United States Department of the Interior

FISH AND WILDLIFE SERVICE

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June 21, 2001

Mr. Thomas J. Reiss, Jr.
President
Indianford Water Power Company, Inc.
P.O. Box 553
Watertown, Wisconsin 53094

re: Stage One Consultation
Indianford Water Power Project
(FERC No. 11844)
Rock River, Dane Co., Wisconsin

Dear Mr. Reiss:

These comments provide the U.S. Fish and Wildlife Service's (FWS) review of the Initial Consultation Package (ICP) for the Indianford Water Power Company, Inc.'s (IWPCO or Applicant) proposed *License Exemption for Small Hydroelectric (hydro) Project 5 Megawatts or Less* through the Federal Energy Regulatory Commission (FERC). As stated in the ICP, the dam and project civil works are owned by Rock County. Proposed generating equipment, including the turbines, generators, etc., will be owned by the Applicant.

As established in the Federal Power Act, as amended by the Electrical Consumers Protection Act (1986), in deciding whether to issue a license, the FERC must give equal consideration to a full range of purposes related to the potential value of a stream or river. Among these purposes are hydro development, energy conservation, fish and wildlife resources, including their spawning grounds and habitat, recreational opportunities, other aspects of environmental quality, irrigation, flood control, and water supply. Relative to license exemptions, FERC regulations pursuant to *18 C.F.R, section 4.34 (2) Exemption Conditions* state:

> *"Any exemption from licensing issued for conduit facilities, as provided in section 30 of the Federal Power Act, or for small hydroelectric power projects having a proposed installed capacity of 5,000 kilowatts or less, as provided in section 405(d) of the Public Utility Regulatory Policies Act of 1978, as amended, shall include such terms and conditions as the fish and wildlife agencies may timely determine are appropriate to carry out the responsibilities specified in section 30(c) of the Federal Power Act."*

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At this point in the license exemption process, the FWS will not specify terms and conditions for inclusion in the exemption, but rather, in this letter we will discuss fish and wildlife concerns related to operation of the project, list plans that we recommend be developed to protect fish and wildlife resources, and list recommended environmental studies that the Applicant should conduct during Stage Two Consultation.

Federal Threatened and Endangered Species

To facilitate compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, Federal agencies are required to obtain information from the FWS concerning any species, listed or proposed to be listed, which may be present in the area of a proposed action. Recognizing your application to the FERC and its involvement as a licensing agency, we are furnishing you with the following list of species that are or may be present in the concerned area:

Classification	Common Name	Scientific Name	Habitat
threatened	bald eagle	*Haliaeetus leucocephalus*	breeding
endangered	Higgin's eye pearly mussel	*Lampsilis higginsi*	Lower Wisconsin River
threatened	prairie bush-clover	*Lespedeza leptostachya*	dry to mesic prairies with gravelly soil
threatened	eastern prairie fringed orchid	*Plantathera leucocephaea*	wet grassland

Bald eagle. Our recent distribution records indicate that the bald eagle does not currently nest in the immediate vicinity of the project. The extent of human development and probable lack of suitable nest trees in the project area may be a limiting factor. The bald eagle is currently listed as threatened but is proposed for delisting. After delisting, the FWS is obligated to monitor the bald eagle for a minimum of five years. In addition, the bald eagle will still be protected by the Bald and Golden Eagle Protection Act.

Higgins' eye pearly mussel. The Higgins' eye pearly mussel is known to occur in Dane County. However, it has only been found in the Upper Mississippi River and larger Tributaries, such as the Wisconsin and St. Croix rivers. We know of no reports from the Rock River.

Prairie bush-clover and Eastern prairie fringed orchid. These plants are known to occur in the vicinity of the project. However, Rock County only owns a few acres of land in the

immediate vicinity of the dam and power house. No prairie bush-clover or Eastern prairie fringed orchid plants are known to occur on hydro project land owned by Rock County.

Fish and Wildlife Concerns

During the license exemption process, the FWS will develop terms and conditions to protect fish and wildlife resources in the project area that are affected by operation of the hydro project.

We are primarily concerned with protection of:

1) Aquatic habitat in the Rock River from unacceptable hourly and/or daily fluctuations in the tailwater resulting from operation of the Indianford Hydro Project.

2) Wetlands and other environmental sensitive areas in Lake Koshkonong from unacceptable water level fluctuations due to the operation of the hydro project, including winter drawdown. Environmentally sensitive areas include:

   - Koshkonong Creek Woods. A large stand of bottomland hardwoods bordering the Koshkonong Creek interspersed with scrub/shrub and emergent wetlands.

   - Mud Lake Wetlands. An emergent and open water wetland complex located adjacent to the Rock River, north of where the Rock River enters Lake Koshkonong.

   - Koshkonong State Wildlife Area. An emergent and open water wetland complex of approximately 605 acres located adjacent to the Rock River, south and east of the where the Rock River enters Lake Koshkonong.

   - Thiebeau Marsh. An emergent and open water wetland complex located on the south side of Lake Koshkonong.

3) Tailwater habitat from becoming dewatered in the event that the project would undergo a rapid shutdown due to power loss.

4) Fish from being entrained in the project and being subjected to turbine mortality.

5) All federal and state-listed threatened and endangered species and their habitats that may occur on project land over the term of exemption.

6) Water quality in the tailwater during operation of the project and, in particular, to insure that adequate dissolved oxygen and temperature levels are sustained to protect fish and other aquatic life.

Recommended Plans to Protect Fish and Wildlife Resources

1. Project Operations. The Applicant should develop a plan that explains the specifics of how the project would be operated in a run-of-river mode within the maximum, target, and minimum water levels for Lake Koshkonong, as ordered by the Wisconsin Department of Natural Resources (DNR) in April 1991.

   Basis: The ICP states that the Applicant intends to operate the hydro project in a run-of-river mode within the Wisconsin DNR water level order. The FWS concurs that the project should be operated in run-of-river mode such that instantaneous outflow from the project closely approximates instantaneous inflow to the project. The appropriate U.S. Geological Survey flow gauging station that will document inflow to the project needs to be determined for operational compliance purposes. The project should not be operated such that the pool fluctuates from the allowable maximum to the allowable minimum on a daily basis. This type of operation is characteristic of hydro peaking and would result in unacceptable fluctuations in the headwater and tailwater. The FWS does not consider this run-of-river operation. We believe that a narrow operating range (yet to be determined) of allowable fluctuation in the headwater is necessary to protect wetlands and shoreline habitat in Lake Koshkonong and to protect tailwater habitat. The hydro project should be operated to minimize large changes in daily flow releases and to provide relatively stable discharge flows on a day-to-day basis. This type of hydro operation (i.e., run-of-river) mimics an unimpounded river flowing under natural hydrologic conditions, which are the conditions to which fish and other aquatic life have adapted.

2. Plant Shut-Downs. The Applicant should develop a plan to pass river inflow through the project on an instantaneous basis, or within a few minutes, in the event of emergency or planned project shutdowns.

   Basis: Implementation of this plan is intended to avoid an interruption in flow below the dam which could dewater aquatic habitat in the tailwater area for fish and other aquatic life. This is especially important if the current winter drawdown is retained and, as a result, no water would normally be discharged over the uncontrolled spillway. All water would be directed through the turbines. Avoiding sudden plant shutdowns is especially critical in the spring when several species of fish (e.g., walleye, smallmouth bass) spawn in the tailwater.

3. Operational Compliance. The Applicant should develop a plan to document compliance with the prescribed operating rules of the exemption. Key components of the plan should include the following conditions:

   A. Mechanisms to document inflow to and discharge from the hydro project.

   B. The maximum, target, and minimum headwater levels prescribed by the FWS and Wisconsin DNR (Agencies) should be shown on a staff gauge mounted on the dam, or other location as appropriate. The exact location of the staff gauge should be identified with concurrence from the Agencies.

   C. Install and maintain automatic water level recorders to record headwater and tailwater elevations every hour.

   D. Maintain a daily record (log) of operation and provide any pertinent information to the Agencies upon request, including turbine operations, headwater and tailwater elevations, debris sluicing events, and flow releases through the powerhouse and spillway.

   Basis: Implementation of this plan is intended to demonstrate compliance with the terms of project operation. Operational compliance is necessary at all times to protect fish and wildlife species and the habitats upon which they depend.

4. Log Sluicing. The Applicant should develop a plan to sluice all large woody debris downstream that accumulates in the intake area to provide cover and substrate for fish and other aquatic organisms.

   Basis: Dams act as barriers to downstream movement of large woody vegetation and dam owners often remove and destroy this material as unwanted debris. In rivers that are not impeded with dams, trees and logs fall into the river naturally, drift downstream, and eventually rest in the river channel where they provide cover and substrate for fish and other aquatic organisms. Therefore, to help mitigate for this habitat loss and provide habitat enhancement, the licensee should sluice large woody debris downstream. Human generated trash should be removed before log sluicing events.

5. Reservoir Drawdowns. The Applicant should develop a plan to coordinate with the Wisconsin DNR on all emergency drawdowns and include the FWS in coordination for planned maintenance drawdowns. The plan should include the following components:

A. Notify the Wisconsin DNR's Janesville Service Center at the earliest possible opportunity, but no later than 12 hours, of any proposed or already enacted emergency reservoir drawdown done to prevent dam failure and/or imminent risk to public health and safety.

B. Notify the FWS and Wisconsin DNR if a reservoir drawdown (and refill) for dam maintenance purposes is necessary and follow the Agencies' recommendations to minimize potential adverse environmental and recreational effects. The licensee should provide at least two (2) months advance notice of its proposed drawdown to allow a reasonable time for the Agencies to consider measures to prevent or minimize adverse impacts.

C. The public should be notified of a proposed reservoir drawdown by notice in a local newspaper, radio announcement, and/or other suitable means.

Basis: The timing, duration, and rate of drawdowns can significantly affect aquatic and wildlife species and their habitats, public recreational use, and water quality. For example, drawdowns can strand small fish and mussels and disrupt the life cycle of reptiles and amphibians. Consultation with the Agencies could minimize or avoid such impacts. Planned drawdowns should not be conducted during the months of April, May, and June to avoid the fish spawning and nursery period. Sufficient advance notice of planned drawdowns is needed for the Agencies to assess possible adverse impacts and identify suitable avoidance measures, and to allow the licensee to inform the public about a possible temporary disruption of recreational activities in the flowage.

6. Drought Contingency. The Applicant should develop a drought contingency plan that involves consultation with the Agencies during extremely low flow conditions in the Rock River.

Basis: Although the Rock River in the project area had a mean flow of 1,807 cubic feet per second (cfs) for the period of record of water years 1975 through 1999, the hydrologic record indicates that the river flow can become less than 100 cfs occasionally during very dry conditions. During these conditions, it may be necessary for a decision to be made to either abide by the minimum pool requirement of the exemption, or go below the minimum pool level such that sufficient water can be discharged through the hydro project to protect aquatic habitat in the Rock River downstream. The Applicant should develop a plan to consult with the Agencies, via conference call or meeting, to discuss and mutually agree on a procedure for project operation when the headwater level approaches the minimum pool level allowed in the exemption.

7. Winter Drawdown. Whether or not the existing annual winter drawdown should continue is an issue that the Agencies will evaluate during the exemption process. This is one of the items that will be studied by the Wisconsin DNR and the Rock-Koshkonong Lake District when the lake grant study of Lake Koshkonong begins this summer. We know that there can be advantages and disadvantages to winter drawdown. On one hand, drawdown may help reduce shoreline erosion resulting from "ice push" from wind and wave action but drawbacks can occur. For example, aquatic macrophytes can suffer by being dewatered and killed because their roots become frozen. Impacts of winter drawdown on herptile populations is a concern. Another concern is that if winter drawdown is continued, a continuous flow at the dam overflow spillway would not be possible, thus, a decision on winter drawdown vs. a continuous spillway flow must be made on its merits.

8. Project land. We understand from our April 25, 2001 interagency meeting that only a few acres of lands are owned by Rock County in the immediate vicinity of the hydro project and that the Applicant does not own any land at the hydro project. Given that, it would not be practical to develop a wildlife management plan for FERC licensed-project land. The project map should delineate land owned by Rock County within the project boundary.

Recommended Studies to Protect Fish and Wildlife Resources

9. Fishery Resources. The Applicant should obtain from the Wisconsin DNR, all recent fish survey data for Lake Koshkonong and the Rock River in the vicinity of the hydro project for inclusion in the application for exemption. If, after consultation with the Wisconsin DNR, adequate fishery information does not currently exist in the vicinity of the project, then the FWS recommends that the Applicant update the fishery information by conducting surveys in Lake Koshkonong and in the Rock River downstream from the project.

Basis: Up-to-date fish species survey data is needed to adequately describe the existing fish community affected by the operation of the Indianford Hydro Project. This information is part of the reporting requirements ordered by the FERC for inclusion in Exhibit E of the application for exemption. Current and well-defined fishery information is needed by the Wisconsin DNR to make informed decisions about management of the fishery. Further, this information is needed as a basis for determining how the fishery could be potentially affected by entrainment and turbine mortality and in formulating mitigation measures to minimize turbine mortality losses.

Methodology: If Wisconsin DNR determines that additional fish survey work is needed, then standard fish assessment techniques should be employed which are endorsed as standard operating procedure by Wisconsin DNR fishery personnel.

Standard fish assessment techniques normally used by the DNR include, but not are limited to, electrofishing (e.g., boom electroshocker, back-pack shocker), netting (e.g., fyke net, bag seine, trawl), tag and recapture, and use of statistical techniques to interpret the data. The specific gear and sampling design should be developed through consultation with the Agencies when the plan of study is developed.

10. Entrainment and Mortality of Fish. The FWS recommends that the Applicant conduct, or contract for, a feasibility study to determine measures that could be installed in the intake area of the Indianford Hydro Project to prevent fish from being entrained and subjected to turbine mortality. The study plan should be prepared in consultation with the Agencies and address potential measures to:

A. Exclude passage of fish into the hydro turbines (e.g., barrier net) or convey fish safely and efficiently around and downstream of the project via a bypass structure; and,

B. Minimize impingement of fish on devices or structures used to prevent entrainment.

Methodology. The study should focus on the feasibility of installing a louver or angled bar rack system in the intake area of the Indianford Hydro Project. Although a barrier net should also be considered in the feasibility study, this would not be our first preference because barrier nets can be very labor intensive, depending on debris load, to keep them functional. Louver or angled rack structures can likely be designed to guide fish and debris. Recent research conducted at the Alden Research Laboratory (Holden, MA) showed that louvers and angled racks set at a specific angle to the flow can be very effective in guiding walleye, smallmouth bass, and other riverine fish species to a bypass structure around hydro turbines. At the interagency ICP meeting, you stated that the trash rack would have to be rebuilt if the project is developed. Given that, a new trash rack should be designed to incorporate features that are known to guide fish to a bypass.

Basis: Although no fish entrainment studies have been conducted on the Rock River, the Agencies know from numerous entrainment and turbine mortality studies conducted in Wisconsin and Michigan that thousands of fish are entrained annually at hydro projects. Since 1989, many fish entrainment/mortality studies have been conducted in Wisconsin and Michigan as a requirement for relicensing hydro projects. Most fish entrained are small, typically less than six inches in total length. Initial mortality can be 10 percent or less but is often 20 percent or more when including delayed mortality from turbine injury to the entrained fish. Results have shown that fish entrainment data is too variable to be validly extrapolated among hydro

sites on the same river and most certainly, among hydro sites located on different rivers. The numerous entrainment studies conducted to date show high variability in total numbers of fish entrained, species composition, and in diel and seasonal entrainment patterns among hydro sites. These studies document that turbine mortality occurs at each hydro project and that the mortality rate is variable. The FERC's own report entitled *Preliminary Assessment of Fish Entrainment at Hydropower Projects: A Report on Studies and Protection Measures* found that "entrainment results show extreme variability in diel, seasonal, spatial, site-specific, and species-specific patterns. Total entrainment rates ranged from a low of 0.6 fish/hour to 2,492 fish/hour."

An attempt to determine the biological significance of loss of fish due to turbine mortality in the affected portion of the Rock River is not appropriate because biological significance is not the primary issue. Rather, project operation results in the mortality of important fishery resources, which are an important component to the fisheries of the State of Wisconsin and are a trust resource to Wisconsin and U.S. citizens. Therefore, turbine mortality of fish should be avoided and/or minimized through installation of fish protection devices, and unavoidable losses compensated. This approach is consistent with the Wisconsin DNR's April 1993 *Guidelines for Fish Entrainment and Mortality Mitigation at Federal Energy Regulatory Commission Licensed Hydropower Projects* (copy enclosed). The Wisconsin DNR, Great Lakes Indian Fish and Wildlife Commission, and FWS jointly developed these guidelines. This approach is also consistent with the FWS's Mitigation Policy, which, in turn, is consistent with the mitigation sequence specified in the Council on Environmental Quality's regulations implementing the National Environmental Policy Act. Highest priority is given to measures that avoid impacts. Measures to offset impacts with compensatory mitigation, which may include cash payments for killed fish, are only considered after all other alternatives to avoid and minimize impacts have been reviewed and implemented, if feasible, or rejected if not feasible.

11. Water Quality. The Applicant should develop, in consultation with the Agencies, a study to monitor dissolved oxygen (DO) and temperature in the intake area (headwater) and tailwater of the Indianford Hydro Project.

Methodology: The Applicant should prepare a draft study plan for water quality monitoring and submit it to the Agencies for review. The Applicant should use water quality sampling techniques described in a current Standards Methods handbook for examination of water samples. In addition, please use Wisconsin DNR guidelines for water quality sampling at hydro projects.

Basis: Hydro projects should be operated within State water quality standards pursuant to State water quality certification requirements of Section 401 of the Clean Water Act of 1977, as amended. Good water quality is critical for the survival and growth of all life stages of fish, aquatic invertebrates, and other aquatic life. The FWS will largely defer water quality issues to the Wisconsin DNR. However, the FWS recommends that a one year water quality study be conducted in the tailrace and intake/headwater area of the Indianford Hydro Project. At a minimum, DO and temperature should be measured plus any additional parameters requested by the Wisconsin DNR. This data is needed to insure that the operation of the Indianford Hydro Project does not result in violation of state water quality standards. If low dissolved oxygen levels are found in the forebay and/or tailrace area of the project, certain mitigating factors can be done through project operations to increase DO levels, such as air/oxygen injection into the turbine chambers.

12. Flow Study. The FWS recommends that the Applicant, in cooperation with the Agencies, contract for an incremental flow release study to be conducted at the Indianford Hydro Project.

Basis: As previously discussed under the Drought Contingency section of this letter, the hydrological record for the Rock River in the vicinity of the Indianford Hydro Project shows that the river historically varies widely in stream flow. The Wisconsin DNR has currently set the minimum discharge at the project at 64 cfs which is the estimated Q710 flow value. This flow is known to occur occasionally in the river, but it has been our experience that, as a minimum flow, the Q710 if often too low to adequately protect fish and other aquatic life in a river. The Agencies believe that an incremental flow release study is needed to determine what minimum flow is needed at the Indianford Hydro Project to protect the Rock River during occasional drought conditions when a temporary relief from a strict run-of-river operation may be appropriate. The flow study will give the Agencies an opportunity to observe three or four discharge flows and thus select the flow that adequately protects instream aquatic habitat during low flow conditions. We recommend that you have a contractor develop a scope of work and send it to the Agencies for review. Enclosed for your guidance are documents that outline instream flow methodologies that the FWS accepts as valid techniques (New England, Incremental Release, and Tennant methods).

13. Wildlife Studies. The Applicant should obtain from the Wisconsin DNR, all recent wildlife survey data, including waterfowl surveys, for Lake Koshkonong and the Rock River in the vicinity of the hydro project. This information should be presented in the application for exemption. If, after consultation with the Wisconsin DNR, adequate wildlife information does not currently exist in the vicinity of the project, then the FWS recommends that the Applicant update the wildlife information by conducting

surveys in Lake Koshkonong and in the Rock River downstream from the project. Scopes of work should be submitted to the Agencies for review prior to initiation of the surveys. The waterfowl study, if needed, should document species use of the project area year-round and to the extent practical, which species breed in the project area.

Methodology: Waterfowl census and other wildlife surveys should be conducted in accordance with current wildlife management techniques as referenced in professional journals.

Basis: Up-to-date information on wildlife species and habitat in the project area is needed to adequately describe the existing environment affected by operation of the Indianford Hydro Project. The information is also part of the reporting requirements required by the FERC for inclusion in Exhibit E of the application for license exemption.

14. Wetland Protection and Waterfowl Resources. A major concern of the FWS is that wetlands influenced by operation of the project be protected to provide habitat for waterfowl and other waterbirds. In the application for exemption, wetland types and aquatic macrophyte beds occurring in the project area should be described in terms of species composition and relative abundance, and delineated on a map. We understand that the Rock-Koshkonong Lake District conducted an aquatic vegetation survey in August 2000, thus, existing information should be available without conducting a aquatic plant survey.

Basis: Our interest is that wetland habitat and associated aquatic vegetation important to waterfowl (duck and geese), waterbirds (e.g., herons and bitterns), and wetland associated birds (e.g., black tern, yellow-headed blackbird) continue to flourish in the project area and that the prescribed mode of operation not result in any wetland degradation or loss. Lake Koshkonong has historically been a valuable lake for waterfowl. Given the constraints of operating the Indianford Hydro Project for hydro power, we believe the most effective way to protect and enhance species diversity of emergent and submergent wetland vegetation at the project is to minimize fluctuations in the flowage and tailwater. Our terms and conditions to the FERC to protect wetlands will include operational considerations to minimize adverse effects to wetlands. Further, FWS terms and conditions for operation of the project will be consistent with the North American Waterfowl Management (NAWM) Plan (1986), which states goals and objectives for the protection and enhancement of wetland habitat to help increase populations of waterfowl in North America. The populations of many waterfowl species have rebounded in recent years due, in part, to widespread implementation of the NAWM Plan.

15. Purple Loosestrife Control and Eurasian Milfoil Control. The application for exemption should include information on the extent that purple loosestrife (Lythrum salicaria) and Eurasian watermilfoil (Myriophyllum spicatum) have infested the project area. If existing information is not available, the Applicant should contract for a purple loosestrife and Eurasian watermilfoil survey.

Basis: If purple loosestrife and Eurasian Milfoil occur in Lake Koshkonong or in the tailwater area, the Agencies need information on relative abundance to develop control strategies, when deemed appropriate. If control measures need to be implemented in Lake Koshkonong (and tailwater area) in the future, implementation will likely require cooperation by the operator of the Indianford Hydro Project for perhaps, a temporary change in operations or other appropriate actions. Purple loosestrife and Eurasian milfoil are invading exotic wetland plants which outcompete many other valuable wetland plants and can dominate the species composition of a wetland or aquatic macrophyte bed in a few years. There is little food value for wildlife from purple loosestrife and infestation of valuable wetlands by this plant is extremely undesirable and harmful. Eurasian milfoil can rapidly cause aquatic weed problems and alter fish communities by providing too much refugia for prey species which leads to overpopulation and stunting problems in the flowage. Measures to control purple loosestrife and Eurasian milfoil are limited, but good results are being reported with some control measures such as localized use of herbicide and introduction of certain beetle and weevil species.

Recreational Resources

For recreational concerns, the FWS will largely defer to recommendations of the Wisconsin DNR, National Park Service, and recreational units of local government. We trust that the Applicant and Rock County will coordinate with these Agencies during preapplication consultation to identify needed improvements in existing recreational facilities (e.g., canoe portage, boat launching ramps, parking areas, directional signs, barrier free facilities, etc.) and evaluate the need for additional ones. For example, during our field inspection of April 25, 2001, we noticed substantial shoreline erosion at the small boat launch to the tailwater. This area should be stabilized as soon as possible. The existing fishing platform on the spillway side of the dam appears in good condition. Over the term of the exemption, the public must be allowed free access to the headwater and tailwater for fishing.

RESERVATION OF AUTHORITY TO PRESCRIBE FISHWAYS PURSUANT TO SECTION 18 OF THE FEDERAL POWER ACT

Pursuant to Section 18 of the Federal Power Act, as amended, the Secretary of the Department of the Interior, as delegated to the FWS, exercises his/her authority under Section 18 by reserving the authority to prescribe the construction, operation, and maintenance of such fishways as deemed necessary, including measures to evaluate the need for fishways,

and to determine, ensure, or improve the effectiveness of such fishways. This reservation includes authority to prescribe fishways for existing riverine fish species and/or any fish species to be managed, enhanced, protected, or restored in the basin during the term of the exemption.

Basis: The need for fish passage in the Rock River may be pursued by the Agencies at some time over the term of the exemption, after preparation of a fisheries management plan that addresses goals and objectives of a fish passage initiative. For example, the Agencies are interested in restoring native species whose populations are at suboptimum levels to more of their historic ranges. Restoring selected species to a greater percentage of their historic range by fishways or other measure(s) will help considerably to preclude the need for the FWS to formally list species on the federal endangered and threatened species list.

If the Rock River were unobstructed by dams, species such as walleye, smallmouth bass, northern pike, yellow perch, and channel catfish would be capable of unimpeded, long distance upstream and downstream travel on spawning runs and to preferred summer and winter habitat. The disruption of these movements and fragmentation of fish populations between dams may have significant implications for riverine fish populations. The original range of several fish species in Wisconsin rivers is discussed by Becker (1983). It is also known that many of what are termed "resident" fish species utilize large amounts of riverine habitat. Langhurst and Schoenike (1990) documented smallmouth bass movements of 60 miles or more. Other studies conducted by the Wisconsin DNR on channel catfish (Don Fago, unpublished), yellow perch (Weber and Les 1982); lake sturgeon (Thuemler 1988), brown trout (Clapp et al. 1990) and carp (Otis and Weber 1992) all document long distance movements of several miles. Studies of walleye in Wisconsin, the results of which are found in Wisconsin DNR files, by Jim Holzer, (Mississippi River), John Lyons (lower Wisconsin River), Al Hauber (Wisconsin River), and Tom Thuemler (Menominee River) show extensive riverine movements in excess of 40 miles.

We look forward to further input and coordination with the IWPCO during the license exemption process. If you have questions, please call Jim Fossum of my staff at (920)465-7421.

Sincerely,

James D. Fossum

/ for /

Janet M. Smith
Field Supervisor

Enclosures

cc: Susan Josheff, P.E., Wisconsin DNR, Fitchburg, WI
Don Bush, Wisconsin DNR, Janesville, WI
Tom Kautz, Rock County Park and Conservation Division, Janesville, WI
Jerry Richardson, Rock-Koshkonong Lake District, Janesville, WI
Arie DeWaal, Mead and Hunt, Inc., Madison, WI
Angie Tornes, NPS, Milwaukee, WI
Todd Ambs, Executive Director, River Alliance of WI, Madison, WI
David P. Boergers, Secretary, Federal Energy Regulatory Commission, Washington, D.C.

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