

2013

Elkhart River and Christiana Creek Dams

Appendix F – 404(b)1 Analysis, Draft FONSI
and Agency Coordination

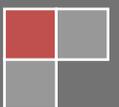


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PRELIMINARY SECTION 404(B)(1) EVALUATION

I. Project Description

a. Location

The study area is part of the St. Joseph River system and is located in north central Indiana in Elkhart County (**Figure 1**). Overall, the St. Joseph River extends a total of 210-miles through portions of southern Michigan and northern Indiana. Approximately 65-miles downstream from Elkhart, the St. Joseph River flows into Lake Michigan. The proposed riverine restoration for the Elkhart River is located northeast of Elkhart Avenue and Waterfall Drive in the City of Elkhart, Indiana and the proposed riverine restoration for Christiana Creek is located northeast of East Crawford and Cassopolis Street (High Dive Park) in the City of Elkhart, Indiana (**Figure 2**). The project sites are located in the City of Elkhart. Elkhart is located on the St. Joseph River in north central Indiana just south of the Michigan border.

Figure 1 – City of Elkhart Dams in North-Central Indiana



Figure 2 – Aerial View of the City of Elkhart Dams



b. General Description

The plan for the project is to remove both of the aforementioned dams in Elkhart. Both of the dams are within the St. Joseph River, which is a highly impounded system. With so many impoundments, natural function of the river ecosystem is impacted resulting in a lowering of ecological integrity. Removal of the dams will help restore portions of river connectivity which will allow riverine fishes to access important spawning habitats such as headwater tributaries and wetlands. In addition, natural hydrologic function will be restored within the area which will further perpetuate native species colonization.

c. Authority and Purpose

This study is authorized under Section 506 of the Water Resources Development Act (WRDA) of 2000. Authority is given to plan, design, and construct projects to restore the fishery, ecosystem, and

beneficial uses of the Great Lakes. Projects are justified by ecosystem benefits alone, while considering affects to public health, safety, economic benefits, recreational or any combination of these.

The City of Elkhart, Indiana has requested the Chicago District, U.S. Army Corps of Engineers (USACE) to initiate a study to determine the feasibility of the dam removals under the Section 506 Fisheries and Ecosystem Restoration. This feasibility study has evaluated the environmental impacts of removing the dams to river and ecological function. The scope and purpose of this study is to help restore river ecosystem function within the St. Joseph River. This FS assessed and identified problems and opportunities, identified and evaluated measures, and recommends and designs the most cost effective feasible solution to the ecological problems currently existing within the area of study.

d. Proposed Fill Material

1) General Characteristics

Fill material consists of:

- φ Fluvial or glacially derived stone (cobble/gravel) would be used to construct work platforms for dam removal. This would allow for most of the material to be left in the stream, primarily to fill the scour trench, and to avoid costly removal of riprap stone that is not indicative or health for streams of this sort.
- φ Fill materials used will be free from the presence of environmental contaminants and will contain less than 5% fines.
- φ Fill materials will be free from the presence of environmental contaminants.
- φ The Elkhart Dam is made of river cobbles encased in a concrete cap. The concrete cap material would be removed from the river, while the natural cobbles would not be removed and would become part of the river again.

2) Quantity

Approximately 423 tons of glacial stone will be needed to armor the bridge abutments if it is determined they need to be armored. In addition, 144 tons of stone will be used to create the temporary dam breach outlet. This stone will be removed after construction.

3) Source

Glacial boulders, cobble and gravel for construction will be clean, inert materials obtained from a commercial supplier.

e. Proposed Discharge Site

1) Location

The proposed fill activity would occur within the location of the removed dams. The Elkhart River dam is located northeast of Elkhart Avenue and Waterfall Drive, while the Christiana Creek dam is located northeast of East Crawford and Cassopolis Street (High Dive Park).

2) Size, Type, and Habitat

The dam removal projects consist of small patches of riverine and riparian land. The area surrounding the dams consists primarily of urban infrastructure and invasive species are abundant.

3) Timing and Duration of Discharge

The removal of the Christiana Creek dam should be about 1-month and the removal of the Elkhart River dam 2-months. Within the river, construction would consist of machinery moving back and forth to dismantle and clear the dam from the river.

f. Placement Method

Cobble and gravel would be brought to the project site by truck and placed into position using machinery.

II. Factual Determinations

a. Physical Substrate Determinations

1) Substrate Elevation and Slope

The average slope through the project area at Christiana Creek is 0.005 with a slope of 0.009 and 0.003 upstream and downstream, respectively. The average slope through the Elkhart dam project area is 0.0025. This slope is true from the dam upstream to the railroad bridge. Further downstream from the dam the slope decreases to 0.0013.

2) Sediment Type

Christiana Creek substrates are indicative of a higher gradient, clear water stream. Substrates primarily consist of cobble, gravel and sand, with minor pockets of important detritus and muck. This dam does not significantly impound any materials.

Elkhart River substrates in the free flowing sections include cobble, gravel, sand, detritus, much and silts. Currently, in the reservoir created by the dam, a fine layer of silt covers up materials of cobble, gravel, and sand. During storm events the fine silt is washed over the dam, but the large substrates are still sequestered by the dam, which is currently starving downstream reaches and causing significant channel incision. It is important to let the river move these sequestered substrates downstream after the dam is removed to bring the section of river back into equilibrium.

3) Material Movement

Concrete rubble, steel, rebar and any unnatural waste from the destruction of the dam will be loaded into trucks via light machinery and disposed of properly. Following the removal of the dams, the stream

will seek equilibrium over the next few storm events. This means downstream of the dam will increase slightly in elevation and upstream of the dam would decrease in elevation. All of the material expected to move would do so naturally as storm events pulse them side to side and downstream. These processes create riffles, sand bars and other fluvialgeomorphic features. This is beneficial and actually critical for some riverine species such as chestnut lamprey and freshwater mussels, which require sand, gravel and silt bars that are distributed naturally in the river channel to bury themselves in for overwintering.

4) Physical Effects on Benthos

Existing benthos immediately below and above the dam may be effected from the dam removal and riffle construction. However, the area is so small that impacts to the surrounding benthos will be insignificant. Once the riffles are constructed, benthos will greatly benefit from the new and naturalized habitat.

5) Other Effects

Affects/effects of removing the dam will naturalize sediment transport and improve water quality. The notion that releases of “sediment” from dam removals as negative is no longer accepted by stream ecologists. Aside from controlled releases of sediment, uncontrolled releases by dam ruptures, such as the one on the Rock River in Illinois, actually show marked improvement in richness and abundance of aquatic riverine organisms. As long as sediments are not toxic, the redistribution of these are important to create microhabitats within the active floodplains of rivers and streams.

6) Actions Taken to Minimize Impacts

No special actions are necessary minimize impacts since once the dams are removed the river begins to place substrates where they would naturally go in the appropriate amounts. Trying to contain or train sediment, unless it is toxic is not a prudent for restoring fluvial morphology and hydraulic functions.

b. Water Circulation, Fluctuation, and Salinity Determinations

1) Water

The proposed project would not have significant adverse effects to water chemistry, water clarity, color, odor, taste, dissolved gas levels, nutrients, or increased eutrophication as a result. In fact, the project would result in the opposite, since the dams in place cause adverse affects to the mentioned parameters.

2) Current Patterns and Circulation

The proposed project would not have significant adverse effects to riverine hydraulics, but would have significant positive benefits. The construction of dams on lotic water bodies removes the fluvial hydraulics from the reach it affects, thusly homogenizing the river channel into a stagnant pool.

3) Normal Water Level Fluctuations

This project would not increase flooding upstream or downstream of the dams. These dams are too diminutive to regulate ground water or surface water hydrology. The reservoir created by the Elkhart Dam does unnaturally increase the surface water elevations above the dam, but this would be rectified once the dams were removed.

4) Salinity Gradients

Not applicable to freshwater environments.

5) Action Taken to Minimize Impacts

No special measures would be taken to minimize the temporary impacts on water circulation, since there would be no temporary impacts. The removal of the dams is aimed at restoring fluvial hydraulics.

c. Suspended Particulate/Turbidity Determinations

1) Expected Changes in Suspended Particulates and Turbidity in Vicinity of Fill

The expected turbidity is not expected to be greater than that of any flood condition. As stated, with every storm, fine wash load sediment is taken over the dam. It is the larger substrates that are sequestered.

2) Effects on Chemical and Physical Properties of Water Column

There would be negligible effects to light penetration and dissolved oxygen levels during construction. There are no known toxic metals, organics, or pathogens in the construction area. The placement of clean fill will not introduce metal, organic, or pathogens to the project area. Aesthetics would be improved in the long-term after instream connectivity is restored.

3) Effects on Biota

Only beneficial effects on aquatic biota are expected to result from the dam removal. Minor increases in turbidity and perhaps dissolved oxygen will be negligible compared to the beneficial impacts post-construction.

4) Action Taken to Minimize Impacts

Work would be done and material placed during days of low flow conditions to allow for safe construction activities.

d. Contaminant Determination

The proposed fill material or release of sequestered natural riverine substrates would not introduce any new contaminants into the St. Joseph River, or release any significant amounts of existing contaminants through bottom disturbance in the construction zone.

For all sediment sampling in both Elkhart River and Christiana Creek only arsenic results exceed RISC Residential Soil DCL for some samples. However, Indiana background (naturally-occurring) levels of

some inorganics such as arsenic can be found at concentrations exceeding the standard. Given that there are no other metals with elevated levels that would indicate anthropogenic sources, it is unlikely that the arsenic concentration is due to contamination. Overall there is no indication of contamination and the fines amount is minimal.

e. Aquatic Ecosystem and Organism Determinations

1) Effects on Plankton

Only beneficial affects to planktonic organisms are expected.

2) Effects on Benthos

Refer to section II.a.4)

3) Effects on Nekton

Fish eggs and larvae would not be smothered by the proposed fill activity since the anticipated construction activities will occur during non-reproductive or rearing seasons. Fish and other free-swimming organisms will tend to avoid the construction area; the construction area will be used again by those organisms soon after construction ends and overall species richness is expected to increase.

4) Effects on Aquatic Food Web

Beneficial improvements to the food web are expected, due to expected increases in macroinvertebrate richness and abundance.

5) Effects on Aquatic Sites

- a) Sanctuaries and Refuges – increase in native species
- b) Wetlands – increase in hydrophytic vegetation
- c) Mud Flats – none present; no significant impact
- d) Vegetated Shallows – increase in submergent aquatic macrophytes
- e) Coral Reefs – not applicable to freshwater environments
- f) Riffle and Pool Complexes – increase in riffles

6) Threatened and Endangered Species

Based on the nature and objectives of this project, to restore habitat, the US Army Corps of Engineers and the U.S. Fish and Wildlife Service has coordinated that the proposed ecological restoration project would not *affect* any Federal or State listed species. There is potential for restoring habitat for species that may use if present, or are attracted to the areas after restoration activities are complete. A 5-year monitoring plan that was developed in conjunction with the Feasibility Study and Integrated Environmental Assessment would take note if this were the case.

7) Other Wildlife

No other wildlife would be significantly impacted by the proposed activity.

8) Actions Taken to Minimize Impacts

General construction scheduling and sequencing would minimize impacts to reproducing macroinvertebrates and fishes, which also takes advantage of low flow periods for safety reasons during demolition.

f. Proposed Discharge Site Determinations

1) Mixing Zone Determinations

A mixing zone is not applicable to this project as no violation of applicable water quality standards is expected during construction.

2) Determination of Compliance with Applicable Water Quality Standards

The proposed activity would not cause significant or long-term degradation of water quality within the St. Joseph River and would comply with all applicable water quality standards.

3) Potential Effects on Human Use Characteristics

No significant impacts to municipal and private water supplies, water-related recreation, aesthetics, recreational, or commercial fisheries are expected. There are no significant adverse effects expected.

g. Cumulative Effects on the Aquatic Ecosystem

The proposed project would restore aquatic habitat structure and function via connectivity. There are no significant adverse effects expected.

h. Secondary Effects on the Aquatic Ecosystem

No significant impacts on the St. Joseph River ecosystem are expected as a result of the proposed activity.

III. Findings of Compliance with the Restriction on Discharge

- a) No adaptation of the Section 404(b)(1) guidelines was made for this evaluation.
- b) No practical alternatives are available that produce fewer adverse aquatic impacts than the proposed plan.
- c) The proposed project would comply with applicable water quality standards.
- d) The project is in compliance with applicable Toxic Effluent Standards under Section 307 of the Clean Water Act; with the Endangered Species Act of 1973; with the National Historic Preservation Act of 1966; and with the Marine Protection, Research, and Sanctuaries Act of 1972.
- e) The proposed fill activity would have no significant adverse impact on human health or welfare, including municipal and private water supplies, recreational and commercial fisheries, plankton, fish, shellfish, or wildlife communities (including community diversity, productivity, and stability), species aquatic sites, or recreational, aesthetic, and economic values.
- f) Typical erosion control measures would be taken to minimize construction impacts other than selection of the least environmentally damaging construction alternative.
- g) On the basis of the Guidelines, the proposed site for the discharge of fill material is specified as complying with the requirements of these guidelines with the inclusion of appropriate and practical conditions to minimize pollution or adverse impacts to the aquatic ecosystem.

Date _____

Susanne J. Davis, P.E.
Chief of Planning Branch

Draft Finding of No Significant Impact

Background

The St. Joseph River Watershed, located in the southwest portion of lower Michigan and northwestern Indiana is the third largest river basin in Michigan. Beginning in Michigan's Hillsdale County at Baw Beese Lake, it spans the Michigan-Indiana border and empties into Lake Michigan at St. Joseph, Michigan. Like most of the major watersheds in the Great Lakes basin, the St. Joseph River watershed is fragmented by dams. Natural hydrologic and hydraulic functions have been compromised for nearly a century due to large and small dams. A cluster of these dams is present in downtown Elkhart, Indiana, which includes a hydropower facility on the St. Joseph River and a small low-head dam on each of two tributaries, the Elkhart River and Christiana Creek. Native fish and macroinvertebrate communities have been displaced from historical migration routes on these tributaries for many decades. Water quality, erosion sediment transport mechanisms have also been adversely affected above and below these dams.

The City of Elkhart, Indiana requested that the Chicago District, U.S. Army Corps of Engineers (USACE) initiate a study under Section 506 Fishery and Ecosystem Restoration to ascertain the feasibility of restoration features to restore the ecological integrity and hydraulic regime of Christiana Creek and the lower section of the Elkhart River. This study evaluates the feasibility and environmental effects of dam removal, fish passage, and riparian restoration. The scope of this study addresses the issues of altered hydrology and hydraulics, altered fluvial geomorphology and associated processes, riverine habitat degradation, habitat fragmentation and fish passage, native riverine species richness, rare and endangered species, and encourages public education. This study has assessed and identified problems and opportunities, identified and evaluated measures, recommends the most cost effective and feasible solution to the ecological benefits that would be realized by the removal or modification of these dams and provides associated effects/affects with if the preferred plan were to be implemented.

Brief Summary of the EA & Preferred Plan

The Feasibility Study and Integrated Environmental Assessment identified the direct, indirect and cumulative effects of a set of measures that were part of five (5) alternatives plans including the No Action plan. The National Ecosystem Restoration (NER) preferred plan is Alternative 3.

The NER Preferred Plan

Discussion of Environmental Compliance

The preferred plan presented is in compliance with appropriate statutes and executive orders including the Endangered Species Act of 1973 as amended; the Fish and Wildlife Coordination Act of 1934 as amended; Executive Order 12898 (Environmental Justice); Executive Order 11990 (Protection of Wetlands); Executive Order 11988 (Floodplain Management); and the Rivers and Harbors Act of 1899 as amended; the Clean Air Act of 1970 as amended and the National Environmental Policy Act of 1969 as amended.

Environmental Justice EO12898

To the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review, each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana Islands. The preferred plan would not have any adverse effects to any populations including minority and low-income populations.

Clean Air Act

Due to the small scale, short duration and relatively unpolluted nature of the restoration project, it is assumed that the project is below the de minimis level of PM 100 tons per year. As a reference, other USACE projects that are much grander in scale and earthwork have General Conformity Act emissions well below the PM 100 tons per year.

Section 401 & 404 of the Clean Water Act

A Section 404 analysis was completed for the preferred plan. Features addressed by the 404 include the placement of stone material for a workbench/platform, for the activities of physically removing the dam and provides discussion on the anticipated effects of naturalizing sediment transport.

On the basis of Section 404(b)(1) Guidelines, the proposed activities are specified as complying with the requirements of these guidelines with the inclusion of appropriate and practical conditions to minimize pollution or adverse impacts on the aquatic ecosystem. A 401 Water Quality Certification permit would be applied for during the design phase and is expected to be granted based on the intent of the project to restore fluvial process that are known to improve water quality once restored.

USFWS Coordination

Coordination with the USFWS commenced with a project scoping letter dated 01 October 2012. The recommended plan was determined to have “no effects” on Federally listed threatened or endangered species or their habitats, which precluded Section 7. Coordination will continue with USFWS through the NEPA process.

State of Indiana Historic Preservation Act

Pursuant to Section 106 of the National Historic Preservation Act (16 U.S.C. §4701) and 36 C.F.R. Part 800, the staff of the Indiana State Historic Preservation Office (Indiana SHPO) has conducted an analysis of the materials dated 01 October 2012. Based upon the documentation available, the staff of the Indiana SHPO has not identified any historic buildings, structures, districts, or objects listed in or eligible for inclusion in the National Register of Historic Places within the probable area of potential effects. Therefore the SHPO has no objection to the project. All areas affected by ground disturbance under this project have already been previously disturbed; therefore an archaeological survey is unnecessary and is consistent with the SHPO letter dated 04 November 2012.

Public Interest

An Environmental Assessment (EA) was prepared for the project and sent to Federal, State and local agencies along with the general public for review. A 30-day Public Review period was held from ____ 2013 to ____ 2013 for the Environmental Assessment. Significant comments from the Federal, State or local agencies or the public were addressed and are attached to this FONSI. All comments and correspondence are attached to this FONSI.

Conclusion

In accordance with the National Environmental Policy Act of 1969 and Section 122 of the River and Harbor and Flood Control Act of 1970, the U.S. Army Corps of Engineers has assessed the environmental impacts associated with this project. The purpose of this EA is to evaluate the impacts that would be associated with the restoration of the Elkhart River and Christiana Creek via dam removal. The proposed project has been determined to be in full compliance with the appropriate statutes, executive orders and USACE regulations.

The assessment process indicates that this project would not cause significant effects on the quality of the human environment. The assessment process indicates that this project would have only beneficial impacts upon the ecological, biological, social, or physical resources of this area, and would provide environmental benefits to the Lake Michigan coastal zone and the Great Lakes as a whole. The findings indicate that that the proposed action is not a major Federal action significantly affecting the quality of the human environment. Therefore, I have determined that an Environmental Impact Statement (EIS) is not required.

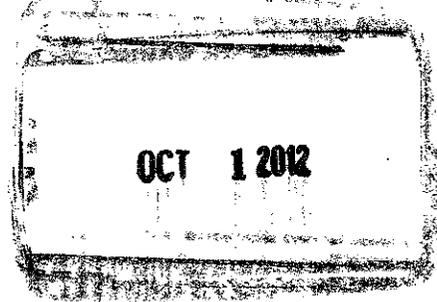
Frederic A. Drummond Jr.
Colonel, U.S. Army
District Commander

Date: _____



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
111 NORTH CANAL STREET
CHICAGO IL 60606-7206



Planning Branch
Environmental Formulation Section

Dear Coordinating Agency,

The Chicago District is preparing a Feasibility Study with an Integrated Environmental Assessment to determine the most effective and environmentally acceptable methods for removing two dams in the City of Elkhart, Indiana; the Christiana Creek dam in High Dive Park and the Elkhart Dam in downtown Elkhart. This scoping letter serves as preliminary notification and coordination of the US Army Corps of Engineer's intent to release a public document that would be available for the required 30-day review period per National Environmental Policy Act (NEPA).

Preliminary planning and environmental analyses indicate that the most beneficial and cost effective methods to restore these two segments of stream would be to fully remove the dams to defragment habitat and restore the river's natural sediment transport. The Chicago District understands that dam removal is a relatively new activity in the region and feels that a coordination meeting prior to release of the preferred plan in an official public document would promote timely and successful agency coordination. The meeting would be arranged with subsequent follow on coordination via email. Successful dam removals to date by the Chicago District include the Red Mill Pond dam in LaPorte County, Indiana and the Fairbanks, Armitage and Hofmann dams in Riverside, Illinois.

Again, this coordination letter is not official release that requires action or permitting by your Agency, but begins the coordination process for purposes of ecological restoration. Please mark your reply to the attention of Mr. Frank Veraldi, U.S. Army Corps of Engineers, 111 North Canal Street, Suite 600, Chicago, Illinois 60606. Questions may be directed to Mr. Veraldi at 312/846-5589, or at frank.m.veraldi@usace.army.mil.

Sincerely,

for

Susanne J. Davis, P. E.
Chief of Planning Branch

Enclosure
CC : see distribution list

Elkhart River and Christiana Creek Dams – Scoping Information

The study area is part of the St. Joseph River system and is located in north central Indiana in Elkhart County (**Figure 1**). Overall, the St. Joseph River extends a total of 210-miles through portions of southern Michigan and northern Indiana. Approximately 65-miles downstream from Elkhart, the St. Joseph River flows into Lake Michigan. The proposed riverine restoration for the Elkhart River is located northeast of Elkhart Avenue and Waterfall Drive in the City of Elkhart, Indiana and the proposed riverine restoration for Christiana Creek is located northeast of East Crawford and Cassopolis Street (High Dive Park) in the City of Elkhart, Indiana (**Figure 2**). The project sites are located in the City of Elkhart. Elkhart is located on the St. Joseph River in north central Indiana just south of the Michigan border.

Figure 1 – City of Elkhart Dams in North-Central Indiana



Figure 2 – Aerial View of the City of Elkhart Dams



General Description

The preliminary plan for the project is to remove both of the aforementioned dams in Elkhart. Both of the dams are within the St. Joseph River, which is a highly impounded system. With so many impoundments, natural function of the river ecosystem is impacted resulting in a lowering of ecological integrity. Removal of the dams will help restore portions of river connectivity which will allow riverine fishes to access important spawning habitats such as headwater tributaries and wetlands. In addition, natural hydrologic function will be restored within the area which will further perpetuate native species colonization.

Authority and Purpose

This study is authorized under Section 506 of the Water Resources Development Act (WRDA) of 2000 and is funded through the USEPA’s Great Lakes Habitat Initiative (GLRI). Authority is given to plan, design, and construct projects to restore the fishery, ecosystem, and beneficial uses of the Great Lakes.

Projects are justified by ecosystem benefits alone, while considering affects to public health, safety, economic benefits, recreational or any combination of these.

The City of Elkhart, Indiana has requested the Chicago District, U.S. Army Corps of Engineers (USACE) to initiate a study to determine the feasibility of the dam removals under the Section 506 Fisheries and Ecosystem Restoration. This feasibility study has evaluated the environmental impacts of removing the dams to river and ecological function. The scope and purpose of this study is to help restore river ecosystem function within the St. Joseph River. This FS assessed and identified problems and opportunities, identified and evaluated measures, and recommends and designs the most cost effective feasible solution to the ecological problems currently existing within the area of study.

The Dams

The first dam on the Elkhart River was constructed in 1832 and permanently rebuilt in 1875. This dam (**Figure 3**) is about 10-feet high and 147-feet long and serves no functional purpose. The dam itself is constructed of river cobbles that were piled up and capped with concrete. Its backwater effects extend for about 2,000-feet upstream, forming a degraded reservoir system due to a lack of fluvial hydraulics (flow parameters). This dam impedes critical transport of large grain material, primarily sand, gravel and cobble, which has induced significant channel incision below the dam; this has caused the City's river walk to fall into the channel at various points. Measures taken to stabilize banks were unsuccessful because it was the channel bed that was subsiding, not the banks eroding. Also, these impeded substrates are important to provide critical spawning material for several rare fish species, such as the greater redhorse (*Moxostoma valenciennesi*). Small pockets of fine sediment accumulate behind the dam, but are washed over the dam annually during larger flood events.

Figure 3 – Elkhart River Dam



The Christiana Creek Dam is about 60-years old and presently serves no purpose. This dam (**Figure 4**) is about 3-feet high, 50-feet long and is constructed of concrete and steel sheet pile. Its backwater effects on stream hydraulics and geomorphology are quite negligible. The main issue with this dam is that it impedes small fish migration, such as the rare and unique greenside darter (*Etheostoma blennioides*). Although it is evident from field visits that sand and gravel are being shoaled behind the dam, flood waters carry these particles over the dam as evidenced by the lack of channel incision and sand and gravel deposits downstream.

Figure 4 – Christiana Creek Dam



Riverine Communities

Loss of aquatic species diversity is mainly associated with the loss of riverine hydraulics, homogenization in channel geomorphology, a reduction in water quality, and impeded migration and recolonization of riverine species all due to the dams. Several fish species including greater redhorse (*Moxostoma valenciennesi*), shorthead redhorse (*Moxostoma macrolepidotum*), silver redhorse (*Moxostoma anisurum*), walleye (*Sander vitreus*), greenside darter (*Etheostoma blennioides*), and rosyface shiner (*Notropis rubellus*) are intolerant of the present hydraulic and geomorphic conditions above the dams. Most of these species do occur in the free-flowing conditions below Elkhart River and the Christiana Creek dams where the streams remain unimpeded to their individual confluences with the St. Joseph River.

In 2009, the City of Elkhart, along with the Chicago District, USACE surveyed both streams in April and June to determine species composition immediately above and below both dams. Species collected upstream and downstream of the dams are presented in **Tables 1** and **2**. Seventeen fish species in total were collected above the Christiana Creek dam while 28 species were collected below the dam. Eighteen fish species in total were collected above the Elkhart River dam while 34 species were collected below

the dam. The low species diversity, abundance and absence of intolerant species above both dams indicate that the riverine habitats are degraded and that no source of recolonization exists. This in itself ecologically justifies removal of these two structures. Species highlighted in red could recolonize upstream reaches if the dams were removed. Species in green would benefit from hydraulic and geomorphic restoration that would result from dam removal. Species in blue would benefit from dam removal, but have stable populations above and below the dams.

The riverine habitats within the study area also provide habitat for a variety of other organisms such as wading birds, shorebirds, waterfowl, reptiles, amphibians, and aquatic mammals. Aquatic bird species common in the area include great blue herons (*Ardea herodias*), green herons (*Butorides striatus*), belted kingfishers (*Megaceryle alcyon*), mallards (*Anas platyrhynchos*), and wood ducks (*Aix sponsa*). Alteration of the riverine hydraulics and structure caused by the dams has likely affected the composition of species from these groups as well. Several of these species rely on fish and aquatic invertebrates for food. A reduced abundance of prey species and increased water depths above the dams make these portions of the river less suitable for wading birds and waterfowl to find and capture prey. Common aquatic mammal species in the project area are beavers (*Castor canadensis*), and muskrats (*Ondatra zibethicus*). The common species of amphibian and reptile that are present include soft shell turtle (*Apalone spinifera*), common snapping turtle (*Chelydra serpentina*), common map turtle (*Graptemys geographica*), painted turtle (*Chrysemys picta*), American toad (*Bufo americanus*), bull frog (*Rana catesbeiana*), leopard frog (*Rana pipiens*), tiger salamander (*Ambystoma tigrinum*), garter snake (*Thamnophis radix*), and northern water snake (*Nerodia sipedon*).

Table 1 – Christiana Creek Native Fish Species Richness & Abundance

| Species | Common Name | Above Dam | | Below Dam | |
|---------------------------------|-------------------------|------------|-----------|------------|------------|
| | | Apr-09 | Jun-09 | Apr-09 | Jun-09 |
| <i>Ambloplites rupestris</i> | rock bass | | 2 | 4 | 7 |
| <i>Amia calva</i> | bowfin | | | | 2 |
| <i>Catostomus commersonii</i> | white sucker | 1 | 9 | 5 | 1 |
| <i>Cyprinella spiloptera</i> | spotfin shiner | 57 | 8 | 4 | 9 |
| <i>Esox americanus</i> | grass pickerel | | 1 | | 2 |
| <i>Etheostoma blennioides</i> | greenside darter | | | 11 | 27 |
| <i>Etheostoma caeruleum</i> | rainbow darter | 1 | 2 | 46 | 17 |
| <i>Hypentelium nigricans</i> | northern hog sucker | 6 | 5 | 1 | 6 |
| <i>Ichthyomyzon castaneus</i> | chestnut lamprey | | | 1 | 1 |
| <i>Ictalurus punctatus</i> | channel catfish | | | | 3 |
| <i>Lampetra appendix</i> | American brook lamprey | | 2 | 1 | |
| <i>Lepisosteus osseus</i> | longnose gar | | | | 1 |
| <i>Lepomis cyanellus</i> | green sunfish | | | | 3 |
| <i>Lepomis macrochirus</i> | bluegill | | | | 15 |
| <i>Lepomis megalotis</i> | longear sunfish | | | | 3 |
| <i>Luxilus cornutus</i> | common shiner | 32 | 5 | 48 | 1 |
| <i>Micropterus dolomieu</i> | smallmouth bass | 1 | 4 | 3 | 13 |
| <i>Micropterus salmoides</i> | largemouth bass | | 2 | | 1 |
| <i>Minytrem melanops</i> | spotted sucker | | | 1 | |
| <i>Moxostoma erythrurum</i> | golden redhorse | 1 | 2 | | 3 |
| <i>Moxostoma macrolepidotum</i> | shorthead redhorse | | 1 | | 18 |
| <i>Nocomis biguttatus</i> | hornyhead chub | | | 3 | 1 |
| <i>Nocomis micropogon</i> | river chub | | | 1 | |
| <i>Notropis volucellus</i> | mimic shiner | | 11 | 3 | 26 |
| <i>Noturus flavus</i> | stonecat | | 1 | | |
| <i>Percina caprodes</i> | logperch | | 10 | 12 | 87 |
| <i>Percina maculata</i> | blackside darter | | 1 | 4 | 5 |
| <i>Pimephales notatus</i> | bluntnose minnow | 2 | 2 | 3 | 5 |
| <i>Semotilus atromaculatus</i> | creek chub | | | 1 | |
| | Total Abundance | 101 | 68 | 152 | 257 |
| | Species Richness | 8 | 17 | 18 | 24 |

Table 2 – Elkhart Dam Native Fish Species Richness & Abundance

| Species | Common Name | Above Dam | | Below Dam | |
|---------------------------------|-------------------------|------------|------------|------------|------------|
| | | Apr-09 | Jun-09 | Apr-09 | Jun-09 |
| <i>Ambloplites rupestris</i> | rock bass | 17 | 42 | 21 | 35 |
| <i>Amia calva</i> | bowfin | | | 5 | |
| <i>Amieurus natalis</i> | yellow bullhead | 1 | | | 1 |
| <i>Amieurus nebulosus</i> | brown bullhead | | | | 2 |
| <i>Carpiodes cyprinus</i> | quillback | | | | 1 |
| <i>Catostomus commersonii</i> | white sucker | 20 | 25 | 53 | 10 |
| <i>Cyprinella spiloptera</i> | spotfin shiner | | 2 | 3 | 13 |
| <i>Dorosoma cepedianum</i> | gizzard shad | | | | 8 |
| <i>Esox lucius</i> | northern pike | | | 4 | 3 |
| <i>Esox masquinongy</i> | muskellunge | | | 1 | |
| <i>Hypentelium nigricans</i> | northern hog sucker | | 4 | 3 | 1 |
| <i>Ichthyomyzon castaneus</i> | chestnut lamprey | 5 | 2 | 11 | 1 |
| <i>Labidesthes sicculus</i> | brook silverside | 1 | | | |
| <i>Lepisosteus oculatus</i> | spotted gar | | | | 1 |
| <i>Lepisosteus osseus</i> | longnose gar | | | | 1 |
| <i>Lepomis cyanellus</i> | green sunfish | | | 2 | 13 |
| <i>Lepomis macrochirus</i> | bluegill | 6 | 19 | 7 | 11 |
| <i>Lepomis megalotis</i> | longear sunfish | 12 | 78 | 5 | 11 |
| <i>Luxilus cornutus</i> | common shiner | 65 | 65 | 147 | 70 |
| <i>Micropterus dolomieu</i> | smallmouth bass | 13 | 32 | 12 | 71 |
| <i>Micropterus salmoides</i> | largemouth bass | | 8 | 5 | 3 |
| <i>Minytrem melanops</i> | spotted sucker | | | 24 | |
| <i>Moxostoma anisurum</i> | silver redhorse | | | 2 | 5 |
| <i>Moxostoma carinatum</i> | river redhorse | 1 | | 5 | 5 |
| <i>Moxostoma erythrurum</i> | golden redhorse | 25 | 78 | 19 | 2 |
| <i>Moxostoma macrolepidotum</i> | shorthead redhorse | | | 15 | 21 |
| <i>Moxostoma valenciennesi</i> | greater redhorse | | | 2 | 1 |
| <i>Nocomis biguttatus</i> | hornyhead chub | 1 | 2 | | 8 |
| <i>Notropis rubellus</i> | roseyface shiner | | | 45 | 29 |
| <i>Notropis volucellus</i> | mimic shiner | | | 2 | 164 |
| <i>Percina caprodes</i> | logperch | | | 1 | 2 |
| <i>Percina maculata</i> | blackside darter | | | | 1 |
| <i>Pomoxis nigromaculatus</i> | black crappie | | 1 | 3 | |
| <i>Pimephales notatus</i> | bluntnose minnow | | | 2 | 5 |
| <i>Sander vitreus</i> | walleye | | | 1 | 2 |
| | Total Abundance | 167 | 358 | 400 | 501 |
| | Species Richness | 12 | 13 | 26 | 30 |

CC Distribution List

US Fish & Wildlife Service
Bloomington Field Office
620 South Walker Street
Bloomington, IN 47403-2121
Elizabeth_McCloskey@fws.gov

US Environmental Protection Agency
Kenneth Westlake, Chief
Environmental Review Branch
U.S. EPA ME-19J
77 West Jackson
Chicago, IL 60604
Poole.Elizabeth@epamail.epa.gov

Indiana Department of Environmental Management
Matt Smedley
msmedley@idem.IN.gov

Indiana State Historic Preservation Officer
Division of Historic Preservation & Archaeology
402 W. Washington Street, W274
Indianapolis, IN 46204-2739
cslider@dnr.IN.gov
ajohnson@dnr.IN.gov

Indiana Department of Natural Resources
Division of Fish and Wildlife
402 W. Washington St. RM W273
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Indiana Department of Natural Resources
Division of Water
ATTN: Doug McKinney
402 W. Washington St. RM W264
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dmckinney@dnr.IN.gov



Division of Historic Preservation & Archaeology • 402 W. Washington Street, W274 • Indianapolis, IN 46204-2739
Phone 317-232-1646 • Fax 317-232-0693 • dhpa@dnr.IN.gov



October 29, 2012

Susanne J. Davis
Chief of Planning Branch
Department of the Army
Chicago District, U.S. Army Corps of Engineers
111 North Canal Street
Chicago, Illinois 60606-7206

Federal Agency: U.S. Army Corps of Engineers

Re: Information regarding the City of Elkhart Dams Great Lakes Fishery & Ecosystem Restoration Study
(DHPA #13985)

Dear Ms. Davis:

Pursuant to Section 106 of the National Historic Preservation Act (16 U.S.C. § 470f) and 36 C.F.R. Part 800, the staff of the Indiana State Historic Preservation Officer ("Indiana SHPO") has conducted an analysis of the materials dated and received on October 1, 2012, for the above indicated project in Elkhart, Elkhart County, Indiana.

Based upon the documentation available to the staff of the Indiana SHPO, we have not identified any historic buildings, structures, districts or objects listed in or eligible for inclusion in the National Register of Historic Places within the probable area of potential effects.

The Elkhart River dam, as structural remains initially built before 1870, falls under Indiana Code 14-21-1. There is currently insufficient information regarding whether this site is eligible for the National Register of Historic Places as an archaeological site. Additional historical archival research is needed regarding the history of this dam as well as construction techniques used, especially since it is described as the first dam on the Elkhart River. For example, is any of the dam originally built in 1832 still extant, and what was the type of construction used? Did the 1875 rebuild affect all of the original dam? Could there possibly be remnants of early construction methods such as timber cribbing underneath the cap of concrete?

We do not believe the Christiana Creek dam is eligible for the National Register of Historic Places as an archaeological resource.

Once the indicated information is received, the Indiana SHPO will resume identification and evaluation procedures for this project. Please keep in mind that additional information may be requested in the future.

A copy of the revised 36 C.F.R. Part 800 that went into effect on August 5, 2004, may be found on the Internet at www.achp.gov for your reference. If you have questions about archaeological issues please contact Amy Johnson at (317) 232-6982 or ajohnson@dnr.IN.gov. If you have questions about buildings or structures please contact Chad Slider at (317) 234-5366 or cslider@dnr.IN.gov. Additionally, in all future correspondence regarding the above indicated project, please refer to DHPA # 13985.

Very truly yours,

James A. Glass, Ph.D.
Deputy State Historic Preservation Officer

JAG:ALJ:CWS:cws

From: [Bullock, Peter Y LRC](#)
To: [Veraldi, Frank M LRC](#)
Subject: FW: DHPA #13985 Elkhart Dams. (UNCLASSIFIED)
Date: Tuesday, November 06, 2012 8:21:30 AM

Classification: UNCLASSIFIED
Caveats: NONE

This is what I sent to Indiana DNRs, DHPA (Division of Historic Preservation and Archaeology).

Peter Y. Bullock
Archaeologist
USACE
CELRC-PM-PL-E
312-846-5587
FAX 312-886-2891

-----Original Message-----

From: Bullock, Peter Y LRC
Sent: Monday, November 05, 2012 9:32 AM
To: Slider, Chad
Subject: DHPA #13985 Elkhart Dams. (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

DHPA # 13985
Elkhart Dams

Mr. Slider,

Regarding your letter of October 29, 2012 concerning the Elkhart River Dam. It is extremely unlikely that any of the original 1832 dam is still in place. The 1875 dam is recorded as having stone and cement construction. It is possible that elements of this 1875 dam exist within the current dam, but are not apparent since the dam has been heavily modified through the time, lastly repaired and capped with concrete in the 1960s. The dam is currently considered structurally unsound. Subsidence and erosion have affected the dams integrity with water flowing through it in a number of areas.

It is the opinion of the US Corps of Engineers that the Elkhart River dam is not eligible for listing on the National Register of Historic Places, and this project will have no adverse affect on historic resources.

Sincerely,

Peter Y. Bullock
Archaeologist
USACE
CELRC-PM-PL-E
312-846-5587
FAX 312-886-2891

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE



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December 4, 2012

Susanne J. Davis, P.E.
Chief of Planning Branch
Department of the Army
Chicago District, U.S. Army Corps of Engineers
111 North Canal Street
Chicago, Illinois 60606-7206

Federal Agency: U.S. Army Corps of Engineers

Re: Notification of the Army Corps of Engineers' finding of "no adverse effect" regarding the City of Elkhart Dams Great Lakes Fishery & Ecosystem Restoration Study (DHPA #13985)

Dear Ms. Davis:

Pursuant to Section 106 of the National Historic Preservation Act (16 U.S.C. § 470f) and 36 C.F.R. Part 800, the staff of the Indiana State Historic Preservation Officer ("Indiana SHPO") has conducted an analysis of the materials dated November 5, 2012 and received on November 7, 2012, for the above indicated project in Elkhart, Elkhart County, Indiana.

As was stated previously, based upon the documentation available to the staff of the Indiana SHPO, we have not identified any historic buildings, structures, districts or objects listed in or eligible for inclusion in the National Register of Historic Places within the probable area of potential effects.

The email dated November 5, 2012 from Peter Y. Bullock, Corps of Engineers archaeologist, provided additional information regarding the Elkhart River Dam. Based upon the information provided, it appears that it is extremely unlikely that any of the original 1832 dam is still extant, and it appears the 1875 rebuild has been affected by the most recent impacts in the 1960s. Therefore, based upon the type of construction used in 1875, and the 1960s impacts, it does not appear that there is a likelihood for intact archaeological deposits there which would be eligible for the National Register of Historic Places. As stated previously, we do not believe the Christian Creek dam is eligible for the National Register of Historic Places as an archaeological resource.

Therefore, we see no reason to object to the Corp of Engineers' November 5, 2012 finding that no historic properties within the area of potential effects will be adversely affected by the above indicated project.

If any archaeological artifacts or human remains are uncovered during construction, demolition, or earthmoving activities, state law (Indiana Code 14-21-1-27 and 29) requires that the discovery must be reported to the Department of Natural Resources within two (2) business days. In that event, please call (317) 232-1646. Be advised that adherence to Indiana Code 14-21-1-27 and 29 does not obviate the need to adhere to applicable federal statutes and regulations.

If you have questions about archaeological issues please contact Amy Johnson at (317) 232-6982 or ajohnson@dnr.IN.gov. If you have questions about buildings or structures please contact Chad Slider at (317) 234-5366 or cslider@dnr.IN.gov.

Very truly yours,

James A. Glass, Ph.D.
Deputy State Historic Preservation Officer

JAG:ALJ:CWS:cws

enc: Frank Veraldi, U.S. Army Corps of Engineers, Chicago
Peter Y. Bullock, U.S. Army Corps of Engineers, Chicago

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State of Indiana
DEPARTMENT OF NATURAL RESOURCES
Division of Fish and Wildlife
Early Coordination/Environmental Assessment

DNR #: ER-16903

Request Received: March 11, 2013

Requestor: US Army Corps of Engineers, Chicago
District
Nicholas A Barkowski
111 North Canal Street, Suite 600
Chicago, IL 60606

Project: Elkhart River Dam removal project: complete removal of two dams in Elkhart River and Christiana Creek to restore hydraulics and fish passage; City of Elkhart

County/Site info: Elkhart

The Indiana Department of Natural Resources has reviewed the above referenced project per your request. Our agency offers the following comments for your information and in accordance with the National Environmental Policy Act of 1969.

If our agency has regulatory jurisdiction over the project, the recommendations contained in this letter may become requirements of any permit issued. If we do not have permitting authority, all recommendations are voluntary.

Regulatory Assessment: These proposals will require formal approvals for construction in a floodway under the Flood Control Act, IC 14-28-1. Please submit a copy of this letter with the permit applications.

Natural Heritage Database: The Natural Heritage Program's data have been checked. The state endangered Greater Redhorse (*Moxostoma valenciennesi*) and the Ellipse (*Venustaconcha ellipsiformis*), a state species of special concern mussel, have been recorded within 1/2 mile of the project area.

Fish & Wildlife Comments: The comments provided in our previous letter under ER-16604, dated October 31, 2012 (copy enclosed), still apply. We offer the following recommendations in addition to our previous comments:

1) Listed Species:

During a March 14, 2013 on-site meeting, the US Army Corps of Engineers (USACE) suggested the relocation of mussel beds or the possibility of relocation. The Division of Fish and Wildlife (DFW) Environmental Unit, recommend continued communication and coordination between the USACE, DFW Environmental Unit, and Brant Fisher, DFW Nongame Aquatic Biologist.

More information is needed to adequately address the impacts to the fish and mussels in this area. The removal of the dams will result in sediments being transferred downstream, which could significantly impact the mussels downstream. Additional details regarding the dam removal process are needed to better determine potential impacts. More details on the dewatering upstream of the dams are also required to determine the amount of water that will be available for fish and mussels during dewatering. At a minimum, conducting work outside of the fish spawning period will minimize impacts to the greater redhorse. Further requirements for the protection of fish and mussels may be necessary once additional details are provided.

Attachments: A - General Information

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Division of Fish and Wildlife
Early Coordination/Environmental Assessment

2) Causeways:

If possible, the project design should avoid inclusion of a temporary causeway or runaround. Such features result in impacts to the stream and surrounding habitat. If a causeway is deemed critical for the construction to occur, please submit a justification for the necessity of the causeway with any permit application.

In many cases, the need for a causeway can be eliminated by working from either bank, or at least reduced such that it does not span the entire channel. A causeway could extend from just one bank and leave the other side of the creek open, or it could extend from both sides but leave the middle of the channel open and flowing at all times. If the causeway needs to span the entire width, consider whether or not construction can be sequenced in such a way that as a portion of the bridge is completed, a section of the causeway can be removed.

The use of temporary, easily removed structures such as timber mats should be considered before using causeways. If a causeway is absolutely necessary, impacts to the waterway from the installation and removal of a temporary causeway can be reduced by minimizing the amount of time the causeway is in place, reducing the temporary crossing width, using more and larger culvert pipes, placing filter fabric under the aggregate fill to reduce impacts during the removal of the causeway post construction, and by using larger size aggregate with no fines included.

Contact Staff:

Christie L. Stanifer, Environ. Coordinator, Fish & Wildlife

Our agency appreciates this opportunity to be of service. Please contact the above staff member at (317) 232-4080 if we can be of further assistance.



Date: June 24, 2013

Christie L. Stanifer
Environ. Coordinator
Division of Fish and Wildlife

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**State of Indiana
DEPARTMENT OF NATURAL RESOURCES
Division of Fish and Wildlife**

Early Coordination/Environmental Assessment

DNR #: ER-16604 **Request Received:** October 1, 2012

Requestor: US Army Corps of Engineers, Chicago District
Frank Verald
111 North Canal Street, Suite 600
Chicago, IL 60606

Project: City of Elkhart Dams Great Lakes Fishery and Ecosystem Restoration Study: removal of the Christiana Creek Dam in High Drive Park and the Elkhart Dam

County/Site info: Elkhart

The Indiana Department of Natural Resources has reviewed the above referenced project per your request. Our agency offers the following comments for your information and in accordance with the National Environmental Policy Act of 1969.

If our agency has regulatory jurisdiction over the project, the recommendations contained in this letter may become requirements of any permit issued. If we do not have permitting authority, all recommendations are voluntary.

Regulatory Assessment: This proposal will require the formal approval for construction in a floodway under the Flood Control Act, IC 14-28-1. Please submit a copy of this letter with the permit application.

Natural Heritage Database: The Natural Heritage Program's data have been checked. The state endangered Greater Redhorse (*Moxostoma valenciennesi*) and the Ellipse mussel (*Venustaconcha ellipsiformis*), a state species of special concern, have been recorded within 1/2 mile of both dams.

Fish & Wildlife Comments: We were not able to adequately assess impacts to fish, wildlife, and botanical resources resulting from the project with the information provided. As project plans develop, we recommend submitting more information for further review regarding the extent of the dam removal, placement and type of equipment to be used during the dam removal, and potential impacts to riparian habitats along the streambanks.

One week prior to the initiation of the dam removal, contact Lori White, North Region Environmental Biologist, at (765) 473-9715 or lwhite1@dnr.in.gov. Also, if any dead or dying fish (at any life stage) are noticed at the removal site or downstream, contact the Division of Law Enforcement, District 1 Headquarters at (574) 457-8092.

Avoid and minimize impacts to fish, wildlife, and botanical resources to the greatest extent possible, and compensate for impacts. The following are preliminary recommendations that address potential impacts identified in the proposed project area:

1) Listed Species:

Removing the two dams should have a positive long-term effect on the listed fish and mussel species above by opening up more habitat and by allowing fish to more easily move through the systems. However, immediate impacts to potential mussel beds downstream during the actual removal of the dams is of great concern. Efforts should be made to minimize in-stream work during this process. Depending on the amount of sediment build-up behind the dams, there is a possibility of a major release of sediments upon removal of the dam(s), which could result in downstream mussel beds being buried.

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DEPARTMENT OF NATURAL RESOURCES
Division of Fish and Wildlife**

Early Coordination/Environmental Assessment

To minimize impacts to fish and mussels, the following should be incorporated into the study and the proposal:

- a) The amount of accumulated sediment behind each structure should be investigated and properly calculated;
- b) A cross-section plan sheet should be provided that shows elevations upstream, at the dam, and downstream;
- c) Staged release and partial dredging options should be investigated and considered to reduce downstream sedimentation and the associated negative impacts;
- d) Monitor all sediment barriers and remove accumulated sediment from the floodway before opening the channel;
- e) Conduct work during low flow conditions to prevent sedimentation in the stream and potential impacts to mussels downstream of the project area;
- f) Minimize the release of sediments downstream after construction is completed;
- g) Do not construct any temporary runarounds, causeways, or cofferdams; and
- h) Operate equipment used to remove the dams from the existing banks. Do not cross the creek bed with heavy machinery.

2) Bank Stabilization:

Establishing vegetation along the banks is critical for stabilization and erosion control. In addition to vegetation, some other form of bank stabilization may be needed. While hard armoring alone (e.g. riprap or glacial stone) may be needed in certain instances, soft armoring and bioengineering techniques should be considered first. In many instances, one or more methods are necessary to increase the likelihood of vegetation establishment. Combining vegetation with most bank stabilization methods can provide additional bank protection while not compromising the benefits to fish and wildlife. Information about bioengineering techniques can be found at <http://www.in.gov/legislative/lac/20120404-IR-312120154NRA.xml.pdf>. Also, the following is a USDA/NRCS document that outlines many different bioengineering techniques for streambank stabilization: <http://directives.sc.egov.usda.gov/17553.wba> (Choose Handbooks; Title 210 Engineering; National Engineering Handbook; Part 650 Engineering Field Handbook. Choose Chapter 16 from next window).

Riprap should not be placed in the active thalweg channel or placed in the streambed in a manner that precludes fish or aquatic organism passage (riprap should not be placed above the existing streambed elevation). Riprap may be used only at the toe of the sideslopes up to the ordinary high water mark (OHWM). The banks above the OHWM should be restored, stabilized, and revegetated using geotextiles and a mixture of grasses, sedges, wildflowers, shrubs, and trees native to Northern Indiana and specifically for stream bank/floodway stabilization purposes as soon as possible upon completion.

3) Riparian Habitat:

Impacts to the riparian habitat within the project area should be minimized to the extent possible. Christiana Creek appears to have woody vegetation along both banks surrounding the dam. We recommend accessing the Elkhart River dam from the west banks to avoid impacting the woody vegetation on the east side of the dam, if possible.

Impacts that remove trees from a non-wetland, riparian area should be mitigated. Impacts to non-wetland forest over one (1) acre should be mitigated at a minimum 2:1 ratio. If less than one acre of non-wetland forest is removed in a rural setting, replacement should be at a 1:1 ratio based on area. Impacts to non-wetland forest under one (1) acre in an urban setting should be mitigated by planting five trees, at least 2 inches in diameter-at-breast height (dbh), for each tree which is removed that is 10" dbh or greater (5:1 mitigation based on the number of large trees).

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DEPARTMENT OF NATURAL RESOURCES
Division of Fish and Wildlife**

Early Coordination/Environmental Assessment

The DNR's Floodway Habitat Mitigation guidelines (and plant lists) can be found online at: <http://www.in.gov/legislative/iac/20120801-IR-312120434NRA.xml.pdf>. A native riparian forest mitigation plan should use at least 5 canopy trees and 5 understory trees or shrubs selected from the Woody Riparian Vegetation list or an approved equal. A native riparian forest mitigation plan for impacts of less than one acre in an urban area may involve fewer numbers of species and sizes of trees, depending on the level of impact.

4) Wetland Habitat:

Due to the presence or potential presence of wetlands on site, we recommend contacting and coordinating with the Indiana Department of Environmental Management (IDEM) 401 program and also the US Army Corps of Engineers (USACE) 404 program. Impacts to wetlands should be mitigated at the appropriate ratio (see the above link for the DNR's Floodway Habitat Mitigation guidelines).

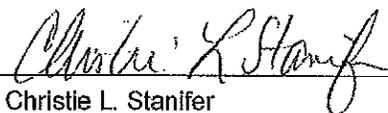
The additional measures listed below should be implemented to avoid, minimize, or compensate for impacts to fish, wildlife, and botanical resources:

1. Revegetate all bare and disturbed areas with a mixture of grasses (excluding all varieties of tall fescue), legumes, and native shrub and hardwood tree species as soon as possible upon completion.
2. Minimize and contain within the project limits all tree and brush clearing.
3. Minimize and contain within the project limits inchannel disturbance and the clearing of trees and brush.
4. Do not work in the waterway from April 1 through June 30 without the prior written approval of the Division of Fish and Wildlife.
5. Do not cut any trees suitable for Indiana bat roosting (greater than 3 inches dbh, living or dead, with loose hanging bark) from April 1 through September 30.
6. Do not excavate in the low flow area except for the placement of piers, foundations, and riprap, or removal of the old structure.
7. Use minimum average 6 inch graded riprap stone extended below the normal water level to provide habitat for aquatic organisms in the voids.
8. Underlay the riprap with a bedding layer of well graded aggregate or a geotextile to prevent piping of soil underneath the riprap.
9. Do not deposit or allow demolition materials or debris to fall or otherwise enter the waterway.
10. Appropriately designed measures for controlling erosion and sediment must be implemented to prevent sediment from entering the stream or leaving the construction site; maintain these measures until construction is complete and all disturbed areas are stabilized.
11. Seed and protect all disturbed slopes that are 3:1 or steeper with erosion control blankets (follow manufacturer's recommendations for selection and installation); seed and apply mulch on all other disturbed areas.

Contact Staff:

Christie L. Stanifer, Environ. Coordinator, Fish & Wildlife

Our agency appreciates this opportunity to be of service. Please contact the above staff member at (317) 232-4080 if we can be of further assistance.



Christie L. Stanifer
Environ. Coordinator
Division of Fish and Wildlife

Date: October 31, 2012