condition of any license issued for the Dead River Project.

**Marquette Project**

During scoping, resource agencies and other interested parties identified minimum flow requirements, lake level management, and the effect of project operation on fish resources as important issues to be addressed in the environmental analysis. The agencies and interested parties provided several recommendations for reservoir level restrictions and for minimum flows at each of the project developments (table 7).

Project Operations

*MBLP Proposal*

MBLP proposes to operate the Forestville development such that reregulation of streamflow at the Tourist Park development would be possible. MBLP proposes to maintain Forestville reservoir between elevation 769.5 and 771.0 feet NGVD, and to release from the No. 2 powerhouse, minimum flows of 80 cfs between November 16 and March 15, and 40 cfs between March 16 and April 30, and October 1 and November 15, when sufficient water is available. MBLP also would maintain a minimum flow of 20 cfs in the Forestville bypassed reach, except during cold-weather conditions when inflow is less than 100 cfs. During these conditions, MBLP would divert 80 cfs to the powerhouse to prevent the penstock from freezing. The remainder of the stream inflow would be released to the bypassed reach.

MBLP proposes to operate the No. 3 powerhouse in a re-regulating mode of operation and maintain the reservoir level between elevation 636.7 and 637.7 feet NGVD. MBLP proposes to match the average daily outflow to the average daily inflow in operating the No. 3 development.

*Recommendations from Agencies and Interested Parties*

MDNR, NWF, and MHRC recommend that a minimum flow of 85 cfs be maintained at the No. 2 powerhouse at all times.

MDNR, NWF, Carl Lindquist and MHRC recommend that the No. 3 powerhouse be operated in a non-peaking mode, while maintaining a reservoir elevation of 637.2 feet NGVD +/- 0.5 foot. MDNR, Interior, NWF, and MHRC also recommend that a 40-cfs minimum flow be maintained in the Tourist Park bypassed reach. As an alternative to the 40-cfs minimum flow, Interior recommends installation of a fish barrier to prevent fish from ascending the bypassed channel.

Interior further recommends that MBLP operate both the Forestville and Tourist Park developments in a non-peaking mode with reservoir level fluctuation no more than +/- 0.25 foot.

MDNR, Interior, NWF, and MHRC recommend that the remnant No. 1 dam, which is located within the Forestville bypassed reach, be removed to improve fishery habitat in the reach.

*Our Analysis*

Reservoir Level Restrictions: Large fluctuations in reservoir levels with long drawdown periods may affect the impoundment fishery because of potential dewatering and abandonment of fish spawning nests or redds, exposure of aquatic macroinvertebrates and aquatic plants, and stranding of fish. There is no existing information on the effect of historical reservoir fluctuations on these impoundment fisheries, and likewise none of the agencies present site-specific data to support their recommendations for reservoir level restrictions. Nevertheless, there are benefits to reducing the depth and duration of reservoir level drawdowns, as well as the frequency and depth of daily fluctuations. Littoral zone aquatic habitat would benefit from reduced and less frequent drawdowns, because less habitat would be dewatered, which would reduce adverse effects (dessication, direct mortality, or stranding) on aquatic macroinvertebrates, aquatic plants, and fish that typically utilize this habitat. The WQC conditions for reservoir level restrictions, which are identical to the MBLP proposal, appear to be a good "compromise" between the applicant's proposal and the recommendations made by Interior, MDNR, NWF, and MHRC. Under the WQC, MBLP would be able to continue limited peaking operations, while littoral zone habitat would be afforded protection by reduced reservoir level drawdowns and daily fluctuations. For those reasons, we support the WQC conditions for reservoir level restrictions that would be included in any license issued.

No. 2 Powerhouse Minimum Flow Release: The MDNR recommends a continuous minimum flow of 85 cfs to enhance fishery resources in the 2,640-foot section of river between the No. 2 powerhouse and the Tourist Park reservoir. MBLP (1999) states, however, that only 600 feet of this reach offer riverine habitat, and the remaining 2,040 feet are pool habitat resulting from the backwater effect of Tourist Park reservoir. MDNR does not dispute this habitat characterization, and in 1992, applied a modified IFIM analysis to this reach, and recommended a minimum flow of 53 cfs for this reach. This minimum flow was to be a comprise of the 40-cfs minimum flow determined for the Forestville bypassed reach, in addition to an estimated 13-cfs leakage and tributary inflow to the bypassed reach. However, the MDNR later agreed that a lower minimum flow of 33 cfs (20 cfs in the Forestville bypassed reach, in addition to 13-cfs leakage and tributary inflow) would be acceptable. The Commission accordingly issued a June 1997 Order requiring MBLP to release a 20-cfs minimum flow into the Forestville bypassed reach (see below). In its 10(j) recommendations made on September 27, 2000, the MDNR did not make a minimum flow recommendation for the Forestville bypassed reach and instead chose to continue to recognize the 20 cfs required by the June 27, 1997, order.

The MDNR's recommendation for a minimum flow of 85 cfs from No. 2 powerhouse was based on the proposed year-round 80-cfs minimum flow from the upstream McClure powerhouse, plus groundwater and dam seepage, plus tributary inflow to the Forestville reservoir for a combine total of about 5 cfs. The WQC conditions require a minimum flow of 80 cfs from the No. 2 powerhouse from November 16 to March 15, and 40 cfs from March 16 to April 30, and October 1 to November 15. The MDNR says the minimum flow restrictions required to be released from the No. 2 powerhouse that are required by the WQC, represent zero protection for the river during the summer months when the applicant would maximize their power generating capacity, offer little protection to spring and fall spawning fish, and would only meet the applicant's minimum flow requirements during the winter months to avoid freezing the penstocks at the facility.

The WQC also requires a continuous 20-cfs minimum flow in the Forestville bypassed reach, except under cold-weather conditions. Thus, there would be a minimum flow of at least 33 cfs (including leakage) in the reach downstream of the No. 2 powerhouse during the period May 1 to September 30, and higher flows (from 53 to 93 cfs) during the rest of the year. Based on a review of previous instream flow studies and on the Commission's May 1997 Order, we conclude that seasonal minimum flows ranging from 33 to 93 cfs would adequately protect aquatic habitat in the short (600-ft) riverine reach and longer backwatered reach of the Dead River downstream of the No. 2 powerhouse.

We concur with the flows required by the WQC for the No. 2 powerhouse. Since all but 600 feet of the reach below the powerhouse is inundated by the backwaters from the Tourist Park Reservoir, fish would be able to move out of the 600-foot reach into the deeper backwater areas during critical times of the year, i.e., during the extremely cold winter months. In addition, the stream reach below the No. 2 powerhouse is classified as a warmwater fishery. Logperch and small yellow perch were the dominate species collected below the No. 2 powerhouse in surveys conducted in 1997, with this stream reach accounting for 97 percent of the YOY yellow perch collected between the No. 2 powerhouse and the Tourist Park Reservoir. The minimum flows required for this reach would enhance the riverine characteristics of this ½ mile reach and provide enhanced spawning habitat for warmwater species and increase recruitment and the overall productivity of the Dead River.

Because flow releases affect project economics, however, we make our final recommendations for all resource protection and enhancement measures in section VII, *Comprehensive Development*.

Forestville Bypassed Reach Minimum Flows and Habitat Improvement: A 16-inch iron pipe through the dam at elevation 762.55 feet NGVD would provide the minimum flow from the base of the dam into the bypassed stream reach. Gaging associated with this release structure is discussed in the order issued by the Commission on March 23, 2001. The MDNR and Interior did not include any recommendations for a minimum flow in this bypassed reach in their Section 10(j) recommendations and we conclude they concur with the 20 cfs minimum flow required by the 1997 order. There has not been any new biological or fisheries information that would persuade the staff that the existing 20 cfs minimum flow was inadequate to protect aquatic resources or that it should be changed for this bypassed stream reach. Therefore, we recommend a continuation of the 20-cfs minimum flow in the Forestville bypassed reach.

The June 1997 Commission order required MBLP to prepare a Stream Habitat Improvement Plan, for Commission approval, that detailed how stream habitat would be improved in the nearly 1-mile long bypassed reach, that included the remnant no. 1 dam. The habitat improvements were to consist of creating a pool and making minor manipulations to the existing streambed materials and placing small amounts of gravel in this reach. However, in a Commission order issued on March 8, 2000, the Stream Habitat Improvement Plan was revised to eliminate the placement of gravel in the bypassed reach because there was an error in the earlier analysis of the situation, there was already an abundance of gravel in this stream reach. However, the plan also identified that heavy construction equipment would not be able to reach the upper portion of the bypassed reach in the area immediately above the remnant no. 1 dam, to create a pool in the streambed. Therefore, the pool that was to be 150 feet long by 30 feet wide with a maximum depth of 4 feet and an average depth of 2 feet, would be built at another location in the bypassed reach. In addition, the plan required a survey be made of existing pools in the lower portion of the bypassed reach to identify whether any existing pools needed to be deepened to improve fisheries habitat.

Minimum Flow Below No. 3 Powerhouse: The MDNR recommends that MBLP operate No. 3 powerhouse in a non-peaking, re-regulation mode, and continuously release the average daily inflow to the Tourist Park reservoir. MBLP proposes to operate No. 3 powerhouse in this manner, to the extent practicable, based on information received from UPPCO on the likely daily releases from the upstream Dead

River Project. Because inflow to the Forestville and Tourist Park reservoirs is almost entirely dependent on UPPCO's McClure powerhouse releases, we conclude that MBLP's proposed operations would satisfy the intent of MDNR and Interior recommendations. This mode of operation would adequately protect aquatic resources in the 250-ft-long tailrace section and in the Lake Superior estuary. We therefore recommend that MBLP be required to operate the No. 3 powerhouse in the proposed non-peaking, re-regulation mode.

Tourist Park Bypassed Reach Minimum Flow: The entire Tourist Park bypassed reach is approximately 600 feet long. The upper 200-foot section of the reach is a narrow bedrock channel with a moderately steep slope, dropping 15 feet. The lower section is almost flat, dropping less than 3 feet in 400 linear feet, and could provide riffle and possibly pool habitat, if modified. The rock/cobble substrate in the lower transitional section leading to the Tourist Park tailrace could provide habitat for aquatic invertebrates, which would serve as a food source for fish and other aquatic species. The transitional section may also provide limited spawning habitat for any warmwater fish species that may occur downstream from the tailrace.

The MDNR did not identify this bypassed reach to be significant enough for inclusion in the 1992 instream flow studies, which culminated in the Commission's June 1997 Order requiring minimum flows from the Marquette Project developments. In its letter to the Commission dated January 25, 1999, MDNR, however, identifies the issue of minimum flow in the Tourist Park bypassed reach (letter to the Commission dated January 25, 1999).

In its letter to the Commission dated June 11, 1992, MDNR identifies the approximately 1-mile reach of the Dead River below the Tourist Park development as important fishery habitat, with their primary objective to protect and enhance the existing sport fishery. MDNR stated that the sport fishery in the reach is directed primarily at migratory salmonids from Lake Superior (chinook, coho, steelhead, lake trout) and resident species, including northern pike, smallmouth bass, and white suckers. MDNR acknowledges that there are 2,000 feet of river below No. 3 powerhouse available for the sport fishery, but that the 600-ft.-long bypassed reach would also be available to the fishery, and would provide additional aquatic habitat. MBLP and MDNR have already cooperated in developing a program to minimize the potential for fish stranding during down-ramping of spillway releases. MBLP has physically modified the bypassed reach to eliminate isolated pools where fish could become stranded. The Commission's 1997 Order requires that MBLP provide a minimum flow of 40 cfs (or inflow, if less) below

the No. 3 powerhouse between September and April, to enhance spawning habitat for salmonids. The Order, however, does not require a minimum flow in the bypassed reach.

MDNR now recommends a minimum flow of 40 cfs in the bypassed reach and suggests that conclusions drawn from minimum flow studies at the upstream Forestville bypassed reach could be extended to the Tourist Park bypassed reach. For such an extension of results to be valid, the physical structure and habitat of the two bypassed reaches must be substantially similar. This, however, does not appear to be the case, with significant differences in river morphometry (slope, substrates), and differences in the species composition of fishes using each of the bypassed reaches (the migratory species from Lake Superior only occur in the Tourist Park reach). MDNR has not demonstrated the need for their recommended flow release in the Tourist Park bypassed reach.

Interior expresses concern that anadromous fish might ascend the bypassed reach during spill, and recommends a barrier to prevent fish from entering the reach, in the absence of any minimum flow. MBLP states, however, that reservoir spills are rare (less than one event per year), and has agreed to gradually ramp both spill and turbine discharge operations, to minimize the potential for stranding of fish after spill events. MBLP also agrees to dispatch observers to the bypassed reach to search for stranded fish after ceasing periods of extended spill, and to capture and release any fish to the Dead River.

MDNR recommends a 40 cfs minimum flow in the 600-foot-long bypassed reach at the Tourist Park Dam to: (1) restore the stream section to a functioning stream system; (2) eliminate fish stranding; and (3) to significantly increase spawning habitat for resident and adfluvial fish, including lake sturgeon. Interior recommends 40 cfs for the Tourist Park bypassed reach for generally the same reasons and mentions the importance of spawning habitat for anadromous fish species and that a barrier net should be installed to prevent future fish stranding if the 40-cfs-minimum flow is not instituted.

We conclude that a 40 cfs minimum flow is not needed to protect the existing fishery resources nor potential fish habitat in this reach. The current program of removing stranded fish is adequate. There is no indication that a barrier net would be needed and there is very limited fisheries habitat to be gained by releasing a 40-cfs flow into this bedrock-bottomed stream reach. The reference to potential lake sturgeon use of this reach is unjustified based on current unconfirmed sightings and historical records showing no indication of the presence of lake sturgeon in the Dead River.

Remnant No.1 Dam

*MBLP Proposal*

In a letter dated November 20, 2000, MBLP requests that any license FERC issues for the Marquette Project contain language that provides for the removal of the remnant dam No. 1 in accordance with provisions of a FERC-approved agreement between MDEQ and MBLP, to be developed within 18 months of license issuance. The Commission's June 20, 1997, license order had deferred action on the disposition of the remnant dam until relicensing of the project.

*Recommendations from Agencies and Interested Parties*

MDNR, Interior, NWF, and MHRC have recommended that the remnant No. 1 dam be removed, primarily to improve fishery habitat in the Forestville bypassed reach.

*Our Analysis*

With the staff-recommended 20-cfs minimum flow in the Forestville bypassed reach, aquatic habitat would be maintained in this reach. Removal of the remnant No. 1 dam would enhance fish access to the 0.5-mile reach upstream of the remnant dam, and would remove the small pool upstream of the dam, restoring riverine habitat to the reach. Removal of the dam could result in a one-time release of some sediment that has accumulated behind the dam, as well as sedimentation resulting from excavation and removal work. This sediment release, estimated to be about 1,500 cubic yards, however, would be minimized by good construction practices, and by adherence to other federal, state, and local permits (Corps 404 permit and other permits issued by the MDEQ) for this work. The potential release of any sediment during removal would likely be short-term and would not have any significant long-term effects on local water quality or fishery habitat. Removing the remnant No. 1 dam would benefit aquatic habitat and water quality in the Forestville bypassed reach. The removal of the dam would allow the cooler waters entering the Dead River from Bancroft Creek to move, unimpeded, downstream.

MBLP is seeking sources of additional funding to pay for removal of the remnant dam. An earlier grant application, made by MBLP in the summer of 2000, to MDEQ's Clean Michigan Initiative Program was rejected in the summer of 2001. MBLP applied for a second grant with the same entity in the summer of 2001. MBLP estimates

removal of the remnant dam would cost about $200,000. MBLP is still seeking other funding sources to help pay for removing the remnant dam.

We recommend that MBLP prepare a dam removal plan, and file this plan for Commission approval within 6 months after the issuance date of any new license. This plan should be prepared in consultation with MDEQ, MDNR, Interior, the Corps, and MHRC, and should include documentation of this consultation. Implementation of the plan (dam removal) should be completed within 24 months of approval of the plan.

Downstream Fish Passage and Protection

*MBLP Proposal*

MBLP states that fishery surveys conducted in 1997 in the Forestville reservoir indicate a healthy fishery, with no indication that fish need to move downstream, nor that entrainment mortality losses were adversely affecting fish populations in the project reservoirs. Hence, MBLP is not proposing any downstream fish protection measures.

*Recommendations from Agencies and Interested Parties*

MDNR, NWF, and MHRC recommend that MBLP install fish protection and downstream passage devices at the No. 2 and No. 3 powerhouses, within 5 years after license issuance, to minimize potential fish entrainment and mortality during passage through project turbines. MDNR further recommends that if project economics would not support installation of such devices within 5 years, that MBLP should establish an escrow fund for future installation of these devices within 20 years of license issuance. MDNR and MHRC also recommend that MBLP provide monetary compensation for fish mortality, as an alternative to installing fish protection devices.

Interior recommends provision of fish protection devices, and recommends compensation as a last option, if protection devices or other mitigation is not feasible. In its letter to the Commission dated October 5, 2000, commenting on the Marquette Project, Interior states that the licensee should establish a fund to provide fish protection at some future date, when and if fish protection technology is shown to be biologically effective.

*Our Analysis*

The fish species present within the impoundments of the Marquette Project are resident and generally non-migratory species. Most of the species maintain self-supporting populations, with all life history stages found in the project reservoirs. Many of the native fish species are abundant, and in some cases, i.e., yellow perch, may be overabundant and exhibit stunting in their growth pattern. Fish population sampling and the active sport fishery suggest an abundance of fish are available for recreational harvest. Large-scale environmental factors are more likely to affect fish population levels than the localized influence of any turbine entrainment mortality.

Based on the fish entrainment studies at the upstream Hoist and McClure powerhouses and the types of fish species involved and types of generating units used at the Marquette Project, it is likely that some level of fish entrainment and mortality also occurs at the Marquette No. 2 and No. 3 powerhouses. However, it is also reasonable to assume, consistent with the observations at the Dead River Project, that this entrainment is likely to be primarily of YOY or juvenile fish, which typically experience high natural mortality. The loss of a portion of these age classes should not result in a significant effect on the overall fish population of the project reach of the Dead River. Further, there is no evidence of adverse effects on the fish populations from turbine mortality. Therefore, we do not recommend measures to minimize entrainment mortality at this time. Likewise, escrow accounts for future fish protective measures, or monetary compensation for fish losses, also are not warranted at this time. Further, fish loss compensation may be considered damage payments to the state, which the Commission cannot require.

Upstream Fish Passage

*MBLP Proposal*

MBLP does not propose upstream fish passage at either the No. 2 (Forestville) or No. 3 (Tourist Park) dams. MBLP contends it would provide little environmental benefit at a prohibitive cost to the project.

*Recommendations from Agencies and Interested Parties*

MDNR recommends that any license issued for the Marquette Project include language that clearly provides for the development of a fish ladder at the Tourist Park facility and that the license provide flows necessary to operate the fish passage through the open water season. The MDNR also recommends that a standard reopener clause be

included in any license issued, for future construction of passage facilities at the Forestville facility.

Interior reserves its authority under Section 18 of the FPA to prescribe fish passage at the project as it deems necessary in the future, but makes no recommendation at this time.

MHRC recommends that MBLP provide upstream passage where it is determined to be necessary.

*Our Analysis*

We are unaware of any existing or historical information indicating that habitat in the Dead River above No. 3 dam provided essential spawning habitat for migratory fish from Lake Superior. MDNR states that the lake sturgeon has been extirpated from the Dead River above No. 3 dam, but there is no historical information to indicate that such a population existed. The MDNR indicates there have been several unconfirmed sightings of lake sturgeon below Tourist Park. The Lake Sturgeon Rehabilitation Strategy, a comprehensive plan accepted by the Commission, does not identify the Dead River as a target water body for sturgeon restoration. It should also be noted that to date, no fish passage facilities have been designed which can pass lake sturgeon. The Commission has discussed the difficulty of lake sturgeon use of fish passage facilities in its orders issued for the Shawano Hydroelectric Project (FERC Project No. 710) on March 15, 2001 [94 FERC ¶ 61,294(2001)] and May 16, 1997 [79 FERC ¶ 61,181(1997)].

The Dead River downstream of No. 3 powerhouse currently supports spawning runs of chinook and coho salmon and steelhead trout, from Lake Superior. Installing upstream fish passage at the No. 3 (Tourist Park) dam would allow these species to continue their upstream migration into the Tourist Park reservoir, and into the Forestville bypassed reach. There would, however, be limited biological justification to pass these species upstream. Tourist Park reservoir would not provide suitable spawning or rearing habitat, and the Forestville bypassed reach would only provide limited additional habitat. Passing fish upstream into the Forestville bypassed reach could provide additional riverine habitat for anglers to pursue these migratory species. However, movement of these species upstream of No. 3 dam would reduce the numbers of fish downstream of No. 3 dam and powerhouse, and potentially reduce reproduction and angling success in

that reach. Overall, there appears to be limited justification for providing upstream fish passage at the No. 3 dam, and we do not recommend it.

The Commission recognizes that future fish passage needs and management objectives cannot always be determined at the time of project licensing. Under these circumstances, and upon receiving a specific request from Interior, we recommend that the Commission follow its practice of reserving the Commission's authority to require such fishways as may be prescribed by the Secretary of the Interior.

The MDNR's recommendation that any license issued for the project contain a standard reopener license article that can be used to specifically address upstream fish passage at the project's dams would be recommended for adoption by the Commission. This issue would be addressed by the use of standard L-form articles that would be attached to any license issued by the Commission for the Dead River Project. However, it should be noted that there is no specific Ll-form article that specifically addresses fish passage, rather there are L-form articles that are much broader in coverage including one that would provide for the general conservation and development of fish and wildlife resources at the project as may be ordered by the Commission upon its own motion or upon the recommendations of state fish and wildlife agencies, afer notice and opportunity for hearing. Thus, in effect, if the need for fish passage were to arise at the project in the future, the MDNR could petition the Commission to re-open the license to address their concerns about this issue and a standard L-form article would be used to facilitate the request.

Natural Organic Debris Management at the Dead River and Marquette Projects

*UPPCO and MBLP Proposal*s

Both UPPCO and MBLP propose to develop plans, in consultation with resource agencies, to pass vegetative debris collected at the projects' dams, trashracks, and other structures, to the Dead River downstream of the project structures.

*Recommendations from Agencies and Interested Parties*

MDNR and Interior recommend, and MDEQ requires, passing woody (vegetative) debris downstream from all three reservoirs in the Dead River Project, and the two reservoirs in the Marquette Project.

*Our Analysis*

Organic debris that is naturally recruited into rivers from riparian areas provides habitat for macroinvertebrates and fish (Todd and Rabeni, 1989). Organic debris sustains lower order trophic organisms and in turn, influences the productivity of a river for higher order organisms. The passing of large woody debris also would improve habitat structure downstream of the project dams, and enhance the carrying capacity of the Dead River for macroinvertebrates and fishes, by providing cover and velocity shelters. This additional woody debris, in conjunction with the staff-recommended minimum flows in the Dead River, removal of the remnant dam, and stream enhancement measures in the Forestville bypassed reach would be an important enhancement of aquatic habitat in the Dead River. UPPCO and MBLP would also benefit from passing woody debris downstream, instead of bearing the expense of hauling it to offsite landfills.

While there appears to be ample amounts of woody debris in some sections of the Dead River, ensuring the natural movement of woody debris past the project reservoirs into downstream sections of the Dead River are appropriate and would benefit aquatic resources. Therefore, staff recommends the applicants develop an organic debris disposal plan within one year of license issuances, for Commission approval, in consultation with the resource agencies, that focuses on passing downstream any natural organic debris that accumulates on project structures.

c. Cumulative Effects:

Operation of the Dead River and Marquette Projects could contribute to cumulative effects on fisheries in the Dead River. We assess cumulative effects on fisheries from the Dead River headwaters above the SLSB, to the river mouth in the Lake Superior estuary.

Significant positive effects on fishery resources would occur throughout this reach of the Dead River, compared to existing conditions, if applicant-proposed and staff-recommended measures are required as conditions of any licenses issued. Reduction of water level fluctuations in the projects' reservoirs, maintenance of minimum flows (below Silver Lake dam; below Hoist, McClure, and No. 2 powerhouses; and in the McClure and Forestville bypassed reaches), and the removal of remnant No. 1 dam would enhance habitat for most life stages of important game and forage fishes in this 35-mile reach of the Dead River. Improvements to water quality

associated with the minimum flow releases would further improve aquatic habitat. Although some fish mortality would continue to occur as a result of entrainment through the project turbines, licensing of the two projects, with staff-recommended enhancement measures, would likely offset this low level of mortality and result in overall beneficial cumulative effects on aquatic resources in the project reach of the Dead River.

d. Unavoidable Adverse Effects:

Continued operation of the Dead River and Marquette Projects would result in some unavoidable mortality of fishes as a result of entrainment through the turbines. The level of mortality, however, has been shown to be relatively low, and would not significantly affect the overall fish populations in the project reach of the Dead River.

### 5. Terrestrial Resources

a. Affected Environment:

The complex mosaic of streams, lakes and extensive forests of the Upper Peninsula of Michigan provide diverse habitat for plants and wildlife. Pre-settlement forests constituted a mix of pine, bog, and hardwood or hardwood/hemlock forest types (Braun, 1950). With settlement, changes in the forested landscape resulted from logging, mining and residential/commercial development, although the Upper Peninsula remains extensively forested. In Marquette County, where both projects are located, forested land still constitutes about 88 percent of the land area.

**Dead River Project**

Vegetation

The area including and surrounding SLSB is forest land composed of northern hardwoods (about 29 percent of the area), quaking aspen, paper birch, spruce-fir, mixed swamp conifer, and pine (jack, red and white pine). These forests are mostly second-growth that developed in response to the extensive logging activities in this area around the turn of the century. Within the SLSB itself, the applicant estimates that emergent and aquatic bed vegetation comprise about 33 acres of the reservoir area, at normal maximum elevation.

Nearly half of the area surrounding the DRSB 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 DRSB (letter from L. Sargent, Michigan Natural Resource Heritage, MDNR, to G. Whelan, MDNR, dated September 16, 1997, regarding the Marquette Project application). The extensive outcrop area consists of shale, supporting scattered white spruce and balsam fir, with a relatively dense shrub and diverse herbaceous stratum. DRSB 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 DRSB. Within the reservoir, the applicant estimates emergent and aquatic vegetation covers approximately 378 acres.

Big-leaf sandwort, listed by the State of Michigan as threatened, has historically been recorded from a locale near the Hoist Powerhouse. No individuals of big-leaf sandwort could be located, however, during surveys of the powerhouse vicinity conducted by the applicant. No occurrence of purple loosestrife or Eurasian water milfoil were noted in project waters.

The steep slopes that border the MSB support mostly hardwood forest dominated by red oak. The MSB, much smaller than either SLSB or DRSB, supports only small areas of emergent wetland vegetation. The applicant estimates that about 7 acres of aquatic bed vegetation, mostly characterized by pondweeds, occur within the existing normal operating pool elevation.

UPPCO estimated the total wetland area occurring within the normal maximum pool elevations of the three Dead River impoundments to be approximately 418 acres. Staff, however, using the National Wetlands Inventory (NWI) 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 indicated a significantly higher acreage of wetlands directly associated with the project reservoirs and project reach of the Dead River (table 8).

Table 8. Acreage of palustrine wetlands in the vicinity of the Dead River Project reservoirs, and along the Dead River in the project area. (Source: Staff)

| Reservoir/River Reach | Palustrine Wetlands (acres) |
|---|---|
| Silver Lake storage basin | 184 |
| Dead River reach below Silver Lake storage basin | 184 |
| Dead River storage basin | 890 |
| Bypassed reach below Hoist dam | 0 |
| Dead River reach below Hoist powerhouse | 0 |
| McClure storage basin | 0 |
| Bypassed reach below McClure dam | 160 |
| Total | 1418 |

Wildlife

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, 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, stripped skunk, beaver, and muskrat. The distribution of this wildlife assemblage can be affected by human activities associated with residential development and recreation, by reducing or eliminating 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.

The juxtaposition 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. Applicant observations of broods of mallards, black ducks and common mergansers indicate that these species nest on or near project waters. Redheads and loons, which may also nest in the project area, 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.

The common loon is listed by the state of Michigan as threatened. No nesting loons have been documented on the project reservoirs, but the relatively pristine shoreline of SLSB likely provides suitable nesting habitat for this species. Nesting loons are particularly sensitive to human intrusion. 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 and osprey. The bald eagle is federally listed as threatened (but is proposed for delisting) and is discussed in detail in section V.C.6. The osprey is listed by the state of Michigan as threatened. Osprey 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 nesting occurrence in 1989, and observations of a possible unoccupied nest during the 1992 survey, indicate that the project area might support breeding osprey. The merlin, state-listed as threatened, has 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, both listed by the State of Michigan as species of special concern, occur 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.

**Marquette Project**

The Forestville reservoir and Tourist Park reservoir are located, within about 1 mile and 0.5 mile, respectively, of a predominantly residential area within the city of Marquette. The wooded shorelines provide habitat for waterfowl and furbearers in an area readily accessible to residents of the city. A local park adjoins Tourist Park reservoir.

Vegetation

Northern hardwood forest surrounds Forestville reservoir and portions of Tourist Park reservoir, as well as much of the Forestville bypassed reach. Sugar maple dominates the tree canopies, mixed with white pine and less common white birch and red oak. The relatively steep slopes of the two reservoirs, and absence of tributaries (other than Dead River), restrict wetlands to a few isolated locales and narrow bands along the water-land interface. Staff estimates, from NWI wetland inventory mapping, that roughly 6 acres of forested wetland occur within and upstream of Forestville reservoir adjacent to the Dead River, and below UPPCO's McClure powerhouse (table 9). Approximately 11 acres of scrub-shrub and forested wetland occur at the west end of Tourist Park reservoir. Additional wetlands occur along the No. 2 bypassed reach (about 11 acres), and between the No. 3 dam and Lake Superior (about 6 acres).

Table 9. Acreage of palustrine wetlands in the vicinity of the Marquette Project reservoirs, and along the Dead River in the project area. (Source: Staff)

| Reservoir/River Reach | Palustrine Wetlands (acres) |
|---|---|
| Within/upstream of Forestville reservoir | 6 |
| Bypassed reach below No. 2 dam | 11 |
| Tourist Park reservoir | 11 |
| Dead River below No. 3 dam | 6 |
| Total | 34 |

MBLP has field mapped the vegetation immediately adjacent to the reservoir shorelines and the No. 2 bypassed reach. About 75 percent of the Forestville reservoir shoreline comprises a mix of open land and shrubs; much of the remainder of the shoreline is mesic hardwood and conifer woods. Emergent marsh and scrub-shrub wetlands fringe portions of the shoreline along the southern edge of the reservoir. Mesic hardwoods and conifers occur along about half of the Tourist Park reservoir shoreline, with dry conifers (pine) and hardwood forest along about 30 percent. Lowland hardwoods (such as red maple, black ash and green ash) and alder predominate along the rest of the shoreline. The North Country Trail runs along the northeastern shore of Tourist Park reservoir, providing access for nature observation. Lowland shrubs (alder, willow, spiraea) border portions of the western half of the No. 2 bypassed reach. Dry conifers/hardwoods and mesic hardwoods/conifers border most of the rest of the

bypassed reach. Seeps and marsh occur in or adjacent to the middle portion of the bypassed reach.

Waxy meadow-rue, listed by the State of Michigan as threatened, has historically occurred at a site located within about a mile of the No. 2 powerhouse. This species is found on moist soil adjacent to rivers and marshes. Satiny willow, designated by the state as a species of special concern, has also historically occurred in the general project area (letter from L. Sargent, MDNR, to G. Whelan, MDNR, dated September 16, 1997). No surveys for rare or uncommon plants have been conducted for the Marquette Project.

MBLP notes several occurrences of purple loosestrife in Tourist Park reservoir, but no occurrence in Forestville reservoir. Eurasian water milfoil has not been observed in either reservoir.

Wildlife

The Marquette Project waters and adjacent environs provide habitat for wildlife typical of northern hardwood forests and lakes located near a semi-urban setting. Water-dependent furbearers that occur in the project area include mink, muskrat, beaver, and river otter. Birds that may occur in association with the project reservoirs include the common loon (state threatened), pied-billed grebe, great blue heron, wood duck, mallard, hooded merganser, red-breasted merganser, spotted sandpiper, ring-billed gull, herring gull, and belted kingfisher.

MBLP conducted a reptile and amphibian survey in which no uncommon species were recorded. The wetlands and shallow waters of the project reservoirs and bypassed reach provide good habitat for a diversity of amphibians and reptiles. The most productive sites occur at the wetland just west of Forestville reservoir, the oxbow between the No. 2 dam and powerhouse, wetlands near the western end of Tourist Park reservoir, and the mouth of the Dead River at Lake Superior.

b. Environmental Effects and Recommendations:

Resource agencies and other parties expressed concerns regarding the effects of reservoir level fluctuations and minimum flows on riparian vegetation, wetland waterfowl habitat, other wetland or water-dependent species, and threatened and endangered species. Concerns also focused on the need for wildlife management within

the area of the projects' influence. The spread of nuisance plants, in particular purple loosestrife and Eurasian water milfoil, was identified by resource agencies as a threat to native flora and habitat quality.

On May 14, 2001, MBLP petitioned the Commission for approval to remove approximately 77 acres of wooded upland and shoreline area near the Forestville development from the project boundary, and to include 100 acres of shrubland, wetland, woodland and shoreline area near the Tourist Park development (figure 3) within the project boundary. We address the potential environmental effects of such a land exchange in this section, and in our discussion of threatened and endangered species (section V.C.6).

**Dead River Project**

*UPPCO Proposal*

UPPCO proposes to develop, in consultation with appropriate agencies, a WMP, a Bald Eagle Protection and Management Plan (BEPP), and a Nuisance Plant Control Plan, as recommended by MDNR.

*Recommendations from Agencies and Interested Parties*

MDNR recommends that UPPCO develop a WMP, a BEPP, and a Nuisance Plant Control Plan. Interior recommends that UPPCO develop a WMP that protects and enhances wildlife habitat on project lands.

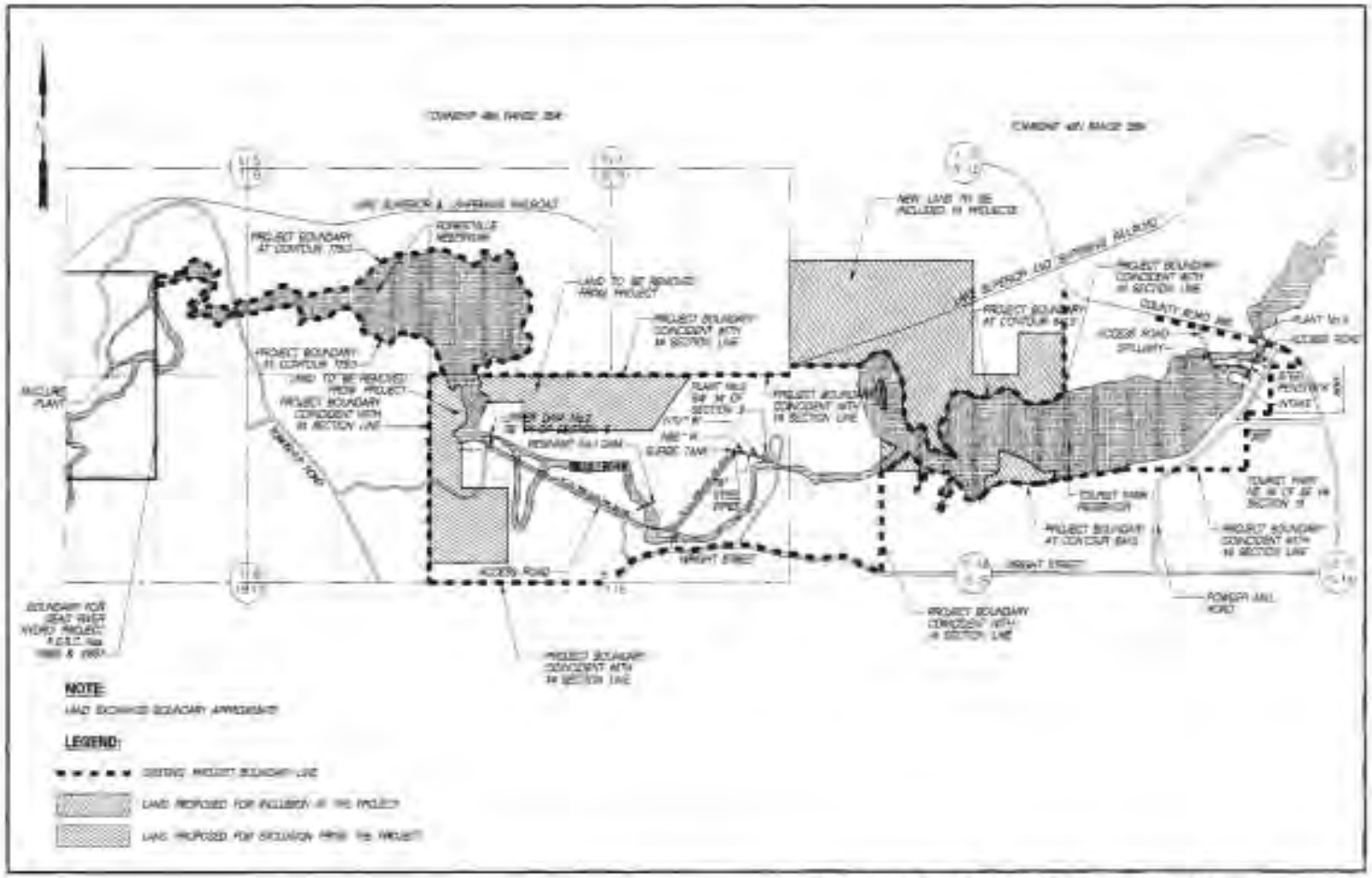
The NPS recommends that UPPCO address the need to protect riparian lands in their natural state for wildlife purposes.

*Our Analysis*

Vegetation: Hydrologic soil conditions supporting wetlands that lie adjacent but landward of project reservoir shorelines are influenced by reservoir water levels. The extent to which the influence of reservoir hydrology extends landward at a particular locale depends on the quantity and timing of surface water flow into the reservoir, such as in the vicinity of tributaries, as well as the elevation gradient and other factors such as soil type.

Wetland plants vary in their response to the frequency and range of water level fluctuations. Some wetland species require exposed substrate for germination, and will not readily colonize areas where water levels are constant (Middleton, 1999). Water level fluctuations, however, can adversely affect some species, while benefitting others. In general, water depths greater than 6 to 7 feet (two meters) preclude growth for most emergent species (Cowardin et al., 1979). The depth and duration of fluctuation that wetlands will tolerate, or benefit from, depends on species and wetland type (Hamilton et al., 1986; Toner and Keddy, 1997).

Under the staff-recommended alternative, the reservoir water level at SLSB would range from the annual low of 1,477 feet NGVD at the beginning of April, to 1,481.5 feet NGVD by June 1, a difference of 4.5 feet, which is similar to UPPCO operations since 1988. Prior to 1988, however, UPPCO has estimated that the range in water level was approximately 16.5 feet. The reduced fluctuation in water levels during the spring months would improve conditions for wetland plants, potentially favoring expansion of wetlands into unvegetated shoreline areas (mudflats), or increasing species diversity of existing wetlands. The 4.5-ft. rise in water level from April 1 to June 1, however, may still somewhat restrict wetland expansion and species diversity, compared to a water level regime that would occur under natural (ROR) inflows and outflows from SLSB. For example, plant species established along the shoreline at or above water elevation 1,479 feet NGVD (targeted by May 1), would likely suffer sub-optimal conditions during much of the month of April, when water levels would be from two to four feet lower.




(SOURCE: MDLP 2001, as Modified by staff.)

Figure 3. Marquette Project land exchange parcels.

UPPCO proposes to maintain a continuous minimum flow of 8 cfs in the Dead River below Silver Lake dam. Prior to 1988, discharges from SLSB were occasionally curtailed or stopped. Maintenance of a continuous minimum flow would improve and maintain conditions for riparian and wetland vegetation associated with this reach of the Dead River.

Under UPPCO's proposal, water levels at DRSB would typically rise from elevation 1,335 feet NGVD on April 1, to 1342 feet NGVD by May 1, a difference of 7 feet, which is similar to current and historical UPPCO operation. This range of fluctuation would likely impede expansion of wetland vegetation along the reservoir shoreline, and restrict wetland species to those that can tolerate relatively dry substrate during early spring.

As part of the UPPCO's proposed operations, water levels in McClure reservoir would fluctuate in a narrow band, with a constant target level throughout the year. Since 1988, water level fluctuations between April 1 and May 1 have been less than 0.1 feet. Wetland acreage in this reservoir, however, is relatively limited due to the steep shoreline.

The WQC prescribes monthly target and minimum water levels that reduce fluctuations from early spring (April 1) to early summer (July 1) to a maximum of 4.5 feet at SLSB, and a maximum of 3.5 feet at DRSB. MDNR has also recommended the same restrictions in water level fluctuations. This degree of fluctuation would improve the hydrologic regime in the two reservoirs for wetland plants, compared to the applicant's proposal, which would include a fluctuation of up to 7 feet at DRSB. The WQC, however, requires target (start-of-month) water levels at DRSB that may affect existing wetland vegetation. The WQC requires start-of-month water levels at DRSB to be 1,340.5 feet NGVD from June through November, compared to target levels of 1,342.0 feet NGVD proposed by the applicant for May through December. The difference in reservoir surface area between elevation 1,342.0 feet NGVD and 1,340.5 feet NGVD is approximately 190 acres. This acreage would remain inundated during summer months under the applicant's proposed plan, but exposed under the WQC requirement. About 144 acres of this acreage is currently aquatic bed vegetation and emergent wetland. If the WQC target levels are maintained and exceeded only rarely, this vegetation would likely, over time, convert to drier scrub-shrub vegetation, characterized by plants that grow both in wetland and upland conditions.

Interior recommends that the project be operated as a ROR facility with no greater than +/-0.5 feet level fluctuations in the reservoirs. Reducing water level fluctuations to natural levels and timing, would potentially provide the maximum improvement for aquatic bed and wetland vegetation within the SLSB and DRSB, as well as the riparian and wetland vegetation occurring along the reach below Silver Lake dam. The significant acreage of wetland forest and riparian vegetation along the McClure bypassed reach would also benefit from near-natural flow variability.

MDNR recommends slightly higher minimum flows in the Dead River reach below Silver Lake dam, and at the Hoist and McClure powerhouses, than prescribed in the WQC, but both release schedules reflect a natural discharge pattern consisting of higher flows in spring months. Both the WQC and MDNR recommendations would improve conditions for wetland and riparian vegetation along this reach of the Dead River, compared to the applicant's proposal and existing conditions. ROR operation recommended by Interior would likely provide more benefit to wetland communities associated with the reach, but the differences among the MDNR, WQC, and Interior minimum flow recommendations are not significant.

The MDNR recommendation for the McClure bypassed reach, 40 cfs, is the same as that recommended by Interior. The WQC prescribes a minimum flow of 20 cfs in this reach. The bypassed reach flows through a relatively flat, confined, winding valley containing approximately 160 acres of mostly forested wetland (table 8). The level terrain and meandering shape of the bypassed channel indicate that hydrologic conditions for these wetlands depend on river flow, and that some increase in minimum flow would likely improve conditions for a greater diversity of wetland plants. However, the additional benefit that would accrue to wetlands as a result of providing a minimum flow of 20 cfs, compared to a minimum flow of 40 cfs, is not anticipated to be substantial.

The operating schedule prescribed in the WQC for reservoir water levels and minimum flows would provide good protection for wetland resources, while allowing UPPCO to continue generating peaking power. This alternative, which we recommend, would reduce water level fluctuations in SLSB and DRSB, compared to recent historic conditions and UPPCO proposed operations, and thereby improve hydrologic conditions for expansion and diversification of wetlands. Although the ROR alternative recommended by Interior would provide a higher probability of maximum benefit to wetlands, the MDEQ prescription would provide similar benefits.

Wildlife: Reduced fluctuations in water levels at SLSB and DRSB that have resulted from the applicant's operation of the project since 1988, have improved aquatic and wetland habitat for plants and wildlife, but still limit habitat use, compared to conditions that would exist under a more natural hydrologic regime. The state threatened common loon sites its nest on floating vegetation near shore, although nesting loons have not been reported on the project reservoirs. Under the applicant's proposed operating plan, few, if any, suitable nesting sites would be available on the SLSB during the period of nest site selection in early spring. Late nesting waterfowl would be less affected by fluctuating water levels, but would be indirectly affected by any adverse effects on wetlands that are utilized for nesting habitat.

Interior and MDNR recommend that UPPCO develop a WMP within 36 months of license issuance. The MDNR recommendations (provided in a letter to the Commission dated May 25, 1999) include the following elements:

- Biennial (every 2 years) consultation with agencies regarding status of wildlife populations within project boundaries, and measures for protection;
- Measures for protection/enhancement of federal or state-listed threatened, endangered or sensitive species occurring on project lands;
- Measures for protection of environmentally sensitive areas on project lands;
- 200-foot riparian buffer strip adjacent to reservoirs and riverine reaches ;
- Management of forest lands for wildlife food and cover (retaining fruit and mast-bearing trees, hollow trees, and snags), including revegetation of timber harvest roads with plants palatable to wildlife;
- Wildlife plantings in rights-of-way; and
- Maintenance of all wildlife structures in consultation with resource agencies.

Interior recommendations (provided in a letter to the Commission dated May 24, 1999) include the following elements:

- One wood duck nesting box per 2 acres of forested wetland within project boundaries;
- One mallard nesting house per 2 acres of emergent marsh within project boundaries;
- One purple martin colonial nesting structure at each impoundment;
- Bat houses, bluebird, owl and kestrel boxes;
- One osprey nesting platform in each impoundment;
- One common loon adjustable nesting platform in each impoundment;

- Plantings to enhance wildlife habitat on project lands; and
- Annual monitoring of structures and wildlife populations, and annual report of findings.

UPPCO has agreed to develop a WMP in consultation with the resource agencies, and agrees with many of the recommendations of MDNR and Interior listed above. However, UPPCO has questioned the need for wood duck nesting boxes, mallard hen houses, purple martin houses, bat houses, and bluebird, owl, and kestrel boxes. Staff has reviewed MDNR and Interior recommendations for these structures, from the standpoint of species dependence on aquatic or wetland habitat, and whether project operations have the potential to affect any of these species. Proposed operations would result in reduced reservoir fluctuations, compared to historical operation however, littoral zone habitat, where waterfowl typically nest in close proximity to the shoreline, would still be affected by some water level fluctuations. Thus, providing nesting structures for mallards and wood ducks would be an effective enhancement measure for nesting of these species along the reservoir shorelines, that could be provided at relatively low cost. Other species, such as purple martins, bluebirds, bats, and kestrels, which are insectivorous and may benefit from proximity to wetlands, however, are not considered to be wetland-dependent, and are not likely to be affected by proposed reservoir operations. Similarly, owls are not wetland-dependent, although they may feed in the proximity of wetlands and reservoirs. We find insufficient justification for requiring nesting structures and "houses" for purple martins, bluebirds, bats, kestrels, and owls, as part of the WMP.

Loon nesting platforms in the project reservoirs would improve conditions for nesting, but we question whether there is sufficient justification to place nesting platforms in all three project reservoirs. MSB and some of the DRSB are too developed to provide suitable nesting habitat for this species, with the potential for human disturbance of any nesting loons attracted to these platforms. There may, however, be some potential for attracting loons to nesting platforms in the less-developed SLSB, and the undeveloped parts of the DRSB. During consultations for development of the WMP, UPPCO should investigate the potential for placement of up to two nesting platforms, which could either be placed in one or both reservoirs in the most suitable locations available.

Osprey nesting activity has been reported in the project area in the past, but it is not known whether the recent lack of nesting activity is the result of unsuitable nesting sites, or other factors. It is well documented that ospreys are relatively tolerant of human

activities, and will readily utilize artificial nesting structures. Interior has recommended that one nesting structure be installed on each of the three project reservoirs, as part of the WMP. Because osprey have previously nested in the area, this appears to be a reasonable request to enhance nesting habitat for this state-listed (threatened) species. Installing nesting structures as recommended by Interior should become a part of the WMP.

A 200-foot buffer strip adjacent to the reservoirs and the Dead River would help protect wetland and riparian habitat, and the use of this habitat by wildlife (travel corridors, feeding, nesting, etc.). Typically, however, a 200-foot buffer strip is only applied to lands already owned by the applicant, and that contain unique resources of concern, or recreational areas. In the Dead River Project area, UPPCO-owned lands comprise only a relatively small portion of the total riparian area, and there is insufficient justification to require UPPCO to acquire significant amounts of additional land to provide this riparian corridor. Therefore, we are not requiring this 200-foot buffer strip along all the project shorelines, but do recommend that UPPCO consult with MDNR and other shoreline owners in any ongoing programs to maintain open space, to provide wildlife habitat protection, or recreational access to the project reservoirs and the Dead River.

Both agencies recommend management of forest lands to provide wildlife with food and cover, but MDNR focuses on protecting or retaining existing habitat features (such as hollow trees and snags and forest openings), whereas Interior recommends including these vegetative plantings. MDNR also recommends plantings for revegetating timber harvest roads, and within the project's rights-of-way. The location of the project within a largely forested landscape, and the presence of large impoundment perimeters, would appear to favor management of forest habitat as emphasized by MDNR. Planting of additional species would not likely improve habitat for wildlife dependent on, or that utilize, forested shoreline. We concur, however, with MDNR that wildlife plantings along rights-of-way can effectively improve forage quality. Such plantings may provide valuable forage in largely forested landscapes, may help to control invasion and spread of undesirable plants that tend to colonize disturbed areas, and would represent a relatively minimal increment in the cost of necessary maintenance and clearing activities. We also concur that timber harvest roads should be revegetated with plants palatable to wildlife, although UPPCO should not be required to manage lands other than those they own as part of the project.

Staff concurs with MDNR that biennial consultation with the resource agencies constitutes a sufficient frequency for reviewing the status of wildlife populations and wildlife-related structures. The biennial review would require some level of field inspection and survey, targeted toward sensitive areas identified in the WMP, and wildlife that are being actively managed, such as loons and other waterfowl.

Accordingly, staff recommends the following elements be included in the WMP to be developed by UPPCO for project lands, in consultation with Interior and MDNR:

- Plans for placement of wood duck nesting boxes and mallard hen houses on project lands, based on the recommendations of Interior for 1 wood duck box per 2 acres of forested wetland, and 1 mallard house per 2 acres of emergent marsh;
- Placement of 3 osprey nesting platforms on the project reservoir(s);
- Placement of 2 common loon nesting platforms on the SLSB or, after consultation with MDNR and Interior, one platform on the SLSB and one on the DRSB;

(1) Management of forest lands with the emphasis on identifying and protecting existing habitat and sensitive areas, with appropriate plantings for wildlife forage in project rights-of-way;

- Plans for maintenance of all structures; and
- A biennial report on the status of wildlife management activities in the project area, to include measures implemented for protection and enhancement, results of any field monitoring of sensitive areas or wildlife management measures, and recommendations for additional management measures during the next 2 years.

This plan should be filed within 36 months after issuance of any new license.

**Marquette Project**

*MBLP Proposal*

MBLP proposes to maintain Forestville and Tourist Park reservoir level fluctuations to within 1.5 feet and 1.0 foot, respectively, whenever such control is possible. MBLP proposes to maintain a continuous minimum flow of 20 cfs in the Forestville bypassed reach, whenever sufficient water is available from upstream projects.

MBLP has agreed to develop, in consultation with appropriate agencies, a WMP and a BEPP within 18 months after issuance of a new license, to develop a plan to monitor nuisance plants within 36 months, and to work with the agencies to implement an effective nuisance plant control method. As part of its WMP, MBLP also proposes to provide two osprey platforms, six wood duck nesting boxes, and four mallard nesting structures.

*Recommendations from Agencies and Interested Parties*

MDEQ has prescribed that MBLP maintain a water level of 770.25 feet NGVD +/- 0.75 feet in Forestville reservoir, and 632.2 feet NGVD +/- 0.5 feet in Tourist Park reservoir. The WQC also specifies that MBLP maintain a minimum flow of 20 cfs in the Forestville bypassed reach when sufficient water is available.

MDNR recommends reservoir water levels similar to the WQC conditions. MDNR, however, recommends a minimum discharge of 85 cfs from the No. 2 powerhouse, and a minimum flow of 40 cfs in the Tourist Park bypassed reach. MDNR further recommends that MBLP develop a WMP, BEPP, and a Nuisance Plant Control Plan within 36 months after issuance of a new license.

Interior recommends a ROR operation with reservoir level fluctuations no greater than +/- 0.25 feet. Interior also recommends development of a WMP and a Nuisance Plant Control Plan, and that MBLP provide a 40-cfs minimum flow in the Tourist Park bypassed reach, or provide a barrier to prevent fish from ascending the reach.

*Our Analysis*

Vegetation: Under the terms of the WQC, water levels at Forestville and Tourist Park reservoirs would fluctuate within a range of +/-0.75 feet and +/-0.5 feet, respectively, of the target elevations. The applicant estimates that these water level fluctuations would expose less than 2 acres of wetland in the reservoirs. Staff estimates, from NWI mapping, that approximately 17 acres of marsh, scrub-shrub and forested wetland occur immediately adjacent to project reservoir shorelines (table 9). The 1.5-foot fluctuation range on Forestville reservoir and one-foot fluctuation range expected at Tourist Park reservoir are within natural ranges that many wetland plants can tolerate (Thornhorst, 1993). Limited fluctuations in water levels at the project reservoirs would

protect wetlands within the normal fluctuation zone, as well as those adjacent to the reservoir shorelines.

The MBLP proposes to continue releasing a minimum flow of 20 cfs (or inflow, if less) to the Forestville bypassed reach. Since 1997, when MBLP started this operation, increased water and soil moisture probably have improved conditions for the approximately 11 acres of forested wetland associated with the bypassed reach as compared to minimum flows.

The WQC conditions require that the No. 2 powerhouse discharge a seasonal minimum flow ranging from 0 to 80 cfs, whenever sufficient water is available.

From the standpoint of wildlife and wetland resources, however, there is little benefit to be derived by requiring the No. 2 powerhouse to seasonally increase its minimum flow release up to the 85-cfs discharge recommended by MDNR. The increased stream velocity and wetted area resulting from a higher minimum flow would also not likely benefit wetlands adjacent to No. 3 bypassed reach, because of the limited wetland habitat that occurs along this short bypassed reach.

Wildlife: The occurrence and abundance of wildlife in the project area reflects a number of factors including: proximity to a semi-urban residential area; loss of habitat due to residential and commercial development, open-water and wetland habitat associated with project reservoirs and the Dead River, and the availability of upland northern hardwood forest habitat. The applicant's proposed operations would reduce water level fluctuations and protect water-dependent or wetland-dependent wildlife. Other factors affecting wildlife abundance and distribution in the area are largely unrelated to project operations.

Interior recommends that MBLP develop a WMP within 48 months of license issuance. According to Interior, the plan should include provisions for installing an osprey nest platform, nesting boxes for wood ducks and mallards, a purple martin colonial nesting structure, and enhancement structures for bats, bluebirds, owls and kestrels. Interior recommends one wood duck box per 2 acres of forested wetland, and one mallard hen house per 2 acres of emergent marsh, on project lands. Interior further recommends that the plan include plantings for wildlife on project lands, and an annual consultation with (or report to) resource agencies concerning status of wildlife populations, and use of any structures provided to enhance wildlife.

MDNR also recommends the applicant be required to develop, in consultation with Interior and MDNR, a WMP within 36 months of license issuance. The plan would include:

- Provision for biennial consultation with resource agencies concerning status of wildlife populations and measures to protect/enhance them;
- Measures for protection and enhancement of habitat for any federal or state listed threatened, endangered or sensitive species on project lands;
- Measures for the protection of environmentally sensitive areas on project lands; and
- Measures for preserving and restoring naturally functioning wetlands and preserving and managing for old-growth forest within project boundaries.

MDNR recommends that, as part of a land management plan, MBLP work with landowners to manage lands within 200 feet of project reservoirs, to protect the resources associated with project waters and shorelines. The NWF requests that the license require the MBLP to retain ownership and manage all project-owned land adjacent to the impoundments and tailwaters. One of the NWF concerns is with loss of habitat for wildlife that require relatively wild settings free from human disturbance.

The MHRC recommends that the applicant develop a WMP and that it include provisions for resolving future fish and wildlife problems.

As discussed for the Dead River Project, it would be appropriate to adopt agency and other recommendations that specifically relate to shoreline, or unique resources that may be affected by project operations. Thus, measures involving waterfowl and threatened or endangered species should be required as part of the WMP. Measures related to other species not directly dependent on project waters, or affected by project operations, should not be included in the WMP. These would include measures for purple martin, bats, bluebirds and kestrels. Plantings for wildlife should also not be required, unless they are specifically designed to mitigate effects of the project. Similarly, in the absence of any indication that wetlands on project lands have become degraded, we do not recommend requirements for restoring or preserving them, other than as part of the general requirement to protect environmentally sensitive areas. In addition, measures designed specifically to protect habitat for state-designated sensitive species, while not receiving Federal protection, could be addressed in the WMP as part of its treatment of sensitive areas. We agree that reporting or consultations on a regular basis would be appropriate, but that biennial reporting would be adequate.

There would be little merit in requiring the applicant to retain/manage the lands adjacent to the Forestville and Tourist Park reservoirs as a long-term refuge for species that can tolerate only limited human intrusion. Both reservoirs are relatively close to urban areas, with the possibility of expanded residential and commercial development, and increased use of the lands adjacent to the reservoir for recreation. Additional discussion of the retention or disposition of project lands, and maintenance of a 200-foot buffer around the project reservoirs is included in section V.C.9.

With regard to the MHRC's recommendation for provisions to resolve future fish and wildlife problems, we believe that any future wildlife issues not currently recognized can be adequately addressed through the biennial consultation provisions of the WMP.

Accordingly, we recommend that the following elements be included in the WMP, which would be developed by the MBLP in consultation with Interior and MDNR:

- Nesting structures for osprey, wood duck and mallard as proposed by MBLP;
- Measures for protection/enhancement of habitat for any federally listed threatened or endangered species on project lands;
- Identification of biologically sensitive areas on project lands, including habitat for sensitive species and old-growth forest, and measures for their protection; and
- A biennial report on the status of wildlife management activities in the project area, to include measures implemented for protection and enhancement, results of any field monitoring of sensitive areas or wildlife management measures, and recommendations for additional management measures during the next 2 years.

Land Exchange: MBLP is currently negotiating with Longyear Realty concerning an exchange of approximately 77 acres of city-owned land located in the Marquette Project in the vicinity of the eastern end of Forestville reservoir, for approximately 100 acres of land owned by Longyear Realty located near the Tourist Park reservoir (figure 3). The 100 acres of land to be acquired by the city of Marquette would become part of the Marquette Project. It comprises shrubland, wetland, Tourist Park reservoir shoreline and some woodland. The 77 acres of land that would be transferred to Longyear Realty, and which currently comprise part of the Marquette Project, include wooded upland and Forestville reservoir shoreline. If carried out, the land exchange would increase opportunity to manage wetlands associated with Tourist Park reservoir.

The lands surrounding Forestville reservoir are largely undeveloped. The potential effects of the land exchange on terrestrial resources would not likely have significant effect because the land parcels do not offer unique habitat opportunity, not otherwise available in the area. There is no impact on bald eagle habitat from the land swap, and this is discussed in Section V.C. 6., Threatened and Endangered Species.

Management of Nuisance Plants in the Waters of Dead River and Marquette Projects

*UPPCO and MBLP Proposals*

UPPCO and MBLP have proposed to develop, in consultation with the agencies, Nuisance Plant Control plans to control the spread of purple loosestrife and Eurasian water milfoil in their respective project waters.

*Recommendations from Agencies and Interested Parties*

MDNR and Interior both recommend development of a plan for monitoring and controlling the spread of purple loosestrife and Eurasian water milfoil in the Dead River and Marquette Projects' waters.

*Our Analysis*

MBLP reports that purple loosestrife occurs in the Forestville reservoir of the Marquette Project, but purple loosestrife and Eurasian water milfoil have not been reported in the other reservoirs of the Dead River and Marquette Projects. Because purple loosestrife does occur in the Dead River drainage, however, there is the potential for it to spread to the other reservoirs in the system. Should purple loosestrife and Eurasian water milfoil become well established in project waters, these plants could adversely affect existing wetland vegetation and associated wildlife habitat. Early detection of the introduction or further spread of these species within the project area is an important step in the control of these species. Thus, it would be appropriate to require both UPPCO and MBLP to monitor for the presence of these species in their reservoirs, and to implement control measures if these species are found. Although MDNR states that reliable methods for eradication and control of these species are currently unavailable, they recommend that control measures be attempted at an appropriate time in the future.

UPPCO and MBLP should develop a plan to monitor for the introduction and further spread of nuisance aquatic plants in project waters, and file this plan for Commission approval within 36 months after issuance of a license. We recommend that this plan be prepared in consultation with the MDNR and FWS, and include criteria for determining the need and frequency of field (or photographic) surveys for nuisance species. As part of the plan, UPPCO and MBLP should periodically consult with MDNR, to update the plan to include control and eradication methodologies as they become available, and to implement these measures as required. The plan should address the use of public information methods to control the spread of these invasive nuisance species, such as information signs, when appropriate, at boat launch ramps. If, during the period of any licenses issued, the MDNR demonstrates that purple loosestrife or Eurasian water milfoil is substantially affecting fish and wildlife populations at the projects, the applicants should cooperate with the MDNR and undertake reasonable measures to control or eliminate the weeds from public waters.

c. Unavoidable Adverse Effects:

None.

### 6. Threatened and Endangered Species

a. Affected Environment:

**Dead River Project**

Interior has identified four federally listed species that may occur in the project area: peregrine falcon, Kirtland's warbler, gray wolf, and bald eagle. In its May 24, 1999, letter, Interior states that the peregrine falcon and endangered Kirtland's warbler may occur in the project area as transients, but are not known to nest in the area. The peregrine falcon was delisted August 25, 1999 (64 FR 164).

The first successful breeding pair of wolves on the Upper Peninsula was recorded in 1991. Since then, wolf numbers have been more or less steadily increasing on the peninsula, primarily due to abundance of the primary prey, white-tailed deer, and their protection from hunting. Trackers estimated that 216 wolves were on the Upper Peninsula in 2000. The *Michigan Gray Wolf Recovery and Management Plan* developed by MDNR calls for maintaining a minimum of 200 wolves on the Upper Peninsula (MDNR, 1997). The endangered gray wolf is known to occur in the project area,

although no sign of wolf habitation was observed by the applicant during 1991-92 surveys. Habitat for this species is any large forested area supporting an abundance of deer, with minimal human intrusion.

The threatened bald eagle was observed by the applicant within the project area. In a field survey conducted by the applicant in May 1992, no active nests were found, but the northern and western shorelines of SLSB were judged to be sufficiently remote to provide nesting sites of medium quality. Low densities of large trees suitable for nest sites, however, might limit eagle nesting in the area. The shorelines of DRSB and MSB were considered low quality for nesting, due primarily to the density of human habitation. Bald eagle populations have been expanding throughout most of the species range; Interior proposed delisting the bald eagle on July 6, 1999 (64 FR 128).

**Marquette Project**

In its letter dated October 5, 2000, Interior states that no federally listed species of fish or wildlife are known to occur in the vicinity of the Marquette Project.

b. Environmental Effects and Recommendations:

**Dead River Project**

*UPPCO Proposal*

UPPCO has proposed to develop a BEPP in consultation with the agencies.

*Recommendations from Agencies and Interested Parties*

Interior recommends the applicant: (1) follow guidelines in the "Recovery Plans for the Eastern Gray Wolf" if new roads are to be constructed on project lands in the future and consult with Interior on any new road construction proposals; (2) consult with resource agencies and implement the "Michigan Gray Wolf Recovery and Management Plan" if a gray wolf den or pup rendevous area is known within the project area; and (3) develop a bald eagle management plan following the recommendations from "The Northern States Bald Eagle Recovery Plan" in consultation with the resource agencies and the plan should be similar to plans developed for other UPPCO projects in the Upper Peninsula such as Prickett, Cataract, and AuTrain.

MDNR recommends the applicant develop a Bald Eagle Protection Plan (BEPP) in consultation with the resource agencies. The BEPP should: (1) incorporate Interior's bald eagle management guidelines and (2) identify potential, existing, or new nesting, roosting and perching trees ("super canopy trees") on project lands. The results of the evaluations for the BEPP may require the development of additional protection measures to be incorporated into a final BEPP. The MDNR recommends a final BEPP include: (1) a mechanism for defining the means, extent and duration of necessary surveys during the term of the license and (2) the bald eagle data and management should be discussed at biennial consultations with the resource agencies to ensure bald eagles are not adversely affected by timber harvest or other activities.

*Our Analysis*

Kirtland's Warbler: The endangered Kirtland's warbler may occur in the Dead River Project area, but only as a transient. It uses successional pine forest, a habitat that is not affected by project operations. Continued operation of the Dead River Project would not affect this species.

Gray Wolf: According to Interior, gray wolves are known to inhabit the project area. To preclude or minimize potential future indirect effects of the project, Interior recommends that UPPCO consult with them prior to construction of any new roads, and follow construction guidelines set forth in the *Recovery Plan for the Eastern Timber Wolf* (FWS, 1992). Interior further recommends that, should a wolf den or pup rendezvous area be found within project boundaries, UPPCO must inform the resource agencies and implement the *Michigan Gray Wolf Recovery and Management Plan* (MDNR, 1997).

Project operations would unlikely have any effect on wolf habitat unless increased recreation or vehicular access introduces more human activity into the area. The staff recommends upgrades and new recreational facilities in the project area (see section V.C.7), but does not recommend any new road construction. These recommendations would result in some increased human activity in the project area, although should not significantly increase human access to more remote areas, in the vicinity of the project, that would provide the most suitable wolf habitat. Continued operation of the project, with implementation of the staff-recommended alternative for project operation and provision of additional recreational facilities, is likely to not adversely affect the gray wolf. However, to address any remaining concerns regarding gray wolf habitat, we recommend that the above Interior recommendations, regarding

road construction and implementation of the *Michigan Gray Wolf Recovery and Management Plan* (MDNR, 1997), be incorporated into any new license issued.

Bald Eagle: The threatened bald eagle is known to occur in the Dead River Project area, and suitable nesting sites are available on the SLSB. Interior recommends that UPPCO be required to develop a BEPP, following guidelines provided in the Northern States Bald Eagle Recovery Plan.

As noted above, bald eagles have been observed in the project area, and with suitable nesting sites on the SLSB, there is the potential for bald eagles to nest in the project area. Nesting sites for this species typically occur in tall trees (in Michigan, conifers) near open water, with an abundance of fish, and minimal human intrusion. The staff-recommended measures to enhance recreation have the potential to increase human activity in the vicinity of these nesting areas. To ensure that bald eagle habitat and usage in the project area is protected, UPPCO should develop a BEPP, as a part of the WMP, and file this plan for Commission approval on the same schedule as the WMP. Continued operation of the project, with implementation of the staff-recommended alternative for project operation and provision of additional recreational facilities, is not likely to adversely affect the bald eagle.

Interior, by letter dated May 24, 1999, has said that the peregrine falcon and Kirtland's warbler may be present within the project area during transient or migratory periods but neither species is known to nest within the project boundaries. Therefore, Interior has concluded that licensing the Dead River Project would not affect either species.

**Marquette Project**

*MBLP Proposal*

MBLP has proposed to develop a BEPP in consultation with the agencies.

*Recommendations from Agencies*

Interior did not make any recommendations for the Marquette Project concerning T&E species and has determined there are presently no federally listed threatened, endangered, or proposed species within the project area.

MDNR recommends that MBLP be required to develop a BEPP in consultation with the resource agencies. The MDNR recommendation requires the BEPP to contain the same features as mentioned above for Interior's recommendation for a BEPP for the Dead River Project. The MDNR also recommends that the Wildlife Management Plan to be developed for the Marquette Project, include measures for the protection and enhancement of habitat for any Federal or state listed threatened, endangered, or sensitive species on project lands.

*Our Analysis*

No federally listed species are known to occur in the Marquette Project area, and, therefore, no effects on Federally listed species are expected in connection with the licensing of this project. Bald eagles have not been reported to nest or reside in the project area, although they have been reported upstream on the Dead River, and may occur as transients through the area. We anticipate that if the population of this species continues to increase, the project impoundments and shorelines may provide suitable foraging or nesting habitat. Even if the bald eagle is delisted, it would likely remain a species of special concern and an important raptor in the project area. Thus, a BEPP should be developed for the project, as a component of the WMP, and should be filed for Commission approval at the same time as the WMP (see section IV.C.4.b).

Land Exchange Effect on Bald Eagles: The proposed MBLP land exchange has the potential to affect eagle habitat along the Forestville reservoir shoreline that could be lost from project lands as a result of the land exchange. The exchange of land would result in a net increase of shoreline in excess of 6,500 feet and an additional 45 acres of bottomland. The upland portions of the land exchange on the Forestville reservoir would likely result in the development of residential housing on much of that tract of land.

To ensure staff had better information about the potential of the land swap to affect bald eagles, the staff requested additional information from MBLP concerning the land swap. On January 2, 2002, MBLP responded to staff's request to survey the lands to be exchanged to determine the presence of bald eagles and bald eagle nests. The lands surveyed included the 77 acres of land owned by MBLP and the 100 acres of land currently owned by Longyear Realty Corporation. MBLP's letter states that no bald eagles or eagle nests were seen on the two survey dates of October 3 and October 8, 2001. In addition, the MDNR has no recent records of bald eagles in the area. Further, no eagles or nests were seen in a previous 1998 MBLP survey.

MDNR, in response to the application that did not include the land exchange, had recommended that with respect to potential eagle use in the project area, that a buffer of sizeable trees should be left between any project-planned activity or development along the water's edge. Staff recommends that if the land exchange occurs, that a shoreline buffer zone be considered for the newly acquired lands. However, at present, there are no bald eagles or nests on the lands to be exchanged, therefore, the land exchange, if it occurs, would not affect bald eagles from continued operation of the Marquette Project.

c. Unavoidable Adverse Effects:

None.

**7. Cultural Resources**

a. Affected Environment:

**Dead River Project**

Area of Potential Effect

In consultation with the State Historic Preservation Office (SHPO), UPPCO identified an Area of Potential Effect (APE) that includes the shorelines of all the project reservoirs up to the maximum water surface elevations, areas including and immediately around project facilities, and the project's three boat launch facilities.

Archaeological Resources

No archaeological sites within the Dead River Project APE have been listed in the National Register of Historic Places (NRHP). As part of its relicensing efforts, UPPCO commissioned an archaeological sensitivity study for the shorelines of all three reservoirs, plus locational surveys at "discrete study areas" around the dams, pipelines and power houses, and around the three boat launch facilities. An archaeological location survey, followed by an intensive evaluation survey of sites in the fluctuation zone along the shoreline of SLSB, were also conducted. As a result of the archaeological investigations at SLSB, the SHPO agreed with the UPPCO finding that no sites within the fluctuation zone of SLSB were eligible for listing in the NRHP due to lack of intact deposits. The SHPO provided its opinion in a letter dated April 6, 1994, that historic

period dump sites near SLSB and Hoist dams could potentially contain intact deposits relating to construction of these dams. The sensitivity assessment for the DRSB and MSB shorelines concluded that the potential for finding archaeological materials in stratigraphic context below the maximum water surface elevations in these reservoirs, was very poor.

Historic Resources

No historic resources in the Dead River Project APE have been listed in the NRHP. As a result of a historical evaluation of project facilities, the SHPO provided its opinion that facilities associated with the SLSB and Hoist developments were not eligible for listing in the NRHP. The SHPO noted the potential eligibility of the facilities associated with the McClure development (powerhouse, dam, penstock, caretaker's house, and landscaped grounds).

**Marquette Project**

Area of Potential Effect

In consultation with the SHPO, the MBLP identified an APE that encompasses project facilities and the Forestville and Tourist Park reservoirs up to their respective project boundaries, 775 feet NGVD and 642 feet NGVD. The portion of the Dead River within the project boundary that is bypassed by the penstock (from No. 2 dam to No. 2 powerhouse), portions of the river outside of the two reservoirs, and the portion of the spillway downstream from No. 2 dam were excluded from the APE.

Archaeological Resources

No archaeological sites in the APE have been listed in the NRHP. As part of its relicensing efforts, MBLP commissioned a reconnaissance-level archaeological survey to identify archaeological sites within the project's APE. Of six sites identified, the SHPO concluded, by letter dated February 17, 1999, that two of the sites were not eligible for the NRHP. The remaining sites (20MQ147, 20MQ148, 20MQ150, and 20MQ151) were considered eligible for the NRHP by the SHPO. The 20MQ147 site is the community of Collinsville, once associated with the Collins Iron Company forge. Site 20MQ148 is a historic archaeological site representing remains of the Lake Superior Powder Company. Site 20MQ150 is a prehistoric site consisting of a surface scatter of lithic artifacts and

subsurface artifacts. Site 20MQ 151 is a large historic site consisting of the remains of Forestville, a former industrial site and community.

Historic Resources

No historic resources in the APE have been listed in the NRHP. Based on an evaluation study commissioned by MBLP, the SHPO concluded by letter dated June 16, 1999 that remnant No. 1 dam, No. 2 powerhouse and associated structures, and No. 3 powerhouse and associated structures, were not eligible for listing in the NRHP. The SHPO was unable to provide an opinion on the eligibility of the 1897 Forestville dam (remnant dam no. 1), because this structure is submerged in the reservoir above No. 2 dam and could not be properly investigated. The SHPO requested that the 1897 Forestville dam (remnant dam no. 1) be evaluated if it is exposed during a future planned drawdown.

b. Environmental Effects and Recommendations:

The Commission is required to consult with the SHPO and the Advisory Council on Historic Preservation (ACHP) in accordance with the requirements of Section 106 of the NHPA, for licensing actions.

**Dead River Project**

In its license application, UPPCO proposed to conduct intensive evaluation surveys of the SLSB and Hoist dam dump sites in the future, if project operations or project-related activities appeared to have the potential to damage these sites. UPPCO also proposed to provide the SHPO with the requested additional information about the McClure development, and to consider nominating the development to the NRHP if it were found to be eligible for listing.

The Dead River Project's McClure development has been in operation since 1919. Continued operation of the McClure development would maintain its historic facilities in productive use for the purpose for which they were originally designed and built, and would therefore be beneficial to the potentially NRHP eligible McClure powerhouse, landscaped grounds, dam, penstock and caretaker's house.

The facilities of the McClure development would, however, require maintenance, repair and possibly alteration to meet changing circumstances over the

license period. Thus, staff recommends that UPPCO prepare a Cultural Resource Management Plan (CRMP), in consultation with the SHPO, to ensure that potential adverse effects to historic properties resulting from such future actions would be avoided or satisfactorily mitigated.

Construction of recreation enhancements and minimum flow facilities could also potentially affect historic properties. Development of any recreation plans or design of structures mandated by a new license, in consultation with the SHPO, would ensure that potential adverse effects to historic properties resulting from such enhancement measures would be avoided or satisfactorily mitigated.

To ensure that adverse effects to known and potential historic properties, and to any as yet unidentified archaeological resources are satisfactorily resolved over the term of the license, the Commission would execute a Programmatic Agreement (PA) with the SHPO and ACHP, with the licensee as an invited signatory. The PA would require the licensee to prepare a CRMP, in consultation with the SHPO. The PA would specify that the CRMP contain principles and procedures to address identification, continued use, and protection of historic properties; mitigation of unavoidable adverse effects; compliance with laws and regulations governing human remains; and discovery of previously unidentified resources. Execution of the PA and implementation of its measures would document the Commission's consideration of the effects of relicensing the Dead River Project on historic properties.

**Marquette Project**

MBLP proposes to develop a Historic Resources Management Plan (HRMP) in consultation with the SHPO, to provide for management of historic properties over the term of the new license. MBLP proposes to include in the HRMP, measures to accomplish recommendations of the SHPO to evaluate the 1897 Forestville dam (remnant dam no. 1) in the event that it is uncovered in a planned drawdown, to prepare detailed, measured site maps of sites 20MQ147 and 20MQ148, mapping of site 20MQ151, and completion of limited subsurface testing in any parts of a site where erosion may be affecting archaeological deposits. An HRMP would also incorporate measures to address the SHPO recommendation for conducting a Phase II (evaluation) survey at 20MQ150. If the site was found eligible for the NRHP, steps would be taken to protect or mitigate any effects on the site, which is being affected by an access road to No. 3 dam. Alternatively, direct protection of the site without further evaluation could be undertaken.

To ensure that adverse effects to known and potential historic properties (the four archaeological sites and the 1897 Forestville dam ), and to any as-yet unidentified archaeological resources are satisfactorily resolved over the term of the license, the Commission recommends executing a PA with the SHPO and ACHP, with the licensee as an invited signatory. The PA would require the licensee to prepare a HRMP, in consultation with the SHPO. The PA would specify that the HRMP contain principles and procedures to address identification, continued use, and protection of historic properties; mitigation of unavoidable adverse effects; compliance with laws and regulations governing human remains; and discovery of previously unidentified resources. Execution of such a PA and implementation of its measures would document the Commission's consideration of the effects of relicensing the Marquette Project on historic properties.

c. Unavoidable Adverse Effects:

None.

## 8. Recreational Resources

a. Affected Environment:

The Dead River and Marquette Projects are located in the central region of Michigan's Upper Peninsula, where there is an abundance of natural outdoor recreational resources. These resources include lakes, streams, waterfalls, and forests. Nearly one-quarter of the land in Marquette County, in which both projects lie, is publicly owned (national forests, state forests, state parks, state boating/fishing sites). There are no federal lands, however, within the project boundaries. Traditional spring, summer, and fall recreational opportunities include fishing, hunting, boating, canoeing, and camping. Off-road vehicles (ORVs) frequently use the project areas during these seasons. Snowmobiling, cross-country skiing, and ice-fishing are the traditional winter activities.

Marquette County includes one state park (Van Riper), nine state forest campgrounds, one county campground, and four township or city campgrounds. 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 six scenic hiking trails in Marquette County, including the North Country National Scenic Trail, which crosses through the Marquette Project. Marquette County also has approximately 200 miles of snowmobile trails.

In the 1985-1990 Michigan Recreation Plan (MDNR, 1985), MDNR states that 90 percent of the recreationists in Michigan are state residents. In the 1991 to 1995 Michigan Recreation Plan (MDNR, 1991b), MDNR reports that state forest camping use and state park use have shown no significant changes from 1980 to 1990, while activities such as fishing, hunting, boating, and off-road vehicle use have shown modest increases. The top priorities described in the statewide recreation plan are to provide for community recreation (ball fields, tennis courts, playgrounds, and picnic areas), and trailways (for bicycling, walking, running, horseback riding, and skiing).

The Marquette County Recreation Plan (MBLP, 1999) indicates demand for user-based (e.g., baseball, basketball, horseshoes) recreation facilities. Local priorities focus primarily on renovating and upgrading existing facilities such as community parks. Baseball diamonds, basketball courts, tennis courts, horseshoe pits, and other user-oriented facilities are planned for construction near community centers. Marquette County and four townships have plans to develop or improve resource-based recreation facilities such as fishing access, campsites, and nature trails. Overall, the demand for resource-based recreational opportunities is low compared with demand for user-based opportunities.

**Dead River Project**

The major recreational resources at the Dead River Project are the three reservoirs (SLSB, DRSB, and MSB), the Dead River reaches between these impoundments, and at the mouths of creeks entering the Dead River. Recreation settings range from the wilderness-like natural character of SLSB, to the more developed recreation facilities and private cottages on the shores of the DRSB and MSB, to the steep gorges and forested banks of the Dead River between the reservoirs.

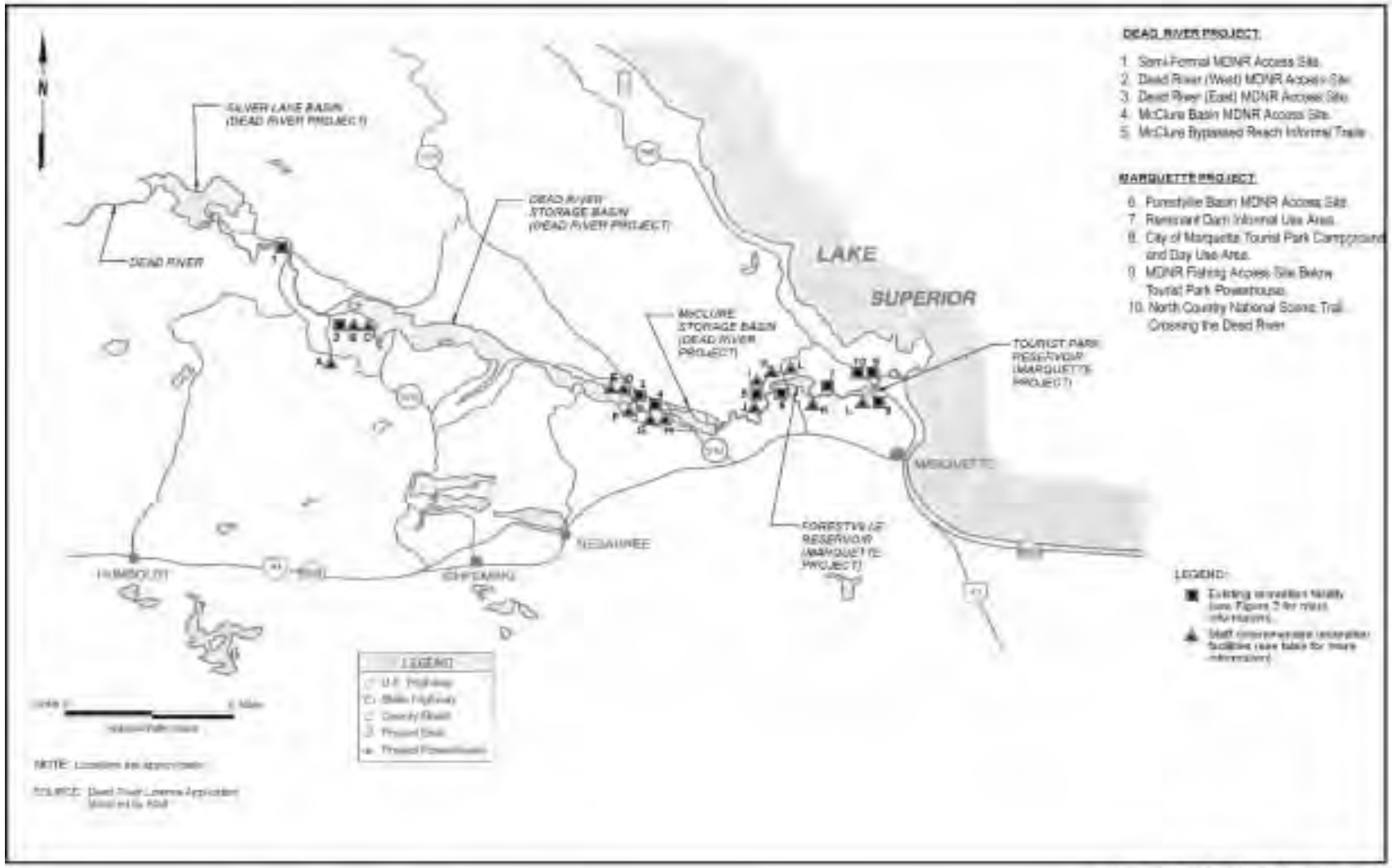
Seven sites provide public access to the project area for fishing, boating, and other recreational activities (figure 4). Developed recreational opportunities are provided at two sites on the DRSB (DRSB-west and DRSB east access points), and one site on the MSB. Vault toilets are provided at the three access sites for persons with disabilities. These three sites are managed by the MDNR. Two existing, undeveloped recreation sites, one owned by UPPCO and the other owned by the Escanaba Paper Company, provide boating access to SLSB. Access to these SLSB sites is difficult because of the condition of secondary and logging roads. The access is further limited by the recent removal of a bridge over the Dead River below SLSB on county road AAT. Undeveloped access sites at the Hoist and McClure powerhouses provide fishing

opportunities. 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. A largely undeveloped recreation site is located along the Dead River below SLSB, near the confluence with Mulligan Creek. An undeveloped recreation site is also located just upstream of the McClure powerhouse.

UPPCO owns only a small portion of project lands (lands located within the FERC project boundary). The majority of project lands are 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 not including the right to use or manage these lands for public recreation.

Silver Lake Storage Basin

SLSB is a 1,464-acre reservoir located near the headwaters of the Dead River. It is accessed by U.S. Highway 41, County Road 573, and several unsigned secondary and logging roads. Access to the project vicinity was made more difficult in November 1999, when Marquette County removed a bridge across the Dead River on County Road AAT, located just below Silver Lake dam (personal communication, R. Meyers, Supervisor of ).




(Source: UPPCO, 1994 as Modified by Staff)

Figure 4. Existing recreation facilities in the Dead River vicinity.

Hydro Operations, UPPCO, Houghton, MI, and S. Bedross, Recreation Specialist, Harza Engineering, Chicago, IL, June 6, 2000).

There are no developed recreational facilities at Silver Lake. UPPCO provides access to Silver Lake dam via the dam access road. Visitors park at the access road gate in a lot with capacity for 7 cars and walk approximately 300 feet to the reservoir/dam area. This site is also used for carry-in boat access. Signs warn motorists to stay off earthen portions of the dam. The old caretakers'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 (personal communication, R. Meyers, Supervisor of Hydro Operations, UPPCO, Houghton, MI, and S. Bedross, Recreation Specialist, Harza Engineering, Chicago, IL, June 6, 2000). 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.

MDNR regularly stocked SLSB with lake trout and brook trout beginning in 1985, and with splake since 1987. Currently, only splake are stocked.

Timber was not removed from the SLSB prior to filling. Hence, use of the lake by all but the smallest of watercraft is difficult and potentially hazardous because of remnant snags and deadheads created by decomposing trees (personal communication, R. Meyers, Supervisor of Hydro Operations, UPPCO, Houghton, MI, and S. Bedross, Recreation Specialist, Harza Engineering, Chicago, IL, June 6, 2000).

Snowmobiling is very popular in the lands surrounding SLSB. Snowmobilers typically park their vehicles along U.S. Highway 41 in Ishpeming, and wind their way up to the lake on approximately 20 miles of secondary and logging roads (personal communication, R. Meyers, Supervisor of Hydro Operations, UPPCO, Houghton, MI, and S. Bedross, Recreation Specialist, Harza Engineering, Chicago, IL, June 6, 2000).

Prior to UPPCO's purchase of the Dead River Project in 1988 from the Cleveland Cliffs Iron Company, SLSB drawdowns to an elevation of 1,465 feet NGVD (i.e., approximately 21 feet below spillway crest level) were common during late winter (January 1 to April 1). Since 1988, average late winter drawdown has been about 8 feet, resulting in the exposure, on average, of just over 11 linear feet of shoreline. During these periods (January 1 to April 1), recreational use, with the exception of snowmobiling, is very low. The fluctuating water levels potentially make for unstable ice conditions and pose hazards to snowmobilers or ice fishermen attempting to recreate

on the surface of the lake. During the summer recreation season, the water surface elevations at SLSB are more stable, with fluctuations on the order of 2 to 3 feet.

Typical historical releases from SLSB in the summer average from 15 to 20 cfs. During winter, average releases are about 80 to 90 cfs. No minimum flow requirements are currently in place, because the project is unlicensed. Historically, releases have been curtailed in all months to conserve water for later releases for power generation at the downstream generating facilities.

Below Silver Lake dam, the Dead River flows through a narrow (15 to 25-foot-wide), heavily vegetated channel for approximately 5.4 miles, to the upper reaches of the DRSB. Several beaver-formed or beaver-enhanced pools are found in the lower portion of this reach, while several small bedrock plunge pools occur in the upper portion.

Below Silver Lake dam, Connors and Mulligan Creeks join the Dead River. The MDNR stocks brown and brook trout near the County Road 573 bridge. An informal, semi-developed, cleared area with well-worn trails to the water's edge, located upstream of Mulligan Creek confluence, provides fishing, canoeing access, and camping opportunities.

Dead River Storage Basin

The 3,202-acre DRSB 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.

Because of its large storage capacity, the normal variations in inflows or outflows do not cause significant water level fluctuations at the DRSB. Since 1988, lake level variation has been approximately 7 feet between April 1 and May 1. A maximum daily reservoir fluctuation of less than a few inches occurs during the peak recreation season (Memorial Day to Labor Day).

Two public recreational facilities, developed and managed by the MDNR, provide access to the western and eastern extremes of the long, narrow reservoir. The DRSB west access (MDNR Site Number 52-41) is located near the Dead River inlet (figure 4). This site is located approximately 22 miles from the city of Marquette, and is accessible via U.S. Highway 41, County Road 573, and secondary roads. Access to the site is somewhat difficult, in part because the recently installed directional signage has

been vandalized. There is a hard surfaced ramp suitable for launching boats from trailers and a skid pier (courtesy dock). The parking area has a capacity for 7 car/trailer units. An Americans with Disabilities Act (ADA)-accessible vault toilet is located at this site. Although a few adjacent cottages are visible from this access site, the vicinity is much less developed than around Site 52-42 located near Hoist dam (see below).

The DRSB east access (MDNR Site Number 52-42) is located near Hoist dam. The site is located approximately 8 miles from the city of Marquette and is easily reached from U.S. Highway 41 and County Roads 502 and 510. Hoist dam and a number of adjacent cottages are visible from this site. This site is in good condition and has a hard-surfaced ramp with sufficient water depth to launch boats from trailers. The capacity of the parking lot is 15 car/trailer units. Two ADA-accessible vault toilets and appropriate signage are provided. An undeveloped sandy beach at the site is used for swimming and sunbathing.

The Hoist dam access road leads to the tailrace. The parking area at the gate for the Hoist powerhouse accommodates 10 cars. Anglers park at the gate blocking the road down to the powerhouse and then walk about 1,000 feet down the steep road to the powerhouse tailrace.

The Hoist powerhouse tailrace and the reach of the Dead River between the tailrace and the backwaters of the MSB were and continue to be popular for fly fishing.[8] MDNR stocks brown and rainbow trout in the reach. Maintenance and enhancement of this fishery is an objective of the MDNR and local anglers. Fishing occurs along both banks of the Hoist tailrace and the downstream river reach.

Because of its large storage capacity, the normal variations in inflows or outflows do not cause significant water level fluctuations at the DRSB. Since 1988, lake level variation has been approximately 7 feet between April 1 and May 1. A maximum daily reservoir fluctuation of less than a few inches occurs during the peak recreation season (Memorial Day to Labor Day). Historically, powerhouse discharges have been shut off during periods of low electrical demand. However, this short (0.4-mile long) tailrace has continued to support a good trout fishery.

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[8] See Robert Traver, 1903. Anatomy of a Fisherman. Text by Robert Traver (pen name, author's real name John Donaldson Voelker) and photos by Robert W. Kelley. First Edition. New York, McGraw-Hill.

McClure Storage Basin

The MSB is the smallest (96 acres) of the three Dead River Project reservoirs. Water level fluctuations in the MSB have historically varied within a range of less than 2 feet. Summer cottages occupy the more level areas of shoreline. There is one public recreation facility located on the MSB, developed and managed by the MDNR (figure 4). The MSB access (MDNR Site Number 52-47) provides a hard-surfaced ramp for launching boats from trailers, and appropriate signage. The parking area has a capacity for 4 cars/trailers, and an ADA-compliant vault toilet is provided. The site is located approximately 6.5 miles from the city of Marquette and is easily reached by U.S. Highway 41 and County Roads 502 and 510. Marquette County has proposed to close the existing bridge on County Road 510 to traffic, because of the bridge's historic value. A new bridge with a slightly altered road alignment is being planned. The area surrounding the access site is heavily wooded, and residential development is limited. No public access exists to the McClure dam.

The McClure powerhouse, located at the end of Forestville Road, is easily accessible from the city of Marquette. A gravel parking area at the powerhouse can accommodate about 10 vehicles and is open to the public.

Little recreational use occurs in the typically dewatered upper segment of the 6.-1-mile long bypassed reach, because of extremely difficult access conditions and lack of water. Leakage from McClure dam and the penstock along with tributary inflows provide an average of about 17 cfs in the middle and lower segments of the bypassed reach. Local anglers fish for brown trout at the confluences of tributary streams in the middle section of the bypassed reach, which is accessed with difficulty via back roads, logging roads, and private lands. They also fish for brown trout in the tailrace and in the stream reach between the McClure powerhouse and the headwaters of the Forestville reservoir.

From the McClure powerhouse, a steep, informal, and natural surfaced pathway extends upstream into private property for about 0.5 mile, and provides access to the scenic waterfalls in the lower segment of the bypassed reach. The waterfalls area (immediately upstream from the McClure Powerhouse) is popular with local residents for swimming, sunbathing, and hiking. Use of the network of informal trails, however, has caused soil disturbance and associated erosion along the hillsides. Access to the McClure tailrace is severely limited because of steep slopes, rapidly fluctuating water

levels and velocities, and the adjacent private property. There are no public toilets or trash collection receptacles at the McClure powerhouse area.

Recreation Use Surveys

UPPCO conducted recreation surveys in 1992 (UPPCO, 1994) to determine the level of recreational use, identify the major recreational activities and major access sites, and evaluate the adequacy of existing access to the Dead River Project. Three types of surveys were conducted to collect recreation data: a public survey (May to September 1992), a ground survey (spring, summer, and fall of 1992), and an aerial winter survey. Based on the results of these surveys, 2,800 people were estimated to visit the Dead River Project in 1992. The major recreational activities at the project were fishing and sightseeing.

Recreational use at the project varies by site and season. The most visited sites were the McClure powerhouse access and the DRSB east access. The least visited site was the Hoist powerhouse access site. Six of the seven project access sites appear not to be used to their capacity. The DRSB east access was occasionally used to capacity on peak-use days in the spring and summer. Most recreationists described the existing recreation access sites as adequate or more than adequate.

Information from public survey comments indicated that visitors wanted the natural character of the largely undeveloped sites (the McClure powerhouse and bypassed reach access, and the SLSB access) to be preserved and to remain undeveloped. Visitor comments requested enhancements that included improvements to road access to SLSB, addition of a dock and longer boat launch at the existing MDNR accesses in the DRSB, higher summer water levels in DRSB, stable flows from Hoist powerhouse, more trout stocking below Hoist powerhouse, and provision of a toilet and trash collection in the McClure powerhouse area.

The winter survey indicated that snowmobiling and ice-fishing activity occurs at the project. Winter recreational use appears to be light at MSB and along the Dead River. Winter use appears to be light to moderate at SLSB and the DRSB.

Population in the region over the last several years was relatively stable or slightly decreasing, and the 1992 estimate of recreational use is generally assumed valid for staff analysis presented in subsequent sections.

**Marquette Project**

The major recreational resources at the Marquette Project are the Forestville and Tourist Park reservoirs. Forestville and Tourist Park reservoirs provide opportunities for boating with canoes, kayaks, and small aluminum craft with electric motors or small horsepower gas motors. The shallow nature of the reservoirs, abundant stumps, and rocks make any high speed boating dangerous. Recreation settings range from the natural character of the Forestville reservoir to the developed recreational facilities and private residences on the shores of the Tourist Park reservoir within the city of Marquette.

Public access to the project is provided for fishing, boating, and other recreational activities at five sites throughout project area (figure 4). Developed recreation opportunities are provided at two MDNR-managed sites (one on the Forestville reservoir and another just below the Tourist Park powerhouse), and a city of Marquette managed site (on the Tourist Park reservoir). Undeveloped recreation sites are provided at the remnant No. 1 dam site in the Forestville bypassed reach, at the No. 2 powerhouse, and at the No. 2 dam.

The MBLP conducted a Recreational Resources Inventory for the project area during 1998. The purpose of the study was to inventory existing facilities along the Forestville and Tourist Park reservoirs, assess their condition, and evaluate potential enhancements. The report concluded that the two reservoirs, the Forestville bypassed channel, and associated riparian zones provide an outstanding natural area and recreational resource and that the most feasible uses of the project are low-impact activities such as hiking/skiing, fishing, and non-motorized boating. Unregulated use of all-terrain vehicles was identified as an increasing problem in terms of erosion and destruction of vegetation in the project area.

Forestville Development

The MDNR facility (MDNR Site 52-46) is located at the upstream end of the Forestville reservoir, about 0.25 mile downstream of the Dead River Project's McClure powerhouse. The site, which contains a concrete boat ramp suitable for launching boats from trailers, is in good condition. Stumps and other woody debris in the reservoir adjacent to the launch make fishing and boating difficult for some users. The gravel access road to the site is in need of resurfacing. An ADA-accessible vault toilet, signage,

and parking for 8 cars/trailers are available at this site. Shoreline fishing is popular along the Forestville reservoir immediately downstream from the MDNR boat launch.

No developed recreational facilities exist in the vicinity of No. 2 dam. Informal paths have been established for portaging around the No. 2 dam. A popular undeveloped fishing site occurs on the north side of the reservoir at No. 2 dam. The site is accessed by vehicle from the west via a road that skirts the north side of the reservoir, or from the east on a two-track road. Undeveloped pedestrian access to the area appears to have caused some erosion on the sandy slopes.

The remnant No. 1 dam, located approximately 2,800 feet downstream from No. 2 dam, is a popular recreation site for anglers and ORV users. This informal use area is easily accessible by a short informal trail and a vehicle bridge used by MBLP vehicles to maintain the Forestville penstock. Along Bancroft Creek, a tributary to the Dead River above the remnant No. 1 dam, erosion effects resulting from ORV use appear severe. At MDEQ's request, MBLP has rip-rapped the creek crossing, bermed and mulched the creek banks, and installed ORV barriers. Unauthorized and heavy ORV use is known to occur on private, as well as MBLP property, in the vicinity of the Forestville powerhouse. Bancroft Creek is a coldwater creek that reportedly contains self-sustaining population of brook trout.

The Forestville powerhouse road provides access to recreational lands north of the Dead River including the North Country Trail (see section on Tourist Park Development below). The road is popular with joggers, walkers, and bikers. Some fishing occurs just downstream of the powerhouse. Canoeists are not known to use this area of the project (personal communication, R. Meyers, Supervisor of Hydro Operations, UPPCO, Houghton, MI, and S. Bedross, Recreation Specialist, Harza Engineering, Chicago, IL, June 6, 2000).

Tourist Park Development

The Tourist Park Campground is located on the north edge of the city of Marquette in a well-wooded 40-acre park. This popular day use and camping area is located along the southeastern shore of the Tourist Park reservoir and is managed by the city of Marquette Parks and Recreation Department. The park features 100 recreational vehicle (RV) campsites, tent campsites, parking, restrooms, showers, an RV dump station, and water/electric/sewer hookups. The camping season is from mid-May through mid-October. The east restroom is ADA accessible. The park has ballfields, a

playground, and a small swimming beach. Canoes and kayaks are currently launched at either end of the Tourist Park beach.

The North Country National Scenic Trail, which is administered by the North Country Trail Association (NCTA), can be accessed on the extreme northeastern edge of the Tourist Park reservoir, just above the powerhouse. The trail progresses west and then jogs north through a private quarry on the north shore of the reservoir. When completed, this trail would link outstanding scenic, natural, recreational, historic, and cultural areas in seven northern states: New York, Pennsylvania, Ohio, Michigan, Wisconsin, Minnesota, and North Dakota. The eastern end of the trail is at Crown Point State Historic Site on the Vermont-New York border. The western end of the trail is at Lake Sakakawea State Park in west-central North Dakota, where it joins the route of the Lewis and Clark National Historic Trail (Great Outdoor Recreation Pages, 2000). In 1995, MBLP signed a memorandum of understanding with the NPS that allows construction of the trail on MBLP lands, and commits MBLP to provide long-term maintenance of the trail within its lands. An important regional recreational trail follows the same alignment in the vicinity of the Tourist Park reservoir.

Downstream of the No. 3 powerhouse and just downstream of the Route 550 Road Bridge is an ADA-accessible fishing platform and associated restrooms and parking on the east bank of the Dead River. This site was designed and built by MDNR and is maintained by the city of Marquette. The site is in good condition. Approximately 0.5 mile below the 550 Road Bridge the Dead River enters Lake Superior.

Recreation Use

The 1992-1996 Marquette County Recreation Plan (MBLP, 1999) includes the results of a user survey conducted by the county in 1991. Respondents named parks and recreation sites, winter sports, and water resources as the three greatest recreational assets of the county. Almost 80 percent of those surveyed indicated that more recreational facilities were needed, with trails, golf, and waterfront development leading the list. Reported recreational use of the Forestville reservoir in 1990 was very low, with unimproved access areas being used at 10 percent of capacity and the MDNR boat ramp being used at 1 percent of capacity. Use of Tourist Park reservoir was much higher, but still well below its capacity. At Tourist Park reservoir, use was highest at the picnic and park areas at 40 percent of capacity, followed by the swimming area at 37 percent of

capacity. Campground use was at 17 percent of capacity, and unimproved access areas were estimated to be used at 2 percent of capacity.

b. Environmental Effects and Recommendations:

**Dead River Project**

In this section, we analyze the proposed project's effects on recreational resources, UPPCO's proposed enhancements, and the recommendations from agencies and interested parties, for recreational enhancements in relation to recreational needs and use associated with the licensing of the Dead River Project. Our analysis addresses recreational issues pertaining to planning, O&M, construction of new enhancements, and upgrades of existing facilities.

Recreation Plan

*UPPCO Proposal*

UPPCO has not made any specific proposal related to the preparation of a recreation plan for the project.

*Recommendations from Agencies and Interested Parties*

MDNR recommends that UPPCO, within 12 months from the date of issuance of the license, develop and implement a Recreation Plan for the Dead River Project, in consultation with MDNR.

The KBIC recommends that UPPCO develop and implement a Recreation Plan for the project in consultation with the resource agencies.

*Our Analysis*

The Dead River project area provides significant and varied recreational opportunities, both existing and proposed, and development and implementation of a Recreation Plan for the project would be appropriate, to allow UPPCO and the agencies to carefully plan for meeting existing and future recreational needs at the project. Thus, we recommend that UPPCO develop a Recreation Plan, in consultation with MDNR and interested parties, and file this plan with the Commission for approval within 12 months

from the date of issuance of any new license. The plan should include existing and staff-recommended recreational enhancements, and any additional measures jointly developed by UPPCO and MDNR.

Operation and Maintenance of Existing and Staff-Recommended Recreation Enhancements

*UPPCO Proposal*

UPPCO proposes to continue to maintain public access to project lands and existing project-related recreation facilities.

*Recommendations from Agencies and Interested Parties*

MDNR recommends that UPPCO provide for the O&M of all existing recreational facilities described in the application (see figure 4), and for the O&M of all MDNR-recommended new facilities. In addition, MDNR recommends that UPPCO fund O&M of boat launch ramps currently operated by MDNR in the project area.

*Our Analysis*

UPPCO should provide access to the project waters for recreation and pay for O&M at any of its currently operating facilities. We do not concur with MDNR that UPPCO should fund O&M for MDNR operated facilities, because these facilities have been developed and maintained by the MDNR using public funds for public use of project waters. UPPCO's obligation for O&M of its own facilities should be for the duration of any new license issued.

Signage

*UPPCO Proposal*

UPPCO proposes to provide directional signage for the existing MDNR-managed DRSB (west) access site at the junction of the access road with County Road 573. UPPCO also proposes to provide directional signs or to provide funds for improved directional signage to SLSB.

*Recommendations from Agencies and Interested Parties*

MDNR recommends that UPPCO provide directional signage on major highways to all Dead River Project recreational facilities.

*Our Analysis*

During our site visit in June 2000, we confirmed the need for directional signage to all existing and proposed recreational facilities from major highways. Current signage is not adequate to direct recreational users to the available facilities, and this lack of signage likely discourages some users from using the facilities because they are not easy to find. Additional signage would facilitate access to the Dead River (Hoist) MDNR west access site and should improve use at the site. We recommend that UPPCO implement its proposal to provide directional signage at the junction of the access site road with County Road 573, and additional signage for all project impoundments.

Toll-free Telephone Number

*UPPCO Proposal*

UPPCO has not made any specific proposal related to providing a toll-free telephone number to make available information on project operations.

*Recommendations from Agencies and Interested Parties*

Mr. Raymond Weglarz, in a letter dated November 30, 1996, requests that UPPCO set up a 24-hour, toll-free telephone access to provide information on current water levels at the project reservoirs, and flow releases from all project dams and powerhouses.

*Our Analysis*

On the basis of our analysis presented in section V.C.3, we conclude that sufficiently accurate information on project water levels and flow releases would be available by contacting UPPCO operations directly, on an as-needed basis. Based on existing and potential future recreational usage of the project area, it does not appear that a 24-hour, toll-free telephone number would be heavily used and, therefore, would not be justified. We do not recommend this measure.

Silver Lake Development Enhancements

*UPPCO Proposal*

UPPCO does not propose any recreational facility improvements or additions at SLSB. However, UPPCO proposes to reduce the maximum SLSB annual drawdown to 8.5 feet, and to maintain a minimum flow of 8 cfs in the Dead River reach below the Silver Lake dam.

*Recommendations from Agencies and Interested Parties*

MDNR recommends construction, operation, and maintenance of a no-fee, barrier-free reservoir shoreline fishing, bird watching, and aesthetic viewing access site on SLSB. This site would include parking for 5 vehicles with two additional designated, barrier-free parking spaces, a barrier-free vault toilet, hardened paths, signage, and a barrier-free fishing pier. MDNR recommends that the fishing pier should be located such that anglers can access areas of the reservoirs expected to hold fish (e.g., deep water or good cover).

MDNR also recommends construction, operation, and maintenance of a no-fee, barrier-free reservoir boat launch at the SLSB, including a concrete boat launching ramp, parking for 12 vehicles with trailers, (including 2 barrier-free parking spaces), accessible skid pier, hardened paths, barrier-free vault toilet, and signage. MDNR recommends that the boat ramp be designed to be functional at all reservoir elevations during the ice-free season.

The NPS recommends that opportunities for instream recreational boating in the Dead River reach below the SLSB be addressed.

Mr. Weglarz states that canoeing in the Dead River below SLSB is highly recreational and enjoyable, and requests that UPPCO maintain a minimum flow of 15 cfs for that purpose.

*Our Analysis*

The SLSB area is difficult to access and remote in character. Because of its remote nature and lack of development, SLSB currently provides a quality wilderness experience. Current recreational use at the SLSB is low, and little or no significant increase in usage is expected in the near future, because of the availability of similar reservoir-based (although not wilderness) recreational opportunities at the easily

accessible Hoist and McClure developments. Public surveys conducted by UPPCO in 1992 indicated that respondents preferred to see the SLSB area remain undeveloped. The SLSB would fall within the planning zone of the Escanaba River State Forest Comprehensive Plan, which calls for prevention of new access into lakes that support loons. Even though loons have not been observed to nest in the SLSB, they have been observed in the area. Interior has also recommended and the staff has concurred, with the recommendation that UPPCO provide loon nesting platforms at SLSB (section V.C.5). For these reasons, we do not recommend construction of a no-fee, barrier-free reservoir shoreline fishing area and boat launch at SLSB.

We have reviewed instream recreational boating opportunities in the Dead River reach below the SLSB. Access to this reach is difficult, and the Dead River in this reach is only 15 to 25 feet wide. Numerous beaver-formed or beaver-enhanced pools are found in the lower reach, and several small bedrock plunge pools occur in the upper portion of this reach. The portion of the reach upstream of County Road 573 bridge is popular for trout fishing, even though population densities of trout and other species are low. MDNR stated that canoeing use of the Dead River below Silver Lake Dam is unlikely and recommended against installing canoe portages at Silver Lake dam (UPPCO, 1994), partially because of difficult access and the presence of beaver dams. We have not identified any demand for instream recreational boating below SLSB, and, therefore, do not recommend development of instream boating facilities in this reach of the Dead River.

Staff recommends a minimum flow of 10 cfs be released from SLSB during the period July to September, and from 15 to 25 cfs at other times of the year, consistent with the WQC conditions (section IV.B.1). These flows would enhance fishery resources in the reach. Anglers currently have access to the reach, particularly near County Road 573 bridge, and no additional access appears necessary. The staff-recommended minimum flows would enhance recreational fishing in the Dead River reach below Silver Lake dam.

Hoist Development Enhancements

*UPPCO Proposal*

UPPCO does not propose any facility improvement or additions at DRSB. However, UPPCO proposes to reduce lake level fluctuations, with a maximum

drawdown limit of 7 feet. UPPCO also proposes to maintain a minimum flow from the Hoist powerhouse of 100 cfs when sufficient inflow is available.

*Recommendations from Agencies and Interested Parties*

Dead River Storage Basin: MDNR recommends construction, operation, and maintenance of a no-fee, barrier-free reservoir shoreline fishing, bird watching, and aesthetic viewing access site on DRSB. The site would include parking for 5 vehicles with 2 additional designated barrier-free parking spots, a barrier-free vault toilet, hardened paths, signage, and a barrier-free fishing pier. MDNR recommends that the fishing pier should be located such that anglers can access areas of the reservoirs expected to hold fish (e.g., deep water or good cover).

MDNR also recommends that UPPCO provide funding for the O&M of the no-fee MDNR boat launch ramps on the Dead River (Hoist) basin. MDNR further recommends that funding be provided to upgrade the facilities to meet ADA standards. MDNR considers the following upgrades to be necessary at the Hoist East Side Launch: a barrier-free skid pier, hardened paths, and 2 barrier-free parking spaces. At the Hoist West Side Launch, MDNR recommends the following upgrades: a barrier-free skid pier; 7 parking spaces, 2 of which are barrier-free; hardened paths; and a barrier-free vault toilet.

*Our Analysis*

The user survey conducted by UPPCO in 1992 indicated that the most popular recreational activities in the DRSB were fishing, boating, and swimming at the MDNR east access, and fishing and boating at the MDNR west access. Approximately one-quarter of the survey commentors requested a dock and extension of the existing boat ramp at the east access area, which reaches its capacity during some peak use days. However, survey results do not suggest a demand for additional access points for shoreline fishing, bird-watching, or aesthetic viewing. There appears to be little justification for requiring such access sites on DRSB, and we do not recommend that UPPCO be required to provide such access.

User surveys did not identify a need for additional ADA-compliant facilities at the west or the east access points. As discussed above, MDNR facilities have been and should continue to be maintained by public funding to provide public access to the DSRB. However, because there is information that the east access site reaches its

capacity on peak usage days, requiring UPPCO to provide a boat dock or improve the existing boat ramp at the east access site would improve boating access to the DRSB, and mitigate potential overcrowding. Such an improvement to the existing facility would be a cost-effective solution for providing the needed enhancement. We recommend that the Recreation Plan to be prepared for the project include conceptual designs and a proposed schedule for installing a boat dock or other improvements to the existing east access boat ramp to meet current and projected future needs. Once constructed, however, we recommend that UPPCO should not be responsible for the O&M for the additional facility, rather that responsibility should remain with MDNR.

We observed the barrier-free vault toilets at the Hoist west access and Hoist east access during the June 2000 site visit. The toilets were in good condition and are anticipated to meet current and projected demands. Hence, we do not recommend additional upgrades to these toilets.

DRSB Summer Water Levels: Mr. Menard, Mr. Parkkonen, and DRCI are concerned about the summertime (June through November) start-of-the-month target elevation of the DRSB, specified in the state WQC issued for the project. To enhance boating opportunities in the west end of the basin, Mr. Menard requests that the target elevation during summer be raised 1 foot from 1,340.5 feet NGVD to 1,341.5 feet NGVD. He states that protruding stumps, boulders, and debris hamper safe operation of moving water craft at the lower lake level. Mr. Parkkonen expresses concern that a target level of 1,340.5 feet NGVD and minimum level of 1,339.0 feet NGVD during the summer would leave a piece of dry land between his property and the waterline. Mr. Parkkonen questions if his riparian rights would be affected by the lower levels. DRCI requests that the target level during June through November be raised 0.5 foot to 1,341.0 feet NGVD, while increasing the minimum water level in July through November from 1,339.0 to 1,339.5 feet NGVD.

*Our Analysis*

Staff recommends a reduction in reservoir fluctuations in the DSRB from the current range of 15 feet to a maximum of 4 feet, which should enhance recreational opportunities through more stable reservoir elevations than under existing conditions.

The WQC prescribes a start-of-the-month target water level of 1,340.5 feet NGVD at DRSB from June through November. DRCI has petitioned the MDEQ to revise the target level upward to 1,341.0 feet NGVD during this period, and to raise the

minimum water level to 1,339.5 feet NGVD. The MDEQ, in its letter to the Commission dated April 12, 2001, stated that the increased target start-of-the-month and minimum water levels requested by DRCI would provide the same water quality protection as the lower levels prescribed in the WQC, and they would not oppose the change in target elevation.

A higher target water level of 1341.0 feet NGVD at DRSB to benefit recreation would not adversely affect fishery resources, wetlands, or existing recreational facilities located on the lake. Higher water levels may, in fact, provide some enhancement of fishery and wetland resources by maintaining more wetted area in the shallow littoral zone of the reservoir, potentially benefitting fish spawning and rearing areas. Higher water levels would benefit wetlands by maintaining the hydrology of the wetland areas and prevent the loss of sensitive wetland vegetation due to habitat drying out, a condition that normally occurs during the summer months as reservoir levels are lowered. UPPCO reportedly maintained a water level of 1,340.5 feet NGVD as a trial level for some time during the year 2000, but the DRCI determined that this level was too low to significantly improve recreational opportunities in the lake.

According to UPPCO, an increased water level in summer would not adversely affect UPPCO's project operation (UPPCO, 2000). UPPCO, however, identified a potential risk of flooding of properties with a minimum level higher than 1,339.5 feet NGVD, particularly in June, when there still is the potential for higher river flows. The risk of flooding is reduced from July to September because of historical low summer flows. High inflows from fall rains could occur in October and November, with another potential increased risk of flooding. However, because of the large storage capacity of DRSB, the staff anticipates that raising the target start-of-the-month level to 1,341.0 feet NGVD from June through November and increasing the minimum level to 1,339.5 feet NGVD from July through November would not significantly increase the flooding risk for properties around the lake.

Mr. Menard's request for an increased target water level (to elevation 1,341.5 feet NGVD) is to provide better recreational opportunities (boating conditions), similar to that of DRCI. Raising the target water level to 1,341.0 feet NGVD (as recommended by DRCI) would partially address his concern about sufficient water levels for boating, by providing a water level that would be 0.5 foot higher than required by the WQC. Requiring any higher levels, however, would increase the potential for flooding (as noted by UPPCO), if higher flows occur during this period. A target level of 1,341.0 feet would appear to be a good compromise between providing higher water levels for

boating and lower levels to minimize flooding potential. Thus, we do not recommend increasing the target water level to 1,341.5 feet NGVD. Raising the target start-of-the-month level to 1,341.0 feet NGVD would alleviate some of Mr. Parkkonen's concern regarding exposed land. Historically, DRSB has been drawn below 1,339.0 feet NGVD during the summer months. Thus, a minimum level no less than 1,339.0 feet NGVD would result in less exposure of land than under historical operations.

The staff concludes that raising summer target and minimum levels at DRSB, to address the concerns of DRCI and others, would have beneficial effects on recreation, and on other environmental resources in the reservoir. In addition, these levels would not adversely affect flooding potential for the reservoir. These increased reservoir levels would be compatible with those required in the WQC (as shown in Table 2). In summary, we recommend that UPPCO maintain the following revised water levels in the DRSB:

- June through November start-of-the-month target level of 1,341.0 feet NGVD; and
- July through November a minimum monthly level of 1,339.5 feet NGVD.

In effect, our recommendation requires start of the month target elevations for the DRSB be .5 foot higher between June and November and that the minimum elevation be .5 foot higher for July through November.

Hoist Powerhouse Area: MDNR recommends construction of a no-fee, barrier-free tailwater fishing, bird watching, and aesthetic viewing access site, adjacent to the Hoist powerhouse. The site would include: parking for 5 vehicles with 2 additional designated barrier-free parking spots, a barrier-free vault toilet, hardened paths, signage, and a barrier-free fishing platform. MDNR also recommends that UPPCO provide for year-round maintenance of this site.

*Our Analysis*

The Hoist powerhouse tailrace is a popular area for flyfishing. Staff recommends a continuous minimum flow from the Hoist powerhouse to enhance the fishery in this reach. However, the 1992 user surveys indicated that this site was the least popular recreation site, partly because of the steep, one-lane access road and a lack of public parking near the powerhouse. Currently, anglers drive up to the powerhouse gate to park their vehicles and walk 1,000 feet down a steep road to the tailrace. An enhanced

access site adjacent to the Hoist powerhouse, however, would contribute significantly to the overall recreational usage of the powerhouse area. Such a facility would serve existing users of the Dead River reach below the Hoist powerhouse, improve recreational opportunities in the vicinity, and accommodate the physically challenged. We recommend that such a facility include the components recommended by MDNR, including: parking for 5 vehicles with 2 additional designated barrier-free parking spots, a barrier-free vault toilet, hardened paths, signage, and a barrier-free fishing platform. We recognize that the existing powerhouse access road is steep and rather narrow. However, it appears that a suitable access could be developed at the site on UPPCO property, without widening the road and requiring land acquisition. We recommend that UPPCO develop functional and final design drawings for the facilities, after consultation with the MDNR, and include these drawings in the recreation plan for the project.

McClure Development Enhancements

*UPPCO Proposal*

UPPCO does not propose any major recreational facility construction or improvements at the MSB. However, UPPCO proposes to operate the MSB with a constant year-round target water level of 1,195.8 feet NGVD and to maintain a continuous minimum flow of 72 cfs from the McClure powerhouse. UPPCO proposes to construct a vault toilet facility at the McClure powerhouse parking lot to avoid potential sanitation problems caused by recreationists using the existing informal McClure bypassed reach trail. UPPCO also proposes to conduct or organize annual cleanups of the existing informal McClure bypassed reach trail, above the McClure powerhouse.

*Recommendations from Agencies and Interested Parties*

McClure Storage Basin: MDNR recommends construction, operation, and maintenance of a no-fee, barrier-free reservoir shoreline fishing, bird watching, and aesthetic viewing access site on McClure reservoir. The site would include parking for 5 vehicles with 2 additional designated barrier-free parking spots, a barrier-free vault toilet, hardened paths, signage, and a barrier-free fishing pier. MDNR further recommends that the fishing pier be located such that anglers can access areas of the reservoir expected to hold fish (e.g., deep water or good cover) and that UPPCO provide for maintenance of the site during the ice-free months.

MDNR also recommends that UPPCO provide funding for the O&M of the no-fee MDNR boat launch ramp on the MSB and that UPPCO provide funding to upgrade and maintain the facilities to meet ADA standards. According to MDNR, the following upgrades would be necessary: a barrier-free skid pier, 2 barrier-free parking spaces, hardened paths, and a barrier-free vault toilet.

*Our Analysis*

User surveys (UPPCO, 1994) did not indicate a need for a no-fee, barrier-free reservoir shoreline fishing, bird watching, and aesthetic viewing access site on MSB. The existing MDNR-operated access to the MSB, which provides similar recreational opportunities, does not experience any significant use. User surveys indicate a high degree of satisfaction with existing facilities at the MSB. Although Marquette County is planning to replace County Road 510, which provides access to the MSB, we do not anticipate that this project would significantly affect recreational usage of the MSB.

There is also little indication that there is a need to upgrade the existing MDNR-operated facility to meet ADA standards. Similar facilities at the nearby Forestville and Tourist Park developments of the Marquette Project, which are within the Marquette metropolitan area, are under-used. We, therefore, do not recommend that UPPCO provide funding to upgrade the no-fee MDNR boat launch ramp. The existing boat launch site already has a barrier-free vault toilet, which we observed during the June 2000 site visit to the project. The toilet was in good condition and in no need of any upgrade.

McClure Dam Area: MDNR recommends construction of a no-fee aesthetic viewing access trail adjacent to the McClure dam to include 7 parking spaces, 2 of which are barrier-free; hardened paths; a barrier-free vault toilet; signage; and a barrier-free viewing area. MDNR further recommends that UPPCO provide for maintenance of the site during the months of no snow cover.

The NPS recommends that recreational boating in the McClure development bypassed reach be addressed.

*Our Analysis*

There appears to be little justification for the construction of a no-fee aesthetic viewing access trail adjacent to the McClure dam. There are no unique resources for

viewing in the vicinity of the dam, and the reservoir itself is relatively small and extensively developed with private residences around the shoreline. UPPCO also owns very little land near the dam, so access to this area would be through private property. The area, which was not identified as a potential recreation site in the 1992 user surveys, does not experience any recreational use.

We have reviewed the potential recreational boating opportunities in the 6.1-mile bypassed reach of the Dead River below McClure dam. The upper 2.1-mile segment and the lower 1.9-mile segment of the bypassed reach are not boatable because of steep gradient, the narrow gorge, and numerous waterfalls. The middle 2.1-mile segment offers a pool-type channel and is accessible only by undeveloped or poorly maintained back roads and logging roads through private lands. UPPCO owns no land in this reach. We have not identified any demand for recreational boating in this reach, and we, therefore, do not recommend the development of boating facilities or additional boating access in the McClure bypassed reach.

McClure Tailrace Area: MDNR also recommends construction of a no-fee, barrier-free tailwater fishing, bird watching, and aesthetic viewing access site adjacent to the McClure powerhouse. The site would include parking for 5 vehicles with 2 additional designated barrier-free parking spots, a barrier-free vault toilet, hardened paths, signage, and a barrier-free fishing platform. MDNR further recommends that UPPCO provide for year-round maintenance of this site.

MDNR also recommends construction of a no-fee aesthetic viewing access trail adjacent to the McClure powerhouse, including paths, signage, and viewing areas. MDNR recommends that this facility be developed in conjunction with the tailwater fishing access and that a determination of the feasibility of constructing this site in compliance with ADA standards be made. Further, MDNR recommends that UPPCO provide for maintenance of the site during the months of no snow cover.

*Our Analysis*

The McClure powerhouse area is the most used recreation area of the project. The main attraction is the scenic waterfalls located on private property a short distance upstream from the powerhouse, in the lower segment of the bypassed reach. User surveys identified the need for toilet facilities and trash receptacles in the area. We agree that there is a need for these facilities and recommend that UPPCO provide a vault toilet at the McClure powerhouse parking area, and maintain trash receptacles in the area, to

improve sanitation. We also recommend that UPPCO implement its proposal to conduct annual cleanups of the informal bypassed reach trail. These actions would enhance the recreational experience for visitors.

Although the McClure powerhouse area is popular, our analysis of current and projected recreation needs in the area indicates that a no-fee, barrier-free, tailwater fishing, bird watching, and aesthetic viewing access site adjacent to the McClure powerhouse would not be necessary. User surveys indicated that a majority of users would prefer to retain the existing character of the area, without additional development, to preserve quality, dispersed recreational opportunities. Access to most of the tailrace area is limited by steep slopes that end abruptly at the waters edge, and adjacent private property. Most recreationists currently access the McClure tailrace area using the Forestville boat launch area and walking upstream. A more difficult access to the tailrace area is from the left bank (looking downstream), immediately adjacent to the McClure powerhouse. This access is steep and wooded and not clearly marked. UPPCO owns only a small portion of land on the left bank, from the powerhouse to a point below the small bridge that provide access to adjacent private property. Although some usage of a new access site would occur, similar recreational facilities at the more accessible Forestville and Tourist Park developments do not see capacity usage. Because of the more difficult access and the probable limited usage that would occur, we do not recommend construction of a new multipurpose access site as recommended by MDNR. For the same reasons, we do not recommend construction of a permanent aesthetic viewing access trail in the tailrace area. However, we recommend that UPPCO post warning signs near the informal limited access on the left bank below the powerhouse to alert visitors about steep slopes, dangerous river currents during project generation, and the limited amount of public property.

The informal trail above the McClure powerhouse is used by local recreationists to hike along the lower segment of the McClure bypassed reach. Swimming and sunbathing are also popular activities in the reach. Staff recommends that a minimum flow of 20 cfs be provided in the bypassed reach. With about 17 cfs average flow from upstream tributaries and leakage, the additional 20 cfs would significantly enhance the visual quality of the waterfalls. However, because UPPCO does not own any property in the area, we do not recommend that UPPCO provide a permanent trail along the reach. We recommend, however, that UPPCO consult with local land owners to explore options to maintain and improve informal trail access to the area.

The FERC Form 80 process provides a means to evaluate changing recreational needs at project facilities every 6 years over the term of the license. If additional recreational needs are recognized or developed over the term of a new license, then further resources could be developed to accommodate such needs through the existing Form 80 process, and standard license re-opener provisions.

**Marquette Project**

Recreation Plan

*MBLP Proposal*

MBLP has not made any specific proposal related to the preparation of a recreation plan for the project.

*Recommendations from Agencies and Interested Parties*

MDNR recommends that MBLP, within 12 months from the date of issuance of the license, develop and implement a recreation plan for the Marquette Project, in consultation with MDNR.

*Our Analysis*

The Marquette project area provides existing and future recreational opportunities, and development and implementation of a Recreation Plan for the project would be appropriate, because it would allow MBLP and the agencies to carefully plan for meeting existing and future recreational needs at the project and within the Dead River Basin. We recommend that MBLP develop a recreation plan for the Marquette Project, in consultation with MDNR, and file this plan for Commission approval within 12 months from the date of issuance of any new license. The plan should include existing and staff-recommended recreational enhancements, and any additional measures jointly developed by MBLP and MDNR.

Operations and Maintenance

*MBLP Proposal*

MBLP proposes to continue to operate and maintain existing project-related recreational facilities as under the current license. No new recreational facilities are proposed.

*Recommendations from Agencies and Interested Parties*

MDNR recommends that MBLP provide for the O&M of the MDNR-recommended recreational facilities at the Forestville and Tourist Park reservoirs.

*Our Analysis*

MBLP should provide access to the project waters for recreation and pay for O&M of any of its currently operating facilities. We do not concur with MDNR that MBLP should necessarily fund O&M for all MDNR-recommended facilities.

Signage

*MBLP Proposal*

MBLP proposed to provide signage for the existing portage route around the Forestville dam and to inform users of existing pedestrian access routes in the Forestville bypassed reach.

*Recommendations from Agencies and Interested Parties*

MDNR recommends that directional signage for Marquette Project recreational facilities be provided by MBLP from downtown Marquette and along U.S. Highway 41.

*Our Analysis*

Proposed signage for the existing portage route around the Forestville dam and along the bypassed reach would improve use of these facilities because trail locations would be better delineated. Therefore, we recommend that this additional signage as proposed by MBLP should be implemented. However, we do not find that there is a need for additional signage to indicate the presence of the Marquette Project recreational

facilities for visitors traveling from downtown Marquette and along U.S. Highway 41, because adequate signs already exist.

Forestville Development

*MBLP Proposal*

MBLP proposes to operate the Forestville reservoir with reduced water level fluctuations of 1.5 feet, compared to historical fluctuations of 2 feet. The Commission's 1997 Order requires that MBLP maintain a minimum flow of 20 cfs in the Forestville bypassed reach (section V.C.2), when flow is available. Both of these operational measures would benefit recreational usage. MBLP does not propose any new recreational facility or enhancements to existing facilities, except the signage described above.

*Recommendations from Agencies and Interested Parties*

MDNR recommends that MBLP provide funding for a parking lot for both trailer and non-trailered vehicles, designated barrier-free parking spaces, barrier-free shoreline fishing on the impoundment and in the tailwater, barrier-free vault toilets, hard surface barrier-free pathways from the designated parking spaces to all facilities, and upgrade of the existing MDNR boat launch on the impoundment to ADA standards. MDNR also recommends that MBLP provide funding for year-round O&M for the MDNR and all recreational sites for the life of the license.

MDNR recommends that MBLP fund the development, maintenance, and operation of an adequate and safe canoe portage route around Forestville dam. MDNR recommends that improvements should include a compactable aggregate landing at the put-in and take-out locations, and an improved hard surface path with a continuous surface that denotes its alignment between landings. The MDNR also recommends that MBLP provide for year-round maintenance of the site for the life of the license.

*Our Analysis*

The usage of existing recreational facilities at the Forestville Development is well below capacity. The MDNR-operated boat ramp usage is about 1 percent of capacity, although our field observations indicated that shoreline fishing is popular at Forestville reservoir at undeveloped access points. Providing the facilities recommended

by the MDNR would expand the types and quality of facilities available for recreationists on the Forestville reservoir, although the current limited usage of existing facilities indicates that these additional facilities may not be needed. The most popular activity, shoreline fishing, would not require the additional facilities recommended by MDNR.

Although use of the Forestville boat launch operated by the MDNR is very low, MDNR recommends that the existing boat launch be upgraded to meet ADA standards.

We observed a barrier-free vault toilet at the MDNR boat launch during the June 2000 site visit. The toilet was seen to be in good condition. Hence, we do not recommend that MBLP provide another barrier-free vault toilet at the existing Forestville boat launch.

Recreational fishing in the Forestville bypassed reach would likely improve with the staff-recommended minimum flow releases. However, we disagree with the MDNR recommendation to develop additional fishing access in the powerhouse tailrace. It is likely that angler usage may increase in the natural stream channel of the bypassed reach, but less likely that usage would increase in the tailrace, because of the nature of the "artificial" channel, and fluctuating flow releases. The existing and likely future recreational use of the area also do not warrant development of an additional access point.

We agree that there is a need to maintain a canoe portage around Forestville dam, and have recommended additional signage as discussed above. There is, however, no need to require MBLP to fund the development of a compactable aggregate/hard surface canoe portage route around Forestville dam. The existing natural surfaced pathway adequately serves existing users, and the additional signage would better delineate the route for canoeists.

Remnant Dam No. 1

Staff recommends that MBLP remove the remnant No. 1 dam (see section V.C.3). Maintenance of a minimum flow of 20 cfs, in conjunction with dam removal and MBLP's habitat improvements in the bypassed reach, would likely improve fishery habitat in the entire reach and increase angling opportunities for trout and other species. Removal of the remnant No. 1 dam would likely result in a one-time release of some silt that has accumulated behind the dam. Such a release of silt, however, would not likely have any significant long-term effects on local recreational usage.

Tourist Park Development

*MBLP Proposal*

MBLP proposes to maintain reservoir surface elevations in a 1-foot range between elevations 636.7 and 637.7 feet NGVD, compared to historical fluctuations of about 2 feet. MBLP would operate the reservoir such that average inflow to the reservoir would be released daily. The Commission's 1997 Order requires that MBLP maintain a minimum flow of 40 cfs below No. 3 powerhouse from September through April to enhance spawning conditions for migratory salmonids from Lake Superior.

*Recommendations from Agencies and Interested Parties*

MDNR recommends that MBLP provide funding for a parking lot for both trailer and non-trailered vehicles, develop ADA-compliant boat access on the impoundment with designated barrier-free parking spaces, barrier-free shoreline fishing on the impoundment, barrier-free vault toilets, and hard surface barrier-free pathways from the designated parking spaces to all facilities. MDNR also recommends that MBLP provide funding for year-round maintenance and operation of all of the recreational sites for the life of the license.

MDNR recommends that MBLP fund the development, maintenance, and operation of an adequate and safe canoe portage route around Tourist Park dam. MDNR recommends that improvements should include a compactable aggregate landing at the put-in and take-out locations and an improved hard surface path, with a continuous surface that denotes its alignment between the landings. MDNR also recommends that MBLP provide for year-round maintenance of the portage for the life of the license.

*Our Analysis*

Recreational facilities at Tourist Park reservoir experience greater use compared to those at Forestville reservoir, but still are below their capacity. With the proposed re-regulation operation, reservoir fluctuations would be less and may enhance shoreline fishing opportunities. Access to the Tourist Park reservoir, however, is relatively easy and well maintained, via the city of Marquette campground and day-use area. Providing a new boat launch and other associated facilities on the reservoir, as recommended by MDNR, would not be justified, at this time, because the existing facilities are experiencing usage levels below their capacity, and any new facility would likely only be

lightly used. Anglers would be able to continue to use the existing MDNR fishing access on the river below the No. 3 powerhouse, which is popular during the fall runs of migratory salmonids from Lake Superior. If increased usage were to occur at the city of Marquette site on Tourist Park reservoir, it would be the responsibility of the city of Marquette Parks and Recreation Department, as the owner of the facility, to provide any enhancements it may deem necessary, based on identified user needs. We do not recommend that MBLP provide funding for developing an additional Tourist Park reservoir site at this time.

The development of a new canoe portage route around No. 3 dam, as recommended by MDNR, would also not be justified. We have not identified significant demand for a new, hard-surface canoe portage around No. 3 dam. Canoeists currently have an adequate and safe portage route around No. 3 dam by taking out their canoes at the city of Marquette day-use area on Tourist Park reservoir, and putting them in at the existing tailrace fishing area. We do not recommend that an additional portage route be required.

The FERC Form 80 process provides a means to evaluate changing recreational needs at project facilities every 6 years, over the term of the license. If additional recreational needs are recognized or developed over the term of a new license, then further resources could be developed to accommodate such needs through the existing Form 80 process, and standard license re-opener provisions.

Land Exchange

The proposed exchange of land would likely result in a minor increase in the use of recreational facilities and resources in the project area, because more of the shoreline of the Tourist Park reservoir would be owned by MBLP. We do not anticipate any significant effect on the existing or proposed project recreational enhancements from the potential low-density residential development near Forestville reservoir.

c. Cumulative Effects:

Staff has identified significant positive cumulative effects on recreational resources from the applicant's proposed and additional staff-recommended measures compared to existing conditions or the no-action alternative, for the Dead River and Marquette Projects. Reduction of water level fluctuations in all the reservoirs and maintenance of minimum flows in the Dead River reaches below Silver Lake dam to the

DRSB, McClure bypassed reach, and Forestville bypassed reach would significantly enhance fishing and other recreational activities. The increased flows in the McClure bypassed reach would also improve the aesthetics of the numerous waterfalls in this reach. The additional staff-recommended recreational facilities would also increase recreational opportunities in the Dead River Basin and allow recreationists to better experience the natural resources of the basin. Figure 5 shows staff-recommended recreational facilities in the project each of the Dead River Basin.

d. Unavoidable Adverse Effects:

None.

**9. Land Use**

a. Affected Environment:

The projects are in proximity to the largest urban area in the Upper Peninsula of Michigan, the city of Marquette (1990 population was 21,900). Marquette, a Lake Superior port city of approximately 22,000 residents, is located on Lake Superior near the mouth of the Dead River approximately 3 miles east of the McClure powerhouse. The towns of Negaunee and Ishpeming, historical mining communities with declining populations of 5,200 and 7,500, respectively, are located nearby. Negaunee is about 3 miles south of the DRSB, and Ishpeming is 2 miles west of Negaunee. The remainder of Marquette County is rural, with scattered small communities of 1,000 or fewer people. Population in the Marquette area declined in the 2 years leading up to the closure of K.I. Sawyer Air Force Base in 1995. The current resident population is expected to remain relatively stable over the next few years.

The largest landowners in the central Upper Peninsula are the state of Michigan (Escanaba River State Forest), the federal government (Ottawa National Forest and Hiawatha National Forest), and large private corporations (chiefly timber companies). The predominant land uses in the region are mining and commercial forestry.

Land use regulation in incorporated areas of Michigan is accomplished at the city level of government, while rural land use is controlled at the township and county level. Smaller incorporated areas may adopt their own land use regulations or those of the surrounding town or county. Marquette County has developed a Comprehensive Plan, adopted in 1982, which outlines county goals and policies pertaining to land use.

Marquette County has a total of 1,207,000 acres of land, of which 995,794 acres (82 percent) are forested. Generally, land use patterns have changed only slightly in the last several decades and no significant changes are forecast for the foreseeable future.

Management responsibilities remaining in the hands of the state involve the control of construction in, or infringements to, navigable surface waters. Controlled structures include boat docks, piers, retaining walls, and dams. Michigan has also assumed wetland permitting authority from the Corps for wetland fills under Section 404 of the CWA.

No lands of the United States are occupied by the Dead River or Marquette Projects. In addition, the Dead River is not a National Wild and Scenic River or a study river under the National Wild and Scenic Rivers Act and is not listed on the Nationwide Rivers Inventory. The Dead River is not part of the Michigan Natural Rivers System.

**Dead River Project**

The Dead River Project is surrounded by private land and by public lands including the state and national forests. The major land uses within the project boundary are residential development, commercial forestry, and recreation.

The SLSB 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 DRSB 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.

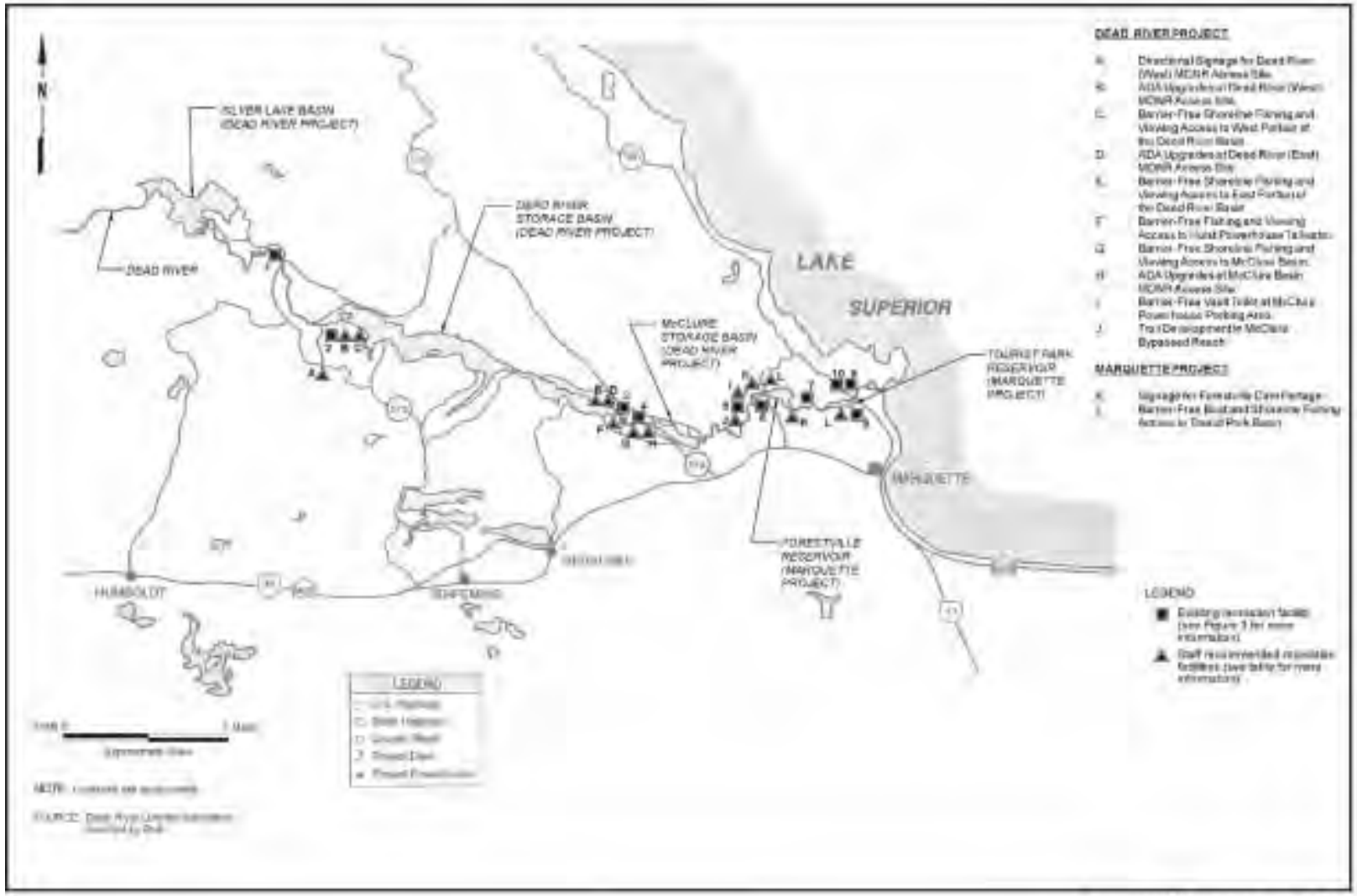


Figure 5. Staff-recommended recreational facilities in the Dead River vicinity.

UPPCO's 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, UPPCO owns only a small part of the lands included within the project boundary, the majority being owned by Longyear Realty. UPPCO holds extensive leases and flowage rights from Longyear for the purpose of project operation, including the right to inundate lands but not including the right to use or manage the forests. Hence, UPPCO claims to have no ability to direct land management activities on the majority of the land within the Dead River Project boundary. However, Longyear Realty has verbally agreed to observe UPPCO's forest management practices by excluding logging from its lands within 200 feet of SLSB, DRSB, MSB, and the Dead River within the project boundary. In the event of an outbreak of tree disease, and as recommended by MDNR to stem the spread of such disease, selective logging might be conducted. Similarly, logging activities might be necessary for safety or in emergency situations, such as fire.

Dead River Project waters are open for fishing, boating, and canoeing, except for small areas near the dams, powerhouses, and substations that are restricted because of public safety issues. Because the majority of the shoreline is not UPPCO-owned, UPPCO has no policies on the development of piers, docks, or other shoreline facilities.

Wetlands occurring within project boundaries provide habitat for diverse fish and wildlife, including waterfowl, wading birds, and raptors (such as osprey and bald eagle). The SLSB, DRSB, and MSB project reservoirs contain approximately 33, 378, and 7 acres of aquatic bed and emergent wetlands, respectively. The reservoirs and connecting reaches of the Dead River influence the hydrology of additional adjacent wetlands, which include emergent marsh, scrub-shrub, and forested wetland vegetation types. The potential effects on wetlands associated with fluctuating water levels in the reservoirs and patterns of flow in the river reaches have been a source of concern of resource agencies and participating parties. Wetlands are described in greater detail in section V.C.5, *Terrestrial Resources*.

**Marquette Project**

In the Marquette Project area, land use is regulated by the city of Marquette in incorporated areas. Outside of the corporate limits, land use is controlled by surrounding townships. Lands near the Marquette Project are in private or corporate ownership, or are owned by the MBLP. Longyear Realty has extensive landholdings in the Marquette Project area, some of which are used by private individuals or by the MBLP under

flowage right arrangements. The southern shoreline of the Tourist Park reservoir is the most developed portion of the Marquette Project, with the remainder of the project area largely in a natural state and/or low density uses. Private uses include residential, light industrial, forested areas, and a cemetery. City-owned lands include Tourist Park and the adjacent forested area, which are open to the public for recreational use. Access to the Marquette Project's dams and power developments is restricted for safety reasons.

Wetlands occurring within project lands and waters provide habitat for fish, waterfowl, wading birds, and other wildlife. The relatively steep terrain of adjacent shores and reservoir bottoms, limit wetland acreage. Emergent marsh and scrub-shrub wetland fringes the southern shore of Forestville reservoir. Additional wetlands, comprising about 28 acres, occur adjacent to the reservoirs and connecting reaches of the Dead River. Wetlands are described in greater detail in section V.C.4.

b. Environmental Effects and Recommendations:

**Dead River Project**

*UPPCO Proposal*

UPPCO has agreed to develop a CLMP in consultation with the agencies for the management of project lands it owns.

*Recommendations from Agencies and Interested Parties*

MDNR recommends that UPPCO maintain all current land within the project boundary and manage these lands using a CLMP developed in consultation with the agencies. MDNR recommends that the plan be reviewed and updated, if necessary, on a biennial basis. MDNR also recommends that any proposal from UPPCO for withdrawal of lands from current boundaries be reviewed by the MDNR prior to approval by the Commission.

*Our Analysis*

Under the proposed action, land use patterns on UPPCO-owned lands would not change. UPPCO's policy prohibiting commercial logging on all UPPCO-owned project lands and within 200 feet of project waters on leased public lands would continue. UPPCO-owned lands provide important public access to SLSB and the Dead

River. Access to these areas for recreational purposes would continue (see section V.C.7).

The applicant has agreed to develop and implement a CLMP for the small amount of land it owns, in consultation with the agencies. Staff recommends that UPPCO revise or update the plan every 5 years, if necessary, in consultation with the agencies. We consider that UPPCO should maintain and improve public access to project waters and recommend that UPPCO seek and obtain a written agreement with Longyear Realty or other private land owners for the continued public use of any of their land that UPPCO currently leases to maintain existing public access to project waters. We recommend that UPPCO seek to obtain an agreement with such land owners for use of any leased land to facilitate construction of aquatic or wildlife habitat enhancements, and recreational improvements recommended in this DEA, and to provide public access to these facilities. Removal of any lands within the FERC Project boundary would require Commission review and approval prior to any removal of project lands from the project boundary. The FERC review and approval process would provide the opportunity for agency and public review and input, and the input would be considered in the Commission's decision of whether to grant any proposed project boundary revisions.

**Marquette Project**

*MLBP Proposal*

MBLP had stated that it has no plans to divest any significant land ownership for non-project development. MBLP has agreed to develop and implement a CLMP in consultation with the agencies to manage the land it owns in the project area. However, after filing the application, MBLP recently entered into negotiations with Longyear Realty concerning an exchange of approximately 77 acres of city-owned land located in the Marquette Project boundary, in the vicinity of the eastern end of Forestville reservoir, for approximately 100 acres of land owned by Longyear Realty located near the Tourist Park reservoir.

*Recommendations from Agencies and Interested Parties*

MDNR recommends that MBLP maintain all current land within the project boundary and manage these lands using a CLMP developed in consultation with the agencies. MDNR recommends that the plan be reviewed and updated, if necessary, on a

biennial basis. MDNR also recommends that any proposal from MBLP for withdrawal of lands from current boundaries be reviewed by the MDNR prior to approval by the Commission. MDNR further recommends that MBLP work with owners of non-applicant lands to have all lands along a 200-foot buffer zone managed according to the CLMP. The NWF requests that the license require MBLP to retain ownership and manage all project-owned land adjacent to the impoundment and tailwater as part of the project.

*Our Analysis*

MBLP should maintain and improve public access to project waters. MBLP proposes to develop and implement a CLMP for the small amount of land that it owns, in consultation with the resource agencies. The staff recommends that MBLP revise or update the plan every 5 years, if necessary, in consultation with the resource agencies. While we agree with MBLP that it would be difficult to require private land owners to have their land holdings in a 200-foot buffer managed by the CLMP, we recommend that MBLP work with Longyear Realty and other private land owners for the continued use of any of their land that MBLP currently leases to maintain existing public access to project waters. We also recommend that MBLP work with the owners of non-applicant-owned lands to have all lands along a 200-foot waterfront buffer zone managed according to the CLMP.

Withdrawal of any MBLP-owned project lands may affect public access to project waters. Based on preliminary inspection of both the land parcels involved in the proposed land exchange (figure 3), we anticipate that Longyear Realty may develop residential housing in a portion of the western section of the parcel along the Forestville reservoir. We anticipate that the density of such housing would be similar and compatible with existing developments in the area near UPPCO's McClure Development. There is no formally developed public access to the project waters in the land parcels proposed for transfer and withdrawal of MBLP-owned project lands would reduce the potential for public access to project waters. Therefore, we recommend that a requirement for a 200-foot waterfront buffer zone be stipulated for the lands that would be transferred from MBLP to Longyear Realty, with further stipulation that the buffer zone would be managed according to the CLMP.

c. Unavoidable Adverse Effects:

None.

## VI. DEVELOPMENTAL ANALYSIS

In this section, we analyze the projects' use of the available water resources to generate hydropower, estimate the economic benefits of the projects, and estimate the cost of various environmental measures and the effects of these measures on the operation of these projects. Under the Commission's approach to evaluating the economics of a hydroelectric project, as articulated in Mead Corporation, Publishing Paper Division (72 FERC 61,027), a proposed project is economically beneficial so long as its projected cost is less than the current cost of alternative energy to a utility in the region that can be served by the project.

Our analysis of the power and economic benefits of both projects as discussed in this developmental analysis, is based on current costs, with no assumptions concerning future escalation or de-escalation of the various cost components included in the cost of project power or alternative power. The current cost economic analysis is not entirely a first-year analysis in that certain costs, such as major capital investments, would not be expended in a single year. The maximum period we use to annualize such costs is 30 years. Also, some future expenses, such as tax depreciation expenses, are known and measurable, and are, therefore, incorporated in our cost analysis. Although we do not explicitly account for the effects inflation may have on the future cost of electricity, the fact that hydropower generation is relatively insensitive to inflation compared to fossil-fueled generators is an important economic consideration for power producers and the consumers they serve. This is one reason project economics is only one of the many public interest factors the Commission considers in determining whether or not, and under what conditions, to issue a license.

### A. Dead River Project

#### 1. Power and Economic Benefits of the Project

UPPCO has not proposed any modifications or additions to project capacity. During a 10-year period of record (1983-1992), the project generated an average of 64,095 MWh annually. UPPCO estimates the average annual generation of the project under its current and proposed operation at 62,257 MWh. We use this latter generation

value as the basis for our analysis of the economic benefits for UPPCO-proposed alternative and the no-action alternative. We base the value of project power benefits on the current cost of replacement, assuming the power would be replaced by generation from a combination of coal and natural gas plants in the UPPCO/MAIN system.

The cost of alternative generation based on UPPCO's current Power Supply Cost Recovery Filing (UPPCO, 2000) has been used as a reasonable proxy of project value for the purposes of our economic studies.

We base our analysis of the project's net benefits on the following economic information and parameters common to all the licensing alternatives:

| | |
|---|---|
| Net investment | $6,406,000[9] |
| Annual (O&M) | $1,440,000[10] |
| Discount rate | 8 percent |
| Cost of money | 8 percent |
| Period of analysis | 30 years |
| Term of financing | 20 years |
| Federal tax | 34 percent |
| Local tax | 3 percent |
| Alternative power value | 90.94 mills/kWh (UPPCO, 2000) |

The existing project (without any new environmental measures) annually generates an average of 62,257 MWh of electricity; has an annual power value, based on the current cost of the alternative power source, of $5,661,700; and costs $2,283,100 annually to operate, resulting in an annual net benefit of about $3,378,600 (or 54.27 mills/kWh).

### 2. Cost of Environmental Measures

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[9] Total capital investment as of April 1, 1994 (UPPCO, 1994) plus capital costs incurred in 1999 and 2000, less depreciation.

[10] Total Annual Cost April 1, 1994 (UPPCO, 1994) increased to Jan. 2001 by CPI index.

Most of the measures proposed or recommended by UPPCO, the agencies, and staff would affect project economics by requiring capital outlays for construction, equipment, and studies, as well as annual O&M costs. The following is a brief discussion of the estimated costs for the environmental measures included in the staff-recommended action alternative and those recommended by the MDEQ, MDNR, and Interior. All costs are in year January 2001 dollars.

a. Project Operation and Compliance:

Because UPPCO's proposal is to operate the project as in the past (since 1988), this alternative results in no change to operating costs compared to the no-action alternative.

The minimum flow and restrictions of reservoir fluctuations imposed by the state WQC would decrease annual project generation by 5,539 MWh valued at $503,700. UPPCO would incur capital costs to develop and implement schemes to maintain minimum flows and reservoir operating levels, as well as to establish calibrated staff gages for flow monitoring at Hoist and McClure developments. UPPCO would also incur annual costs for maintaining these facilities. In 1997, UPPCO estimated the cost of construction of a siphon facility, to release a constant minimum flow of 20 cfs to the McClure bypassed reach, to be between $100,000 and $250,000 (UPPCO, 1997). We estimated a cost of $200,000, to include: construction of a minimum flow facility to draw water from the top 5-10 feet of MSB (see section V.C.6.b); installing staff gages; and for reservoir level monitoring, including developing plans in consultation with the appropriate agencies. We assume that annual costs for compliance and water quality monitoring and reporting required as part of the WQC conditions would increase from current levels by $15,000.

MDNR recommends a minimum continuous discharge from the Hoist powerhouse, a non-peaking operation of the Hoist powerhouse for the period March 15 to June 15, an increased minimum flow of 40 cfs in the McClure bypassed channel, and a minimum continuous flow of 80 cfs from the McClure Powerhouse. MDNR's recommendations would result in a loss of annual generation at the project of approximately 10,488 MWh valued at $953,800. We estimate the incremental capital cost of the 40-cfs minimum flow facility at McClure dam to be $100,000. Further, MDNR has requested that the applicant monitor flows continuously at the three developments and fund operation of the USGS gage No. 04043800. We estimate the cost of installation of continuous recorders at the three stations at $40,000, and an annual

O&M cost for maintaining the USGS gage and continuous flow monitoring and making the data available over the telephone or the Internet at $25,000.

Interior has recommended that the project reservoirs be operated to restrict level fluctuations to no more than +/-0.5 feet. UPPCO estimated the annual loss of project generation with such restriction to be 12,700 MWh valued at $1,155,000. Interior also recommends continuous flow monitoring at the three project developments, maintenance of the USGS gage no. 04043800, and a 40-cfs minimum flow in the McClure bypassed reach. These costs would be similar to the MDNR alternative. Interior further recommends continuous automatic sensors for headwater and tailwater levels at the three developments. Additional cost to install such systems is estimated at $30,000, with an annual operating cost of $8,000.

Table 10 shows our estimates for annualized cost of the operational alternatives recommended by UPPCO, the agencies, and staff.

b. Fish Protection Plan and Devices, Fish Passage, and Fishery Enhancements:

MDNR recommends that UPPCO develop and implement a fish passage protection plan and install fish protection and downstream passage devices at the Hoist and McClure powerhouses. The MDNR also recommends that UPPCO conduct an effectiveness analysis of the installed protection devices and to assess recommends that UPPCO establish an escrow fund with annual contributions to be eventually used for fish protection devices. Interior recommends that UPPCO develop and implement a downstream fish protection plan. As determined in section V.C.4.b, the agencies have not demonstrated any adverse effects on fish populations of current or proposed operations without such protection devices. The staff does not recommend development or implementation of such plans or studies, or the construction of fish protection or passage measures. Neither UPPCO nor the agencies provided specific designs or cost estimates for such measures. Because no specific details of likely protection devices could be

Table 10. Estimated capital costs and levelized annual costs of operational constraints, stream flow gaging, and compliance monitoring for the Dead River Project. (Source: Staff)

| Item | Recommending Entity | Cost Estimate | Levelized Annual Cost |
|---|---|---|---|
| Proposed Operation: Peaking Mode | UPPCO | Net Investment $6,406,000<br><br>Annual O&M $1,440,000<br><br>Included in UPPCO annual O&M | $2,283,100 |
| Restricted Operation at Silver Lake, Hoist, and McClure developments including minimum flow device, installation of gages, and compliance monitoring | MDEQ, Staff | Capital $200,000<br><br>Annual value of energy loss $503,700<br><br>Annual O&M $15,000 | $545,000 (includes energy loss) |
| Increased minimum flows, ROR operation during March 15-June 15 including installation of USGS type gaging station, and compliance monitoring | MDNR | Capital $340,000<br><br>Annual value of energy loss $953,800<br><br>Annual O&M $40,000 | $1,039,000 (includes energy loss) |
| Reservoir fluctuations restricted to +/- 0.5 feet including minimum flow devices, installation of USGS type gaging, and compliance monitoring | Interior | Capital $370,000<br><br>Annual value of energy loss $1,155,000<br><br>Annual O&M $48,000 | $1,252,000 (includes energy loss) |

developed at this time, the staff has not prepared any cost estimates for these enhancements.

c. Other Environmental Measures:

Environmental enhancement measures proposed in UPPCO's license application in 1994 would not change the amount of generation, but would incur a capital cost of $10,300 and an annual expenditure of $800. UPPCO has proposed (UPPCO, 2000) to incorporate several environmental measures recommended by MDEQ in the WQC, MDNR and Interior. These include developing and implementing a Shoreline and Bank Erosion Control Plan, Natural Organic Debris Maintenance Plan, WMP, BEPP, and a Nuisance Plant Control Plan for the project. We estimate the cost of preparing these plans at $30,000, and an annual expenditure of $10,000 for plan implementation and updates.

The staff has recommended placement of wood duck nesting boxes, mallard hen houses, osprey and common loon nesting platforms requested by MDNR and Interior as part of a WMP, to be prepared by UPPCO. The staff has also recommended that UPPCO prepare a CRMP.

The MDNR recommends a number of recreational enhancements at various project locations. The staff has concurred with MDNR to provide some but not all of its recommended recreational enhancements (see section V.C.7), including preparing a Recreation Plan and O&M of existing and staff-recommended recreational enhancements. Table 11 shows estimates of capital, annual, and levelized costs for these environmental measures.

Table 11. Estimated capital costs and levelized annual costs of environmental enhancement measures for the Dead River Project. (Source: Staff)

| Item | Recommending Entity | Cost Estimate | Levelized Annual Cost |
|---|---|---|---|
| Vault toilet at McClure powerhouse and directional signage on County Road 573 | UPPCO, MDNR, Staff | Capital $10,300<br>Annual $800 | $2,200 |
| Develop and implement environmental enhancement/mitigation plans | UPPCO, MDNR, Interior, Staff | Capital $35,000<br>Annual $12,000 | $16,600 |

| Item | Recommending Entity | Cost Estimate | Levelized Annual Cost |
|---|---|---|---|
| Preparation and implementation of CRMP as part of PA | Staff | Capital<br>$20,000<br><br>Annual<br>$2,000 | $4,600 |
| Provide, operate, and maintain wildlife enhancement structures | MDNR, Interior, Staff | Capital<br>$10,000<br><br>Annual<br>$2,000 | $3,300 |
| Cost of developing Recreation Plan | MDNR, Interior, Staff | Capital<br>$20,000<br><br>Annual<br>$2,000 | $4,600 |
| O&M for existing UPPCO operated facilities | UPPCO, MDNR, Staff | Capital<br>$0<br><br>Annual<br>$0 | Included in Proposed Action |
| O&M for staff-recommended new facility signage | Staff | Capital<br>$1,200<br><br>Annual<br>$500 | $1,300 |
| O&M if all MDNR recommended facilities are constructed and/or upgraded | MDNR | Capital<br>$1,200<br><br>Annual<br>$47,500 | $47,700 |
| Cost for developing staff-recommended facilities | Staff | Capital<br>$30,000<br><br>Annual<br>Included in O&M | $4,000 |
| Cost for developing all MDNR recommended (excludes staff-recommended trail at McClure powerhouse/bypass) | MDNR | Capital<br>$310,000<br><br>Annual<br>Included in O&M | $40,800 |

| Item | Recommending Entity | Cost Estimate | Levelized Annual Cost |
|---|---|---|---|
| O&M for all existing MDNR recreation facilities | MDNR | Capital $0<br>Annual $15,000 | $15,000 |

### 3. Comparison of Alternatives

Measures proposed by UPPCO would increase annual costs by $18,800 ($2,200+$16,600, see table 11) and reduce the annual benefit by less than one percent to $3,361,700, compared to the no-action alternative. WQC conditions would increase the cost of operation by $545,000 annually, including the value of reduced generation of 5,539 MWh (table 10). Additional staff-recommended environmental enhancement measures would increase the cost of operation by $36,600 (17,800+18,800, see table 11). Thus, the staff-recommended alternative (which would include the WQC requirements) would increase annual costs by $581,600, compared to the no-action alternative, reducing annual net benefits by 17 percent to $2,811,600 (or 45.16 mills/kWh), compared to the no-action alternative. Annual generation would also be reduced under the staff- recommended action by 9 percent or 5,549 MWh, compared to the no-action alternative. Table 12 presents a summary of the current net annual power benefits for the proposed action, staff-recommended action, and no-action.

Table 12. Cost comparison of alternatives for the Dead River Project. (Source: Staff)

| Alternative | UPPCO Proposed Action | Staff-Recommended Alternative | No-action Alternative |
|---|---|---|---|
| Annual Generation (MWh) | 62,257 | 56,718 | 62,257 |
| Annual Power value ($) | 5,661,700 (90.94 mills/kWh) | 5,116,700 (90.21 mills/kWh) | 5,661,700 (90.94 mills/kWh) |
| Annual Cost ($) | 2,301,900 (36.97 mills/kWh) | 2,319,700 (40.97 mills/kWh) | 2,283,100 (36.72 mills/kWh) |
| Annual Net Benefit ($) | 3,359,800 (53.97 mills/kWh) | 2,797,000 (49.24 mills/kWh) | 3,378,600 (54.27mills/kWh) |

## B. Marquette Project

### 1. Power and Economic Benefits of the Project

MBLP has not proposed any modifications or additions to project capacity. Based on a 10-year record of record (1988-1997), the project generates an average of 16,800 MWh annually. We use this average annual generation as the basis for our analysis of the project's economic benefits. The cost of alternative generation based on MBLP's current replacement cost has been used as a reasonable proxy of project value for the purposes of our economic analysis.

We base our analysis of the project's net benefits on the following economic information and parameters common to all the licensing alternatives:

| | |
|---|---|
| Net investment | $3,213,000 (MBLP, 2000b) |
| Annual (O&M) | $180,000 (MBLP, 2000b) |
| Discount rate | 6 percent |
| Cost of money | 6 percent |
| Period of analysis | 30 years |
| Term of financing | 20 years |
| Tax | Zero (municipal entity) |
| Alternative power value | Varies with available combination of alternate sources of peak and off-peak energy |

The existing project (without any new environmental measures) annually generates an average of 16,800 MWh of electricity; has an annual power value, based on the current cost of the alternative power source, of $449,000; and costs $421,500 annually to operate (annualized cost), resulting in a positive annual net benefit of about $27,500 (or 1.64 mills/kWh).

### 2. Cost of Environmental Measures

Most of the measures proposed or recommended by the applicant, agencies, and staff would affect project economics by requiring capital outlays for construction, equipment, and studies, as well as annual O&M costs. The following is a brief discussion of the estimated costs for the environmental measures included in the staff-recommended action alternative, and those recommended by the agencies:

a. Project Operation and Compliance:

MBLP's proposed operation would incorporate all WQC conditions and would result in a generation loss of 1,600 MWh annually. This reduction in generation is valued at $61,000. In addition, the proposed operation would incur an investment of $379,000 and an increased annual O&M cost of $19,000 (MBLP, 2000b), including cost for construction of a minimum flow structure at No. 2 dam and the removal of remnant No. 1 dam (table 13). We assume that costs for compliance and water quality monitoring and reporting and bank erosion control activities required as part of the WQC conditions are included in routine project O&M costs.

The MDNR recommends maintenance of a minimum flow of 85 cfs from No. 2 powerhouse at all times and 40 cfs in the Tourist Park bypassed reach. The MDNR-recommended operating conditions would result in a loss of annual project generation of 3,000 MWh valued at $103,000. We estimate the cost of constructing minimum flow facilities for 40 cfs at No. 3 dam to be $105,000, and would cost $20,000 annually for maintenance. Minimum flow maintenance at Tourist Park bypassed reach would also result in loss of 977 MWh in generation, with a value of $22,700. MDNR recommends a USGS-type gaging station for flow monitoring below Tourist Park. However, the Interior recommends three gaging stations to be installed for monitoring their recommended non-peaking operation. Cost of constructing a gaging station to measure Tourist Park as recommended by the MDNR would cost approximately $15,000, with an annual cost of approximately $5,000. Cost for constructing continuous flow recording stations proposed by the Interior would be $20,000, and O&M would cost approximately $10,000 annually.

Interior has requested that the project reservoirs be operated to restrict level fluctuations to no more than +/- 0.25 feet. MBLP states, and we concur, that this recommendation may not be appropriate, since operation of the project's powerhouses depend on discharges from the upstream Dead River Project. The daily recommended drawdown limits for the upstream Dead River Project reservoirs may cause the Marquette Project reservoirs to exceed Interior's recommendation. Therefore, we have not estimated the potential cost of such operation.

Table 13. Estimated capital costs and levelized annual costs of operational constraints and streamflow gaging for the Marquette Project. (Source: Staff)

| Item | Recommending Entity | Cost Estimate | Levelized Annual Cost |
|---|---|---|---|
| Restricted Operation at No. 2 and No. 3 developments including installation of gages, and compliance monitoring | MDEQ, Staff, MBLP | Capital $379,000<br>Annual value of energy loss $61,000<br>Additional Annual O&M $19,000 | $108,500 (includes energy loss) (Included as proposed project) |
| Minimum flow release of 40 cfs in Tourist Park bypassed reach, USGS type gaging station | MDNR | Capital $519,000<br>Annual value of energy loss $125,700<br>Additional Annual O&M $25,000 | $189,700 (includes energy loss) |
| Reservoir fluctuations restricted to ±0.25 feet | Interior | Not estimated | - |

b. Fish Protection Plan and Devices, Fish Passage, and Fishery Enhancements:

MDNR recommends that MBLP develop and implement a fish passage protection plan and install fish protection and downstream passage devices at the No. 2 and No. 3 powerhouses. The MDNR also recommends that MBLP conduct an effectiveness analysis of the installed protection devices and to assess recommends that MBLP establish an escrow fund with annual contributions to be eventually used for fish protection devices. Interior recommends that MBLP develop and implement a downstream fish protection plan. As determined in section V.C.4.b, the agencies have not demonstrated any adverse effects on fish populations of current or proposed operations without such protection devices. The staff does not recommend development or implementation of such plans or studies, or the construction of fish protection or passage measures. MBLP provided cost estimates for fish protection devices at the No. 2 and No. 3 powerhouses and upstream fish passage at No. 2 and No. 3 dams. We have used MBLP estimates to provide barrier nets for fish protection, and Denil fish ladders at No. 2 and No. 3 dams in our analysis, as the lowest cost option (table 14).

Table 14. Estimated capital costs and levelized annual costs of environmental enhancement measures for the Marquette Project. (Source: Staff)

| Item | Recommending Entity | Cost Estimate | Levelized Annual Cost |
|---|---|---|---|
| Install fish protection devices at No. 2 and No. 3 powerhouses | MDNR, Interior | Capital<br>$170,000<br><br>Annual O&M<br>$66,000 | $78,800 |
| Provide upstream fish passages at No. 2 and No. 3 dams | MDNR, Interior | Capital<br>$3,000,000<br><br>Annual O&M<br>$31,000 | $256,400 |
| Develop a Recreation Plan | MDNR, Interior, Staff | Capital<br>$20,000<br><br>Annual<br>$2,000 | $3,500 |
| Develop staff-recommended facilities+signage | Staff | Capital<br>$900<br><br>Annual<br>$300 | $400 |
| Provide O&M for existing MBLP operated facilities | MBLP, MDNR, Staff | Capital<br>$0<br><br>Annual<br>$10,000 | Included in proposed project |
| Provide O&M if all MDNR recommended facilities are constructed or upgraded | MDNR | Capital<br>$0<br><br>Annual<br>$20,000 | $20,000 |
| Provide O&M Costs for operating existing MDNR recreation facilities | MDNR | Capital<br>$0<br><br>Annual<br>$10,000 | $10,000 |

| Item | Recommending Entity | Cost Estimate | Levelized Annual Cost |
|---|---|---|---|
| Develop costs for developing all MDNR recommended facilities and/or upgrading them | MDNR | Capital $100,000<br><br>Annual Included in O&M | $7,500 |

c. Other Environmental Measures:

MBLP has proposed to incorporate all environmental measures recommended by MDEQ in the WQC, and several measures recommended by MDNR and Interior. These include developing and implementing a Shoreline and Bank Erosion Control Plan, a Natural Organic Debris Maintenance Plan, a WMP (including placement of wood duck nesting boxes, mallard hen houses, osprey, and common loon nesting platforms requested by MDNR and Interior), a CLMP, BEPP, Nuisance Plant Control Plan, and a HRMP. Capital and O&M costs for these measures are included in the MBLP proposal discussed earlier (table 14).

MDNR recommends a number of recreation enhancements at various project locations. The staff has concurred with MDNR that UPPCO develop a Recreation Plan and provide signage to facilitate directing the public to existing facilities. Table 14 shows estimates of capital, annual, and levelized costs for these environmental measures.

### 3. Comparison of Alternatives

Measures proposed by MBLP would increase annual costs by $47,500 in addition to a loss of energy value of $61,000, for a total increase in annual net cost of 108,500 (table 13). The annual value of energy would be reduced to $388,000 and annual cost of operation (excluding energy loss) would increase to $469,000, compared to no action, resulting in a negative annual benefit of –$81,000 (table 15). The staff-recommended alternative, including additional recreational enhancements (see table 14), would increase the cost of operation by $3,900 annually. Thus, the recommended staff alternative would increase annual costs by $112,400, reducing annual net benefits to –$84,900 compared to the no-action alternative. Annual generation would also be reduced under the proposed action and staff-recommended action, compared to the no-action alternative. Table 15 presents a summary of the current net annual power benefits for the proposed action, staff- recommended action, and no-action alternatives.

Table 15. Cost comparison of alternatives for the Marquette Project. (Source: Staff)

| Alternative | MBLP Proposed Action | Staff-Recommended Alternative | No-action Alternative |
|---|---|---|---|
| Annual Generation (MWh) | 15,200 | 15,200 | 16,800 |
| Annual Power value ($) | 388,000 (25.53 mills/kWh) | 388,000 (25.53 mills/kWh) | 449,000 (26.73 mills/kWh) |
| Annual Cost ($) | 469,000 (30.86 mills/kWh) | 472,900 (35.13 mills/kWh) | 421,500 (25.09 mills/kWh) |
| Annual Net Benefit ($) | –81,000 (–5.33 mills/kWh) | –84,900 (–5.58 mills/kWh) | 27,500 (1.64 mills/kWh) |

## VII. COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to all uses of the waterway on which the project is located. When we review a proposed project, we equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values. Accordingly, any license issued shall be best adapted to a comprehensive plan for improving and developing a waterway or waterways for all beneficial public uses.

Based on our independent review of agency and public comments filed on these projects and our review of the environmental and economic effects of the proposed projects and their alternatives, we selected the proposed projects, with staff-recommended modifications, as the preferred option. We recommend this option because: (1) issuance of hydropower licenses by the Commission would allow UPPCO and MBLP to operate the projects as economically beneficial and dependable sources of electrical energy for their customers; (2) the 15.5 MW Dead River Project and the 3.9 MW Marquette Project would eliminate the need for an equivalent amount of fossil-fuel derived energy and capacity, which helps conserve these nonrenewable resources and limits atmospheric pollution; (3) the public benefits of these alternatives would exceed those of the respective no-action alternatives; and (4) the recommended measures would protect and enhance fish and wildlife resources and would provide improved recreational opportunities at the projects.

### A. Recommended Alternative

The following summarizes the environmental measures we recommend be included in any licenses issued by the Commission for the Dead River and Marquette Projects:

#### 1. Dead River Project

a. Measures Proposed by UPPCO:

- Maintain SLSB levels between elevation 1,483.5 and 1,475 feet NGVD; during June through January, maintain water level between elevation 1,483.5 and 1,481.5 feet NGVD.
- Maintain a minimum continuous discharge from SLSB of 8 cfs.
- Maintain DRSB between elevation 1,342.0 and elevation 1335.0 feet NGVD. After a quick refill period in spring, maintain a relatively constant target water level of 1,342.0 feet NGVD for the remainder of the year.
- Maintain a minimum continuous discharge from the Hoist powerhouse of 100 cfs.
- Maintain a relatively constant water level in the MSB at approximately 1195.8 feet NGVD, except during the fall, when the reservoir may be allowed to fill up to 1,196.4 feet NGVD, and spill over the crest to flush out leaves and debris when needed.
- Maintain a continuous 72-cfs discharge from the McClure powerhouse.
- Conduct annual cleanups of the existing informal McClure bypassed reach trail above the McClure powerhouse.
- Provide a vault toilet facility at the McClure powerhouse parking lot, to avoid potential sanitation problems along the existing informal McClure bypassed reach trail.
- Provide directional signage at the junction of the access site road with County Road 573.
- Develop and implement a Shoreline and bank Erosion Control Plan.
- Develop and implement a Natural Organic Debris Maintenance Plan.
- Develop a Wildlife Management Plan.
- Develop and implement a Bald Eagle Protection Plan.
- Develop and implement a Nuisance Plant Control Plan.
- Develop and implement a Comprehensive Land Management Plan.

b. Additional Measures Recommended by Staff:

- Restrict SLSB drawdown to an annual maximum of 4.5 feet, and DRSB drawdown to an annual maximum of 3.5 feet. Maintain specified monthly minimum water levels and strive to maintain target monthly start levels at both reservoirs. In addition, daily drawdowns are to be limited to 0.5 feet in all months.
- Restrict overall MSB fluctuation to ±1.6 feet, with not more than ±1.0-foot daily fluctuation.
- Maintain seasonal minimum flows downstream of SLSB ranging from 10 to 25 cfs, a continuous minimum flow of 100 cfs from Hoist powerhouse, a minimum flow of 80 cfs from McClure powerhouse when sufficient water is available, and a continuous minimum flow of 20 cfs in the McClure bypassed reach.
- Develop a Recreation Plan for the project in consultation with the MDNR and interested parties.
- Continue O&M for all recreation facilities currently managed by UPPCO.
- Increase target start of the month water level at the DRSB to elevation 1,341 feet NGVD for the period June to November, and the minimum water level to elevation 1,339.5 feet NGVD for the DRSB for the period July to November.
- Construct, operate, and maintain a no-fee, ADA accessible, barrier-free fishing pier , birdwatching, and aesthetic viewing access at the Hoist tailrace area, vehicle parking, and including landscaping of the area.
- Provide signs for river access near McClure powerhouse.

**2. Marquette Project**

a. Measures proposed by MBLP:

- Maintain water levels in the Forestville reservoir at elevation 770.25 feet NGVD +/- 0.75 feet, except during events beyond MBLP's control, including periods of high or low flows. No. 2 powerhouse operation would be such that re-regulation of streamflow by Tourist Park development would be possible.
- When sufficient water is available, maintain the following minimum flows from No. 2 powerhouse: 40 cfs during October 1 - November 15; 80 cfs during November 16 - March 15; and 40 cfs during March 16 - April 30.
- Maintain a minimum flow of 20 cfs in the No. 2 plant bypassed reach immediately downstream of No. 2 dam, except during low flows and cold temperature conditions.
- Operate No. 3 development in a re-regulation mode to moderate or normalize fluctuation in flow releases to the lower river. To the extent possible, this project would be operated to discharge average daily inflow to the project while

maintaining the reservoir level at elevation 636.2 feet NGVD +/- 0.5 feet, except during events beyond MBLP's control.

- Perform minor manipulation of existing streambed materials and the placement of small gravel in the river reach bypassed by the No. 2 penstock (following the Commission's June 1997 order).
- Construct two osprey platforms, six wood duck boxes, and four mallard nesting structures within the project boundary.
- Develop and implement a WQMP as required under WQC conditions.
- Provide signage for the portage route around the No. 2 dam.
- Provide signage that informs users of existing pedestrian access routes in the bypassed reach.
- Develop a HRMP to protect cultural resources that may be affected by the project in consultation with the SHPO.
- Develop and implement a Shoreline and Bank Erosion Control Plan.
- Develop and implement a Natural Organic Debris Maintenance Plan.
- Develop and implement a WMP.
- Develop and implement a Nuisance Plant Control Plan.
- Remove remnant No. 1 dam in consultation with the agencies, if approved by the Commission.
- Develop and implement a BEPP.
- Develop and implement a CLMP.

b. Additional Measures Recommended by Staff:

- Develop a Recreation Plan in consultation with MDNR and interested parties.
- Continue O&M of recreation facilities currently managed by MBLP.

**B. Discussion**

The following describes the basis for additional staff-recommended measures.

**1. Dead River Project**

a. Reservoir Operating Levels and Minimum Flows:

The staff-recommended reservoir levels and minimum flow requirements conform to the state WQC conditions. We recommend these conditions, which involve a combination of continued peaking operations, target minimum reservoir elevations, and minimum releases, to provide adequate protection and enhancement of water quality and

fishery habitat, while allowing UPPCO to continue to generate power to meet its customers' demand. Current UPPCO operations do not provide continuous minimum flows in the Dead River reaches below the project developments, and likely have a limiting effect on fishery habitat. We estimate that our recommended reservoir level and minimum flows requirements would increase UPPCO's annualized operating costs by approximately $545,000, or 24 percent. The annual operating costs, however, would increase by 46 percent to maintain minimum flows and operating conditions recommended by the MDNR, and by 55 percent under the Interior's recommendation for non-peaking operation. We conclude that these higher costs of operation do not provide commensurate potential fishery benefits and hence, are not justified. While our recommendations would cost UPPCO about 24 percent more per year than current operations, the potential benefit of these measures would be worth the additional costs for protecting and enhancing water quality and fishery habitat.

Several positive things would happen to the resources as a result of our recommendations: (1) the aquatic habitat in the littoral zone would benefit from reduced and less frequent drawdowns which would reduce the potential adverse effects of dessication, direct mortality, and stranding of fish species that typically use this habitat (warmwater fish spawning in the Spring); (2) the minimum flows would provide optimal habitat for brook trout below SLSB and enhance brown trout there and in other river reaches; (3) the 6.1-mile-long McClure bypassed reach would experience improved water quality and fish habitat considerably from its current condition where there are no flows (only leakage); (4) slightly higher target reservoir levels in the Hoist Reservoir during the summer and early fall would improve boating and fishing activities; and (5) the minimum flows would ensure adequate water would be available in the tailraces below the developments for improved conditions for aquatic resources where, heretofore, the aquatic resources were subject to no flows situations on occasion, and these organisms experienced increased stress levels from increased water temperatures and DO levels.

b. Minimum Flow in the McClure Bypassed Reach and Use of a Siphon:

We recommend a 20-cfs minimum flow in the McClure bypassed reach to enhance fishery habitat and recreational opportunities in the reach. This flow would provide a substantial improvement over current conditions where no flow is released, although our recommendation would be lower than the 40-cfs minimum flow recommended by MDNR and Interior. The flow recommended by the MDNR and Interior may provide some incremental fishery benefits over the staff-recommended flow, but would do so at a substantially higher cost. Our recommended mid-level siphon

would cost considerably less than a deepwater siphon and provide water that meets the coldwater classification of the river reach below the McClure dam and provides considerable enhancement to aquatic resources in the 6.1-mile-long bypassed stream reach. Our recommended 20-cfs minimum flow would also improve water quality i the bypasses stream reach and enhance the aesthetics of the seasonal flows over the waterfalls located immediately upstream from the McClure powerhouse. Also see discussion above in item a. Reservoir Operating Levels and Minimum Flows.

c. Minimum Flow From Hoist Powerhouse and Non-Peaking Operation for March 15 Through June 15.

MDNR recommends a 120 cfs minimum flow from the Hoist Powerhouse and non-peaking operation of the development from March 15 through June 15. There would be a considerable cost difference between the MDNR two recommendations versus the staff's recommendation that concurs with the WQC issued for the project that requires a minimum flow of 100 cfs and allows peaking operation year-round. We have determined that the benefits to the fishery resources are not commensurate with the high costs that would result from the MDNR's recommendations. There currently is an excellent trout fishery in the Hoist tailrace area that also extends downstream some distance. Brown trout habitat is maximized by a minimum flow of 100 cfs and little additional habitat would be gained by a release of 120 cfs. We believe MDNR's target of improving walleye spawning during the spring, would be met by our recommendations and the WQC conditions that would require outflows from the powerhouse ranging from 100 to 400 cfs. These flows in the spring would provide fair to excellent habitat suitability for walleye. The staff's recommended minimum flow of 100 cfs would provide a balance of habitat suitability among several species of interest by the MDNR and therefore we recommend the 100 cfs minimum flow, without non-peaking operation between March 15 through June 15.

d. Run-of-River Operation

Interior recommends the Dead River Project be operated ROR with ± 0.5- foot changes in reservoir elevations. There are significant costs between this recommendation and the staff's recommendation of continued peaking operation of the project. The staff's recommendation represents a balanced approach that takes into consideration developmental and non-developmental resources. Certainly ROR operation would provide benefits to aquatic resources, but the measures we have recommended, in concert with the requirements of the WQC for the project, would also provide greatly improved conditions for aquatic resources, particularly where increased minimum flows are

provided and minimum flows are released into bypassed stream reaches that only previously had leakage flows.

**2. Marquette Project**

a. Maintain a Continuous Minimum Flow of 85 cfs From the No. 2 Powerhouse (Forestville Powerhouse)

MDNR recommends an 85 cfs minimum flow from the Forestville Powerhouse. We recommend a varying seasonal minimum flow, in accord with the WQC for the project. An 85 cfs minimum flow would be costly in comparison to the benefits received by the aquatic resources. Our recommended seasonally varying flows would provide much of the benefits to the aquatic resources as would the 85 cfs minimum flow. The receiving body of water is relatively short (600 feet) before it merges with the backwaters of the Tourist Park Reservoir and these seasonal flows would allow fish to move into downstream areas during the colder months of the year. Our recommendation offers a balanced approach that provides benefits to the aquatic resources and to the developmental resources.

b. Release a Minimum Flow of 40 cfs Into the Tourist Park Bypassed Reach or Install a Barrier Net

The release of a minimum flow of 40 cfs into the Tourist Park bypassed reach would provide little to no fishery habitat gain for the increased cost of providing that flow. We do not recommend any minimum flow for this bypassed reach. The bypassed reach is very short (600 feet), is relatively barren with an exposed bedrock streambed and would offer very little spawning habitat for resident fish species. The applicant's efforts to gradually ramp both spill and turbine discharges to minimize any stranding of fish in this bypassed reach and the "rescue efforts" that has been underway successfully by the applicant for several years support our reasoning that a 40 cfs minimum flow is not needed. Similarly, a costly barrier net would not offer a cost-effective measure of protecting the few fish that might occasionally enter this bypassed reach. Therefore, we do not recommend installing a barrier net.

c. During Periods of Drawdown and Refill, Tourist Park Powerhouse Discharges Should be Continuous and Not More Than 10 Percent Different Than Inflow and Maintain Compliance With ROR Operation for the Marquette Project.

We do not recommend the Commission adopt this measure as it would be costly, it would interfere with the reregulation capabilities of the project, and it would not provide benefits to the aquatic resources that are commensurate with the costs. See item d. above for the Dead River Project ROR recommendation. We have recommended gaging and operation plans be developed by the applicant, in consultation with the resource agencies, to address the concerns of drawdown and refills of project reservoirs. The recommendations we have made for the Tourist Park Development offers a balanced approach that considers developmental and non-developmental resources, as well as the conditions imposed by the state 401 WQC.

e. Construct, Maintain, and Fund Three USGS Gages and Install Continuous Level Recorders at the Marquette Project Reservoirs

USGS gages and continuously recording water level devices can be costly items. At this point we do not recommend USGS gages be installed because the data needed can be provided by current operational data at a much reduced cost and adequately protect water quality and aquatic resources at the Marquette Project. However, we are recommending the applicant develop a gaging and compliance plan and an operations plan, in consultation with the resource agencies, to ensure the project complies with its required mode of operation to protect water quality and aquatic resources. In addition, we have recommended measure that concur with the WQC that requires measures to ensure strict compliance with the state WQC standards. Following the recommendation made by us and the conditions of the WQC would also lead to outflows that are relatively predictable and stable in comparison to historical project operation. We are also recommending the applicant undergo a 3-year test period to observe how the minimum flows and reservoir levels comply with the WQC over a reasonable range of natural conditions, particularly as changes in flows relate to upstream releases from the Dead River Project. On balance, the measures we are recommending would meet the data that would be provided by USGS gages and adequately protect water quality and aquatic resources at less cost.

## VIII. RECOMMENDATIONS OF FISH AND WILDLIFE AGENCIES

Under the provisions of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project.

Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

Tables 22 and 23 summarize the federal and state recommendations subject to Section 10(j) for the Dead River and Marquette Projects, respectively, and whether or not the staff is recommending them for adoption. Recommendations that we consider to be outside the scope of 10(j) have been considered under Section 10(a) of the FPA and are addressed in the specific resource sections of this document.

We are making a preliminary determination under Section 10(j) of the FPA that 10 recommendations made by the federal and state fish and wildlife resource agencies for the Dead River Project may be inconsistent with the purpose and requirements of Part 1 of the FPA or other applicable law. Similarly, we are making a preliminary determination under Section 10(j) of the FPA that 10 recommendations made by the federal and state fish and wildlife resource agencies for the Marquette River Project may be inconsistent with the purpose and requirements of Part 1 of the FPA or other applicable law. Below is a brief discussion by project of each 10(j) recommendation we are not recommending the Commission adopt in any licenses that are issued for the Dead River and Marquette Projects. Because some of the recommendations are interrelated, their discussions have been combined.

In addition to the above instances where staff is not recommending the Commission adopt 20 recommendations made by the state and federal resource agencies for the two projects, there are 15 recommendations for the Dead River Project and 9 recommendations for the Marquette Project where staff has partially agreed with the resource agency recommendations. A brief explanation for each partial agreement is provided in the Tables 22 and 23 and a more detailed discussion of the issue can be found in the respective resource section of the DEA.

**Dead River Project**

**A. No Discharges From SLSB Above 100 cfs (Item 2 in Table 16).** We agree with the upper limit discharges of 150 cfs required by the WQC. The 100 cfs restriction could adversely affect recreation in the downstream DSRB by delaying the refill of this basin in the late spring. There would be little to minor effects on fish in the stream portion of the Dead River below the SLSB storage basin from a flow release of

150 cfs because these flows would typically occur during January through March when fish activity is low (see Section V.C.4., Aquatic Resources).

**B. Minimum Flow of 120 cfs From Hoist Powerhouse and Non-Peaking Operation From March 15 Through June 15 at Hoist Powerhouse (Item 3 in Table 16).** We conclude that a 100 cfs minimum flow from Hoist powerhouse would adequately protect aquatic resources and meet the requirements of the WQC in a cost-effective manner (See Section VI. Developmental Analysis). With greater restrictions placed on the drawdown of DSRB during June through September, as required in the WQC, it is likely that maintenance of a higher minimum flow would lower reservoir levels below the prescribed minimum elevations and/or substantially affect UPPCO's generation (see Sections V.C.8. Recreation Resources and V.C. 4. Aquatic Resources). In addition, increased minimum discharge would cause greater drawdowns, which would also conflict with maintaining reservoir fishery habitat and recreational activities in the DSRB.

We do not find a run-of-river operation during March 15 through June 15 to be cost-effective for the benefits received to the fishery resource (see Section V.C.4., Aquatic Resources). The typical power plant discharges during this period are not likely to be very different from ROR operations. However, the potential benefit to be gained by fishery resources by ROR releases in this short (0.4 miles before joining the backwaters of the MSB) river reach below the Hoist powerhouse are likely to be minimal.

**C. Minimum Flow of 40 cfs In McClure Bypassed Reach With Source Water From a Deepwater Draw of the MSB at the McClure Dam (Item 5 in Table 16).** We conclude that a minimum flow of 20 cfs, as measured immediately downstream of the McClure dam, into the bypassed reach (as required by the WQC) from the installation of a mid-level siphon would provide adequate enhancement for a coldwater fishery at less cost than the recommended 40 cfs minimum flow (see Sections VI. Developmental Analysis and V.C.4. Aquatic Resources). The 20 cfs minimum flow into the bypassed reach, in conjunction with other sources of water occurring in the entire bypassed reach (penstock leakage, and creek discharges), would adequately protect the aquatic resources in that reach. Much of the upper portion of the bypassed reach is primarily pool habitat with limited spawning potential and currently has limited recreational use. The mid-level siphon would provide sufficiently cold water needed to support a coldwater fishery and be less costly than a deepwater siphon (see Section V.C.4., Aquatic Resources). The cold water release would augment other coldwater creeks entering the Dead River in the lower portion of the bypassed reach.

**D. Run of River Operation and ± 0.5 feet Changes in Reservoir Elevations (Item 11 in Table 16).** We conclude that continued operation of the Dead River Project in a peaking mode with the terms and conditions recommended by the staff, and required by the WQC, represent a balanced approach that is cost-effective in balancing the non-developmental resources with the developmental resources versus run-of-river operation. The run-of-river operation and strict reservoir operating levels would significantly impede the ability of the project to provide minimum flows and to generate power efficiently (see Sections V.C.4., Aquatic Resources and VI. Developmental Analysis). Our recommended ranges of water level elevations for the Dead River Project reservoirs concurs with those required by the WQC and would provide adequate protection to aquatic resources, enhance recreational opportunities, and allow the project to continue to operate as a peaking project.

**E. Install USGS Gages Downstream From the Three Dead River Project Developments (Item 22 in Table 16) and Install Automatic Sensors in the Reservoirs to Provide Continuous Reading of Head and Tailwater Elevations to Comply With Run-of-River Operations (Item 24 in Table 16)**. We do not recommend the Commission adopt these measures to install USGS gages and automatic sensors because the information needed can be obtained by using existing project operational data at considerably less cost and still adequately protect water and aquatic resources affected by the Dead River Project (see Sections V.C.3. Water Resources, V.C. 4., Aquatic Resources, and VI. Developmental Analysis). In addition, the WQC requires UPPCO collect and maintain extensive operational data for the project under any new license and we are also recommending UPPCO develop, in consultation with the resource agencies, a gaging and compliance plan. The WQC requirements and our recommended gaging and compliance plan would ensure the project complies with its required mode of operation and protects aquatic resources. We have not recommended run-of-river operation as discussed above in paragraph D above.

**F. Water Temperatures Below the Silver Lake Dam and Hoist Powerhouse Should Not Be More Than 2EF Above Stream Temperatures Above These Reservoirs Nor More Than 5EF Above Water Temperatures Below the McClure Powerhouse When Compared To Stream Temperatures Recorded Above the McClure Reservoir (Items 27 and 31 in Table 16) .**We do not recommend the Commission adopt these temperature standards because there is no indication that any project-induced temperature changes in the subject stream reaches have adversely affected fishery populations. In addition, our recommended water quality monitoring program and implementation of minimal flows to these stream reaches, in conjunction with the applicant meeting the WQC standards, should ensure that aquatic resources are

adequately protected (see Sections V.C.3. Water Resources and V.C.4. Aquatic Resources).

**G. Conduct Effectiveness Analysis of Installed Fish Protection Devices as Part of a Multi-Step Downstream Fish Protection Plan and Upon Completion of Study, Assess Damages and Compensation (Item 38 in Table 16)**. We do not recommend the Commission adopt this measure (essentially was part of item 37–the downstream fish protection plan which was also not recommended for adoption). Effectiveness studies may be required for downstream fish protection devices. However, we have determined there is no need for fish protection devices at this project because fish populations appear healthy and support a good sport fishery (see Section V.C. 4. Aquatic Resources) and there is no evidence that fish entrainment is adversely affecting fish populations. Therefore, we are not recommending effectiveness studies of the devices. We have also not recommended damage assessments as that activity is outside the Commission's regulatory authority.

**H. As Part of A Wildlife Management Plan (WMP), Provide Nesting Structures For Purple Martins, Bats, Bluebirds, Owls and Kestrels At The Dead River Project (Item 59 in Table 16).** We do not recommend the Commission adopt these enhancement measures as part of the WMP for the Dead River Project because we could not ascertain any effects on these species from current and proposed project operations (see Section V.C.5. Terrestrial Resources). Our recommended approval of the WMP would provide enhancements for other wildlife species and therefore we have not recommended these additional wildlife enhancements proposed by MDNR.

**Marquette Project**

**A. Maintain a Continuous Minimum Flow of 85 cfs from the No. 2 Development Powerhouse [Forestville Powerhouse](Item 2 in Table 17). We recommend the Commission adopt a seasonally varying minimum flow in concert with what is required by the WQC for the Development**. Staff's recommended flows range from inflow to the project to 80 cfs depending on the month of the year. The types of fish species present and the fact that the tailrace area is short before being joined by the backwater for the Tourist Park reservoir, were considerations that led to our selection of the seasonal minimum flows for the Forestville Powerhouse. The benefit to the fishery resources would not be worth the cost of requiring a year-round 85 cfs minimum flow (see Section V.C.4. Aquatic Resources and Section VI. Developmental Analysis).

**B. Release a Minimum Flow of 40 cfs Into the Tourist Park Bypassed Reach or Install a Barrier Net (Items 5 and 6 in Table 17).** We recommend the Commission not release any minimum flow into this short, relatively barren, bedrock reach below the Tourist Park dam. We have concluded there is minimal use of this reach now by fish and the 40 cfs minimum flow would provide little to no fish habitat gain. The on-going fish rescue program for the occasional fish stranded in this bypassed reach appears to be working adequately. The cost of requiring a 40 cfs minimum flow would not be worth the benefit to the fishery resources (see Sections V.C.4. Aquatic Resources and VI. Developmental Analysis). For the above reasons, we also see little resource benefit relative to the costs for installing a fish barrier as recommended by Interior to prevent fish from entering this 600-foot-long bypassed reach.

**C. During periods of drawdown and refill, Tourist Park Powerhouse discharges should be continuous and not more than 10 percent different than inflow (Item 7 in Table 17)**. We do not recommend this measure be adopted by the Commission because in part it would interfere with reregulation of peaking flows from the upstream Dead River Project. Further, there is no indication there is an existing problem with the current operation under these conditions or that there would be site-specific benefits to the aquatic resources commensurate with the costs to provide these releases (see Section V.C.3. Water Resources). Staff has recommended that an operating plan be developed in consultation with the resource agencies to address situations of concern that may occur during drawdown and refill of the Tourist Park Reservoir.

**D. Maintain Compliance With Run-of-River Operation by Having No More Than ± 10 Percent Difference in Discharge Above and Below the Marquette Project (Item 8 in Table 17) and Operate the Marquette Project Run-of-River With Reservoir Fluctuations Restricted to ± 0.25-feet From Target Pool Elevations (Item 10 in Table 17).** We are not recommending the Commission adopt run-of-river operation for the Marquette Project because, like the upstream Dead River Project, continued operation of the Marquette Project in a peaking mode with the terms and conditions recommended by the staff, and required by the WQC, represent a balanced approach that is cost-effective in balancing the non-developmental resources with the developmental resources versus run-of-river operation. The run-of-river operation and strict reservoir operating levels would significantly impede the ability of the project to provide minimum flows, to generate power efficiently, and to provide reregulation of flows from the upstream Dead River Project (see Sections V.C.3., Water Resources, and VII. Comprehensive Development and Recommended Alternative). Our recommended ranges of water level elevations for the Marquette Project reservoirs concurs with those required by the WQC and would provide adequate protection to aquatic resources,

enhance recreational opportunities, and allow the project to continue to operate as a reregulation project.

**E. Construct, Maintain, and Fund Three USGS gages at Various Project Development Locations (Items 16 and 17 of Table 17) and Install and Maintain Continuous Level Recorders at Project Reservoirs With Telemetry for Instantaneous Retrieval of Data by Telephone or Internet (Items 18 and 19 in Table 17)**. We do not recommend the Commission adopt these measures to install USGS gages and automatic sensors with access to these devices by telephone and internet because the information needed can be obtained by using existing operational project data at considerably less cost and still adequately protect water and aquatic resources affected by the Marquette Project (see Section V.C. 3., Water Resources, V.C. 4., Aquatic Resources, and VI. Developmental Analysis). In addition, the WQC requirements and our recommended gaging and compliance plan should ensure the project complies with its required mode of operation and protects aquatic resources. We do not find any necessity for flow data to be made available via telephone or internet and therefore do not recommend this measure.

Table 16. Analysis of fish and wildlife agency Section 10(j) recommendations for the Dead River Project. (Source: Staff)

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
|---|---|---|---|---|
| 1. Maintain minimum flows from SLSB of: 15, 30, 25, 20, and 15 cfs during January through March, April, May, June, and July through December, respectively. | MDNR | Yes | $1,039,000 | Yes, partially; we agree with flows for Jan through March, and with the mandatory WQC flow of 25 cfs or inflow, if less for April, and 5 cfs less per month for the remainder of the year; we conclude that the lower flows would adequately protect fishery habitat, but at a lower cost. |
| 2. Do not discharge from SLSB in excess of 100 cfs when discharges are under UPPCO's control. | MDNR | Yes | Nominal | No. WQC restricts the maximum discharge to 150 cfs for normal operation, and up to 200 cfs in a power emergency, or under extreme wet weather conditions; we conclude that there is no justification for an additional restriction to 100 cfs. |
| 3. Maintain a continuous 120-cfs minimum flow from Hoist powerhouse; operate the Hoist powerhouse in a non-peaking mode from March 15 through June 15. | MDNR | Yes | Included in Item 1 | No. WQC requires 100 cfs. We conclude the 100 cfs release from Hoist Powerhouse would adequately protect fishery resources in a cost-effective manner; we do not find a ROR operation during March-June justified for fishery enhancement. |
| 4. Maintain a continuous 80-cfs minimum flow from McClure powerhouse. | MDNR | Yes | Included in Item 1 | Yes, partially; flow would be maintained when adequate inflow to the development is available. |
| 5. Maintain a continuous 40-cfs minimum flow in the McClure bypassed reach, with MDNR recommending using deepwater draws from MSB. (Interior did not recommend a deepwater draw, per se; they recommended a release that would rehabilitate the downstream coldwater fishery). | MDNR Interior | Yes | Included in Item 1 | No. WQC requires 20 cfs from a deepwater draw; higher flow has no clear fishery benefit. We conclude 20 cfs improves existing conditions and would adequately protect fishery resources in a cost- effective manner. |
| 6. Provide periodic flushing flows to the McClure bypassed reach in sufficient amount and duration to prevent injurious sedimentation of the channel, and to provide for the natural movement of woody debris. | MDNR | Yes | Included in Item 1 | Yes |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
|---|---|---|---|---|
| 7. If minimum or maximum flows are temporarily modified by operating emergencies beyond the control of the license, or for short periods upon mutual agreement between the licensee and resource agencies, notify the Commission as soon as possible, but no later than ten days after each such incident. | MDNR | No [a] | Nominal | Yes, under Section 10 (a). |
| 8. File a plan for Commission approval, within 180 days of license issuance, to provide the minimum instream flow in the bypassed reach below McClure dam. Implement the plan upon Commission approval. | MDNR | Yes | Included in Item 1 | Yes |
| 9. Maintain specific monthly minimum water levels and target start-of-month levels in SLSB and DRSB. Restrict daily level fluctuations at SLSB and DRSB to ±0.5 foot (for lowering and refill). If natural conditions cause elevation at DRSB to exceed 1,340.5 feet NGVD at any time, take steps to lower the impoundment to target level | MDNR | Yes | Included in Item 1 | Yes |
| 10. Maintain MSB between elevation 1,194.8 and 1,196.4 feet NGVD at all times and restrict fluctuations during any 24-hour period to 1 foot. Condition does not apply to instances beyond control of the licensee, including periods of high flow, temporarily passing organic debris over the spillway, or providing periodic flushing flows to the bypassed river channel. | MDNR | Yes | Included in Item 1 | Yes |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 11. Maintain instantaneous run-of-river mode of operation at all project developments, with an allowable variance of reservoir elevations no greater than plus or minus 0.5 feet. Consult with the MDNR and Interior in the event that instantaneous run-of-river operation does not provide sufficient inflow to maintain the minimum reservoir elevations. | Interior | Yes | $1,252,000 | No. We conclude that this measure does not provide a cost-effective balancing of non-developmental and developmental resources. |
| 12. Notify MDNR and MDEQ at the earliest opportunity, but no later than within 24 hours after any emergency drawdown on any project reservoir, to prevent dam failure or imminent risk to public health and safety. Consult MDNR and MDEQ in determining the amount of resource damage, if any, and the appropriate response measures for any emergency drawdowns. After the emergency has passed, consult with MDNR and MDEQ on the proposed remedial measures, mitigation and appropriate methodology and timing of the reservoir level restoration. Within 30 days after the emergency drawdown, consult with and submit a report to MDNR and MDEQ describing the emergency, action taken, remedial measures proposed, mitigation proposed, and measures proposed to prevent reoccurrence. | MDNR | No [a] | Not Determined | No, partially. These general requirements are covered under the Commission's standard L-form licensing conditions that require a licensee to respond to emergency conditions and requires consultation during such periods with agencies. In addition, the Commission's regional office staff periodically conducts dam safety inspections. |
| 13. For all proposed reservoir drawdowns (and refills) for dam maintenance purposes that exceed 1 foot, obtain any necessary MDEQ permits. | MDNR | No [a] | Nominal | No. We recommend the applicant prepare, in consultation with MDNR, an impoundment drawdown plan that would address the 1-foot drawdown situation and others. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 14. Develop and implement a gaging and compliance plan to demonstrate compliance with all minimum flow and maximum flow requirements below all the developments and within the McClure bypassed reach, and file the plan within 12 months of license issuance, after consultation with Interior, the USGS, MDNR and MDEQ. | MDNR | Yes | Included in Item 1 | Yes, but see Items 15 to 19 for additional clarification. |
| 15. Include in the gaging and compliance plan, provision of funds to operate and maintain the USGS gage (No. 04043800). | MDNR | No [a] | $30,300 (Included in Item 1) (includes Items 16 and 17) | No. No need for USGS gages as compliance would be adequately monitored using staff gages and project operational data. See item 16. |
| 16. The gaging and compliance plan shall contain a timetable for implementation of the monitoring within one full construction season after plan approval, annual submission of summary results to the MDNR, and a provision for prompt submission of all data to the resource agencies upon request. Instantaneous flow measurements from all sites shall be made available via telephone lines or posted on the Internet on a daily basis. | MDNR | No [a] | Included in Item 15 | Yes, partially; under 10(a). We are recommending the applicant prepare a gaging and compliance plan but we do not find any necessity for data to be available via telephones or the internet. |
| 17. Maintain a record of headwater elevations of the three project reservoirs. Record SLSB elevations during each site visit and at least weekly. Record the headwater elevations of the Hoist and McClure reservoirs hourly. Submit to the MDNR, in electronic form, an annual report of all recorded storage basin levels and all gate opening changes. Provide data promptly to the resource agencies upon request. | MDNR | Yes | Included in Item 15 | Yes, partially; We are recommending the licensee develop, in consultation with the resource agencies a gaging plan and an operations plan. The determination of whether hourly data is needed would be determined in the plans. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 18. Install calibrated staff gages near or on the upstream wall of each of the Silver Lake, Hoist, and McClure dams within one construction season (Interior does not specify time constraint) of license issuance. The staff gages shall be in locations clearly visible to the public, determined in consultation with the MDEQ and MDNR. | MDNR Interior | Yes | Included in Item 1 and in Item 11 | Yes |
| 19. Clearly mark the minimum and maximum monthly reservoir elevations on the gages. Post (MDNR, only) interpretive signs that describe the operation of the reservoirs near the gages and at the respective reservoir boat launches. | MDNR Interior | No [a] | Nominal | Yes, partially; we conclude that minimum and maximum monthly level markings could be provided on gages at minimal cost, but that interpretive signs are unnecessary. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 20. Conduct a three year test, with protocol to be determined in consultation with resource agencies, to determine the ability of the Licensee to comply with standards for flows and reservoir elevations. Prepare and submit a report to the Commission within 90 days of the end of the test period, in consultation with the resource agencies, documenting licensee's ability to maintain the compliance standards and the recommendations to reach the compliance standards. If the report indicates that plant operations cannot meet the reservoir elevation standards and the minimum flow standards, develop within 90 days of submittal of the compliance report, in consultation with the resource agencies, a plan of action and implementation schedule to meet the compliance standards. The action plan shall include a change in the compliance standards, if deemed necessary by the resource agencies, with changes in the reservoir elevations considered first before changes to minimum flows are evaluated. | MDNR | No [a] | Included in Item 1 | Yes, partially, under 10(a). The Commission would review compliance report and approve any revisions to operational constraints proposed by the Licensee, in consultation with the resource agencies, provided any changes are consistent with the WQC. |
| 21. Develop a plan to demonstrate compliance with Item 11- project operation. The plan shall be developed after consultation with the agencies and shall include a schedule for implementing the plan. Key components of the plan should include items 18 (staff gages), 19 (minimum and maximum water level markings), 22 (downstream gages), 23 (daily logs), and 24 (automatic sensors). | Interior | No [a] | $2,000 | Yes, partially; see items 18, 19, and 22 to 24. The plan would exclude the installation of USGS gages. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 22. Install USGS flow-gaging stations at locations downstream from the project's three dams to measure discharge. Locate the stations in coordination with the USGS and the agencies. The stations should be funded by the applicant for the term of the license. The stations should be equipped with telemetry equipment so that the agencies can access them via computer (over telephone lines), to verify compliance with the prescribed mode of operation for the project. | Interior | Yes | $30,300 (Included in Item 1) | No. No need fro USGS gages as the access of flow data of concern would be developed under the gaging plan recommended in item 21 and by using staff gages and project operations data; see item 14. |
| 23. Maintain a daily record (log) of operation and provide any pertinent information to the agencies upon request, including turbine operations, reservoir elevations, and flow releases through the powerhouses and spillways. | Interior | No [a] | Nominal | Yes, partially; under 10(a); see item 15. |
| 24. Install automatic sensors to provide a continuous reading of head and tailwater elevations, to prevent extreme fluctuation within the reservoirs and to ensure compliance with run-of-river mode of operation. | Interior | Yes | Not determined | No. We recommend compliance monitoring using available project operational data. The gaging and compliance plan developed for item 21 above would ultimately determine if automatic sensors would be needed in conjunction with operational data. We concur with the WQC that requires UPPCO collect and maintain extensive operational data. We have recommended in item 21 above that automatic sensors be considered as part of the gaging and compliance plan. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 25. Maintain dissolved oxygen (DO) concentrations not less than 7 mg/L at any time in the Dead River downstream of the Silver Lake dam, downstream of Hoist powerhouse, and in the McClure bypassed reach. | MDNR | Yes | Included in Item 1 | Yes, partially; to the extent that DO conditions are project-related. DO conditions may occur for reasons outside the Licensee's control. Staff recommends that Licensee be required to maintain DO levels above 7 mg/L, only to the extent that low DO conditions are project related as stated in the WQC. |
| 26. Do not warm the Dead River downstream of the Silver Lake dam, below Hoist powerhouse and in the McClure dam bypassed reach to monthly maximum temperatures greater than 38, 38, 43, 54, 65, 68, 68, 68, 63, 56, 48, and 40EF during January through December, respectively. | MDNR | Yes | Included in Item 1 | Yes, only to the extent that higher water temperatures are project related as stated in the WQC. |
| 27. Do not warm the Dead River below Silver Lake dam and below the Hoist powerhouse more than 2EF above the temperatures as measured upstream of the respective reservoirs. | MDNR | Yes | Included in Item 1 | No. Warmer water temperatures may occur for reasons outside the Licensee's control and aquatic resources in these stream reaches would be protected by the applicant meeting state WQC standards (See Section V.C.3. Water Resources). A relative increase in temperature by itself may not have an adverse effect and, in some cases, may be beneficial. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 28. Monitor compliance with the above (items 25 - 27) DO and temperature standards in the discharge channel immediately downstream of the Silver Lake dam, and in the tailwater immediately downstream of the Hoist and McClure powerhouses. The Licensee shall monitor compliance with the above DO standards in the bypassed river channel downstream of the McClure dam at the railroad bridge in the NW 14, SW1'/4, Section 13, T48N, R26W, and the temperature standards in the bypassed river channel immediately downstream of the McClure dam. | MDNR | Yes | Included in Item 1 | Yes, partially; Staff has recommended compliance monitoring locations following WQC requirements. |
| 29. Maintain DO concentrations in the Dead River downstream of the McClure powerhouse not less than 5 mg/L at any time. | MDNR | Yes | Nominal | Yes, only to the extent that low DO levels are project related as stated in the WQC. Staff recommends that the Licensee be required to maintain DO levels above 5 mg/L, only to the extent that low DO conditions are project related as stated in the WQC. |
| 30. Do not warm the Dead River downstream of the McClure powerhouse to monthly maximum temperatures greater than 38, 38, 41, 56, 70, 80, 83, 81, 74, 64, 49,and 39EF during January through December, respectively | MDNR | Yes | Included in Item 1 | Yes, only to the extent that higher water temperatures are project related. |
| 31. Do not warm the Dead River below the McClure powerhouse more than 5EF greater than the temperatures as measured upstream of the McClure basin. | MDNR | Yes | Included in Item 1 | No. See item 27 above for the same reasoning. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 32. Monitor compliance with the above DO and temperature standards in the natural river channel downstream of the confluence with the McClure powerhouse discharge channel, but in the immediate vicinity of the tailrace channel | MDNR | Yes | Included in Item 1 | Yes. Staff has recommended compliance monitoring locations following WQC requirements. |
| 33. Within 24 months of license issuance, develop and implement a water quality monitoring program, in consultation with the MDNR and MDEQ, that includes: 1) monitoring of dissolved oxygen hourly from June through September, and temperature hourly from May through October, upstream of the SLSB, downstream of the Silver Lake dam, upstream of the Dead River Basin (Hoist), downstream of the Hoist dam, downstream of the McClure dam, and downstream of the McClure powerhouse, using EPA approved methods; 2) taking temperature and DO profiles in the deepest part of the Dead River and McClure basins, near the intake, every two weeks June through August; 3) submitting annual reports to the MDEQ and MDNR, that include daily minimum, maximum, and average temperature for each monitoring site and each day monitored, in an electronic form; 4) the preparation of operating procedures for MDEQ review and concurrence, including notification ( of MDEQ within one business day of identifying a noncompliance condition, and a provision that identifies steps necessary to ensure that compliance with the water quality standards are met; and 5) developing a water/sediment/fish monitoring plan. | MDNR | Yes | Included in Item 1 | Yes, partially; Staff concludes that monitoring requirements in the state WQC are adequate, and that many of the provisions recommended in this item would be duplicative of the WQC monitoring requirements. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 34. Develop and implement within 24 months of license issuance a water quality monitoring plan. The plan should be developed through consultation with the MDEQ, Surface Water Division. The plan should include continuous monitoring of dissolved oxygen and temperature both above and below each impoundment, including at the upstream end of the McClure Bypassed Reach and below the McClure Powerhouse. The locations of the sampling equipment and the sampling frequency should be determined through consultation with the MDEQ. The applicant shall prepare operating procedures for MDEQ review and concurrence, to mitigate conditions which deviate from the established standards, and prepare a plan detailing mitigative measures to correct the known water quality problems. | Interior | Yes | Included in Item 11 | Yes, partially, see Item 33. |
| 35. All violations of water quality standards may require the payment of liquidated damages for each event. Develop the schedule for the liquidated damage payments in consultation with the Department and submit to the Commission within 12 months of license issuance. | MDNR | No [a] | Nominal | No. Licensed projects must operate within MDEQ water quality regulations. Provisions to assess penalties for violations of the WQC are outside the scope of Commission authority. |
| 36. Include language in the Order Issuing License that clearly states that the standard re-opener can be used for fish passage. This language should also include the needed information to allow the Commission to evaluate such requests. | MDNR | No[a] | Nominal | Yes, partially; we have recommended that any license issued for the project reserve Interior's Section 18 authority for prescribing fishways in the future. The standard L-Form reopener article would also provide MDNR a mechanism to address future passage concerns. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 37. Within 12 months of the date of license issuance, develop and implement a multi-step downstream fish passage protection plan for installing fish protection devices at the Hoist and McClure powerhouses. (Interior did not specify developments needing the plan). | MDNR Interior | No [b] | $500 | No. There is no indication that entrainment adversely affects resident fish populations in the Dead River. |
| 38. Conduct effectiveness analysis of installed fish protection devices selected in item 37 above, in consultation with resource agencies; upon completion of study, complete residual damage assessment to determine if additional protective measures are warranted. If not, compensation should be provided for all residual fish losses. | MDNR | Yes | Not determined | No. We are not recommending this measure because there is no indication that entrainment adversely affects resident fish populations in the Dead River and therefore no fish protection devices are being recommended by us for installation. In addition, damage assessment is outside the Commission's regulatory authority. |
| 39. Should it be determined that the Project economics cannot support installation of fish protection and downstream passage devices, within 5 years establish an escrow account with annual contributions, such that fish protection and downstream passage at the Hoist and McClure powerhouses is accomplished as soon as feasible, and at least accomplished within 20 years of license issuance. | MDNR | No [a] | Not determined | No. There is no indication that entrainment adversely affects resident fish populations in the Dead River. |
| 40. Fund, conduct, and complete a fisheries damage assessment, in consultation with the Department, or pay the Department restitution value for the residual lost fishery resources. | MDNR | No [a] | $2,000 | No. Damage assessments for the state are outside the Commission's authority. |
| 41. Within 12 months from the date of issuance of the license, develop and implement a recreation plan. | MDNR | No [a] | $4,600 | Yes, under Section 10(a). See section V.C.8. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
|---|---|---|---|---|
| 42. Provide O&M for all existing (recreational) facilities described in the license application. | MDNR | No [a] | $15,000 | Yes, partially, under Section 10(a). See section V.C.8. |
| 43. Construct, operate, and maintain year-round no-fee, barrier-free fishing, bird-watching, and aesthetic access viewing sites adjacent to Hoist and McClure powerhouses. Include at each site, parking for 5 vehicles, with 2 add. barrier-free parking spots, a barrier-free vault toilet, hardened paths, signage, and a barrier-free fishing platform. | MDNR | No [a] | $88,500 (Includes all MDNR Items 43 to 49) | Yes, partially; we recommend a facility below Hoist powerhouse. See section V.C.8. |
| 44. Construct, operate, and maintain (during ice-free months) no-fee, barrier-free fishing, bird-watching, and aesthetic access viewing sites on Silver lake, Dead River and McClure reservoirs. Include additional items described above in 43. | MDNR | No [a] | Included in Item 43 | No, see section V.C.8. |
| 45. Construct, operate, and maintain (during snow-free periods of the year) no-fee, barrier-free reservoir boat launch at SLSB. Include a concrete boat launching ramp, parking for 12 vehicles with trailers, 2 of which are barrier-free parking spaces, accessible skid piers, hardened paths, signage, and a barrier-free vault toilet. | MDNR | No [a] | Included in Item 43 | No, see section V.C.8. |
| 46. Provide funding for operation and maintenance (year-round) of the no-fee MDNR boat launch ramps on the DRSB and MSB. Funding shall also be provided to upgrade the facilities and meet ADA standards, and other items. | MDNR | No [a] | Included in Item 43 | No, see section V.C.8. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 47. Construct, operate, and maintain (during snow-free periods of the year) a no-fee aesthetic viewing access trail adjacent to the McClure powerhouse. Develop facilities in conjunction with tailwater fishing access and meet ADA standards. Include paths, signage, and viewing areas. | MDNR | No [a] | Included in Item 43 | No, see section V.C. 8. |
| 48. Construct, operate, and maintain (during snow-free periods of the year) a no-fee aesthetic viewing access trail adjacent to the McClure dam. Includes parking spaces, hardened paths, vault toilets, signs, and barrier-free viewing area. | MDNR | No [a] | Included in Item 43 | No, see section V.C.8. |
| 49. Provide directional signage to all recreational facilities from major highways. | MDNR | No [a] | Included in Item 43 | Yes, under Section 10(a). See section V.C.8. |
| 50. Maintain current project lands by developing and implementing within 12 months of license issuance, a Comprehensive Land Management Plan (CLMP). The CLMP shall be updated on a biennial basis in consultation with the resource agencies. | MDNR | No [a] | $4,200 | Yes, partially. We are recommending the licensee develop a CLMP. However, we are recommending the plan be updated every five years rather than biennially. |
| 51. Develop and implement, within 36 months of license issuance, after consultation with the agencies, a WMP that protects and enhances wildlife habitat on project-owned lands, including leased lands. | MDNR, Interior | Yes | $2,600 | Yes, partially; we recommend many but not all components of WMP recommended by the MDNR. Emphasis should be placed on those species that may be affected by project operations and not for items described in item 59, i.e., purple martin houses, bat houses. etc. |
| 52. As part of the WMP, hold consultation with the resource agencies every 2 years on the status of wildlife populations in the Project boundaries, and the measures to be performed to protect wildlife populations. | MDNR | No [a] | Included in Item 51 | Yes |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 53. As part of the WMP, provide for the protection and enhancement of habitat for any federally or state-listed threatened, endangered or sensitive species, and protection of environmentally sensitive areas on project lands. | MDNR | Yes | Included in Item 51 | Yes |
| 54. As part of the WMP, provide for a 200-foot protected riparian buffer strip along all lands adjacent to the reservoirs and riverine sections of the project that are owned or leased by the licensee. | MDNR | Yes | Included in Item 51 | Yes, licensee will consult with resource agencies on this issue when developing the WMP. |
| 55. As part of the WMP, provide for retaining fruit and mast-bearing trees, retaining hollow trees and snags, maintaining existing wildlife openings and areas of winter cover, re-vegetating timber harvest roads with plants palatable to wildlife, and using best management practices when harvesting timber. | MDNR | Yes | Included in Item 51 | Yes, partially, only required on project-owned lands. |
| 56. As part of the WMP, provide for wildlife plantings in the Project rights-of-way. | MDNR | Yes | Included in Item 51 | Yes, partially, only on project-owned lands. |
| 57. As part of the WMP, provide for maintenance of all wildlife enhancement structures, in consultation with the resource agencies. | MDNR | Yes | $3,300 | Yes |
| 58. As part of the WMP, provide on project lands, one wood duck box per 2 acres of wooded wetland and one mallard hen house for every 2 acres of emergent wetland. | Interior | Yes | Included in Item 57 | Yes |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 59. As part of the WMP, provide a purple martin colonial nesting structure near each of the project's impoundments. Additional wildlife enhancement structures the applicant should provide are bat houses, and bluebird, owl, and kestrel nesting boxes. | Interior | Yes | $500 | No. There is no indication that these species are affected by the project, and we have recommended that the WMP focus on species that may be affected by the project. |
| 60. As part of the WMP, construct and place one osprey nest platform in each of the project's impoundments. | Interior | Yes | Included in Item 57 | Yes |
| 61. As part of the WMP, place a common loon nesting platform that adjusts to water level in each of the project's impoundments. | Interior | Yes | Included in Item 57 | Yes, staff recommends two platforms at SLSB, or one each in SLSB and DRSB. |
| 62. The WMP should include wildlife plantings to enhance wildlife habitat on project lands. As part of the plan, the licensee should monitor wildlife populations and the use of the structures provided to enhance wildlife populations, and annually consult with the Agencies and/or provide monitoring reports to the agencies. The plan should account for all maintenance of structures (i.e., cleaning, repair) and eventual replacement of structures as they deteriorate. | Interior | Yes | Included in Item 51 | Yes, partially; staff does not concur with the component of the WMP that requires bat houses, purple martin houses etc. described in item 59. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 63. Develop a BEPP in consultation with the resource agencies. This plan shall incorporate the Interior's bald eagle management guidelines. The Licensee shall, with the cooperation of the resource agencies, identify potential, existing or new nesting, roosting and perching trees (super canopy trees) on Project lands. These evaluations may require the development of additional protection measures to be incorporated into the final plan. The final BEPP shall include a mechanism for defining the means, extent and duration of necessary surveys during the term of the license. Bald eagle data and management shall be discussed at the biennial consultation with the agencies to ensure bald eagles are not adversely affected by timber harvest or other activities. | MDNR | Yes | $1,700 | Yes |
| 64. Within 36 months of license issuance, and in consultation with the resource agencies, develop and implement a plan to monitor and control or eliminate, when deemed appropriate by the agencies, purple loosestrife and Eurasian water milfoil in Project waters. | MDNR | Yes | $2,700 | Yes |
| 65. Within 36 months of license issuance, and in consultation with the resource agencies, develop and implement a plan to pass natural organic debris collected on the trash racks and log booms, over the Silver Lake, Hoist, and McClure dams. | MDNR Interior | Yes | $2,700 | Yes |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 66. Within 36 months of license issuance, and in consultation with the resource agencies, develop and implement a plan to inventory, control, and repair present and future shoreline erosion sites on the three reservoirs, and downstream of the dams and powerhouses in the zone influenced by the Project. | MDNR | Yes | $2,700 | Yes |
| 67. Develop, beginning 10 years after license issuance, and in consultation with MDNR, a project retirement plan that studies the costs of: 1) permanent non-power operation, 2) partial project removal, or 3) complete project removal. | MDNR | No [a] | Not determined | No. No specific proposals to decommission developments were presented, and circumstances do not warrant these studies. |
| 68. Provide for construction, operation, and maintenance of such reasonable facilities and modifications to project structures and operation, as part of fish and wildlife reopener license article. | MDNR | No [a] | Not determined | No. The Commission's Standard L-form license article provides such provisions. |

[a] Not a specific measure to protect fish and wildlife resources.

[b] This is a study that could have been done in pre-licensing stage.

Table 17. Analysis of fish and wildlife agency Section 10(j) recommendations for the Marquette Project. (Source: Staff)

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
|---|---|---|---|---|
| 1. Operate the Forestville powerhouse in a manner that allows reregulation of stream flow at the Tourist Park powerhouse, and maintenance of Forestville reservoir elevations at 770.25+/- 0.75 foot NGVD. | MDNR | Yes | $189,700 | Yes |
| 2. Maintain a continuous minimum flow of 85 cfs from the Forestville powerhouse. | MDNR | Yes | Included in Item 1 | No, benefits of extra flows are not cost-effective for fishery resources. The 85 cfs exceeds various seasonal flows required by the WQC, which we recommend, and are adequate to protect and enhance fishery resources at a reasonable cost. See section V.C.3. |
| 3. Pass river flows instantaneously, in case Forestville and Tourist Park powerhouses are shut down because of total blackouts. | MDNR Interior | Yes | Nominal | Yes, partially; we recommend that MBLP prepare a plan to address emergency shutdown situations; see section V.C.2. |
| 4. Operate Tourist Park powerhouse in a non-peaking, reregulation mode, while maintaining pool elevations at 637.2 feet NGVD +/-0.5 foot; continuously release from the powerhouse the average daily inflow to Tourist Park reservoir. | MDNR | Yes | Included in Item 1 | Yes |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
|---|---|---|---|---|
| 5. Provide 40-cfs minimum flow in the Tourist Park 600-foot-long bypassed reach. | MDNR | Yes | $45,200 (Included in Item 1) | No. Staff analysis indicates that 40-cfs flows would provide little increase in fish habitat and would not be cost-effective. See Section V.C.4 and VI. B. |
| 6. Provide 40-cfs minimum flow in the Tourist Park 600-foot long bypassed reach, or install a barrier at the confluence of the bypassed channel and the tailrace of No. 3 powerhouse, to prevent fish from ascending the bypassed channel. | Interior | Yes | $45,200 (Included in Item 1) | No. Staff analysis indicates little benefit to fish habitat in the 600-ft. bypassed reach with a 40 cfs minimal flow in comparison to the cost of releasing this flow; a fish barrier is not considered cost-effective because of the rare (less than one event per year) of overflow in the bypassed reach to attract fish; MBLP's current measures to physically inspect the bypassed reach and relocate stranded fish is adequate; see section V.C.3. |
| 7. During periods of drawdown and refill, Tourist Park powerhouse discharges should be continuous (non-peaking) and not more than 10 percent different than inflow. | MDNR | Yes | Not determined | No. This measure would not allow for reregulation of peaking flows from the upstream Dead River Project; see section V.C.3. Water Resources. We recommend an operating plan be developed in consultation with the resource agencies. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
|---|---|---|---|---|
| 8. Maintain compliance with run-of-river by having no more than plus or minus 10% difference in discharge above and below the project, corrected for time of travel and accretion. | Interior | Yes | Costly, exact costs not determined | No. Staff's proposed restrictions on drawdown of Forestville and Tourist Park reservoirs concur with the WQC restrictions and would provide adequate protection for fishery resources and would allow for reregulation of peaking flows from the upstream Dead River Project; see Sections V.C.3, Water Resources and VII. Comprehensive Development. |
| 9. Operation of Forestville and Tourist Park may be temporarily modified if required by operating emergencies beyond the control of the Licensee, and for short periods upon mutual agreement between the Licensee and MDEQ, MDNR and Interior. If the flow is so modified, the Licensee shall notify the Commission as soon as possible, but no later than 10 days after each such incident. | MDNR | No[a] | Nominal | Yes, under Section 10(a). |
| 10. Operate Marquette Project reservoirs so that flows as measured immediately downstream form the reservoirs approximates inflows to the reservoirs with reservoir fluctuations restricted to +/-0.25 feet. The licensee should consult with the MDNR in the event that instantaneous run-of-river operation doesn't provide sufficient inflow to maintain the minimum reservoir elevation. | Interior | Yes | Costly, exact costs not determined | No. Run-of-river operation does not allow for reregulation of flows from the upstream Dead River Project and would be costly. See item 8 above. Staff's recommended reservoir elevations concur with those required in the WQC and offer adequate protection for fish and wildlife resources and continued recreational activities at the project. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 11 Prepare an emergency and maintenance drawdown plan, in consultation with MDNR and Interior. Notify MDNR no later than 24 hours after any proposed or already enacted emergency flowage drawdown, done to prevent dam failure and/or imminent risk to public health and safety. Consult with the MDNR in determining the amount, if any, of resource damage and the appropriate response measures. After the emergency has passed, consult with the MDNR on the proposed remedial measures, mitigation, and appropriate methodology and timing of the flowage level restoration. Within 30 days after the emergency drawdown, consult with and submit a report to the MDNR describing the emergency, action taken, remedial measures proposed, mitigation proposed, and measures proposed to prevent reoccurrence. | MDNR Interior | Yes | Nominal | Yes, partially. We are recommending the applicant develop an operations plan. Portions of this recommendation are also typically addressed and required as part of the Commission's standard L-form licensing conditions that respond to emergency conditions and require consultation during such periods with agencies. In addition, the Commission's regional office staff periodically conducts dam safety inspections. |
| 12. For all proposed reservoir drawdowns (and refills) for dam maintenance purposes that exceed one foot, the Licensee shall obtain any necessary MDEQ permits. | MDNR | No [a] | Nominal | Yes, partially. We are recommending the applicant prepare, in consultation with the MDNR, an operations plan that would address the issue of impoundment drawdowns. Also see item 11 above. |
| 13. Consult with agencies if reservoir drawdowns (and refills) are required for dam maintenance purposes. Provide at least two months advance notice; planned drawdowns should not be conducted during April, May, and June. | Interior | Yes | Nominal | Yes, partially. The operations plan and the Standard L-Form articles would address this issue. See also item 11 and 12 above. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 14. The recommended reservoir elevations at the Forestville and Tourist Park developments may be temporarily modified if required by operating emergencies beyond the control of the Licensee, and for short periods upon mutual agreement between the Licensee and the MDNR. If the elevations are so modified, the Licensee shall notify the Commission as soon as possible, but no later than 10 days after each such incident. | MDNR | No [a] | Nominal | Yes, under Section 10(a) |
| 15. Develop a plan to demonstrate operational compliance, by developing and implementing a gaging and compliance plan within 12 months of license issuance, in consultation with the Interior, the USGS, and the MDNR. | MDNR Interior | Yes | Included in Item 1 | Yes |
| 16.As part of the operational compliance plan recommended in item 15, provide funds to establish, operate, and maintain a new USGS gage or equivalent below Tourist Park to verify project compliance with the operational plan. | MDNR | Yes | $11,500 Included in Item 1 | No. The gaging and compliance plan to be developed, in conjunction with the existing project operations data and staff gages, negates the need for USGS gages to obtain the needed flow and compliance data; see item 20. MBLP is required to collect and maintain extensive operational data under the WQC. |
| 17. Construct, maintain, and fund three USGS gages or equivalent: one above No. 2 dam, one below No. 2 dam, and one below No. 3 dam. Gages should be equipped with telemetry equipment for access through computers. | Interior | Yes | $25,000 | No, see Item 16 |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 18. Install continuous level recorders at project reservoirs equipped with telemetry and sufficient short term memory. Gages should be equipped with telemetry equipment for instantaneous and short-term retrieval of data over phone lines or via the Internet. | MDNR | Yes | $2,800 Included in Item 1 | No. We do not recommend at this time the installation of continuous level recorders and defer to the development of the operations plan to determine the exact items that would be needed. See item 19. Impoundment elevation monitoring would be a part of the plan to be developed. The actual methodology and instruments for collecting data would be developed with the plan. We do not find any necessity for flow data to be available via the telephone or internet. |
| 19. Maintain automatic water level sensors to continuously record headwater and tailwater levels. | Interior | Yes | $2,800 | No. We are recommending a gaging plan be developed in consultation with the resource agencies. We concur with the WQC that requires MBLP to collect and maintain extensive operational data. The plan would ultimately determine if automatic water level sensors would be needed based on existing equipment and project capabilities. See items 16 and 18. |
| 20. Install calibrated staff gages on the upstream wall of each of the project dams in locations clearly visible to the public. The staff gages shall show the minimum and maximum impoundment elevations. The gages should be notched to show the operational compliance band of operations. The licensee shall also maintain a record of operation of the gages on an hourly basis, and provide them to the resource agencies upon request. | MDNR Interior | Yes | Included in Item 1 | Yes, partially. We have recommended the licensee develop gaging and operation plans which would address these specifics. Whether there is a need for maintaining hourly records would be determined in the plans. See items 15 through 19 above. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 21. Maintain a daily record of project operations that includes turbine operations, headwater and tailwater elevations, and hourly flow releases through the powerhouses and spillways, and provide this information to resource agencies upon request. | Interior | No [a] | Nominal | Yes, partially; under 10(a). See item 20 above. |
| 22. A 3-year test period shall be used to determine the ability of the Licensee to maintain compliance standards for flows and reservoir elevations, with the test protocol to be determined in consultation with the resource agencies. At the end of the 3-year period, the Licensee shall prepare a report to the Commission, in consultation with the resource agencies, documenting their ability to maintain the above compliance standards, and their recommendations to reach the above compliance standards. This report shall be submitted within 90 days of the end of the test period. | MDNR | No [a] | Included in Item 1 | Yes, partially, under Section 10(a). The Commission would review compliance reports and any revisions to operational constraints proposed by the Licensee, in consultation with the resource agencies, provided any changes are consistent with the WQC. |
| 23. When river discharge is greater than or equal to the 95 percent exceedance flow, maintain DO concentrations in Forestville and Tourist Park tailwater at not less than 5 mg/L at all times | MDNR | Yes | Included in Item 1 | Yes, only to the extent that DO levels are related to project operations. DO conditions may occur for reasons outside the Licensee's control. Staff recommends that the Licensee be required to maintain DO levels above 5 mg/L, only to the extent that low DO conditions are project related as stated in the WQC. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 24. The monthly average water temperature downstream of Forestville and Tourist Park shall not exceed 38, 38, 41, 56, 70, 80, 83, 81, 74, 64, 49,and 39EF during January through December, respectively | MDNR | Yes | Included in Item 1 | Yes, only to the extent that higher temperatures are project related as stated in the WQC. |
| 25. Within six months of license issuance, develop and implement a water quality monitoring program, in consultation with the MDEQ, MDNR and Interior, for the Marquette Project. The program should include: (a) monitoring water temperature throughout the year on an hourly basis, and DO, twice daily (between 4 AM and 8 AM and between 2 PM and 6 PM), from June through September; (b) conduct temperature and DO profile measurements in the deepest part of the impoundments every two weeks between June 1 and September 30; ©) prepare operating procedures for MDEQ review and concurrence, to mitigate conditions which deviate from above limits [see Items 23, 24]. | MDNR | Yes | Included in Item 1 | Yes, partially; we do not recommend monitoring hourly temperature throughout the year as it would be costly for the benefits received by the resource. Instead, staff recommends monitoring temperature hourly during June through September for 5 working days every week, which would provide adequate data for compliance evaluation. The WQC already requires a compliance plan very similar to the MDNR recommendation in item ©) of the WQC. |
| 26. Develop, within six months of issuance of a license, a Water quality/sediment/fish monitoring plan in consultation with MDEQ that includes equipment, calibration, methods, and reporting frequency that follows EPA procedures (40 CFR Part 136). | MDNR | Yes | Included in Item 1 | Yes |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 27. Maintain state of Michigan water quality standards in the project discharge, and conduct periodic water quality monitoring over the term of the license, following the schedule approved by the MDEQ. | Interior | Yes | Included in Item 1 | Yes |
| 28. After 2 years of monitoring item 27 (above), the Licensee may consult with MDEQ, MDNR, and Interior to change frequency of temperature and DO monitoring. | MDNR | No [a] | Nominal | No. The WQC provides MDNR an opportunity to petition MDEQ to continue with or revise appropriately the frequency of temperature and DO monitoring, after 1 year of monitoring rather than after 2 years of monitoring. |
| 29. All violations of water quality standards may require the payment of liquidated damages for each event. The schedule for the liquidated damage payments shall be developed in consultation with MDNR, and submitted to the Commission within 12 months of licensing. | MDNR | No [a] | Nominal | No. Licensed projects must operate within MDEQ water quality regulations. Provisions to assess penalties for violations of the WQC are outside the scope of the Commission's authority. |
| 30. The license be conditioned to include language requiring the development and implementation of a plan by the licensee to remove remnant No. 1 dam. | MDNR, Interior | No [a] | Included in Item 1 | Yes, under 10(a). |
| 31. Within 12 months of the date of license issuance, develop and implement a downstream fish passage and protection plan (the protection plan could include a change in trash rack design or installing barrier nets at Forestville and Tourist Park developments). | MDNR | No [b] | $78,800 | No. There is no indication that entrainment adversely affects resident fish populations in the Dead River. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 32. Conduct effectiveness analysis of installed fish passage and protection plan (item 31 above) devices in consultation with Interior and MDNR; a delay in implementing the protection plan, if agreed to by MDNR and Interior, would allow for accumulation of sufficient funds to finance the fish protection and passage measures by setting aside an escrow account designated for fish protection. | MDNR | No [a] | Not determined | No. There is no indication that entrainment adversely affects resident fish populations in the Dead River. No need to establish an escrow account for future situations. |
| 33. Compensate State of Michigan for residual fish losses occurring after protection devices have been installed for the fish protection plan in item 31 (above).The state shall determine the annual Michigan restitution value for the fish killed. Fish damage payments may be used as credits for upstream fish passage, with MDNR concurrence | MDNR | No [a] | Not determined | No. There is no indication that entrainment adversely affects resident fish populations in the Dead River. Compensatory damage assessment of fish losses is outside the Commission's regulatory authority. |
| 34. Develop a Fish Protection Fund, in consultation with MDNR and Interior, that places into escrow initial and/or annual payments to finance appropriate fish protection measures to be installed in the intake area of the Marquette Project, when deemed appropriate by the resource agencies. | Interior MDNR | No [a] | Not determined | No, see Item 33. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 35. Develop a comprehensive land management plan (CLMP), in consultation with the resource agencies within 12 months of license issuance. The MPLP shall maintain ownership of all project-owned lands and any withdrawals of current project lands from the tailwater or impoundment, or restrictions of public access to these lands shall be reviewed by MDNR and Interior prior to final approval by the Commission. On all non-applicant lands adjacent to the reservoir, the licensee shall work with the landowners to have all lands along a 200-foot buffer zone managed in accordance with the CLMP. | MDNR | No [a] | Nominal | Yes |
| 36. Develop and implement a Wildlife Management Plan (WMP) within 36 months (Interior = 48 months) of license issuance, in consultation with MDNR and Interior. The plan shall include monitoring and annual consultation with agencies or monitoring reports to agencies. The plan shall also include replacement of structures upon deterioration. | MDNR, Interior | Yes | Included in Item 1 | Yes |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 37. As part of the WMP (Item 36), provide for the protection and enhancement of habitat for any federally or state-listed threatened, endangered or sensitive species on project lands; provide for the protection of environmentally sensitive areas on project lands; provide for preserving and restoring naturally functioning wetlands and preserving and managing for old-growth forest within Project boundaries. | MDNR | Yes | Included in Item 1 | Yes |
| 38. As part of the WMP, install, maintain and monitor use of wood duck boxes; mallard hen houses; osprey nest platforms, loon nesting platforms, purple martin boxes (one per impoundment); bat houses, bluebird, owl and kestrel nesting boxes, and wildlife plantings. Interior recommends one wood duck box per two acres of wooded wetland and one mallard hen house for every two acres of emergent wetlands. | Interior | Yes | Included in Item 1 | Yes, partially; we do not concur that purple martin boxes, bat houses, blue bird, owl, and kestrel boxes are necessary because these species are not affected by project operations. |
| 39. Develop and implement Bald Eagle Protection Plan. | MDNR Interior | Yes | Included in Item 1 | Yes |
| 40. Develop, within 36 months of license issuance, and implement a plan to monitor, control and eliminate purple loosestrife, Eurasian water milfoil and other exotic plants found in project waters. Interior did not recommend the 36-month deadline, but did recommend the licensee submit an annual report on survey results. | MDNR Interior | Yes | Included in Item 1 | Yes |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 41. Develop, within 12 months of license issuance, and implement a plan to improve fish habitat below the project by maintaining the transport of large woody debris and vegetative matter. | MDNR | Yes | Included in Item 1 | Yes |
| 42. Develop, within 36 months, and implement a plan to inventory, control and repair present and future shoreline and bank erosion sites on project lands, with a follow-up inventory of project lands every 5 years. Interior did not specify a time frame. | MDNR Interior | Yes | Included in Item 1 | Yes |
| 43. Within 12 months of license issuance, develop a project retirement plan that studies the costs of: (1) permanent non-power operation, (2) partial project removal, and (3) complete project removal. Within six months of developing the project retirement plan, submit the plan to the agencies and Commission for approval. | MDNR | No [a] | Not determined | No. No specific recommendation to decommission projects has been presented, and circumstances don't warrant these studies. |
| 44. Provide for construction, maintenance, and operation of such reasonable facilities and modifications to project structures and operation, as part of the fish and wildlife reopener license article. | MDNR | No [a] | Not determined | No. The Commission's Standard L-form license article provides such provisions. |
| 45. Provide language in the license to provide a fish ladder at Tourist Park in the future, and flows necessary to operate the ladder throughout the open water seasons. | MDNR | No [a] | | Yes. |

| Recommendation | Agency | Within scope of 10(j) | Annual Levelized Cost (2001 $) | Recommend Adopting? |
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| 46. Provide language in the license to provide a fish ladder at the Forestville development in the future. | MDNR | No [a] | Nominal | Yes. |

[a] Not a specific measure to protect fish and wildlife resources.
[b] This is a study that could have been done in pre-licensing stage.

## IX. CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. A total of 57 comprehensive plans are currently on the Commission's list for the state of Michigan that address various resources of the state. Of these, we identified five Michigan and two federal plans to be relevant to both projects.[11] We did not find any inconsistencies.

## X. FINDING OF NO SIGNIFICANT IMPACT

On the basis of our independent analysis, we conclude that the issuance of an initial license for the Dead River Project, and a new license for the Marquette Project, as proposed, with our additional staff-recommended measures, would not constitute a major federal action significantly affecting the quality of the human environment.

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