FINAL

Pucker Street Dam Removal and Dowagiac River Restoration
Environmental Assessment
Berrien County, Michigan

U.S. Fish and Wildlife Service

Green Bay Fish and Wildlife Conservation Office

6644 Turner Road
Elmira, MI 49730

February 2019

ACKNOWLEDGEMENT

This Environmental Assessment was prepared under grants received by United States Fish and Wildlife Service in support of the removal of the Pucker Street Dam and restoration of the Dowagiac River.

United States Fish and Wildlife Service

Environmental Action Statement

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act and other statutes, orders and policies that protect fish and wildlife resources, an administrative record has been established which identifies that the action of the removal of Pucker Street Dam on the Dowagiac River in Niles, Michigan, and its accompanying erosion management and ecosystem restoration actions

___ is a Categorical Exclusion as provided for by 516 DM 6, Appendix 1 and 516 DM 2, Appendix 1. No documentation therefore, will be made.

_X_ is found not to have significant environmental effects as determined by the attached Environmental Assessment (EA) and Finding of No Significant Impact (FONSI).

___ is found to have significant environmental effects, and therefore further consideration of this action will require the publication of a notice of intent in the Federal Register announcing the decision to prepare an Environmental Impact Statement (EIS).

___ is not approved because of unacceptable environmental damage, or violation of Fish & Wildlife Service mandates, policies, regulations or procedures.

___ is an emergency action within the context of 40 CFR 1506.11. Only those actions necessary to control the immediate impacts of the emergency will be taken. Other related actions remain subject to NEPA review.

RICK WESTERHOF Digitally signed by RICK WESTERHOF Date: 2019.02.20 09:46:43 -05'00'

(1) Initiator Date

SUSAN WELLS Digitally signed by SUSAN WELLS Date: 2019.02.20 15:36:04 -06'00'

(2) Project Leader Date
Green Bay Fish & Wildlife Conservation Office

SCOTT HICKS Digitally signed by SCOTT HICKS Date: 2019.02.20 17:07:00 -05'00'

(3) Field Supervisor Date
East Lansing Ecological Services Field Office

2/21/19

(4) Regional Historic Preservation Officer Date

Aaron P. Woldt, Acting ARD 2/22/19

(5) ARD - Fisheries Date

2/22/19

Midwest Regional Director Date

Charles M. Wooley
Acting Regional Director

Pucker Street Dam Removal and Dowagiac River Restoration
Finding of No Significant Impact

PROPOSED ACTION

The proposed action considered in this Environmental Assessment (EA) is to promote aquatic ecosystem and floodplain restoration of the Dowagiac River by removing the Pucker Street Dam The Pucker Street Dam on the Dowagiac River is an aging structure that represents a safety concern and is having an adverse impact on the ecosystem of the project area. The proposed action would increase habitat continuity, restore fish passage and restore the hydrologic regime of the Dowagiac River. At Pucker Street Dam, it is estimated that the restored river channel would be approximately 7,000 linear feet, with total functional benefits (e.g., flow and sediment transport processes upstream of the dam location) to at least 10,000 linear feet of river.

The Pucker Street Dam is located on the Dowagiac River in Niles Township, Berrien County, Michigan and is owned and operated by the City of Niles (City). The existing hydroelectric dam was constructed in 1928 and had generated power up until 1995. However, in 1996 the City announced that the generators were no longer operational after silt and sand had caused major damage to the turbines and they intended to abandon hydropower operations at the dam. Other factors contributing to the decision by the City included excessively high maintenance costs and sedimentation within the reservoir immediately upstream of the dam. Structural issues also created safety concerns at the dam and downstream, which prompted the City to permanently drawdown the impoundment in 1999.

ALTERNATIVES CONSIDERED

Alternatives considered included the No Action Alternative and a dam removal alternative that incorporates restoration measures. Alternatives considered in detail in the EA are described as follows:

- No Action: Leave dam in-place, maintain current water level above Pucker Street Dam.
- Dam Removal with Blended Restoration Using Existing Channel Alignment: Actions would include removal of Pucker Street Dam and associated structures, and a blend of active and passive restoration within the existing river channel alignment.

SELECTED ALTERNATIVE

For the reasons briefly presented below and based on an evaluation of the information contained in the supporting reference listed below, I have determined that funding Alternative B, entailing the removal of Pucker Street Dam in the City of Niles, MI and its accompanying restoration measures is not a major Federal action that would significantly affect the quality of the human environment within the meaning of Section 102(2)(c) of the National Environmental Policy Act. Accordingly, an Environmental Impact Statement (EIS) will not be prepared.

Reasons:

1. Federal and State natural resource agencies have concluded that one of the most effective means of restoring the fish passage and natural functions of the Dowagiac River is to remove Pucker Street Dam and promote the restoration of the Dowagiac River and its associated floodplains. The proposed action increases habitat continuity and restores hydrologic regime of the Dowagiac River to be consistent with that of a natural flowing river.

2. The Pucker Street Dam is located approximately 3 miles upstream from the confluence with the St. Joseph River. As such, it disconnects approximately 98 percent of the Dowagiac River system (main stem and all tributaries) from the lower Dowagiac and St. Joseph rivers. Such segmentation has the effect of isolating resident populations of fish and other aquatic biota that increases their vulnerability to adverse environmental conditions while reducing the opportunity for genetic exchange between segmented populations. Fragmentation also limits access to areas with suitable spawning habitat, optimal food availability, and protection from predators.

3. Dam removal will allow for the composition and abundance of coldwater fishes above and below Pucker Street Dam to become more consistent and uniform.

4. The removal of the dam will reconnect 159 miles of quality habitat for native walleye, logperch, and shorthead redhorse, and expand the range of movement of other fish species such as steelhead, Chinook, and coho salmon.

5. The removal of the dam restores the natural downstream transport of sediment, woody debris and plant propagules critical to sustaining healthy populations of desirable fish and invertebrate species.

6. Restoration activities upstream of the dam include the construction of 1,400 foot long floodplain bench along either bank that will be seeded with a native plant species mix consisting of various grass and rush species. These areas are expected to benefit from reestablished artesian wells and develop as wetlands over time.

7. No spoil materials would be placed in areas expected to remain as wetlands or where wetlands are expected to be formed after the dam is removed.

8. Hydrologic changes to the impounded reach above Pucker Street Dam will result in both losses and gains in wetland area. Overall, improvements in ecosystem health, functionality and connectivity will occur within the floodplain of the Dowagiac River.

9. No significant alteration in hydrology or increase in peak flood levels downstream of the dam.

10. No hibernacula for the Indiana bat and northern long-eared bat occur within Niles Charter Township; however, potential summer roosting trees may exist within the project area. Tree removal activities would be required for the project and would be limited to the October 1 to March 31 timeframe to avoid the bat roosting season.

11. The long-term risk of dam failure will be eliminated and therefore, the dam and associated structures would no longer present a public safety risk.

12. Recreational and economic effects of the proposed action are considered to be minor in consideration of the transfer of recreational fishing opportunities to other locations in the region and the encouragement of paddling as an increased recreational opportunity.

13. There are no known historic properties or known archaeological sites within the project area that will be impacted. However, a potential "legacy dam" may exist upstream from the current dam. If any remnants of the "legacy dam" are found, construction will stop immediately, and the site will be surveyed by qualified personnel.

14. Potential impacts from project activities on air quality, noise, and transportation, are considered to be minor and of short duration.

15. All solid and hazardous waste materials will be properly managed and disposed of in accordance with regulatory requirements.

16. Potential impacts on downstream water quality and sedimentation will be minimized by extensive sediment management practices, including a controlled drawdown coupled with active sediment trap management and cleanout.

Supporting Reference:

1. Environmental Assessment

CONCLUSION:

The selected alternative does not constitute an action that normally requires preparation of an EIS. The selected alternative will not have a significant effect on the human environment. Negative environment impacts that could occur are minor in intensity. There are no significant adverse impacts on public health, public safety, or other unique characteristics of the region. There are no known federally-listed threatened or endangered species known to occur in the project area. There are no unmitigated adverse impacts on sites or districts listed in or eligible for listing in the National Register of Historic Places. No uncertain or controversial impacts, unique or unknown risks, significant cumulative effects, or elements of precedence were identified. Implementation of the action will not violate any Federal, State, Tribal or local environmental protection law.

Based on the foregoing, it has been determined that an EIS is not required for this project and thus will not be prepared.

Approved: Charles Wooley 2/22/19

Midwest Regional Director Date

Charles M. Wooley
Acting Regional Director

Environmental Assessment
Pucker Street Dam Removal and Dowagiac River Restoration
Berrien County, Michigan

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List of Abbreviations and Acronyms

BMP	Best Management Practices
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	Cubic Feet Per Second
CISMA	Cooperative Invasive Species Management Area
CWA	Clean Water Act of 1972
CY	Cubic Yard
DO	Dissolved Oxygen
DOR	Depth of Refusal
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
ESA	Endangered Species Act of 1973
FONSI	Finding of No Significant Impact
IACWD	Interagency Advisory Committee on Water Data
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MNFI	Michigan Natural Features Inventory
msl	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NREPA	Natural Resources and Environmental Protection Act
NRHP	National Register of Historic Places
PCB	Polychlorinated Biphenyl
ppb	Parts Per Billion
RCRA	Resource Conservation and Recovery Act
SHPO	State Historic Preservation Office
USC	United States Code
USCB	U.S. Census Bureau
UCL	Upper Confidence Limits
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish & Wildlife Service
USGS	U.S. Geological Survey

1 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 Background and Project Setting

The Pucker Street Dam is located on the Dowagiac River in Niles Township, Berrien County, Michigan (Figure 1-1). The City of Niles (City) owns, operates and maintains the Pucker Street Dam. The existing hydroelectric dam was constructed in 1928 and had generated power up until 1995. However, in 1996 the City announced that the generators were no longer operational after silt and sand had caused major damage to the turbines. Other factors contributing to the decision to abandon the hydropower operations of the dam included excessively high maintenance costs and sedimentation within the reservoir immediately upstream of the dam. Structural issues also created safety concerns at the dam and downstream, which prompted the City to permanently drawdown the dam in 1999 and thereby diminish the safety issue.

The Pucker Street Dam consists of a short left earthen embankment, a gated concrete principal spillway, a powerhouse section, a concrete and earth fill needle section, an abandoned millrace/spillway and a short right earthen embankment (Figure 1-2). The dam is about 100 feet long and has a structural height of 38 feet. The abandoned spillway consists of two approximately 12-foot wide gated concrete spillway bays and a severely deteriorated concrete-lined channel. The powerhouse has a concrete substructure and a brick masonry superstructure and is 28 feet wide along the axis of the dam.

A “legacy” log dam was built in 1828 approximately 100 feet upstream of the existing Pucker Street Dam. The legacy dam was constructed to power a mill and consisted of a timber dam and fish ladder. The top of the dam was built to elevation 679.7 feet; however, no information is available regarding the current state of the legacy dam under the sediments.

1.2 National Environmental Policy Act

The National Environmental Policy Act ([NEPA], 42 United States Code [USC] § 4321-4347) is a federal law that establishes a national environmental policy and provides a framework for planning and decision making by federal agencies. Specifically, NEPA requires that federal agencies integrate an interdisciplinary environmental review process that evaluates a range of alternatives, including the No Action alternative, as part of the decision-making process. This process also establishes a need to include interagency coordination and public participation in the process. In summary, NEPA is intended to promote informed decision making by federal governmental agencies and public participation in the process, as appropriate. Because federal funds administered by the Department of Interior are anticipated for use in the removal of Pucker Street Dam, the United States Fish and Wildlife Service (USFWS) is the lead federal agency for this proposed action.

1.3 Proposed Action

The proposed action considered in this Environmental Assessment (EA) is to remove the Pucker Street Dam and promote the restoration of the Dowagiac River channel and floodplain. The Pucker Street Dam on the Dowagiac River is an aging structure that represents a safety concern and is having an adverse impact on the ecosystem of the project area. The proposed action would increase habitat continuity and restore the hydrologic regime of the Dowagiac River. At Pucker Street Dam, it is estimated that the restored river channel would be approximately 7,000 linear feet, with total functional benefits (e.g., flow and sediment transport processes upstream of the dam location) to at least 10,000 linear feet of river.

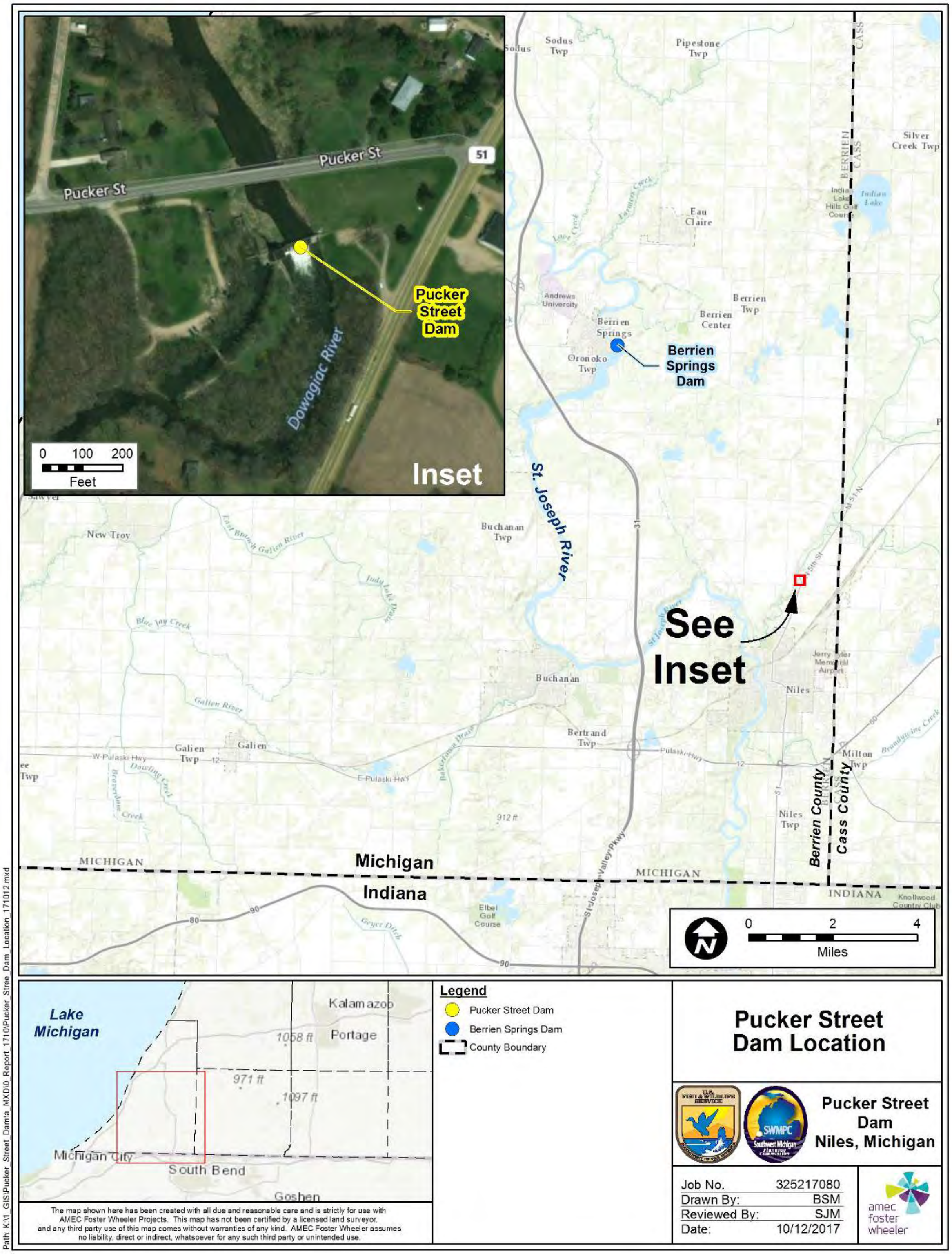


Figure 1-1. Pucker Street Dam Location

Figure 1-2. Pucker Street Dam Elements

1.4 Purpose and Need of the Proposed Action

The purpose of the proposed action is to promote and enhance fish passage as an overall benefit to the river system. This primary purpose is coupled with other secondary objectives, including increased habitat continuity, restoring the hydrologic regime of the Dowagiac River, and addressing the Pucker Street Dam stability and safety issues.

Several key issues contribute to the need for the removal of the Pucker Street Dam. These needs include those regarding the negative effects of the dam and associated impoundment on the local ecosystem, and the opportunities for ecosystem restoration of the Dowagiac River, and the age and current condition of the dam.

1.4.1 Ecosystem Degradation

Barrier to Fish Passage. The Pucker Street Dam is the only main stem barrier blocking all fish and aquatic species passage on the Dowagiac River. The three miles of river downstream of the dam have naturally reproducing populations of steelhead, coho, and Chinook salmon that are supplemented by stray fish from stocking in the St. Joseph River. Above the dam, the fish species composition consists primarily of non-game species such as redhorses, suckers, and shiners, with low densities of wild game fish species such as smallmouth bass and bluegills. MDNR annually stocks brown trout upstream and downstream of the dam. The dam currently blocks the upstream migrations of fish species such as steelhead, Chinook salmon, coho salmon, shorthead redhorse, and walleye to more than 159 miles of main stem and tributary habitat in the Dowagiac River. The proposed action would increase habitat contiguity and restore the thermal and hydrologic regime of the Dowagiac River.

Habitat Fragmentation: The Pucker Street Dam is located approximately 3-miles upstream from the confluence with the St. Joseph River. As such, it disconnects approximately 98 percent of the Dowagiac River system (main stem and all tributaries) from the lower Dowagiac and St. Joseph River. Three additional dams located on tributaries of the Dowagiac River include the Lower Mill Pond Dam and Upper Mill Pond Dam (Dowagiac Creek) and the Barron Lake Road Dam (McKinzie Creek) (Figure 1-3). Discounting the effect of these dams, the Pucker Street Dam disconnects 187 miles of streams and approximately 20,000 acres of wetlands within the Dowagiac River Watershed from the St. Joseph River.

Riverine Functions: Nutrients, water, sediment, and organic material are all transported downstream within a river corridor. The Pucker Street Dam creates discontinuity in the movement of these materials that negatively impacts the natural function of the system. Pucker Street Dam impedes the downstream movement of all material including nutrients, sediment and organic material that support fish and other aquatic species.

Hydrology and Geomorphology: The Pucker Street Dam alters hydrologic and geomorphic characteristics of the Dowagiac River several miles upstream and downstream. The dam currently maintains 15 feet of head and 9 feet of freeboard and forms an impoundment with a surface area of 49 acres under normal flow conditions. The Pucker Street Dam impoundment was drawn down in 1999, reducing but not eliminating the pool created by the dam. As such the impoundment area continues to promote sedimentation upstream of the dam that disrupts normal geomorphic processes, water flow, and stream geomorphology.

1.4.2 High Quality River System

The Dowagiac River is a coldwater river system that is uncommon in the region. The Pucker Street Dam is located at a transition along the Dowagiac River from a flatter upstream gradient to steeper gradients leading into the St. Joseph River Valley (Figure 1-4). Due to the history of glaciation in Michigan, high gradient coldwater streams are rare within the region. Within southern Michigan, there is no comparable coldwater river system of this size that has the capacity to support a high quality coldwater fishery. The unique setting of the Dowagiac River also makes it a popular destination for recreational fishing. Removal of the Pucker Street Dam would restore approximately 2 miles of this high gradient habitat.

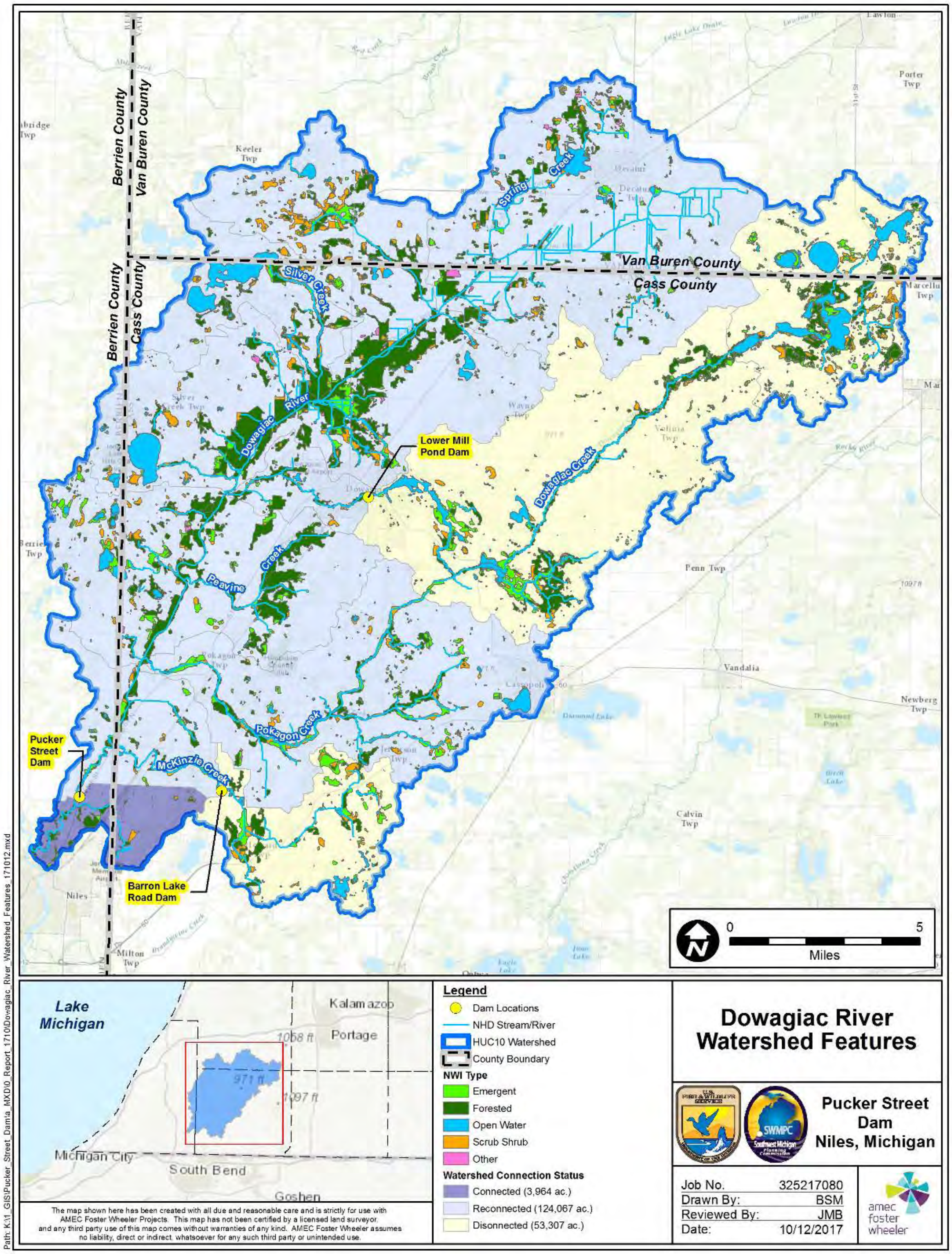


Figure 1-3. Features of the Dowagiac River Watershed

The land use in this watershed is largely dominated by agricultural uses, with urban development more concentrated towards the south. The Dowagiac River was previously dredged and straightened which resulted in extensive degradation of the habitat above the dam. A movement has gained momentum in the past decade, and even more so recently, to restore the Dowagiac system, undoing the comprehensive dredging and straightening projects of the early 20th century. Project partners completed a significant channel restoration and floodplain reconnection project (3/4 mile) upstream of Pucker Street Dam at Arthur Dodd Memorial Park in Cass County. Further, the Pokagon Band of Potawatomi is in final design for a project to re-meander and reconnect an additional three miles of the Dowagiac River upstream from the Pucker Street Dam and Dodd Park. Removing the Pucker Street Dam is a critical component for restoration of the Dowagiac River system. The removal of the dam, along with the re-meandering of the river, would enhance aquatic ecosystem restoration objectives for the Dowagiac River.

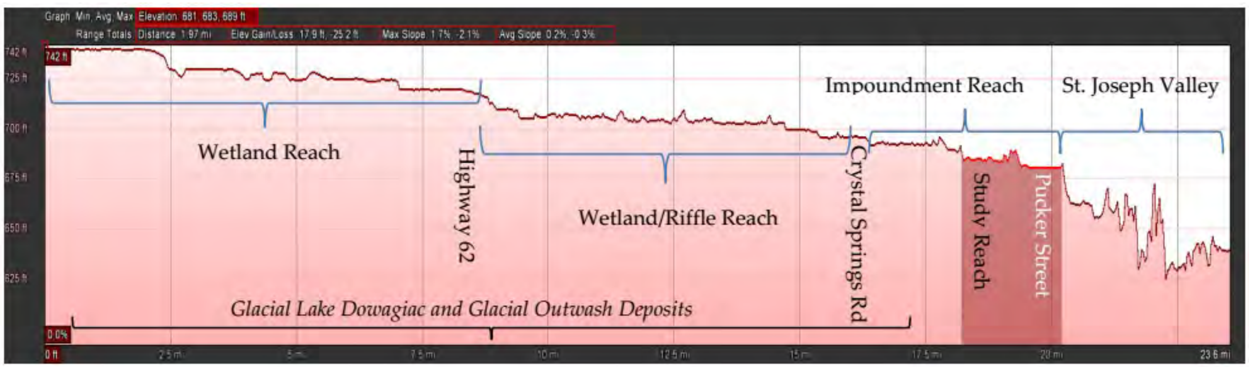


Figure 1-4. Longitudinal Profile of the Dowagiac River

1.4.3 Dam Age and Condition

The existing Pucker Street concrete dam, wing walls and powerhouse were built in 1928. In 1828, Eli Ford built a log dam and gristmill approximately 100 feet upstream of the current Pucker Street Dam. In 1891, Bascom Parker, Sr, bought the mill (known as the old Yellow Mill) and dismantled the grist mill to establish a private power plant. In 1894, the City purchased the dam and 17 acres from the Niles Electric Company. The last major modifications and improvements to the dam were made in 1928 when the concrete dam was built and the generators were converted from horizontal water wheels to a turbine type drive system with an automatic control and switching equipment. The dam produced power from the late 1800's until 1995.

Various repairs to the existing concrete structure have been completed over the years, including repairs to the principal spillway structure in 1939. In 1949, the foundation of the log structure collapsed underneath the west wing wall. The City had a very difficult time repairing it and substantially modified the timber structure with large amounts of concrete. The City installed steel sheet piling along the right auxiliary spillway abutment in the vicinity of the previous timber-crib structure. In 1951, the left downstream abutment wall failed and was reconstructed. In 1996, the City filled a void underneath the spillway apron with concrete.

The City announced in 1996 that the generators were no longer operational after silt and sand had caused major damage to the turbines. In accordance with permitting by the Michigan

Department of Natural Resources (MDNR), the City reduced the pool elevation by 5 feet, to 680 feet above mean sea level (msl).

A series of structural problems associated with the dam have been reported in 1931, 1944, 1996 and 2008. A 2009 Dam Safety Inspection Report by Collins Engineers, Inc. classified the dam as a significant hazard. This report cites problems with the principal spillway structure, tainter gates, embankments, overflow spillway and powerhouse foundation. A 2013 letter from the Michigan Department of Environmental Quality (MDEQ) Dam Safety Program was sent to the City with results from an inspection to evaluate the dam's structural condition and hydraulic capacity as required by Part 315 Dam Safety, of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 45 as amended. MDEQ determined that the principal spillway structure and downstream concrete channel, powerhouse structure, tainter gates and auxiliary spillway were all in extremely poor condition. Significant cracking, spalling, delamination, and efflorescence were found throughout the structural concrete. Vegetation had begun to grow from many cracks in the abutment walls, overflow spillways, and spillway bay piers. MDEQ also indicated that major repairs would not be necessary if the dam was removed within five years, and that monitoring should continue coupled with intermediate repairs as necessary to prevent dam failure. MDEQ also indicated that if the dam was in place beyond five years from the date of inspection, major repairs, replacement, or removal of the structure should be implemented. In accordance with these recommendations, the City continues to monitor the dam and make minor repairs as needed.

1.5 Decision to Be Made

This EA has been prepared to inform USFWS decision makers and the public about the environmental consequences of the proposed action. The decision USFWS must make is whether or not to deconstruct the Pucker Street Dam and undertake sediment management activities. USFWS will use this EA to support the decision-making process and to determine whether an Environmental Impact Statement (EIS) should be prepared or whether a Finding of No Significant Impact may be issued.

1.6 Scope of the Environmental Assessment and Summary of the Proposed Action

This EA evaluates the potential environmental, cultural, and socioeconomic impacts of the proposed action at the Pucker Street Dam on the Dowagiac River. A detailed description of the proposed action and alternatives considered are provided in Chapter 2.

USFWS prepared this EA to comply with NEPA and regulations promulgated by the Council on Environmental Quality (CEQ), and USFWS's procedures for implementing NEPA. USFWS considered the possible environmental effects of the proposed action and determined that potential effects to the environmental resources listed below were relevant to the decision to be made; therefore, potential impacts on the following resources were assessed in detail in this EA:

- Geology and Soils
- Hydrology and Floodplains
- Sediment Transport
- Water Quality
- Aquatic Ecology
- Terrestrial Ecology
- Sensitive Species
- Invasive Species
- Wetlands
- Socioeconomics and Environmental Justice
- Parks and Recreation
- Cultural and Historic Resources
- Solid Waste and Hazardous Waste
- Visual Resources
- Air Quality

USFWS also considered potential effects related to climate change, noise, land use, groundwater, prime farmland, transportation, wild and scenic rivers, and coastal zones. As described below, these resources were considered but eliminated from detailed analysis.

- *Climate Change.* The proposed project would not result in impacts to the climate. The air quality section identifies impacts of temporary emissions during construction and operation.
- *Noise*. The proposed activities include the short-term use of small-scale construction equipment at locations that are distant from sensitive receptors (residences, churches, etc.). As such, operational noise emissions would attenuate to low levels so as to not be disruptive or impactful. Therefore, no impacts from noise would occur from the proposed project.
- *Land Use*. No significant development or change in current land use is proposed. Removal of the Pucker Street Dam would locally result in the alteration of land use from a deteriorating industrial use to open space. Additionally, river restoration activities would not change land use. As such changes in land use would be entirely beneficial and would not adversely impact any other uses in the project area.
- *Groundwater*. The project area is located in a river valley and would not include any below ground disturbance that would impact groundwater resources.
- *Prime Farmland*. The project area is located entirely within the Dowagiac River valley and lacks prime farmland resources. Therefore, there would be no impact to prime farmland.
- *Wild and Scenic Rivers*. The Dowagiac River is not part of the National Wild and Scenic River System and is not included in Michigan's Natural Rivers Inventory (MDNR 2017). Therefore, there would be no impact to wild and scenic rivers.
- *Coastal Zones*. The project area is not included within designated coastal zones of Lake Michigan. Therefore, there would be no impact to coastal zones.
- *Transportation*. The local transportation network in the vicinity of the project area consists of state Highway 51 along with county and local roads that serve the local residents and communities. Use of the local transportation network is expected to occur in support of movement of workers and for disposal of solid and hazardous wastes in conjunction with dam demolition. However, this magnitude of project related traffic is negligible and is expected to be absorbed by the capacity of the existing transportation network. No impacts are therefore expected on the transportation network.

  Pucker Street crosses the Dowagiac River immediately upstream of the dam and is scheduled for some repairs in the future. As such, these activities are included in the assessment of cumulative effects on other environmental resources.

USFWS's action would satisfy the requirements of Executive Order (EO) 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), EO 12898 (Environmental Justice), EO 13112 (Invasive Species), and applicable laws including the National Historic Preservation Act, Endangered Species Act (ESA), Clean Water Act (CWA), and Clean Air Act (CAA).

1.7 Public and Agency Involvement

Public involvement and coordination with local, Tribal, state, and federal resource management agencies is a vital component of the NEPA process. The USFWS and the City have engaged the public in a variety of ways during the development of this EA. There is an "interagency" project team that has met periodically as needed since 2013 and during the preparation of this EA. Agencies and organizations that have participated in the planning process have included but are not limited to the following:

- USFWS
- City of Niles
- Berrien County Road Commission
- Pokagon Band of Potawatomi
- MDNR, Fisheries Division
- MDEQ
- Southwest Michigan Planning Commission
- Wightman & Associates
- Inter-Fluve Inc.
- Michiana Land Services
- Wightman Environmental
- Fahey Schultz Burzych Rhodes
- SME

This working group provided input on the regulatory requirements, environmental resources, and overall direction of the project. Many of these agency representatives were also available at the various public meetings held for the project to answer questions regarding agency involvement and authorizations for the project.

The City hosted landowner/stakeholder meetings in 2014, 2015, and 2018. The USFWS and the City also hosted a public scoping meeting for the EA process on April 14, 2016, which had 52 people in attendance. For these meetings, the City mailed letters to landowners in the project area and placed advertisements in the area newspapers. Presentations were given to communicate the project purpose and need, environmental setting and key project features, project alternatives under consideration, and elements of the NEPA process. Comments were received at the meeting and subsequently by mail and e-mail throughout preparation of the EA. A summary of the scoping meeting and public comments received is included in Appendix A. Key topics raised by respondents included those focused on the potential benefits of the proposed action regarding its restoration of environmental habitats and processes, recreational benefits (canoeing/kayaking), the openness of the public process, and the alternatives under consideration (active restoration, the availability of alternatives, and consideration of sediment management measures). Negative comments pertained to concerns about negative impacts on the higher quality downstream fishery (especially sediment covering habitat or fish kills), negative economic impact to Niles and surrounding areas due to loss of fishing potential, negative impact on brown trout populations upstream of the dam location due to competition from steelhead, loss of opportunities for hydropower, the failure to sufficiently engage the public in the process, a whitewater park not being constructed, and that the schedule for dam removal was not fast enough.

Correspondence was also conducted with representative agencies to solicit input to the NEPA planning process. Agency correspondence is provided in Appendix B. Responses were obtained from the MDNR, MDEQ, Pokagon Band of Potawatomi, and the Berrien Conservation District. No issues were raised by the agencies, and they were in support of the removal efforts.

The Draft EA was made available for public review and comment for a period of 30 days, from December 7, 2018 to January 7, 2019. Distribution of the Draft EA included making hard copies available at a number of public facilities including the following:

- Niles City Hall, 333 N. 2nd Street, Niles MI 49120;
- Niles District Library, 620 E. Main Street, Niles, MI 49120;
- Niles Charter Township Hall, 320 Bell Road, Niles, MI 49120;
- Berrien County Community Development, 701 Main Street, St. Joseph, MI 49085;
- Cass County Parks and Recreation, 120 N. Broadway, Suite 209, Cassopolis, MI 49031;
- Berrien County Parks Department, 701 Main Street, 4th Floor, St. Joseph, MI 49085;
- Southwest Michigan Planning Commission, 376 W. Main Street, Suite 130, Benton Harbor, MI 49022;
- Pokagon Band of Potawatomi, Department of Natural Resources, 32142 Edwards Street, Dowagiac, MI 49047;
- Harold Washington Library Center, 400 S. State Street Chicago, IL 60605;
- Oak Brook Public Library, 600 Oak Brook Road, Oak Brook, IL 60523; and
- USFWS, Elmira Field Office, 6644 Turner Road, Elmira, MI 49730.

The availability of the Draft EA was announced by issuance of a press release. News releases were issued in four newspapers (Niles Daily Star, South Bend Tribune, Herald Palladium, and Chicago Tribune) and two websites (MLive and City of Niles). The Draft EA was also available on the Pucker Street Dam Project website, www.swmpc.org/puckerstdam.asp.

During that time, five comments were received, four from public citizens and one from the Pokagon Band of Potawatomi. Due to the partial government shutdown during the comment period, the USFWS granted USEPA's request for an extension to provide comments, which were received on February 11, 2019. The Final EA provides the foundation for the significance determinations summarized in the Finding of No Significant Impact (FONSI) and comments on the Draft EA were considered comments on the FONSI as appropriate. A summary of the public and agency comments received on the Draft EA and the USFWS response are provided in Appendix F.

1.8 Tribal Coordination

The USFWS, the City and the Southwest Michigan Planning Commission have coordinated with the Pokagon Band of Potawatomi throughout the planning process. The Pokagon Band of Potawatomi is the most proximate federally recognized Indian Tribe to the project area and has participated in some meetings throughout the planning process. Formal correspondence with the Pokagon Band of Potawatomi has also been conducted to solicit input to the NEPA process (Appendix B). The Pokagon Band of Potawatomi will continue to receive updates through the project period.

Further, as described in Section 3.16 (Cumulative Effects), the Pokagon Band of Potawatomi is currently working to restore several miles of the Dowagiac River upstream from the dam site. The dam removal would complement their efforts and result in a significantly improved river system.

1.9 NecessaryPermits or Licenses

A number of permits and other authorizations must be obtained to implement the action under consideration. The primary permitting action that governs dam removal is specified by Part 315 of the Michigan Natural Resources Environmental Protection Act and is administered by the MDEQ. After the permit application is submitted and reviewed, a hydraulic review may be requested as it relates to floodplain hydraulic engineering analyses if deemed necessary by the MDEQ. Additional permitting is expected in accordance with Soil Erosion and Sedimentation Control (Part 91) in support of the final drawdown/dam removal and associated ecosystem restoration activities.

Section 106 Historic Review requirements have been met and a determination of no adverse effect on historic properties was issued (see Appendix B for documentation). The USFWS Sea Lamprey Program has issued a letter of concurrence for the dam removal stating that the Berrien Springs Dam on the St. Joseph River blocks sea lamprey migration (see Appendix B for documentation.)

The permits/approvals that may be required for the removal of the dam and ecosystem restoration are listed in Table 1-1.

Table 1-1. Authorizations Required for Pucker Street Dam Removal and Ecosystem Restoration Activities

Agency	Authority	Requirement	Activity Covered
MDEQ	Natural Resources Environmental Protection Act	Part 301	Activities in inland lakes and streams, fill placement/stream alteration
MDEQ	Natural Resources Environmental Protection Act	Part 303	Dredge/fill activities in wetlands
MDEQ	Federal Clean Water Act 33 Code of Federal Regulations (CFR) 330	Section 401 Section 404	Fill activities in "waters of the State"
Michigan State Historic Preservation Office	National Historic Preservation Office	Section 106	Consultation and clearance regarding potential effect to historic properties
U.S. Army Corps of Engineers	Federal Clean Water Act 33 CFR 330	Section 404	Cooperative Consultation with MDEQ on Section 404/401 permitting actions
Berrien County Drain Commissioner	Part 91, Soil Erosion and Sedimentation Control (NREPA 1994 PA 451)	Soil Erosion and Sedimentation Control (Part 91)	Soil erosion and sedimentation control during demolition activities
Niles Charter Township	Niles Charter Township Zoning Ordinance	Demolition Permit	Removal/demolition of Pucker Street Dam and associated structures

2 ALTERNATIVES

2.1 Description of Dam, Associated Structures and Existing Conditions

2.1.1 Existing Condition of Dam and Structures

The Pucker Street Dam (referred to as “Niles Dam” by the MDEQ ID No. 537, Berrien County) has been rated as a dam having a significant hazard potential. It is located on the Dowagiac River approximately 2 miles upstream of the City, Michigan and 3 miles upstream of the confluence of the St. Joseph River. The dam is regulated under Part 315, Dam Safety, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), Sections 31501 through 31529. Information provided in this section is derived from the Dam Safety Inspection Report for the Niles Dam (Trumble 2013). The MDEQ Inspection Report states that the dam is in poor condition overall and will require several remedial actions if it is to remain in place beyond five years from 2013 unless continued progress is made for removal.

The existing high head concrete dam and brick powerhouse were constructed in 1928. The dam has a structural height of 38 feet from the top of the powerhouse to the bottom of the dam; however, the hydraulic height varies depending on how many principal spillway gates are open during the design flood. Because of the partial drawdown that was conducted in 1999, the dam currently maintains 15 feet of head and 9 feet of freeboard.

The associated structures include a short left earthen embankment, a gated concrete principal spillway, a powerhouse section, a concrete and earth fill needle section, an abandoned millrace (or auxiliary spillway), and a short right earthen embankment (see Figure 1-2).

2.1.1.1 Embankments

The left-descending (looking downstream) embankment has a crest width of approximately 10 feet, with upstream and downstream slopes of approximately 3 horizontal to 1 vertical (3H:1V). A concrete core wall extends the entire length of the left embankment along the upstream edge of the embankment crest. There is one area of seepage along the downstream toe of the left embankment that needs to be monitored.

The right-descending embankment has a crest width of approximately 10 feet, with a downstream slope of approximately 3H:1V. A vertical concrete training wall is located along the entire upstream face of the right embankment. A portion of the right embankment was overtopped during a flood event in September 2008. The embankment sustained significant erosion damage and required the placement of large riprap until it could be repaired.

2.1.1.2 Spillways

The principle spillway structure is approximately 100 feet long and consists of five gated spillway bays (numbered 1 through 5 from right to left) and an overflow spillway section at the left end. Bay 1 houses a radial tainter gate that is 10.5 feet wide by 7 feet high. The remaining four bays house tainter gates that are 11 feet wide by 7 feet high. Since 1999, three of the five gates have been permanently opened in bays 3, 4 and 5. The concrete overflow section of the principle spillway is approximately 18 feet wide and 7 feet higher than the concrete crest of the gated section. The principle spillway is in poor condition overall with significant cracking, spalling, delamination and efflorescence found throughout the structural concrete. Vegetation growth continues to accelerate the deterioration of the concrete surfaces.

The auxiliary spillway (former millrace) consists of two approximately 12-foot-wide gated concrete spillway bays and a concrete lined channel. All gate-operating equipment was removed from the auxiliary spillway, rendering the gates inoperable in the closed position. The auxiliary spillway and concrete channel are in extremely poor condition overall.

2.1.1.3 Powerhouse

The powerhouse section is approximately 28 feet wide and consists of a concrete foundation and a brick masonry superstructure. Electric generating equipment has been abandoned in place inside the powerhouse since 1994 due to bearing issues with the turbine. The powerhouse gates were permanently closed to prevent flow through the structure. The powerhouse has exhibited significant settling and is in overall poor condition. A concrete and earth fill needle section exists between the powerhouse and auxiliary spillway structures.

2.1.2 Impoundment

The three of the five gates being permanently opened in 1999 resulted in a permanent drawdown of the impoundment by approximately 5 feet. The impoundment currently has a surface area of 49 acres under normal flow conditions.

The 5,900-foot-long impounded area upstream of Pucker Street Dam has promoted sediment detention such that approximately 1,000,000 cubic yards (CY) of sediment is estimated to be contained within the former previous impoundment (Inter-Fluve 2016).

Suburban homes line the edge of the valley, some within 50 feet of the channel. Most of the upland areas more distant from the river are farmed. With the exception of the developed areas in the vicinity of Pucker Street, much of the floodplain is undeveloped.

The lower impoundment section extending approximately 6,000 feet upstream of the dam is flanked by high, steep, wooded valley walls that delineate the adjacent flat floodplain of the former reservoir. In this lower section, the channel is straighter than upstream, despite the wide flat valley. Channel widths are variable, ranging from around 70 feet to 100 feet wide (at estimated bankfull conditions), and channel depths (i.e., impounded sediment surface to channel bed) vary from around 4 feet to around 8 feet (Inter-Fluve 2016). Wetlands and small side channels are common where groundwater seeps from the adjacent slopes and where side channels were abandoned after the impoundment was partially drawn down in 1999. Much of the floodplain has become vegetated in native and non-native plants, with occasional thick stands of willows and small stands of cottonwood, ash, and alder.

Below Kinzie Road, the valley upstream of the former impoundment includes more woodland and narrower valley widths relative to the lower two-thirds of the study area.. The channel is relatively sinuous, steep, and gravelly, and large woody debris is present in the stream. Downstream of Kinzie Road the channel transitions to the lower gradient, formerly impounded section of the channel.

Five pipes are currently buried across the channel: one abandoned water supply line 250 feet downstream of the dam, and two abandoned and two new gas lines approximately 3,050 feet upstream from the dam. The water supply line is exposed at low flows. In contrast, the two abandoned gas lines are buried below the existing channel and are covered by approximately 3 to 4 feet of sediment. The two new gas lines were installed by the owner in 2018 at a depth of 30 feet below the river channel.

2.2 Alternative Development

This section describes the process used by USFWS to develop and consider a range of alternatives consistent with the requirements of NEPA. The project area is shown in Figure 2-1.

In addition to the No Action alternative, USFWS considered what reasonable alternatives could address the purpose and need in light of the objectives established for the proposed action and in consideration of public scoping comments. The formulation of alternatives has progressed using a step-wise process that included the following:

1. Data review and analysis
2. Identification of project needs
3. Formulation of initial alternative concepts
4. Solicitation of stakeholder input (public, resource/regulatory agencies, other)
5. Development of design concepts
6. Development of EA alternatives

The following sections provide an overview of the alternatives considered in this process and a description of the alternatives retained for detailed analysis within this EA.

2.2.1 Design Concept Alternatives

Initial planning for options related to dam removal and ecosystem restoration was initiated at the conceptual level and then refined to four design concepts. Several considerations and key inputs contributed to the development of project alternatives including the following:

- Objectives associated with the project Purpose and Need:
  - Need for ecosystem restoration to address: fish passage, habitat fragmentation, and habitat degradation;
  - Opportunity to improve a high-quality river system; and
  - Address public safety concerns related to the age and condition of the dam and associated structures.
- Comments/input from the public scoping process.
- Field reconnaissance activities to identify and assess characteristics of the Dowagiac River fluvial geomorphology (channel characteristics, channel stability, sediment transport and depositional patterns, habitat characteristics, etc.).
- Field reconnaissance activities to identify and assess characteristics of the wetlands in the Pucker Street Dam project area (community type, hydrologic relationships to Pucker Street Dam area and groundwater discharge, etc.).
- Engineering studies regarding site topography/bathymetry, river profile and cross-sectional information, sediment depth and chemical composition, hydrologic analysis of the Dowagiac River, biological/ecological data, and other information.

Based on these considerations, four preliminary design concept alternatives, as presented below, were developed and presented to project stakeholders for input (Inter-Fluve 2016). Concepts were developed that included dam removal (common to all “action” alternatives under consideration) and varying ecosystem restoration approaches.

Figure 2-1. Pucker Street Dam Removal and River Restoration Project Area

2.2.1.1 Dam Removal

Dam removal is common to all “action” alternatives. Dam removal concepts consists of the construction of a dewatering structure to facilitate the controlled removal of water from the impoundment, demolition of the existing powerhouse, removal of construction debris for off-site disposal, and grading the embankment to provide for channel development and flood conveyance.

2.2.1.2 Ecosystem Restoration

Options for ecosystem restoration are distinctive for each of the four design concepts and ranged from active to passive restoration as follows:

- Design Concept 1 – Dam Removal with 100 Percent Passive Restoration
- Design Concept 2 – Dam Removal with Blended Active/Passive Restoration using existing channel alignment
- Design Concept 3 – Dam Removal with Blended Active/Passive Restoration creating pre-dam channel alignment
- Design Concept 4 – Dam Removal with 100 Percent Active Restoration creating pre-dam channel alignment and 40-foot floodplain.

Table 2-1 summarizes the key elements of each restoration alternative.

Active restoration involves the construction of a restored channel and its associated floodplain within a short-time period following dam removal. As such, all attendant features are constructed in-place for the development of a functioning river channel, along with the installation of plant materials to establish plant communities that are intended to meet long-term objectives regarding restored habitats and composition. In contrast, passive restoration includes limited, if any, active restoration within the channel and typically limited management of the resulting colonizing vegetation. The passive approach allows the river itself to act as the mechanism to re-establish the river channel and its attendant floodplain. The following sections describe the differences in restoration approaches for each of the Design Concept alternatives presented above.

Table 2-1. Summary of Design Concept Alternatives

Alternatives	Description	Active Sediment Removal Quantity	Passive Sediment Removal Quantity	Pros/Cons	Construction Cost** (2018 dollars)
1 (100% passive)	Extended staged drawdown to allow passive (natural) processes to trap sediments near dam. No work above Pucker Street Bridge.	+/-100,000 CY (delivered to near dam for removal) MIN: Zero	140,000 CY (min)	• Lowest cost (depends on costs for long term staged drawdown) • No habitat restoration in short-term • Greater downstream sedimentation and adverse impacts to fishery. Long recovery time • Poor aesthetics in short term	$2.5M* (includes trapping and removing 100,000 CY of material)
2 (Blended Active/Passive Restoration using existing channel alignment)	Excavate along existing channel alignment and 20 feet average (total) floodplain in some areas.	MAX: 240,000 CY (including partial floodplain excavation) MIN: 71,000	Varies Incidental – 132,000 CY	• Greater vertical and horizontal stability than Alternative 1 • Reduces rate of sediment delivery downstream • Improvement of habitat (substrate) vs. Alternative 1	$4.7M (all channel and some floodplain sediment removed)
3 (Blended Active/Passive Restoration creating pre-dam channel alignment)	Excavate along pre-dam channel alignment and a 20 feet average floodplain.	MAX: 315,000 CY MIN: 183,000 CY	MAX: 132,000 CY MIN: Incidental	• Greater stability • Improvement of habitat (pool and riffle formation) vs. Alternative 2 • More sediment released downstream in short term vs. Alternative 2 • Potential landowner concern with changing alignment of channel	$4.5M (all channel sediment removed)
4 (100% Active Restoration creating pre-dam channel and 40-foot floodplain)	Excavate along pre-dam channel alignment. Excavate channel and 40 feet (total) floodplain.	MAX: 430,000 CY	Minor	• Expanded floodplain habitat • Greatest stability • Lowest quantity of sediment delivered downstream • Highest cost • Lowest banks and better aesthetics • Potential landowner concern with changing alignment of channel	$6.3M (all channel and floodplain sediment removed)

*A staged drawdown approach is not reflected in the cost, it may add or reduce demolition costs which are currently about $1M for all 4 options.
Source: Inter-Fluve 2016
**Does not include engineering, design, easements, bonding costs, etc

2.2.1.2.1 Design Concept 1 – 100 Percent Passive Restoration

The passive restoration of the area above Pucker Street Dam involves only the removal of the dam without any active restoration above Pucker Street Bridge. Under this alternative, the channel above the dam would be allowed to freely adjust its slope and form via incision, widening, and meandering, and the resulting eroded sediment would be allowed to flush downstream with capturing and removing 100,000 CY of material near the dam with sediment traps. These adjustments would continue until the channel develops a form consistent with the flows and sediment regime imposed on it.

If passive management is utilized and the Dowagiac River follows post-dam removal patterns of incision, adjustment through the accumulated sediment would likely generate steep, un-vegetated slopes as the channel cuts away sediment to return to a more natural bed level. Based on the depth of accumulated sediments within the Dowagiac River impoundment determined from a Depth of Refusal (DOR) survey, the riverbed occupied after incision would likely have elevations similar to the bed prior to building the dam. The banks would be approximately 10 to 18 feet high and would likely be too steep and unstable to establish vegetation. With no vegetation for long-term stabilization, the channel would likely widen over time and form a new floodplain inset into the impoundment sediments. It is estimated that over 400,000 CY of sediment would be mobilized from the channel and floodplain area over time if no active excavation is undertaken to reestablish the river channel and associated floodplain. The exact nature of sediment transport and downstream depositional patterns associated with this sediment evacuation is difficult to predict.

No active floodplain or wetland development would be performed under this alternative. With the 1999 drawdown, a new floodplain area was created that includes floodplain wetlands, remnant side channels and floodplain features.

2.2.1.2.2 Design Concept 2 – Blended Active/Passive Restoration Using Existing Channel Alignment

Under the Blended Active/Passive restoration using the existing channel alignment approach, the existing river channel would be excavated to the pre-dam riverbed elevation based on the results of the DOR study. The pre-dam historical channel and the existing channel alignment begin to diverge in their location approximately 4,000 feet upstream of the dam. Using the existing channel alignment would result in a straighter and steeper channel than the historical pre-dam channel alignment. However, using the existing channel would reduce costs in excavation and sediment management efforts. With this alternative, a maximum of 203,000 CY of sediment would be excavated from the existing channel and 37,000 CY would be excavated in the floodplain for a total of 240,000 CY. Sediment traps would be used near the dam to capture and remove sediment that is mobilized from the construction site during the excavation.

Under this alternative the excavated floodplain bench would be an average of 20 feet on either side of the established river channel (40 feet total). These floodplain benches would not be constructed where they would impact structures or where the channel abuts the valley wall. Depending on the extent to which the channel and floodplain are excavated, the sediment removal for floodplain bench creation could be as high as 115,000 CY. The cost estimate shown in Table 2-1 assumes 37,000 CY of material would be excavated in the floodplain. According to modeling of flood events, the relatively low magnitude of flood flow rates in the Dowagiac River suggests that the floodplain bench may function largely for ecological value and safety, rather than as a conveyance for flood energy. However, the need to establish vegetation as a resisting element to channel migration is a critical stabilization component along the river corridor that would be limited without a bench.

Under this alternative re-vegetation efforts would be concentrated within the 20-foot floodplain corridor paralleling each side of the river channel. Following drawdown and the completion of site grading activities, active seeding with native seed mix along the floodplain corridors on either side of the channel would supplement natural re-vegetation.

In addition to the constructed floodplain benches, topographical features may develop naturally over time due to overbank deposition of material during flooding. Wetlands would also naturally develop in areas with a low landscape position and sufficient source of hydrology (groundwater or surface water) to promote the development of a wetland community dominated by hydrophytic species.

2.2.1.2.3 Design Concept 3 – Blended Active/Passive Restoration Creating Pre-Dam Channel Alignment

The Blended Active/Passive restoration option to recreate the pre-dam channel alignment above Pucker Street Dam is very similar to Design Concept 2. However, under Design Concept 3 the pre-dam channel would be excavated rather than utilizing the existing channel alignment. The pre-dam channel alignment deviates from the existing channel alignment in the upper reaches of the impoundment area.

The historic pre-dam channel alignment features a set of meanders that abut the opposing valley walls and traverse the entire valley floor. Taking advantage of this meandering form would maximize channel length resulting in 1,000 additional feet of channel. The additional length and sinuosity would provide opportunities for the development of scour holes and instream woody debris that would promote habitat improvement. The meander bends would reduce overall channel gradient and provide temporary sediment storage on point bars. The amount of sediment excavation to create the pre-dam channel is estimated at 315,000 CY. All or a portion of that quantity could be excavated, while the balance would be allowed to mobilize passively. Under this alternative, however, it is expected that additional sediment entrainment and transport would occur from scour and erosion of outer bends of the created meanders.

This alternative would have the same 20-foot floodplain bench construction along a portion of the channel. The excavation volume for the floodplain bench would be 115,000 CY. Again, this floodplain bench would be a benefit for habitat and have a reduced effectiveness for flood conveyance. Wetland development would occur naturally in areas having a low landscape position and sufficient source of hydrology (groundwater or surface water) to promote the development of a wetland community dominated by hydrophytic species.

2.2.1.2.4 Design Concept 4 – 100 Percent Active Restoration Creating Pre-Dam Channel Alignment and 40-Foot Floodplain

Active restoration of channel and floodplain above the Pucker Street Dam involves the active construction of the physical attributes of the pre-dam river corridor. This approach focuses largely on the use of earth moving equipment to remove accumulated sediment in the impoundment area. Floodplains would be excavated on either side of the channel to a distance of 40 feet. Wetland development would be the same as in Alternatives 2 and 3.

2.2.2 Ecosystem Restoration Concepts Eliminated from Further Consideration

USFWS conducted an analysis of the above design concepts for which project stakeholders identified and recommended those alternatives that warrant further consideration as part of this EA. This analysis integrated an interdisciplinary process that considered all appropriate elements of alternative attributes including their effectiveness in meeting the project purpose and need, engineering factors, cost, and factors related to the environment. Specific environmental factors considered in this analysis included hydrology, water quality, sedimentation potential, aquatic and terrestrial ecology, wetlands, sensitive species, cultural resources, hazardous waste, recreation, visual quality/aesthetics, natural area development, and other factors. As a result of this process, USFWS determined that three design concepts did not warrant further consideration. Alternatives eliminated from further consideration include the following:

Design Concept 1 – Dam Removal with 100 Percent Passive Restoration. This alternative was eliminated based on the depth and extent of sediment stored behind Pucker Street Dam. The absence of sediment management measures would result in significant impacts to downstream areas where sediment deposition would result in in-stream habitat alteration. Because of the negative impact to the high-quality fishery downstream of the dam, passive restoration is not an option. Such impacts are inconsistent with the objectives of the project Purpose and Need and are therefore a basis for the elimination of this alternative.

Design Concept 3 – Dam Removal with Blended Active/Passive Restoration Creating Pre-Dam Channel Alignment. This alternative was eliminated as it does not offer significant advantages in addressing the elements of the Purpose and Need (relative to Design Concept 2) and was not reasonable in consideration of available funding. Further, it is expected that this alternative would result in more sediment being released downstream than with Design Concept 2. The negative impact to the downstream high-quality fishery is undesirable. In addition, changing the channel alignment would introduce riparian landowner opposition to the project.

Design Concept 4 – Dam Removal with 100 Percent Active Restoration Creating Pre-Dam Channel Alignment and 40-foot floodplain. This alternative was eliminated as it does not offer significant advantages in addressing the elements of the Purpose and Need (relative to Design Concept 2) and was not reasonable in consideration of the available funding. This alternative would have greater landowner opposition to the project based on a change in channel alignment. The benefits of this alternative relate to the additional construction effort that could be expended to install additional project features, thereby shortening restoration timelines. However, it was determined that such a greater level of construction is not fiscally feasible.

2.2.3 Other Potential Concepts

2.2.3.1 Dam Removal with Whitewater Park Construction

During the public scoping process, it was proposed that another alternative could include dam removal coupled with the construction of a whitewater park. The project team eliminated this alternative from further consideration based on the following reasons: increased project costs, increased rock and structures needed in-stream, decreased fish passage, landowner opposition to the project, jeopardizing grant funding because grants were based on natural channel restoration design concepts, increased future liability and maintenance for the City, and potentially reducing other recreational opportunities such as fishing from a small boat. The MDNR Fisheries division shared a whitepaper with the project team produced by the MDNR and MDEQ that describes several adverse effects of whitewater parks on stream ecosystems. For these reasons, the construction of a whitewater park is not feasible and was eliminated from further consideration.

2.2.3.2 Dam Repaired for Hydropower Generation

The City has intensively investigated repairing the dam for hydropower generation. However, after several studies and a request for proposal process, it was determined that the use of the dam for hydropower is not an option. The City has made a determination that hydropower at this facility is not economically feasible due to the costs associated with the required repairs and maintenance of the dam. The City received two offers by private companies to take ownership of the dam and begin hydroelectric generation. Both offers were evaluated, and it was determined that transferring the dam to private ownership was not prudent or feasible because of the associated costs and risks. Further, the City's wholesale contract with Indiana Michigan Power does not allow the City to generate power (Appendix C). Consequently, this concept is not feasible and was eliminated from further consideration.

2.2.4 Alternatives Retained for Detailed Consideration

Further alternative development was conducted to clarify the action represented within a blended approach. As a result, the following two alternatives warrant detailed consideration in this EA:

- Alternative A – No Action
- Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment (Design Concept 2)

The major components of these alternatives are provided in Table 2-2.

The action alternative is reasonable and representative of a range of actions that integrate varying degrees of active restoration with a sufficient level of sediment management to minimize off-site (downstream) impacts. USFWS coordinated with the City, as owners of the Pucker Street Dam, to develop plans for this alternative to assess its likely environmental impacts, as well as both short- and long-term costs.

Table 2-2. Summary of Alternative Elements

Project Element	Alternative A – No Action	Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment
Pucker Street Dam	All dam elements remain, including spillway and powerhouse	Powerhouse and dam removed completely Embankment removal except the concrete wall along the east bank that will be left in place.
Fish Passage	Barrier in-place, no fish passage	Complete restoration of fish passage
Aquatic Ecosystem Type	Partially drawn down Impoundment – 49 acres	10,000 linear feet of free-flowing river
Excavation/Sediment Management	No sediment management/ excavation	Excavation of channel and 20-foot floodplain bench Total sediment excavation around 240,000 cubic yards for 6,300 feet
In-channel Habitat	No enhancements to in-channel habitat	Bedforms such as pools, riffles, and runs are likely presented but muted due to deposition in the impoundment but should develop quickly during subsequent flood events.
Riparian Zone/ Wetlands/Uplands	No active riparian zone/wetland/upland enhancements	Active seeding with native seed mix along 20-foot corridor on either side of channel
Construction Staging	Not applicable	Construction operations, including access routes, would occur at dam/ powerhouse and upstream for about 6,000 linear feet.

2.2.4.1 Alternative A – No Action

Under CEQ regulations (40 CFR Parts 1500 to 1508), consideration of a No Action alternative is required in this EA. The No Action alternative sets a baseline of existing impacts continued into the future against which to compare impacts of action alternatives. This is important context information in determining the relative magnitude and intensity of impacts.

Under the No Action alternative, the USFWS would take no immediate action to remove the dam to improve fish passage and habitat, which would also not resolve the City’s cost and safety liabilities associated with ownership of Pucker Street Dam. Existing facilities would remain in-place and would continue to impede fish passage and sustain the fragmented habitats within the Dowagiac River system. Additionally, the structural deterioration of the dam would continue to persist and be a safety hazard for river users.

Based on the 2013 safety inspection, the MDEQ has mandated that the City either remove the dam within 5 years or make extensive repairs to ensure its stability and minimize the risk of failure. In response to the MDEQ mandate, the estimated cost of rehabilitation to mitigate the identified safety issues and prevent failure was estimated to be approximately $301,600 for engineering and $928,600 for the repairs (in 2018 dollars). In addition, the City would also incur about $72,000 for inspections required every 4 years.

The No Action alternative would not support USFWS' goal of removing barriers to fish passage or the City's goal of cost effectively promoting safety and reducing the liability of the existing dam. Consequently, this alternative would not satisfy the project purpose and need and, therefore, is not considered viable or reasonable. It does, however, provide a benchmark for comparing the environmental impacts of implementation of Alternative B.

2.2.4.2 Alternative B - Dam Removal with Blended Restoration Using Existing Channel Alignment

Under Alternative B, the proposed project would include the removal of Pucker Street Dam and a blend of active and passive restoration within the existing channel alignment. Figure 2-2 identifies the primary activities planned within the project area. The details of each component of this alternative are provided below.

The project site includes the Dowagiac River valley from about 300 feet downstream of Pucker Street Dam to the Kinzie Road Bridge, approximately 11,000 feet upstream of the dam. Within that reach, the focus is on Pucker Street Dam and its 5,900-foot long impoundment. The Dowagiac River valley width ranges from about 200 feet to 700 feet wide. The wider sections are included in the impoundment area.

2.2.4.2.1 Proposed Changes at Pucker Street Dam Location

The dam and the area around it (Figure 2-3) pose both constraints and opportunities for the project. First, channel position would be maintained under the Pucker Street Bridge and through the dam site. The concrete wall along the east bank at the dam would be left in place, but it would be hidden and the vertical drop would be eliminated by creating a stone toe with fabric-encapsulated lifts on top. The upper portion of the slope would be vegetated with native plants that would not require mowing. On the west side of the river, the bank would be shifted to the east enough to accommodate the material placed along the eastern wall while maintaining the conveyance capacity of the upstream reach. The bank would slope up to the existing ground surface at the island to create a natural bank that allows for access to the water by both people and wildlife. Both banks would tie into the existing topography within a few hundred feet downstream of the dam.

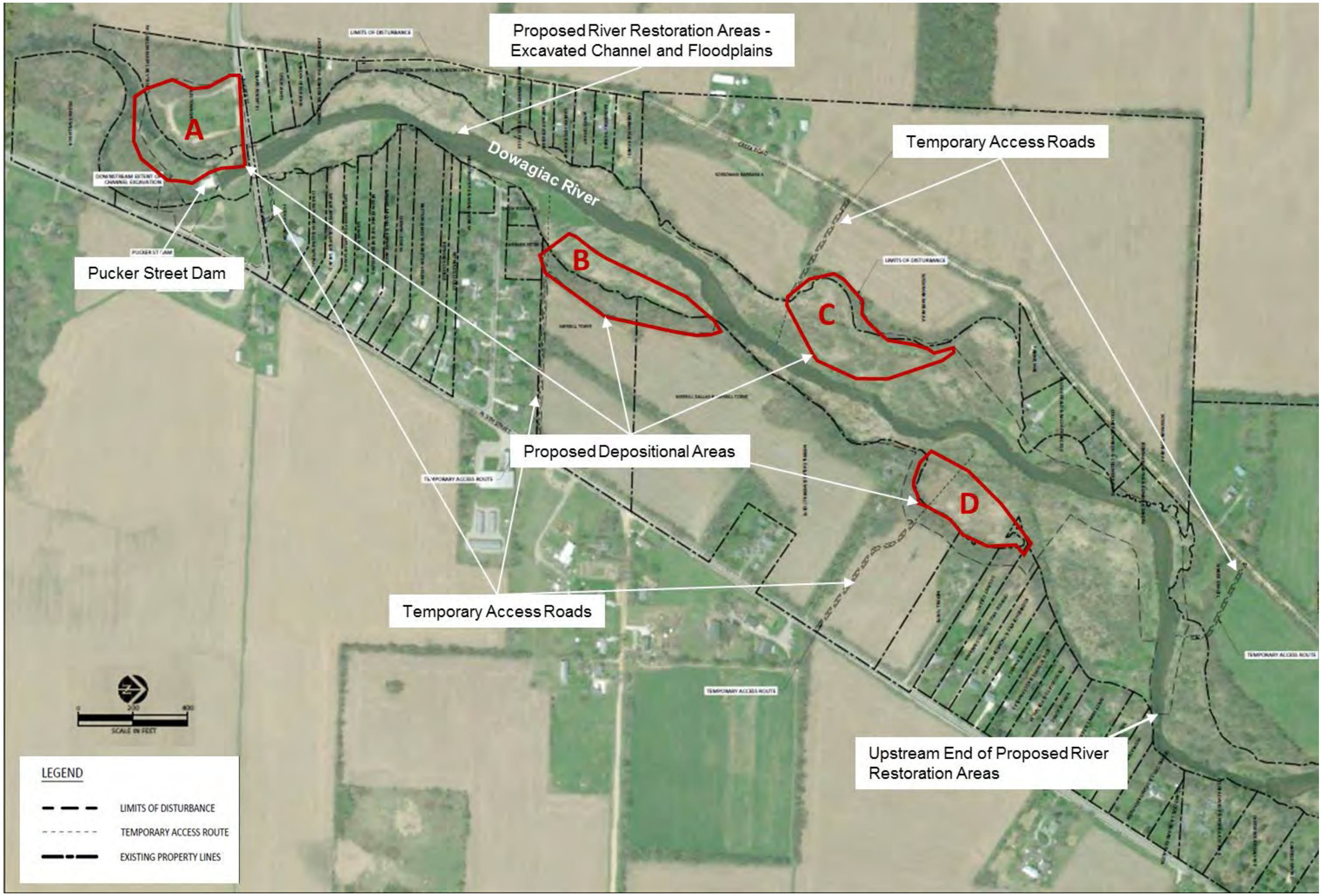


Figure 2-2. Alternative B Project Activity Areas

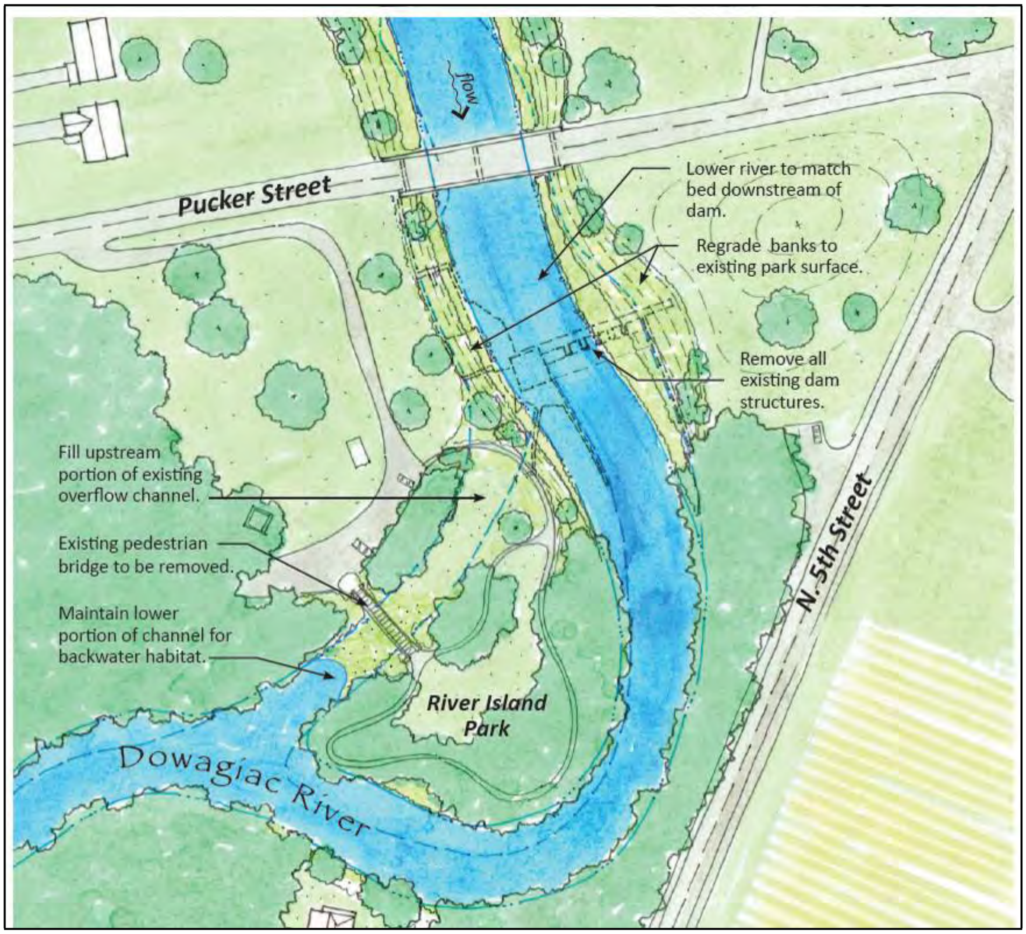


Figure 2-3. Proposed Dam Removal Plan

As shown in Figure 2-3, some of the material excavated from the impoundment will be used to fill the raceway adjacent to the dam (Spoil Area A). The raceway is currently spanned by a footbridge that would be replaced by a wider land bridge created from fill material. The lower end of the raceway may be left open for additional backwater habitat or perhaps to accommodate recreational access.

The remaining excavated material would be placed in three other spoils areas B, C, and D, as shown in Figure 2-2. These areas are located adjacent to agricultural fields on privately owned lands. At each of these locations, the soils will have a low slope from the existing farm level toward the river, then a 1:2 slope down to the river valley.

2.2.4.2.2 Dam Removal and Dewatering

Prior to the start of demolition, temporary access roads would be constructed, including one below the dam and four upstream (Figure 2-2). Additionally, dredging of the area behind the dam would be performed to act as a sediment basin during the drawdown of the river. Dredged material will be disposed of in the spoil area nearest the dam (Figure 2-2).

Demolition and ecosystem restoration activities would be undertaken in accordance with the sequence of work outlined in Table 2-3. In preparation for the dredging and restoration activities, trees will be removed and five access roads from existing roadways will be placed to reach the river with the necessary equipment to perform the work.

The demolition of the dam includes the entire structure down to the lower floor elevation of 659.5 feet. The dam will be removed roughly by halves with the west half being isolated by a cofferdam and demolished while the east half remains in service handling the flow of the river. Gates will then be used to lower and maintain the water level at approximately 6 feet of depth. Active dredging of the channel and shaping the banks as part of the upstream river restoration will be completed with the water level at this partial drawdown stage. Once the upstream dredging is complete the drawdown of the remaining 6 feet of depth will be completed and the cofferdam removed. The east half of the dam will then be isolated and removed. Within the vicinity of the delta, the drawdown of the impoundment would proceed slowly (approximately 0.5 feet per day), such that minimal sediment would be released downstream. Downstream restoration activities and demolition of the remainder of the powerhouse foundations will be done with the river at its permanent drawdown condition.

Full project plans and other supporting documents related to this project are publicly available as part of the MDEQ permit application available at:

https://miwaters.deq.state.mi.us/nsite/#?tab=profile&h=1049&w=726&dh=8.198602426565884&dw=7.789306641707142&bbox%5B%5D=48.604678976859006&bbox%5B%5D=-81.76506867914635&bbox%5B%5D=40.40607655029312&bbox%5B%5D=-89.5543753208535&tb=48.604678976859006&bb=40.40607655029312&rb=-81.76506867914635&lb=-89.5543753208535&z=7&c%5Bx%5D=-85.659722&c%5By%5D=44.65&i=true&b=Street&a=pucker+street&q=pucker+street&s=-7501657195127536997&p=true.

Table 2-3. Sequence of Events for Alternative B

Step	Description	Days Duration	Start Date	End Date
1	Start of construction	0	1	1
2	Securing of site	1	1	1
3	Soil erosion & soil control	2	1	2
4	Hazardous waste cleanup and disposal in powerhouse	10	1	10
5	Demolition of upper powerhouse above main floor	15	11	25
6	Demolition of powerhouse equipment and removal of water supply line	15	11	25
7	Hydraulic dredging of basin from bridge to dam	15	11	25
8	Create sediment basin	5	26	30
9	Remove tainter gates & lower overflow spillway to top of dam	10	11	20
10	Remove concrete walkway from dam	5	21	25
11	Install sheeting & king piles of cofferdam to isolate west portion of spillway upstream of dam	15	26	40
12	Isolate west portion of spillway downstream of dam	5	36	40
13	Start dewatering of cofferdam	1	41	41
14	Add bracing, most likely rakers, attached to apron slab during dewatering	10	41	50
15	Finish dewatering of cofferdam	1	50	50
16	Demo west concrete spillway down to apron slab	15	51	65
17	Add bulkhead gates to downstream edge of sheeting	10	56	65
18	Pull sheeting upstream of gates	2	66	67
19	Drawdown reservoir to top of bottom gate	15.5	69	82
20	Mechanically dredge, restoration, and seeding along river	78	83	160
21	Clean out sediment trap as needed during dredging	1	161	161
22	Drawdown reservoir to bottom of bottom gate	19.5	162	181
23	Remove cofferdam sheeting, gates, and king piles	7.5	181	187
24	Direct stream flow through western portion of demolished spillway	0.5	187	187
25	Reinforce bridge pier	10	182	191
26	Isolate east portion of spillway upstream of dam	3	187	189
27	Isolate east portion of spillway downstream of dam	3	187	189
28	Demo east concrete spillway	15	190	204
29	Remove isolation of east portion of spillway	2	205	206
30	Isolate west dam spillway apron	2	205	206
31	Remove west dam spillway apron	5	207	211
32	Remove powerhouse below main floor	20	185	204
33	Remove concrete wingwall west side of river downstream of dam	5	189	193
34	Remove structures that extend above final grade along banks	15	189	203
35	Back fill and remove drainage structures along bank on east side of river	5	200	204
36	Restore east bank on east side of river	18	200	217
37	Additional seeding and punchlist items as needed	5	218	222

* Some of the tasks listed may be performed simultaneously in order to complete the work within the scheduled time frame and based on professional judgement of contractor.

On the ground activities are expected to begin in the spring 2019, with in-stream work beginning in spring or summer 2019 and channel/floodplain restoration activities continuing into fall 2019. No construction activities would take place until all permits have been issued. Further, work in the Dowagiac River is limited by MDNR regulations to avoid spawning times. Any large rain events could also delay project initiation. Phasing of work at the dam would be integrated with the needs for water level management as part of river restoration and sediment management.

2.2.4.2.3 Restoration and Sediment Management Measures

Under this alternative restoration activities would consist of the integration of active sediment management practices upstream of the dam coupled with channel and floodplain redevelopment.

It is expected that the majority of the restoration activities would be conducted over a 60- to 90-day timeframe during the summer and fall of 2019 and any follow up restoration would occur in the spring of 2020. This schedule would depend on securing permits and favorable weather conditions (water levels). As required by state and local permits and approvals for this project, a monitoring and maintenance plan will be developed that will detail monitoring and reporting performed during construction and restoration activities to ensure that they are done in accordance with the design plans and permits.

Earth moving equipment would be used to remove accumulated sediment within the reach above the dam. Figure 2-4 illustrates the typical cross section of the reconstructed river channel. Equipment operating in water would be required to utilize vegetable oil (e.g., rapeseed or canola) as a lubricant to reduce potential impacts to water quality. Floodplains would be excavated along the 82-foot wide channel to an average of 20 feet on each side of the river upstream of the dam for a distance of approximately 1,400 feet.

A number of methods were applied to estimate stable cross-sectional geometry for the Dowagiac River through the project reach, including using reference reaches as guides to channel sizing, estimating widths and depths based on regional hydraulic geometry studies, and using bankfull flow estimates to refine the final dimensions. The bankfull discharge was predicted using the estimated annual flood data from the Sumnerville stream gage and then transferring the data downstream by the ratio of drainage area.

Based on the channel geometry analyses summarized by Inter-Fluve (2016) that considered both unimpacted reference reaches and the characteristics of the Dowagiac River channel downstream, bankfull channel dimensions are proposed as summarized in Table 2-4 and illustrated in Figure 2-4. The excavation volume for the channel configuration along the existing alignment, with no floodplain bench construction, is about 199,000 CY (Figure 2-4A). A similar amount, at least, would be expected to evacuate naturally over time if no channel excavation is conducted.

Table 2-4. Alternative B Restoration Characteristics

Attribute	Value
Length of channel excavation	6,300 feet
Excavation volume	240,000 CY
Channel bed width	82 feet
Channel bankfull width	94 feet
Channel depth	3 feet
Side slope dimension	2:1 slope
Floodplain bench width	20 feet (each side)
Floodplain bench length	1,400 feet
Bankfull flow capacity	1,015 cfs

Source: Inter-Fluve 2016

In the case of a 20-foot bench, the lower surface would extend 20 feet from the top of the design channel before starting up the slope to the top of the impounded sediment (Figure 2-4B). Benches would not be constructed where they would impact adjacent structures, or where the channel abuts the valley wall and are often wider on the inside of bends to replicate point bars. The floodplain benches will be excavated between the dam and extend 1,400 feet upstream. Excavating 20-foot benches along the lower portion of the impoundment will add approximately 40,000 CY to the excavation quantity, bringing the total excavation to approximately 240,000 CY of sediment.

Based on the characteristics of the material at the proposed channel excavation site within the impoundment, hydraulic dredging may be used to remove some material. The immediate work area would be isolated from the flow of the Dowagiac River and silt curtains would be used in the immediate dredge work area to control turbidity. Dredged materials would be disposed of in the spoil area nearest the dam (see Figure 2-2). Because the dredged material would consist predominantly of sands, these materials are expected to drain readily. Decanted water would be returned from the disposal site using best management practices (BMP) such as sandbags, turbidity curtains and other means to ensure good water quality. Following the completion of the dredging process, material would be graded in-place and seeded with a native plant species mix consisting of various grass and rush species, such as Virginia wild rye, hardstem bulrush, softstem bulrush, common bur reed, river bulrush, and prairie cordgrass, and forbs such as swamp milkweed, swamp aster, boneset, sneezeweed, and ironweed to promote rapid vegetative recovery. Tables 2-5 and 2-6 list plant species proposed to be seeded within floodplain and upland transition zones.

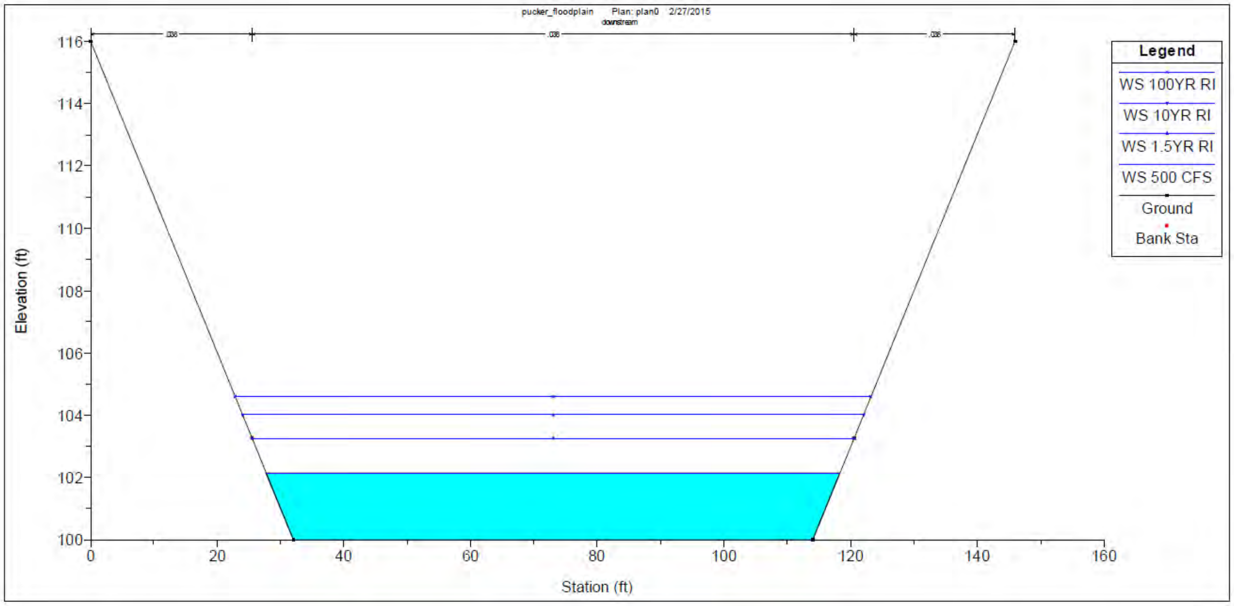


Figure 2-4A

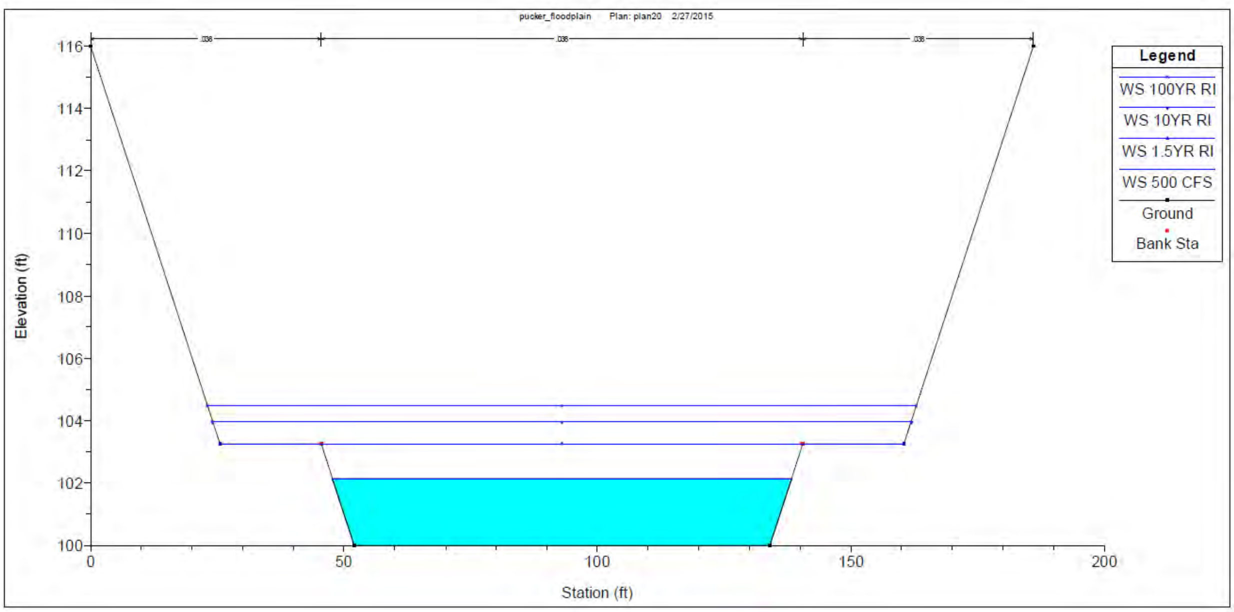


Figure 2-4B

Figure 2-4. Typical Cross Section of the Reconstructed River Channel

(Figure A: Without floodplain bench, B: with floodplain bench)

Table 2-5. Proposed Floodplain Seed Mix

Scientific Name	***Common Name***
Grasses/sedges/rushes	
Carex spp.	Sedges
Elymus virginicus	Virginia Wild Rye
Schoenoplectus acutus	Hardstem bulrush
Schoenoplectus tabernaemontani	Softstem bulrush
Sparganium eurycarpum	Common Bur Reed
Scirpus fluviatilis	River bulrush
Spartina pectinata	Prairie cordgrass
Cover Crop	
Avena sativa	Seed Oats
Lolium multiflorum	Annual Rye
Forbs	
Asclepias incarnata	Swamp Milkweed
Asclepias syriaca	Common Milkweed
Aster puniceus	Swamp Aster
Eupatorium maculatum	Joe-Pye Weed
Eupatorium perfoliatum	Boneset
Helenium autumnale	Sneezeweed
Solidago graminifolia	Grassleaved Goldenrod
Solidago patula	Swamp Goldenrod
Vernonia missurica	Ironweed

Table 2-6. Proposed Seed Mix for Transitional Upland Zones

Scientific Name	***Common Name***
Native Grass Mix	
Andropogon gerardii	Big Bluestem
Panicum virgatum	Switch Grass
Schizachyrium scoparius	Little Bluestem
Sorghastrum nutans	Indian Grass
Cover Crop	
Avena sativa	Seed Oats
Lolium multiflorum	Annual Rye
Forbs	
Achillea millefolium	Yarrow
Asclepias syriaca	Common Milkweed
Asclepias tuberosa	Butterflyweed
Aster laevis	Smooth Aster
Aster novae-angliae	New England Aster
Aster pilosus	Hairy Aster
Coreopsis lanceolata	Sand Tickseed
Echinacea purpurea	Purple Coneflower
Monarda fistulosa	Wild Bergamot
Rudbeckia hirta	Black-eyed Susan
Solidago rigida	Stiff Goldenrod

Additional techniques would be incorporated into the restoration approach to minimize downstream sediment transport. In particular, a sediment trap would be installed and maintained just above the dam location to trap sediments mobilized by the drawdown from upstream areas (see Figure 2-5). The sediment trap would be approximately 150 feet long by 80 feet wide by 12 feet deep, and it is expected to collect sediment at a rate of 30 tons per day. Based on this, it would need to be cleaned when 1/3 full, or approximately every 2 to 3 months. The sediment build-up would be monitored weekly during active dredging and cleaned out as needed with the material disposed of in the adjacent raceway and park areas.

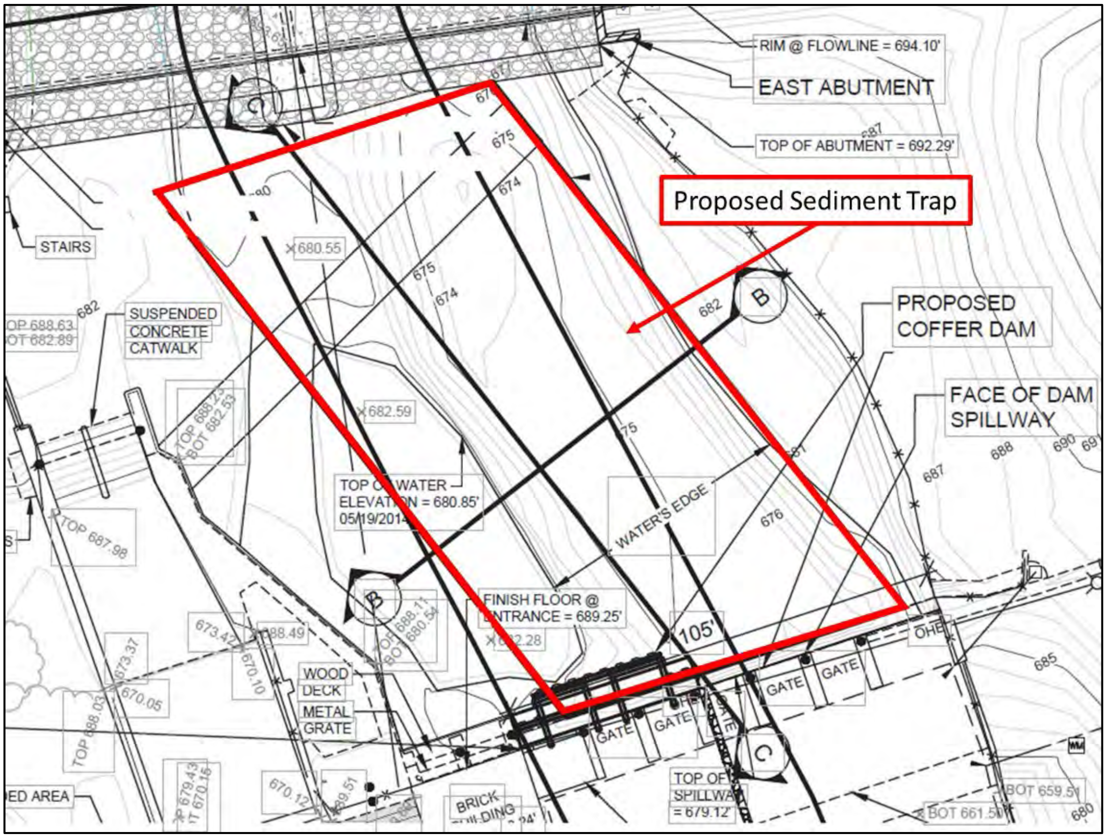


Figure 2-5. Proposed Sediment Trap Location

This alternative also incorporates a number of elements that would promote natural community establishment including:

- Active seeding and management of the associated vegetation community using native species appropriate for floodplain and upland/steep slope stabilization. Following drawdown, and subject to project funding, seeding would be conducted for all exposed areas using a native seed mix.
- Active seeding of exposed areas around the former dam site with native vegetation that is ecologically appropriate for the riparian area.

Several potential environmental enhancements may also be implemented in the future, subject to the availability of funds. Such potential future enhancements may include:

- Aggregates of large woody debris could be installed at regular intervals along the length of the river channel to provide rapid development/enhancement of in-stream habitat.
- Active wetland development by shallow excavation and planting within floodplain areas to promote shallow/deep marsh community development.
- Streambank stabilization using live stakes to promote riparian zone establishment.
- Riparian/wetland zone plantings using potted plants to promote wetland community development.

Access will be achieved at the dam site and at locations within privately owned property that has been secured by the City for access, staging areas, and spoil placement along the valley. Potential locations of access roads are shown in Figure 2-6.

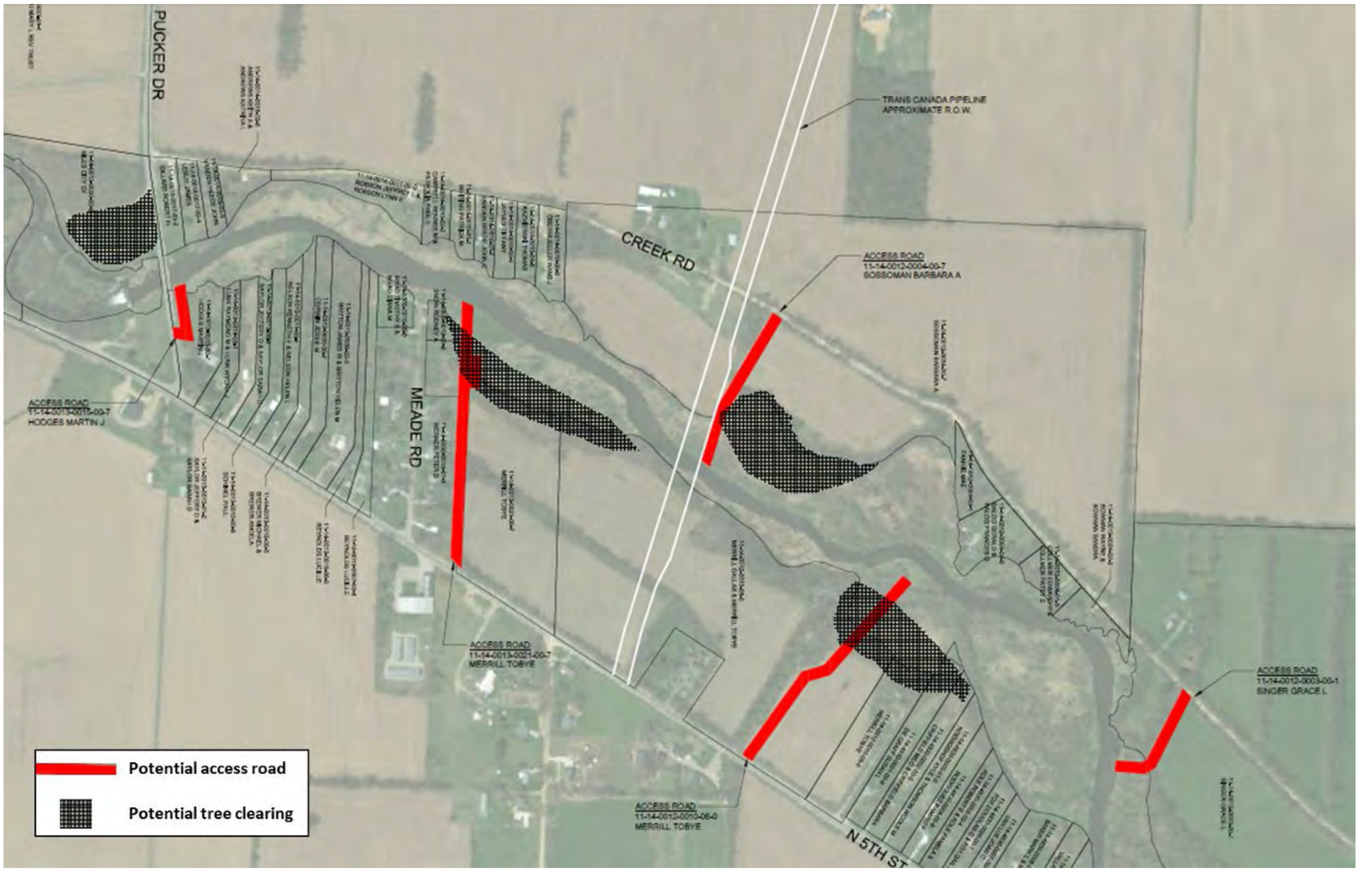


Figure 2-6. Potential Access Roads and Tree Clearing

2.2.4.2.4 Legacy Dam

In 1828, Eli Ford built a log dam and gristmill approximately 100 feet upstream of the current Pucker Street Dam. This dam was constructed to power a mill and consisted of a timber dam and fish ladder. The top of the dam was built to elevation 679.7 feet. In 1891, Bascom Parker, Sr., bought the mill (known as the old Yellow Mill) and dismantled the gristmill to establish a private power plant to supply electricity for street lights. In 1894, the City purchased the dam and 17 acres from the Niles Electric Company. Documentation of construction or modifications that were made to the 1828 dam in 1928 are not available. The current concrete dam and powerhouse was built in 1928, and the generators were converted from horizontal water wheels to a turbine type drive system with an automatic control and switching equipment.

If any remnants of the 1828 dam are discovered during the removal of Pucker Street Dam, the Contractor shall immediately stop work and inform the engineer so the proper authorities can be notified. At that time, the USFWS, with consultations from SHPO, will use the following process to determine the most appropriate actions given the best information at that time.

1. Phase I Survey

Upon discovery of any remnants, the USFWS will compile concise documentation to present findings from a brief, focused, effort. If the USFWS finds that the 1828 dam is not present and notifies the SHPO, then the project will proceed as planned with no further Section 106 compliance. However, if a portion, or all, of the 1828 dam is present, the USFWS, in consultation with the SHPO and the City, will hire an outside professional archaeological contractor to complete a Phase I archaeological survey.

2. Phase II Evaluation

Probably conducted associated with the Phase I survey by the same archaeological contractor, USFWS will direct that Phase II investigations will be done on the 1828 dam site (as feasible given the setting of the dam) to evaluate its integrity and significance. If the USFWS determines and the consulting parties concur that the remnants are not eligible for inclusion on the NRHP, the Section 106 compliance is completed for this portion of the undertaking. If the site remnants are determined eligible by USFWS, with concurrence by the consulting parties, then the USFWS will further consult with the consulting parties regarding the findings with consideration of need for any additional investigations.

3. Phase III Mitigation

If the 1828 dam remains fully or partially in place and is deemed eligible for inclusion on the NRHP and portions below the waterline (and perhaps above the waterline) need to be removed for public safety, Phase III mitigation measures will be put in place to resolve the Adverse Effect. Consultations among the consulting parties will guide the USFWS in determining the appropriate mitigation measures.

2.2.4.2.5 Cost Estimate

The estimated construction cost for Alternative B is $4.7M (2018 dollars). The total cost for the alternative, including construction, design, engineering, easements, bonding costs and contingency, of dam removal and restoration for this alternative is approximately $7.173 million (2018 dollars) (subject to refinement through detailed design and refinement of methods).

2.2.5 Comparison of Alternatives and Project Objectives

The ability of these alternatives to meet the project objectives (the objectives identified in the Purpose and Need) are compared in Table 2-6. Alternative B meets each of the objectives identified for this project, while Alternative A (No Action alternative) does not address the objectives.

Based upon the analyses of each resource described in Chapter 3, the anticipated environmental impacts for the project alternatives under consideration are summarized in Table 2-7.

2.3 Preferred Alternative

The environmentally preferred alternative is determined by applying the six criteria suggested in the NEPA (1969), which guides the CEQ. The CEQ provides direction that the environmentally preferable alternative is the alternative that would promote the national environmental policy as expressed in NEPA §101.

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
- Assure for all generations safe, healthful, productive, and aesthetically and culturally pleasing surroundings.
- Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.
- Preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.
- Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Table 2-7. Summary of Alternative Consistency with Project Objectives

Project Objectives	Alternative A – No Action	Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment
Habitat Fragmentation	Fragmentation imposed by dam and barrier to aquatic species movement unchanged.	Barrier to aquatic species movement and aquatic habitat fragmentation removed.
Habitat Degradation	On-going interruption of downstream transport processes, sediment transport processes, alteration of surface water and groundwater flow patterns, and interruption and alteration of sedimentation processes.	Downstream transport of propagules, woody debris and other materials enabled.
Induced Species Disruptions	Composition and abundance of coldwater fish communities remain distinct between Dowagiac River upstream and Dowagiac River downstream of the dam.	Composition and abundance of coldwater fishes above and below Pucker Street Dam to become more consistent and uniform due to restoration of thermal regime and removal of fish movement barrier.
Opportunity for Expansion of High Quality River System	No additional opportunity to expand high quality, high gradient river system.	Opportunity to expand a high quality, high gradient river system to include 10,000 feet of restored river at and upstream of the dam removal location.
Address Dam Stability/Safety Issue	Dam to remain in-place, safety issue unresolved.	Dam removed, safety issue resolved.

Table 2-8. Environmental Impact Summary by Alternative

Impact Topic	Alternative A – No Action	Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment
Water Resources		
Hydrology and Floodplains	Sustained disparity in hydrology of natural riverine hydrology due to impounded system.	No significant alteration in hydrology or increase in peak flood levels.
Water Quality	Water quality within the impounded reach will continue to be negatively affected by altered flows, sedimentation, and reduced riparian cover.	Short-term increase in turbidity and suspended sediments during dam construction and initial post-construction phase. Direct, long-term benefits that include the restoration of approximately 6,300 feet of aquatic habitat and the elimination of habitat fragmentation within the Dowagiac River system.
Sediments	Continued accretion of sediments within channel with sediment and silt going over the dam impacting the downstream fishery.	Restoration of naturalized sediment transport processes; potential adverse impacts of sediment remobilization and transport mitigated through extensive sediment management measures (excavation, sediment traps, etc.).
Ecology		
Aquatic Ecology	Sustained induced species disruptions due to modified thermal regime; continued fragmentation of habitat and disruption of natural transport of biotic and abiotic materials.	Restoration of coldwater thermal regime and naturalization of river aquatic biotic communities; reduced abundance of warmwater, lentic fish species and associated habitats in the impounded area above Pucker Street Dam.
Terrestrial Ecology	Sustained terrestrial plant and animal communities for short- to moderate-term.	Restoration of floodplain habitats. No significant adverse impact on terrestrial fauna/wildlife.
Sensitive Species	No impact.	No adverse impact to listed species. Establishment of a riparian area and the enhancement of wetland and upland habitats along the Dowagiac River will likely provide a more ecologically diverse and contiguous habitat.
Wetlands	Perpetuation of wetlands created by dam.	Loss of wetlands created by dam. Restoration of more natural riverine system with associated fringe wetland

Impact Topic	Alternative A – No Action	Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment
		areas.
Noxious/Invasive Species	On-going management needs for invasive species.	Intermediate term needs for management of invasive species due to exposed soils. Decontamination practices used during construction to limit invasive species introduction.
Land Use	No impact.	No impact.
Socioeconomics		
Demographics	No impact.	No impact.
Community Facilities/Services	No impact.	No impact.
Recreation	No impact.	Potential impacts to angling below dam, but increases in tourism and recreational expenditures associated with paddling and fishing within broader watershed.
Economics	No impact.	Positive economic benefit due to increase uses associated with fishing and paddling within broader watershed.
Property Ownership	No impact.	Modification of property ownership to expand legal limits of property boundaries to waters edge based on original plat
Environmental Justice	No impact.	No impact.
Cultural and Historic Resources	No impact.	No impacts to historic structures or other cultural resources.

Impact Topic	Alternative A – No Action	Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment
Visual Quality and Aesthetics	No impact.	Improvement of visual landscape due to removal of dilapidated powerhouse and associate structures, progressive re-vegetation of banks and exposed areas. The river corridor would be returned to near natural, pre-dam flow conditions.
Transportation	No impact.	Limited impact with brief closure of Pucker Street during bridge stabilization.
Air Quality	No impact.	Minor short term localized emissions. No regional air quality impacts.
Noise	No impact.	Minor short term localized noise emissions.
Human Health and Safety	Does not resolve potential liability associated with existing structure.	Removes existing structure and eliminates liability. Construction related safety issues to be mitigated using good health and safety practices/management.

Alternative A, No Action, only minimally meets the above six evaluation factors because it retains the existing facilities and does not address the components of the project Purpose and Need. The No Action alternative does not remove the barrier to fish passage and fails to resolve the observed fragmentation of the existing aquatic ecosystem. Additionally, the No Action alternative does not address the existing dam safety issue of the Pucker Street Dam.

Alternative B, Dam Removal with Blended Restoration Using Existing Channel Alignment, is the environmentally preferred alternative because this alternative best addresses these six criteria/evaluation factors. This alternative meets the objectives of the project Purpose and Need, and integrates significant mitigative commitments (e.g., sediment management measures, ecosystem restoration and enhancement, etc.) that will ensure that impacts of this action are minimized.

No new information was identified from public scoping or consultation with other agencies to necessitate the development of any new alternatives, other than those described and evaluated in this document. Because it meets the Purpose and Need for the project, the project objectives, and is the environmentally preferred alternative, Alternative B - Dam Removal with Blended Restoration Using Existing Channel Alignment is also recommended as the USFWS Preferred Alternative.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Geology and Soils

3.1.1 Affected Environment

3.1.1.1 Geology and Topographic Setting

The surface geology within the Dowagiac River Watershed consists almost entirely of thick glacial sands, silts, and gravels, along with limited post-glacial stream deposits, which have buried the shale bedrock by hundreds of feet. The Kalamazoo Moraine and the Valparaiso Moraine, which are large piles of river and delta sand deposited along the edge of the Michigan Lobe during ice retreat, demarcate the east and west side of the watershed near Niles. The moraines mark periods of glacial equilibrium, before melting withdraws the ice front to the next moraine position (Stone et al. 2003; Kincare 2010).

The Dowagiac River runs along the former Glacial Lake Dowagiac bed between the Kalamazoo and Valparaiso Moraines (Figure 3-1). Lake Dowagiac formed when ice and sediment blocked spillway outlets to the south. The flat terrain of the former lakebed results in a generally low gradient of the upper Dowagiac River and the river's associated wetlands upstream of Sumnerville, MI. The glacial lake spillway is largely filled with gravelly, sandy delta deposits from upstream (north) and from the adjacent moraines. These sands and gravels are now the dominant material in the modern channel and floodplain (Stone et al. 2003; Kincare 2010). They also make up the sandy and loamy soils found in the region (e.g. Ockley/Kalamazoo Loams, Oshtemo Sandy Loam, Cohoctah Sandy Loam). The sands and silts stored behind Pucker Street Dam are derived from these materials.

The glacial materials associated with the outwash plains and moraines are relatively permeable, allowing precipitation to infiltrate and travel in subsurface pathways through the deposits. The coarse glacial material of the watershed is responsible for storing large volumes of cold groundwater which maintains the Dowagiac River, even in the heat of summer, as a coldwater river. Within the study reach, floodplain wetlands have formed along the valley walls where groundwater seeps into the valley. Infiltration also reduces surface runoff in the system, thereby limiting flow fluctuations.

The downstream end of the Dowagiac River is characterized as having a steeper gradient as compared to the upper reaches. Pucker Street Dam is located within the upper section of the reach containing this steeper gradient (see Figure 1-4). Survey data suggests the steeper slope extends under the Pucker Street impoundment sediments to near Kinzie Road.

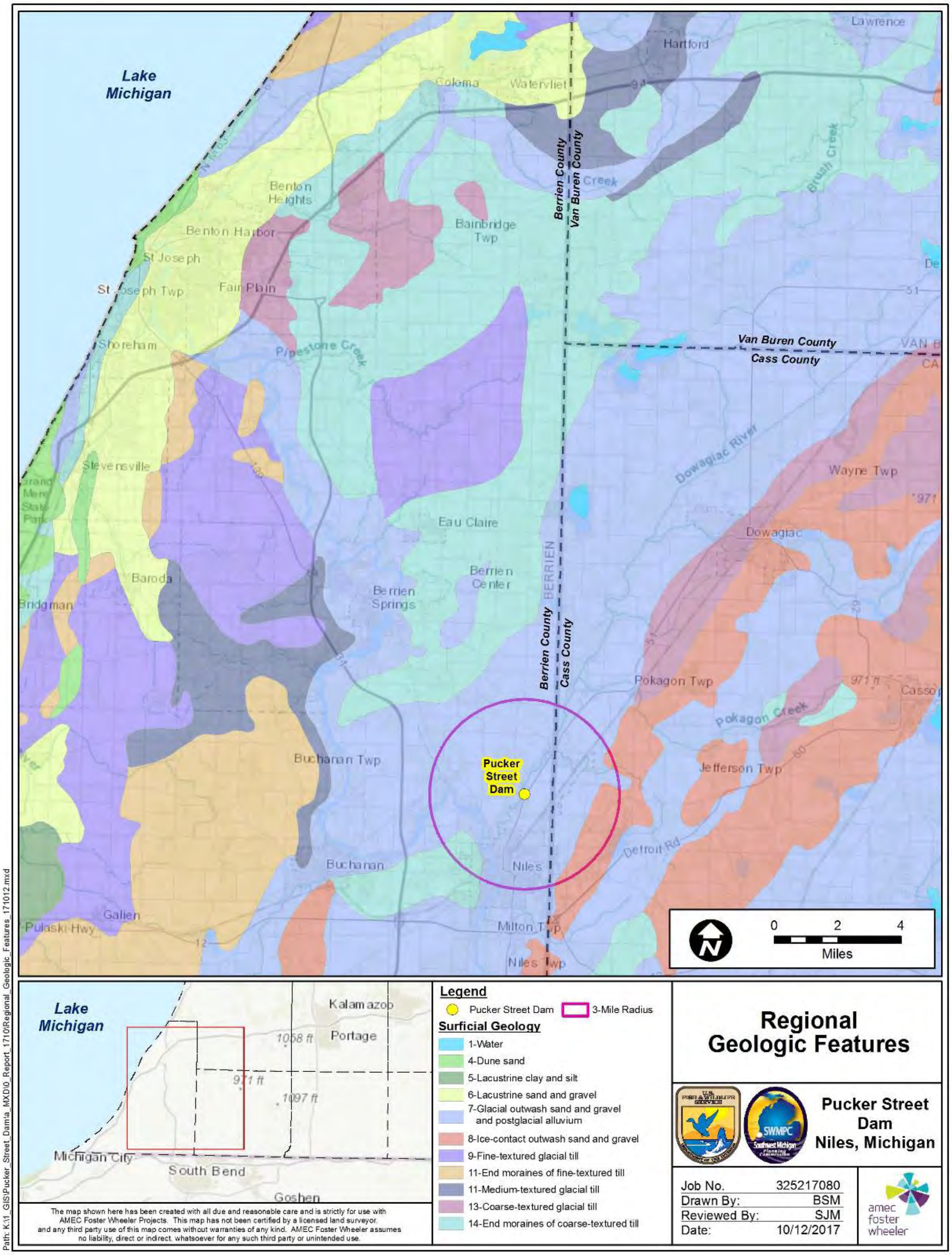


Figure 3-1. Regional Geologic Features

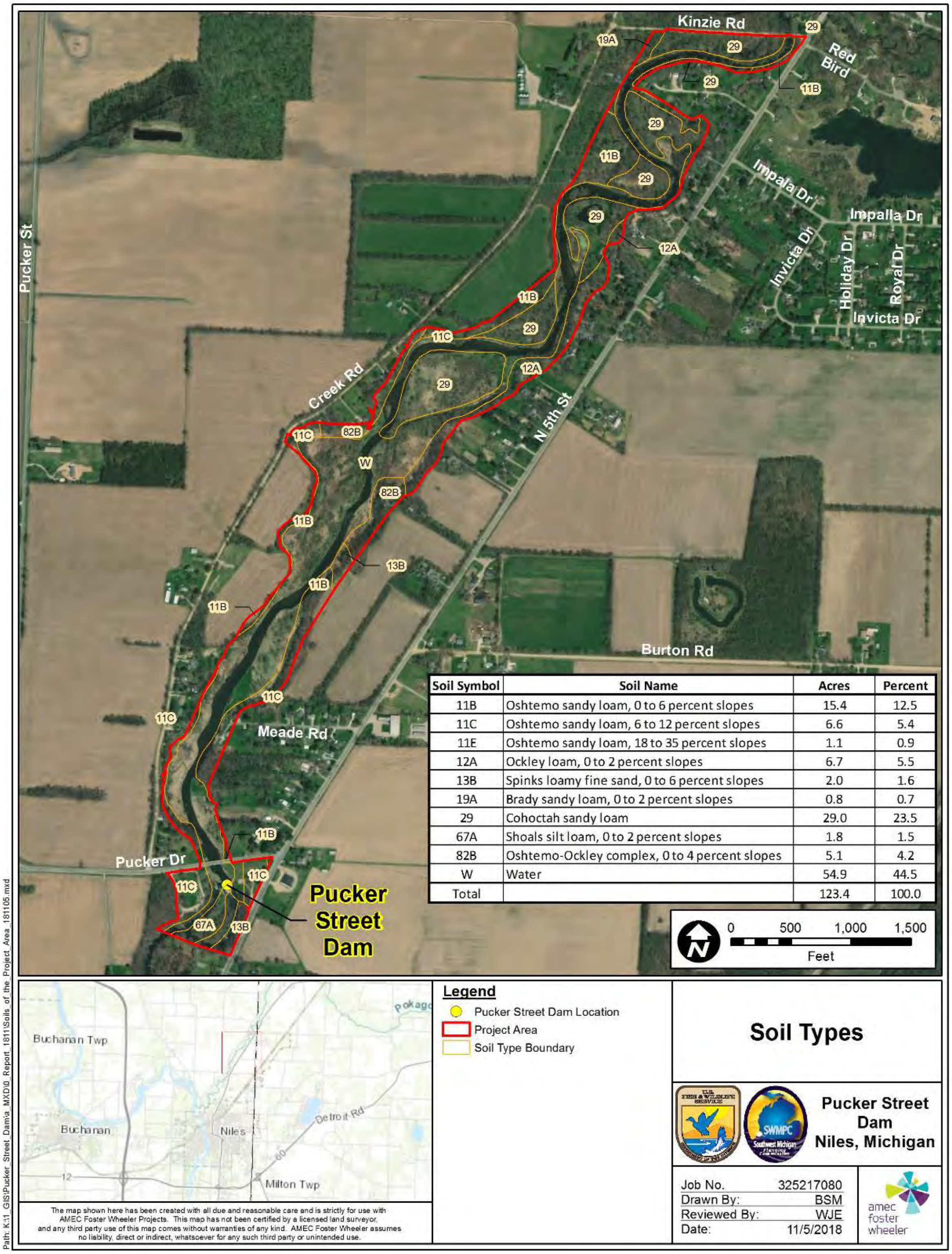
3.1.1.2 Soils

Soils within the immediate project area are summarized in Table 3-1 The dominant mapped soil types within the project area are Cohoctah sandy loam, Oshtemo sandy loam, and Ockley loam (Figure 3-2). Among the nine mapped soil types, three hydric soils are identified from the project area: Brady sandy loam, 0 to 2 percent (19A), Cohoctah sandy loam (29), and Shoals silty loam, 0 to 2 percent (67A). Brady sandy loam is a somewhat poorly drained soil formed in depressions and drainageways; Cohoctah sandy loam is a poorly drained soil formed in elongated areas of floodplains of rivers and streams; and Shoals silt loam, 0 to 2 percent is a somewhat poorly drained soil that forms on broad-flat areas of floodplains and bottomlands along streams and rivers (USDA NRCS 2017).

Table 3-1. Soils of the Project Area

Symbol	Soil Map Unit Name	Drainage Class	Hydric
19A	Brady sandy loam, 0-2%	Somewhat poorly drained	Yes
29	Cohoctah sandy loam	Poorly drained	Yes
67A	Shoals silt loam, 0-2%	Somewhat poorly drained	Yes
11B	Oshtemo sandy loam, 0-6%	Well drained	No
11C	Oshtemo sandy loam, 6-12%	Well drained	No
11E	Oshtemo sandy loam, 18-35%	Well drained	No
12A	Ockley loam, 0-2%	Well drained	No
13B	Spinks loamy find sand, 0-6%	Well drained	No
82B	Oshtemo-Ockley complex, 0-4%	Well drained	No

Source: USDA NRCS 2017



Soil Symbol	Soil Name	Acres	Percent
11B	Oshtemo sandy loam, 0 to 6 percent slopes	15.4	12.5
11C	Oshtemo sandy loam, 6 to 12 percent slopes	6.6	5.4
11E	Oshtemo sandy loam, 18 to 35 percent slopes	1.1	0.9
12A	Ockley loam, 0 to 2 percent slopes	6.7	5.5
13B	Spinks loamy fine sand, 0 to 6 percent slopes	2.0	1.6
19A	Brady sandy loam, 0 to 2 percent slopes	0.8	0.7
29	Cohoctah sandy loam	29.0	23.5
67A	Shoals silt loam, 0 to 2 percent slopes	1.8	1.5
82B	Oshtemo-Ockley complex, 0 to 4 percent slopes	5.1	4.2
W	Water	54.9	44.5
Total		123.4	100.0

Figure 3-2. Soils within the Project Area

3.1.2 Environmental Consequences

3.1.2.1 Alternative A – No Action

Under this alternative, the dam would remain in place and sandy sediment would continue to build up above Pucker Street Dam. The sedimentation is a soil-forming process and would continue to expand the delta, eventually filling the impounded area.

3.1.2.2 Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment

Removal of the Pucker Street Dam would result in soil disturbance from activities associated with dam removal and sediment management within the impoundment. In the vicinity of the dam, the existing soil embankment would be partially removed and would be graded to facilitate the restored river channel. Grading would result in 2H:1V bank slopes that would be stabilized by seeding. In some areas near the bridge, the slope may be decreased to accommodate landowner preferences.

The drawdown of the impoundment would proceed slowly (approximately 0.5 feet per day), such that minimal sediment would be released downstream. The sediment consists primarily of sand and does not remain suspended in the water column once flow velocities are reduced. However, the silt would continue to move downstream.

Under this alternative, a stream channel and adjacent floodplain would be actively restored for a portion of stream channel. The floodplains on each side of the channel would initially be constructed as 20 feet wide on average but would adjust over time based on river flow. As a result of these activities, soils (sediments) within the existing channel and associated floodplain would be excavated and placed in appropriate areas above the 100-year floodplain of the Dowagiac River. This would result in the development of approximately 14.5 acres of upland areas with soils that are slightly elevated (approximately 5 to 7 feet) relative to the surrounding terrain. Slopes of these upland areas, however, are designed to be gentle and not subject to erosion. These soils would be stabilized by seeding.

3.2 Hydrology and Floodplains

3.2.1 Affected Environment

3.2.1.1 Hydrologic Setting

The Dowagiac River Watershed encompasses approximately 286 square miles and is located within the St. Joseph River Basin in the southwestern corner of Michigan's lower peninsula (see Figure 1-2). The Dowagiac River flows diagonally across Cass County in a southwesterly direction to its confluence with the St. Joseph River in Berrien County. The largest tributary is the Dowagiac Creek (formerly known as the south branch of the Dowagiac River). Other tributaries include the Lake of the Woods and Osborn drains and Silver, Peavine, Pokagon and McKinzie "Kinzie" creeks (Cass County Conservation District 2002). The floodplain longitudinal profile surveys within the project area are illustrated in Figure 3-3.

The Dowagiac River is classified as a relatively large, coldwater system with a high connection to groundwater. The highly permeable soils and glacial deposits of the surrounding morainal landscape described in Section 3.1 provide for substantial groundwater contributions to the Dowagiac River and its tributaries. It is estimated that 90 percent of the flow in the Dowagiac River and its tributaries is fed by groundwater and only 10 percent of the flow comes from surface run-off. The average flow at the Sumnerville gauge station for the period of record

(October 1960-present) is 299 cubic feet per second (cfs), which is equivalent to 15.94 inches/year of runoff from the 255 square mile watershed. High groundwater contributions along much of the Dowagiac River's length provide cold temperatures and steady base flow throughout the summer season (Cass County Conservation District 2002).

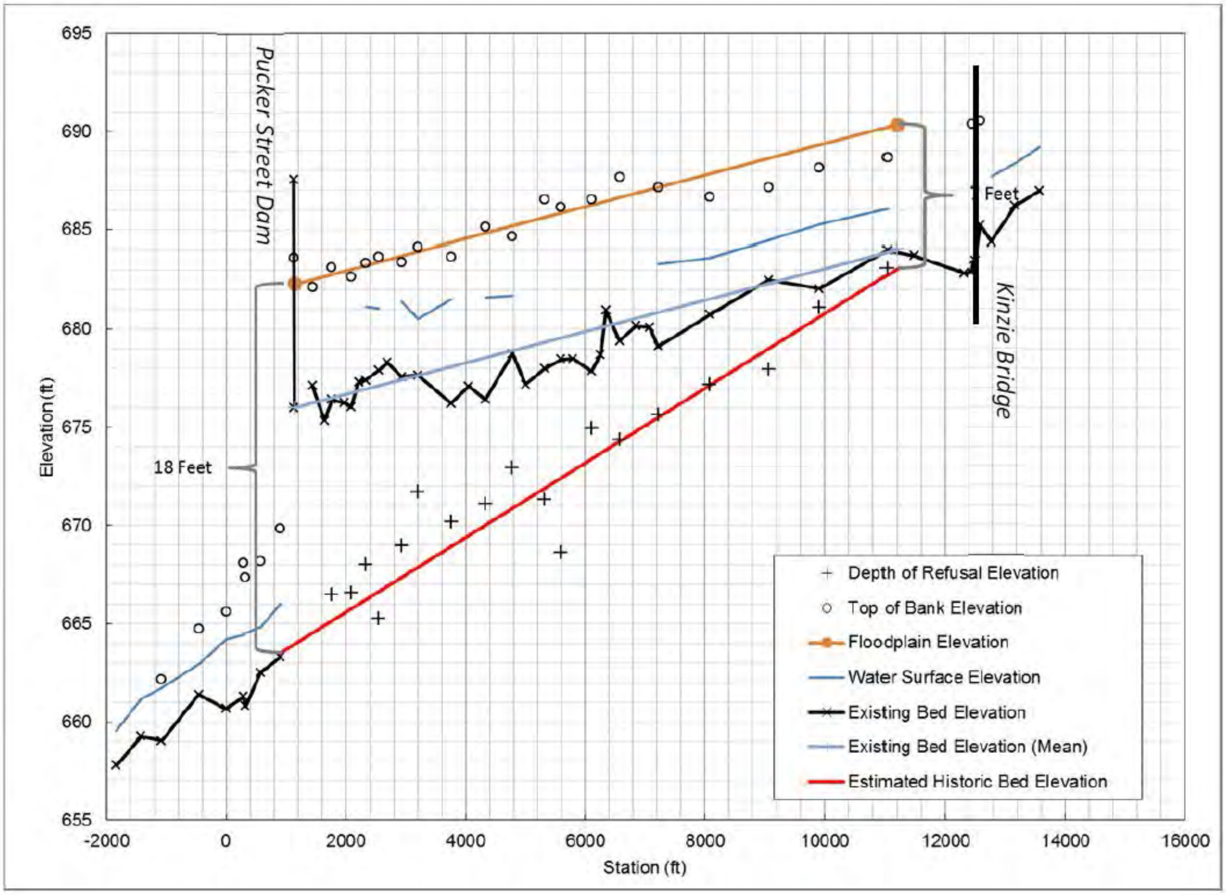


Figure 3-3. Floodplain Longitudinal profile of the Dowagiac River from Kinzie Road to Pucker Street Dam

(Source: Inter-Fluve 2016)

3.2.1.2 Flow Characteristics

Flow characteristics of the Dowagiac River are important considerations for restoration design and for evaluating the potential for flooding from dam removal.

Within the Dowagiac River, base flow is primarily associated with the groundwater portion of the river discharge. Groundwater contribution is important to the Dowagiac River, providing a stable source of cold water that provides suitable habitat for coldwater species, such as trout. Surface water runoff when added to base flow induces flow increases of various magnitudes, including floods. Base flow, although relatively constant, varies in magnitude with precipitation and snow melt within and between years.

To understand the changes between wet years and dry years in the magnitude of base flow, it is useful to consider the exceedance probability, which is expressed as the percentage of time that a given flow rate is exceeded. For example, the driest day would have a 100 percent exceedance flow value, indicating flow has never dropped below this value during the period of record. A 10 percent exceedance value was used to estimate typical low flows in extremely wet years. A plot of average flow, 10 percent exceedance and 100 percent exceedance flows at the Sumnerville gaging station (U.S. Geological Survey [USGS] gage 04101800) is shown in Figure 3-4. Similar recurrence interval data are presented in tabular form for the Sumnerville gage and at Pucker Street Dam (Table 3-2). As shown in Table 3-2, base flows as indicated in the 90 percent exceedance value were determined to be 162 cfs at Sumnerville and 179 cfs at Pucker Street during summer months. Base flow is somewhat higher during other seasons as indicated in Figure 3-4.

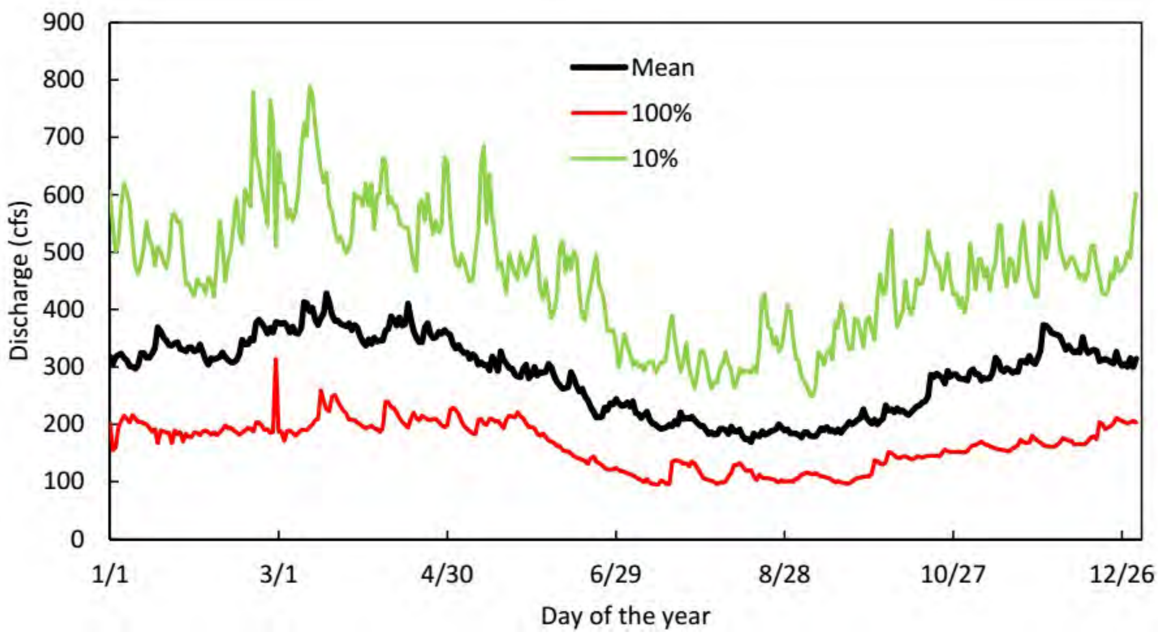


Figure 3-4. Daily Probability of Flows on the Dowagiac River Near Sumnerville

(Source: USGS gage 04101800; IACWD 1983, Sumnerville MI, Inter-Fluve 2016)

To estimate flood magnitudes, a Log-Pearson Type III (LP3) probability distribution was fit to the Dowagiac River at Sumnerville, MI, flow gaging station data (USGS gage 04101800). This gage is located 4.5 miles upstream of the project site. The Sumnerville gage recorded larger floods (>1,250 cfs) in 1968, 1985, 1986, 1990, 1993, 1997, 2008, and 2009. The smallest annual peak flow was 629 cfs in 2000 and the largest annual peak was 2,300 cfs in 2008. An additional flow gaging station at State Highway 51 (USGS gage 04101535, installed in 2012) was not utilized for flood magnitude analysis given its short period of record. In general, the high infiltration rates throughout the watershed and subsequent high groundwater supply to the Dowagiac River results in a relatively stable flood hydrology as summarized in Table 3-3. The range of flood flows is relatively small, with the difference between a frequently occurring peak flow (<2 year return interval) and an infrequent peak flow (>50 year return interval) less than a factor of two.

Table 3-2. Low Flow Statistics at the Sumnerville Gage and at Pucker Street Dam

Return Interval ('ears)	Discharge (cfs)	
	Sumnerville Gage	Pucker Street Dam
1	777	859
5	541	598
10	458	506
50	276	305
75	205	227
90	162	179

Source: USGS gage 04101800; IACWD 1983, Sumnerville MI (Values at Pucker Street Dam adjusted based on watershed area)

Table 3-3. Predicted Flood Magnitudes at Pucker Street

Return Interval (Years)	Pucker Street Dam Discharge (cfs)
1.43	1,008
1.5	1,017
2	1,125
5	1,347
10	1,483
25	1,646
50	1,762
100	1,874

Source: USGS gage 04101800; IACWD 1983, Sumnerville MI (Values at Pucker Street Dam adjusted based on watershed area, Inter-Fluve 2016)

As a federal agency, USFWS is subject to the requirements of EO 11988, Floodplain Management. The objective of EO 11988 is to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. The EO is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances. The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative.

The portion of the Dowagiac River within the project area is mapped as Zone A for the National Flood Insurance Program. The 100-year floodplain elevation is 688.0 feet (NGVD 29) at the upstream side of dam (Inter-Fluve 2016).

3.2.2 Environmental Consequences

3.2.2.1 Alternative A – No Action

Under the No Action alternative, hydrologic conditions currently evident on the Dowagiac River in the vicinity of Pucker Street Dam would remain unaltered. As such the natural flowing regime of the river is interrupted by a still water (lentic) system. Accordingly, the slower flowing water evident upstream from the dam would continue to promote sedimentation. The impounded area would gradually become shallower due to sedimentation and even more sediment would be carried over the dam as the impounded area fills up. Similarly, the extent of the 100-year floodplain would remain unchanged from the existing condition.

3.2.2.2 Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment

Hydrologic and hydraulic analyses indicate that removal of Pucker Street Dam would not significantly change flood flow rates and, therefore, flood elevations downstream of the dam. At Pucker Street Dam, the current flood volume during the 2-year flood is around 16,900 acre-ft compared to a storage volume of just 79 acre-ft (0.5 percent). For the 200-year flood, the current flood volume is 10,233 acre-ft compared to a storage volume of 226 acre-ft (2.2 percent). Both comparisons indicate that under existing conditions, there is little flood attenuation. Under Alternative B, the design channel would store 42 acre-ft during the 2-yr flood and 70 acre-ft during the 200-year flood, which amount to 0.3 percent and 0.7 percent of flood volume, respectively. Although the storage volumes available in the proposed design are smaller than existing storage, the storage-to-flood volume ratios are less than the 15 percent required to produce a noticeable impact. Therefore, dam removal should have no impact on flood storage and peak discharge magnitudes downstream.

As specified in EO 11988 the lead federal agency must provide leadership in reducing the risk of flood loss, minimizing the impact of floods on human safety, health, and welfare, and in restoring and preserving the natural and beneficial values served by floodplains. In accordance with this EO and as demonstrated above, the proposed action does not adversely increase the risk of flooding. However, in concert with the proposed removal of Pucker Street Dam and the associated restoration of a natural river channel, it does provide some benefits in restoring and preserving the natural and beneficial values of floodplains by virtue of the constructed floodplain benches along 1,400 feet of the restored channel. In total, this alternative has the potential to restore up to 4.1 acres of effective floodplain along the reconstructed river channel. Riparian habitats are associated with unique disturbance regimes (i.e., flooding) and distinct physical conditions, and therefore they contain a disproportionately high number of rare species and rare natural community types. Research has demonstrated that the abundance and distribution of floodplain species can be predicted on the basis of the magnitude, frequency, and duration of floodflows (Hupp and Osterkamp, 1985). Therefore, restoring and conserving these species and natural communities through the removal of the dam provides beneficial impacts to the floodplain. Natural functions and values offered by floodplains and provided by Alternative B include natural flood storage, sediment retention, nutrient retention/removal, wildlife support, fish spawning and reproduction, natural heritage values (sensitive species support), and other functions. Consequently, Alternative B is consistent with the requirements of EO 11988.

3.3 Sediment Transport

3.3.1 Affected Environment

3.3.1.1 Existing Conditions

Based on observations in the upper watershed, the Dowagiac River gains sand and finer material from tributaries within the upland wetland reaches, but the sands cannot be transported easily due to the reduced velocities associated with the low gradient of the upper watershed (see Figure 1-4). Once the landscape slope increases, sediment is delivered to the river from tributaries, and to a lesser extent, from erosion along the channel margins. Bed material begins to include more gravels and small cobbles, which form occasional riffles along the channel;

however, sand appears to be the dominant bed material along most of the river. Sand moves nearly continuously within the Dowagiac River system and is eventually delivered to the impoundment behind the dam. Some gravel is also transported through the system, but currently appears to settle at the upstream end of the study reach (downstream of Kinzie Road), while the smaller sand and fine particles can be carried farther downstream into the impoundment.

During the 1999 drawdown, the upstream streambed adjusted to the lowered pool level by down-cutting to a new equilibrium profile, which was achieved approximately three years later. Because sediment transport processes are interrupted by the dam and its associated impoundment, little sediment is carried to the Dowagiac River below the dam. Smaller particles suspended within the water column are, however, transported downstream of the dam during high flow events. As a result, the streambed upstream of the dam is primarily sand with some gravel. Downstream of the dam, the stream sediments are significantly coarser, consisting of gravel and small cobble. As such, the river downstream of Pucker Street Dam may be characterized as sediment starved and as such is exhibiting some reduced channel stability as evidenced by its greater width relative to reference reaches. Additionally, potential changes in the Dowagiac River Watershed have occurred since the dam was constructed that could potentially cause fluvial processes to be different from the pre-dam condition. Channelization and development, as well as climate changes, may have altered the hydrology and the sediment load from the watershed upstream of the Kinzie Road bridge.

3.3.1.2 Sediment Contamination

A total of 42 sediment samples were collected in 2014 and analyzed for grain size and chemical parameters (PCB's, PNA's, arsenic, cadmium, copper, lead, mercury, nickel, selenium and zinc). A total of 14 transects were conducted, with sediment samples collected from the left, center and right side of the stream when looking downstream, as shown in the map in Appendix D. Sediment samples from transects one through 9 were collected by Great Lakes Environmental Center using vibracore methods. The first transect was 25 feet upstream of the dam, with each successive transect 500 feet upstream.

The results of the sediment testing are presented in detail in Appendix D and show that only concentrations of arsenic, selenium and zinc in some samples exceed the statewide default background levels. However, the Upper Confidence Limits (UCL) for arsenic and zinc are below the accepted state background levels for this area. Although the UCL for selenium at 480 parts per billion (ppb) exceeded the default background limit of 410 ppb, this is still a low enough concentration to not exceed the Part 201 (environmental remediation) criteria.

Results of the sediment analysis were submitted to the MDEQ for review and concurrence. Based on this review it was determined that the dredged sediment is considered inert and suitable for unrestricted upland disposal and can be used as unrestricted fill material (Oscar Loveless, email March 5, 2015 in Appendix B). The appropriate federal and state permits from U.S. Army Corps of Engineers and MDEQ would still need to be acquired to place this material in streams and wetlands.

3.3.1.3 Sediment Depth

Field studies in support of river restoration design included completing a DOR study within the Dowagiac River upstream of Pucker Street Dam. Fieldwork included noting general geomorphic characteristics and collecting topographic and DOR surveys at transects across the river and along the existing channel alignment. The DOR survey was conducted by pushing a rod through accumulated impoundment sediment until a firm layer (e.g., clay or gravel) “refuses” further penetration. DOR surveys allow an initial interpretation of former vertical and horizontal channel position and depth of sediment.

Data collected as part of the DOR and longitudinal profile surveys are illustrated in Figure 3-4 and presented in detail in Appendix D. Results indicate that the average channel depth from the existing river bed to impounded sediment surface (i.e., floodplain) is approximately 6 feet throughout the study reach. The DOR data, however, suggest the valley is filled with sediment up to 18 feet deep in the vicinity of the dam, and that the channel gradient prior to dam construction was more than double the existing gradient.

3.3.2 Environmental Consequences

3.3.2.1 Alternative A – No Action

Under the No Action Alternative, Pucker Street Dam is expected to remain in-place for some indeterminate short-term period, during which the current sediment conditions would remain unchanged. The river downstream of Pucker Street Dam would continue to be sediment starved and the stream sediments downstream of the dam would be dominated by gravel and small cobble.

3.3.2.2 Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment

A HEC-RAS sediment transport analysis was completed to assess the stability of the proposed channel restoration plan and rate of sediment transport dynamics associated with the dam removal. The model used the available streamflow data at the USGS Dowagiac River at Sumnerville for the period from January 2005 through June 2010, which included the flood of record at this station that occurred in 2008. The existing conditions model predicted an average annual sediment discharge from the downstream end of the modeled reach (approximately 2,000 feet downstream of the dam) of 4,721 tons/year, which was generated mostly due to a large discharge during 2008. For the years other than 2008, the average annual sediment discharge was 3,324 tons/year. The sediment inflow at the upstream boundary of the model was 2,166 tons/year and 1,956 tons/year for years excluding 2008.

This analysis indicates that, based on project plans, a large increase in sediment discharge within approximately 2,000 feet downstream of the dam is not anticipated. The sandy streambed is expected to adjust relatively rapidly with water level lowering. The model predicted a relatively uniformly occurring sediment load of approximately 118 tons/day during a five-month channel adjustment period following dam removal and water level lowering before returning to a sediment discharge rate of approximately 1,818 tons/year for the next four years.

Additionally, the HEC-RAS model analysis indicated that while significant channel degradation (down-cutting) occurred in the upper portion of the modeled stream reach, some deposition of sediment occurred in the lower portion of the modeled reach, downstream of the former dam, reducing the sediment load to the stream reach further downstream.

It was noted that the channel upstream of the location where the dredged channel bed departs from the identified historic river bed (estimated by the DOR probes) responded immediately to the water level lowering, with down-cutting of the streambed by up to approximately 1.5 to 2.0 feet, trending to a flatter slope closer to the 0.21 percent slope estimated from the DOR profile. A sand bed stream would be expected to adjust to the change relatively quickly. The model indicates that active restoration (excavation) of the future channel down to the profile of the historic streambed at which an armored bed had developed is important to the stability of the streambed and sediment discharge resulting from the dam removal. Actual sediment load discharged would vary from the model based on the streamflow rates that occur in the months following the dam removal. In order to reduce sediment load to the furthest extent possible, the removal of the dam would be scheduled for a typical low flow period of the year. The installation and operation of a sediment trap upstream of the dam to capture and remove sediment during the period of channel adjustment would even further reduce the amount of sediment transported downstream.

3.4 Water Quality

3.4.1 Affected Environment

The Dowagiac River is a coldwater stream (Lyons et al. 2009; Gunderman 2011) that flows southwest from its headwaters in Van Buren County to its mouth at the St. Joseph River near Niles, MI (see Figure 1-3). The St. Joseph River eventually links the Dowagiac River to Lake Michigan near Benton Harbor, MI. Major tributaries to the Dowagiac River include Lake of the Woods and Osborn drains and Silver, Peavine, Pokagon, McKinzie, and Dowagiac creeks. Mean daily streamflow in the Dowagiac River is 300 cfs based on 58 years of existing data (USGS Streamgage No. 04101800 near Sumnerville, MI). Cobble, gravel, sand, and occasional boulder are the major substrate types found throughout the system. Coarse textured glacial deposits allow substantial groundwater contributions to the Dowagiac River system, which keep the Dowagiac River and its tributaries at a lower temperature year-round.

The Dowagiac River Watershed has a history of land use change that contributed to water quality degradation in the basin. Settlements near Niles, MI in the late 1820s and 1830s resulted in large swaths deforested for agriculture (Rogers 1875 as cited in Inter-Fluve 2016). Stream temperatures have been affected by the removal of riparian corridors that provide shading and an increase of surface water runoff, which reduces the influence of cold groundwater (Clarke et al. 1998; Cass County Conservation District 2002). The conversion of lands to agricultural use also increases sediment load runoff, which increases turbidity and causes sedimentation along the stream bottom.

Anthropogenic changes directly to the Dowagiac River have also contributed to water quality degradation. For example, a section of the Dowagiac River was dredged and channelized in the 1900s to facilitate drainage of the surrounding floodplain and free more land for agriculture (Clarke et al. 1998; Cass County Conservation District 2002). Straightening and dredging the river resulted in increased surface water delivery to the system, increased river velocities, and increased sediment transport downstream. Dredging also caused the river banks to become incised and reduced the connectivity of the Dowagiac River from its floodplain, resulting in reduced nutrient delivery and increased the severity of downstream flooding. Ultimately, the channelization succeeded in draining more of the watershed and converting it into farmland—exacerbating sedimentation and surface runoff issues. Additionally, the construction of Pucker Street Dam in the 1920s acts as a barrier separating the middle and upper sections of the Dowagiac River from its lower segment and the St. Joseph River (see Figure 1-3). The combination of land use changes and channelization upstream of the dam led to an increase in the volume of sediment, which was trapped behind Pucker Street Dam. Since its inception, the impounded area behind Pucker Street Dam has filled with approximately 1,000,000 cubic yards of material (Inter-Fluve 2016).

Despite the damage caused by habitat alteration, the large amount of groundwater contribution to the Dowagiac River helps maintain good surface water quality. It is estimated that 90 percent of the flow in the Dowagiac River is groundwater (Cass County Conservation District 2002). Groundwater contributions provide cool, stable base flows. The Dowagiac River's temperatures in the month of July average in the mid to upper sixties with diurnal temperature fluctuations at a minimum (Cass County Conservation District 2002). Overall, the pH is slightly alkaline and the amount of suspended sediments is relatively low (Clarke et al. 1998). Point source pollution sources (e.g., heavy industries and waste-water treatment) are relatively few in the watershed. As of 1998, there were only eight MDEQ permitted outflows in the watershed (Cass County Conservation District 2002). However, a high water table and high infiltration rates in the watershed make groundwater resources vulnerable to non-point source pollution of fertilizers, pesticides, animal waste, and human waste (i.e., leachate from septic systems). For example, agricultural activities appear to be contributing increased nutrients to both the groundwater and surface water in several locations (Cummings et al. 1984; Brennan and Stamm 1991). Nutrients (e.g., phosphorus) easily bind to fine sediments (Allan and Castillo 2007), which accumulate behind the Pucker Street Dam.

Water temperatures, concentrations of dissolved oxygen (DO), and levels of suspended sediments are adequate to support trout (MDEQ 1997a, 1997b). However, the State has listed the Dowagiac River as impaired in MDEQ's Clean Water Section 303(d) list of impaired waterbodies for not meeting the fish consumption designated use due to polychlorinated biphenyl (PCB) found in the water column and in fish tissue (MDEQ 2016). Manufacture of PCB ended in 1979, but they are a persistent organic pollutant and are still found in the Great Lakes region where they bioaccumulate in sportfish. However, the concentrations of PCB in Great Lakes fish have declined since the 1990s (Salamova et al. 2013).

3.4.2 Environmental Consequences

3.4.2.1 Alternative A – No Action

Under the No Action alternative, Pucker Street Dam would remain as a barrier separating the middle and upper sections of the Dowagiac River from its lower segment and the St. Joseph River. Water quality within the impounded reach would continue to be negatively affected by altered flows, sedimentation, and reduced riparian cover. Reduced stream velocity allows sediments and nutrients to settle out of suspension in the impoundment. Sediment would continue to accumulate behind the dam, to the detriment of upstream and downstream water quality. Eventually the impounded area would gradually become shallower due to sedimentation and warming would occur more rapidly, resulting in increased water temperatures.

3.4.2.2 Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment

Under Alternative B, natural flow regimes and sediment transport processes would be restored to both upstream and downstream habitats. Long-term water quality would also improve with the removal of fine sediments that accumulate higher proportions of pollutants. The return of shallow, high-velocity habitats (e.g., riffles and runs) would improve dissolved oxygen concentrations throughout the system. Riparian habitat establishment and enhancement would act as erosion controls along banks and as filters for pollutants in surface-water runoff.

Removal of the Pucker Street Dam and restoration of a free-flowing river would return the Dowagiac River to its natural thermal regime. The decrease in channel width upstream of the dam would reduce the residence time of water, therefore resulting in a slightly lower summer water temperature. Additionally, under Alternative B, restoration activities would have the indirect effect of lowering stream temperatures through vegetation reestablishment that would provide shading along the banks.

Under Alternative B short-term effects to water quality are anticipated. Removal of the dam would mobilize accumulated sediments behind the dam and increase downstream turbidity. Some increases in turbidity are also expected to occur in conjunction with headcutting (i.e., the scouring of the stream channel to a more natural slope). Extensive sediment management efforts using both active excavation of the river channel and passive collection using instream-sediment traps would minimize downstream sediment transport. Sediment removals would reduce adverse effects to water quality, but increased turbidity and sediment deposition would nonetheless occur. Active construction in the channel would also increase turbidity but would be limited to the construction phase of this alternative. Work performed under Alternative B would comply with all terms and conditions regarding turbidity monitoring in the MDEQ permit. Additionally, revegetation and erosion BMPs would be used to limit surface runoff of sediments from upland construction areas. Overall, dam removal is expected to increase downstream turbidity in the short-term, but such effects would be temporary and be offset by the improvements in water quality in restored habitats upstream.

Alternative B would result in direct, long-term benefits that include the restoration of approximately 6,300 feet of aquatic habitat and the elimination of habitat fragmentation within the Dowagiac River system. Removal of Pucker Street Dam would reconnect 159 miles of streams within the Dowagiac River Watershed to the St. Joseph River (Clarke et al. 1998). Extensive sediment management activities would reduce the potential for extensive downstream transport of sediments that can affect water quality. Short-term sedimentation in the lower Dowagiac River would occur but is expected be reduced by seasonal flooding. Overall, this alternative would result in an overall improvement of water quality for the Dowagiac River.

3.5 Aquatic Ecology

3.5.1 Affected Environment

3.5.1.1 Existing Conditions

The Dowagiac River is a coldwater stream that flows approximately 31 miles from its headwaters in Van Buren County to its mouth in the St. Joseph River near Niles, MI (see Figure 1-3). The St. Joseph River eventually links the Dowagiac River to Lake Michigan near Benton Harbor, MI. Major tributaries to the Dowagiac River include Lake of the Woods and Osborn drains and Silver, Peavine, Pokagon, McKinzie, and Dowagiac creeks. Cobble, gravel, sand, and occasional boulder are the major substrate types found throughout the system. Consistent groundwater inflows keep the Dowagiac River and its tributaries at a lower temperature year-round. For example, monitoring at several sites along the mainstem Dowagiac River during 2013-2014 revealed mean July water temperatures from 63.5°F to 68.8°F.

Habitat is degraded throughout the Dowagiac River system largely due to historical channelization, land use impacts, and dam operations. The Dowagiac River has a history of channelization to facilitate wetland drainage for agricultural and urban use. Channelization eliminates important spawning and rearing habitats by reducing stream meanders, instream habitats (e.g., riffles, pools, snags), and riparian vegetation (Gordon et al. 1992). More impervious surfaces (e.g., parking lots) also increase surface runoff, which reduces the influence of cold groundwater and increases river temperatures. Furthermore, the loss of riparian vegetation along the river channel increases stream temperatures by reducing shade on the river.

Pucker Street Dam acts as a barrier separating the middle and upper sections of the Dowagiac River from its lower segment and the St. Joseph River (see Figure 1-3). Dams often result in a range of effects on a river system including fragmentation coupled with the alteration of natural flow regimes, stream temperatures, and sediment transport processes (see Section 1.4.2).

3.5.1.1.1 Fish Composition

Stable groundwater inflows make the Dowagiac River and its tributaries recreationally important coldwater fisheries. The entire Dowagiac River mainstem is classified as a second quality coldwater stream and major tributaries to the Dowagiac River are classified as top or second quality coldwater systems (Wesley and Duffy 2003). The MDNR has completed fisheries surveys on the Dowagiac River on multiple occasions from 1939 through 2011. Brown trout is the primary game fish species upstream of the dam. The brown trout population consists of a mixture of stocked fish and wild fish from tributary streams (e.g., Pokagon and Peavine creeks). The fishery downstream of the dam is dominated by potamodromous fish species, with rainbow trout (steelhead), Chinook salmon, and coho salmon being the most abundant fish harvested during MDNR creel surveys conducted during 1992-2004 and 2006 (Gunderman 2017). MDNR has about 14 years (1992 to 2004 and 2006) of creel survey data available for the section of the Dowagiac River downstream of Pucker Street Dam, which is publicly available at https://www.michigan.gov/documents/dnr/FR16_551843_7.pdf. Brown trout were the most common river resident species observed during the creel surveys in the lower river. Throughout all MDNR surveys, 42 fish species were captured downstream of the dam and 39 species were collected upstream of the dam (Table 3-4). Notable fish species missing from upstream sites include potamodromous salmonids (rainbow trout, Chinook salmon, and coho salmon), walleye, logperch, and shorthead redhorse.

Table 3-4. Fish Species Composition in the Dowagiac River

Common Name	Scientific Name	Upstream of Pucker Street Dam	Downstream of Pucker Street Dam
American brook lamprey	*Lethenteron appendix*	X	X
Black crappie	*Pomoxis nigromaculatus*	X	
Blacknose dace	*Rhinichthys atratulus*	X	X
Blackside darter	*Percina maculata*	X	X
Bluegill	*Lepomis macrochirus*	X	X
Bluntnose minnow	*Pimephales notatus*	X	X
Bowfin	*Amia calva*	X	
Brook silverside	*Labidesthes sicculus*	X	
Brown trout	*Salmo trutta*	X	X
Central mudminnow	*Umbra limi*	X	X
Central stoneroller	*Campostoma anomalum*		X
Chinook salmon	*Oncorhynchus tshawytscha*		X
Coho salmon	*Oncorhynchus kisutch*		X
Common carp	*Cyprinus carpio*	X	X
Common shiner	*Luxilus cornutus*	X	X
Creek chub	*Semotilus atromaculatus*	X	X
Emerald shiner	*Notropis atherinoides*	X	
Golden redhorse	*Moxostoma erythrurum*	X	X
Golden shiner	*Notemigonus crysoleucas*	X	X
Grass pickerel	*Esox americanus*	X	X

Common Name	Scientific Name	Upstream of Pucker Street Dam	Downstream of Pucker Street Dam
Greater redhorse	*Moxostoma valenciennesi*	X	
Green sunfish	*Lepomis cyanellus*	X	X
Hornyhead chub	*Nocomis biguttatus*	X	X
Iowa darter	*Etheostoma exile*	X	
Johnny darter	*Etheostoma nigrum*	X	X
Lake chubsucker	*Erimyzon succetta*	X	
Largemouth bass	*Micropterus salmoides*	X	X
Logperch	*Percina caprodes*		X
Longear sunfish	*Lepomis megalotis*		X
Longnose dace	*Rhinichthys cataractae*		X
Mimic shiner	*Notropis volucellus*		X
Mottled sculpin	*Cottus bairdi*	X	X
Northern Hog Sucker	*Hypentelium nigricans*	X	X
Northern madtom	*Noturus stigmosus*		X
Pirate perch	*Aphredoderus sayanus*	X	
Pumpkinseed	*Lepomis gibbosus*	X	X
Rainbow darter	*Etheostoma caeruleum*	X	X
Rainbow trout	*Oncorhynchus mykiss*		X
Rock bass	*Ambloplites rupestris*	X	X
Rosyface shiner	*Notropis rubellus*		X
Sand shiner	*Notropis stramineus*	X	X
Shorthead redhorse	*Moxostoma macrolepidotum*		X
Slimy sculpin	*Cottus cognatus*	X	
Smallmouth bass	*Micropterus dolomieu*	X	X
Spotfin shiner	*Cyprinella spiloptera*	X	X
Stonecat	*Noturus flavus*	X	X
Walleye	*Sander vitreus*		X
Warmouth	*Lepomis gulosus*	X	X
White sucker	*Catostomus commersoni*	X	X
Yellow bullhead	*Ameiurus natalis*	X	X
Yellow perch	*Perca flavescens*	X	X
Total Species		**39**	**42**

Source: MDNR surveys conducted during 1939-2011

Before construction of dams in the greater St. Joseph River Watershed, lake sturgeon (*Acipenser fulvescens)* and lake trout (*Salvelinus namaycush)* were also noted to historically spawn upstream of Niles, MI (Wesley and Duffy 2003).

3.5.1.1.2 Stocked fish

Dowagiac River as well as Peavine, Pokagon, McKinzie, and Dowagiac creeks are actively managed as a coldwater fishery by the MDNR Fisheries Division. Brown trout have been stocked for decades as natural recruitment in the mainstem Dowagiac River is not sufficient to maintain the existing fishery even though some tributaries to the Dowagiac River support naturally reproducing brown trout populations (Wesley and Duffy 2003). The total annual stocking target for six sites on the Dowagiac River mainstem upstream of the Pucker Street Dam is 7,000 fish (75 fish per acre) and the annual stocking target for downstream of the Pucker Street Dam is 6,800 fish (200 fish per acre) (Gunderman 2011). From 2014 to 2018, MDNR stocked 70,880 yearling brown trout (14,176 per year) in the Dowagiac River. Additionally, MDNR stocks steelhead, Chinook salmon, and coho salmon in the St. Joseph River. The annual stocking target for steelhead is 63,000 yearlings. Chinook and coho salmon stocking numbers are adjusted based on prey abundance in Lake Michigan. MDNR also stocks approximately 100,000 spring fingerling walleyes in the St. Joseph River between Niles and Benton Harbor on a biennial schedule, and the Indiana Department of Natural Resources stocks steelhead and coho salmon in the Indiana portion of the river.

3.5.1.1.3 Macroinvertebrates

Aquatic macroinvertebrates are often used as indicators of water quality because they are less mobile than fish and are sensitive to pollution and siltation. Mussels are particularly important indicator species because they are long lived and can better reveal the water quality history of a stream segment. Aquatic macroinvertebrates have been repeatedly sampled by MDEQ and MDNR within the St. Joseph River Watershed including sections of the Dowagiac River (e.g., MDEQ 1997 and Walterhouse 2012). More recent macroinvertebrate surveys found the Dowagiac River had fair to good invertebrate communities in the headwaters and excellent communities below the dam (MDEQ 1997 as cited in Wesley and Duffy 2003 and Walterhouse 2012). Assemblages of mayflies, stoneflies, and caddisflies were present, which is consistent with a coldwater system and indicative of good water quality.

Historic mussel surveys through the Dowagiac River found five mussel species below the Pucker Street Dam at Niles, MI (Table 27 in Welsey and Duffy 2003). The five species below the dam included: elktoe (*Alasmidonta marginata*), ellipse (*Venustaconcha ellipsiformis*), creek heelsplitter (*Lasmigona compressa*), cylindrical papershell (*Anodontoides ferussacianus*), and spike (*Elliptio dilatata*). Elktoe, ellipse, and creek heelsplitter are all currently listed as species of concern in Michigan (Michigan Natural Features Inventory [MNFI] 2017). No mussel species were found above the Pucker Street Dam. The inability of fish below the dam that may carry larval forms of mussels (glochidia) to move to aquatic habitats upstream of Pucker Street Dam likely contributes to the apparent lack of mussels in upstream habitats.

A mussel reconnaissance survey was conducted downstream of the dam in October 2017 by MDNR and found no mussels (Gunderman personal communication 2017). The survey did find live, fresh dead, and weathered shells of the invasive Asiatic clam. The substrate was observed to be comprised of sand and silts, which is not preferred habitat for most species. Based on mussel modeling efforts completed by MDNR for the Wildlife Action Plan, the Maxent models used to map suitable mussel habitats for special concern, threatened and endangered mussels across the state, indicate that this portion of the Dowagiac River is not expected to support mussels (Gunderman personal communication 2017).

3.5.2 Environmental Consequences

3.5.2.1 Alternative A – No Action

Under the No Action alternative, Pucker Street Dam would remain as a barrier separating the middle and upper sections of the Dowagiac River from its lower segment and the St. Joseph

River. At its current drawdown level, the Pucker Street Dam has a remaining 15-foot concrete sill impounding approximately 6,000 feet of the Dowagiac River. Habitats within the impounded reach would continue to be negatively affected by altered flows, shallower depths and reduced substrate quality due to sedimentation, wider channels, and reduced riparian cover. Habitats downstream of the dam would continue to be negatively impacted by variable flows and depths. Potamodromous fish species would continue to be excluded by the dam from potential spawning habitats in the Dowagiac River system. Important recreational species such as steelhead, Chinook salmon, walleye, and coho salmon and rare species such as lake sturgeon would remain excluded from areas above the dam. Additionally, individual local fish could continue to be displaced behind the dam through the spillway during high flows. Macroinvertebrate populations would remain largely unchanged due to the continued barrier to fish movements and subsequent upstream dispersal of glochidia that may be attached to host fish (i.e., mussel larvae).

3.5.2.2 Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment

Alternative B would result in the restoration of approximately 6,300 feet of high-gradient habitat in the Dowagiac River. Natural flow regimes would be restored to both upstream and downstream habitats. Sediment accumulation above the dam would be eliminated and natural sediment transport processes would be returned to this section of the Dowagiac River. Instream habitat quality would also improve with the removal of fine sediments covering more coarse substrates (e.g., gravel and cobble) underneath. Riffle, run, and pool complexes would establish with a return of natural river meandering and would directly benefit fish and macroinvertebrates. Upstream aquatic communities would also be reconnected to those downstream. Riparian habitat establishment and enhancement would also directly benefit stream temperatures, add energy inputs into the system in the form of leaves, add instream habitat in the form of woody debris, add habitat for adult stages of macroinvertebrates, and act as erosion control along banks.

Short-term effects would include some sediment deposition within downstream habitats. However, extensive sediment management efforts using both active excavation of the river channel and passive collection/removal from instream traps would minimize downstream sediment transport. Such deposition may occur and adversely affect spawning and feeding habitats below the dam and may result in direct mortality of less mobile organisms. However, these impacts are expected to be short-term until the natural sediment transport processes are restored. In the long-term, the overall habitat conditions within the stream would be improved and allow for the return of upstream fish movements. For example, the recent restoration work completed to expose coarse substrate in an old meander at Dodd Park resulted in a river wide high of 37 macroinvertebrate taxa collected (MDEQ 2011). Additionally, removal of the barrier could allow for the natural distribution of native mussel glochidia by upstream fish movements. Long-term improvements in macroinvertebrate stocks would also likely improve fish stocks.

Under this alternative potamodromous fish (e.g., steelhead, Chinook, and coho salmon) would expand their use of the Dowagiac River within the watershed above Pucker Street Dam. Additionally, native fish such as walleye, logperch, and shorthead redhorse would also benefit from the re-opening of historic spawning locations. Fragmented populations of river resident species (e.g., smallmouth bass and northern hog suckers) would be re-connected.

Brown trout are likely to remain an important game fish in the Dowagiac River system. Overall, there is limited potential for Chinook salmon to interact with brown trout as they have short residence periods in streams. Adult Chinook quickly spawn and die, and the fry emerge from the redds (i.e., salmon nests) from March through April and migrate to Lake Michigan from May through June of the same year.

Similar to Chinook, adult coho salmon move quickly upstream and die following spawning, but juvenile coho typically reside in their natal stream for at least one year prior to moving out of the system. During this time, they will directly compete with brown trout. Natural productions would be limited by the amount of summer and winter rearing habitat preferred by juvenile coho based on MDNR sampling other streams where coho are able to spawn. Steelhead are most likely to interact with brown trout as the adults may remain in the Dowagiac River and tributary streams for months before spawning. During this time, large steelhead may feed directly on resident brown trout. Additionally, juveniles will reside in the natal stream much like the coho salmon. Steelhead are expected to be more abundant in the Dowagiac River and its tributaries than coho salmon. During the 1992-2004 creel surveys, the number of steelhead harvested in the river downstream of the Pucker Street Dam were approximately 2.6 times greater than for coho salmon (Gunderman 2017). However, steelhead are expected to have only minor effects on the brown trout population in the Dowagiac River because competition between these species is thought to be greatest in small streams with high trout population densities and high-quality spawning habitat (Nuhfer et al. 2014). Other large coldwater rivers (such as the Pere Marquette and Little Manistee rivers in the northern Lower Peninsula) support excellent fisheries for both brown trout and steelhead. Additionally, any negative effects to brown trout due to competition from other salmonids would be offset by the continued stocking by the MDNR. Stocking has been modified in the past to account for any changes in brown trout populations and could be modified in the future if necessary.

Some adult walleyes from the St. Joseph River will move into the Dowagiac River in the spring to spawn over gravel and cobble riffles. Most of the adult walleyes are expected to return to the St. Joseph River after spawning. Creel data collected on the portion of the Dowagiac River downstream of the Pucker Street Dam during 1992-2004 supports this hypothesis. Only 310 walleyes were harvested during this period, compared to 4,427 steelhead. Walleye fry drift downstream after emergence, and juveniles most commonly are found in slow-moving water with aquatic vegetation or logs for cover (Kerr et al. 1997). Spatial overlap and competition for resources between brown trout and juvenile walleyes likely will be minimal. The Muskegon River downstream of Croton Dam is characterized by one of the largest walleye spawning runs in the state and is one of the walleye egg collection sites for MDNR's walleye rearing and stocking program. Despite this large seasonal influx of adult walleyes, the Muskegon River supports popular fisheries for brown trout, river resident rainbow trout (Eagle Lake strain), and steelhead (O'Neal and Kolb 2015).

Due to the lack of individual unionid mussels found during surveys near the project area, direct impacts are not anticipated. If notable mussel populations are found upstream of the dam during drawdown activities, a salvage operation would be undertaken. Overall, in-stream habitat will be enhanced by the restoration of natural riverbed substrates, and the establishment of riffle/run/pool complexes that should be directly beneficial to mussels, fish, and to the aquatic life stages of insects, which are the primary food sources for fish. Short-term sedimentation in the lower Dowagiac River would occur after construction activities, however it is expected to be reduced by seasonal high flow events and sediment management activities integrated into the project design.

Alternative B would result in notable long-term direct beneficial effects that would include the restoration of approximately 6,300 feet of aquatic habitats of the river and would reconnect 159 miles of streams within the Dowagiac River Watershed to the St. Joseph River. Extensive sediment management activities would reduce the potential for extensive downstream transport and deposition of sediments. Short-term sedimentation in the lower Dowagiac River would occur but is expected to be reduced by seasonal high flow events. Removal of the dam would result in changes in the composition of aquatic communities as potamodromous fish, native fish, and unionid mussel populations are expected to expand their use of the Dowagiac River within the watershed above Pucker Street Dam. Impacts to aquatic ecosystems, therefore, are considered to be adverse but minor in the short-term due to sedimentation effects, but beneficial and notable in the long-term due to the restoration of the river.

3.6 Terrestrial Ecology

3.6.1 Affected Environment

3.6.1.1 Vegetation

The project area is located within the Battle Creek Outwash Plain, a sub-ecoregion of the Southern Michigan/Northern Indiana Drift Plains. This region is characterized by broad, flat plains and streams and rivers occupy some of the main outwash channels. Presettlement vegetation was diverse and consisted of a large concentration of dry tallgrass prairies and wet prairies. Oak savannas historically grew on gently sloping terrain where fires were more frequent and oak-hickory forests grew in steeper terrain or where moisture conditions did not favor frequent fires. The outwash deposits provide stable flows in the region's streams and rivers; however, stream quality has become lower due to the channelization and removal of riparian vegetation (Omernik and Bryce 2007).

The vegetation within the project area and within a 3-mile radius surrounding the project area was evaluated using land use/land cover information obtained from the National Land Cover Database (Homer et al. 2015). Land cover within the immediate project area was delineated by direct photo interpretation of aerial photography. Land cover is summarized in Table 3-5 and illustrated in Figure 3-5.

Table 3-5. Land Use/Land Cover in the Pucker Street Dam Project Area and Vicinity

Land Cover Type	Pucker Street Dam Project Area (acres)	3-mile Radius[1] (acres)
Barren Land	--	101
Cultivated Crops	1.0	7,303
Deciduous Forest	24.8	2,844
Developed, High Intensity	--	238
Developed, Medium Intensity	--	550
Developed, Low Intensity	3.0	1,994
Developed, Open Space	--	1,947
Emergent Herbaceous Wetlands	27.3	37
Evergreen Forest	--	31
Hay/Pasture	--	1,114
Herbaceous	9.4	249
Mixed Forest	--	61
Open Water	24.5	241
Shrub/Scrub	0.3	37
Woody Wetlands	33.2	1,348
Total	**123.4**	**18,095**

[1]Source: Homer et al. 2015

The predominant land cover types within the project area include emergent herbaceous wetlands (27.3 acres), open water (24.5 acres), deciduous forest (24.8 acres), and woody wetlands (33.2 acres). Land cover in the vicinity consists primarily of cultivated crops (7,303 acres), developed land (3,940 acres), deciduous forest (2,844 acres), woody wetlands (1,348 acres), and hay/pasture (1,114 acres).

The majority of the immediate project area is represented by a low-lying river corridor along the Dowagiac River valley. Plant communities within the river valley consist of a mosaic of palustrine emergent and forested wetlands associated with the floodplain of the Dowagiac River. Dominant herbaceous species in emergent wetland communities include reed canary grass (*Phalaris arundinacea),* spotted-touch-me-not (*Impatiens capensis),* wood nettle (*Laportea canadensis),* side-flowering aster (*Symphyotrichum lateriflorum),* narrow-leaved cattail (*Typha latifolia),* common arrowhead (*Sagittaria latifolia),* and smartweed (*Persicaria pensylvanica).* In addition, dominant species in forested wetland communities include green ash (*Fraxinus pennsylvanica),* red maple (*Acer rubrum),* box elder (*Acer negundo),* American hornbeam (*Carpinus caroliniana),* and American elm (*Ulmus americana).* Upland conditions within the project area include mowed lawns of adjoining properties, as well as vegetative communities associated with higher landscape positions within the Dowagiac River valley. Common vegetation observed in the upland portions of the project area included basswood (*Tilia americana)*, black cherry (*Prunus serotina*), hackberry (*Celtis occidentalis*), red oak (*Quercus rubra*), black oak (*Q. vetulina*), sycamore (*Platanus occidentalis*), American beech (*Fagus grandifolia*), box elder, common buckthorn, honeysuckle (*Lonicera spp.*), river bank grape (*Vitis riparia*), poison ivy (*Toxicodendron radicans*), and Virginia creeper (*Parthenocissus quinquefolia*) (Environmental Consulting & Technology, Inc. 2016).

Figure 3-5. Land Cover Types Associated with the Pucker Street Dam Project Area

3.6.1.2 Wildlife

Wildlife communities associated with the emergent and wooded wetlands of the Dowagiac River valley are relatively diverse and are represented by waterfowl (ducks, geese), swans, wading birds (herons), shorebirds (sandpipers), raptors (hawks, bald eagle), wild turkey, pheasant, various mammal species (whitetail deer, cottontail rabbit, and other rodents), and herpetofauna (snakes, frogs, toads, turtles, salamanders).

The upland communities in the vicinity of the Dowagiac River also support a diversity of wildlife but are characterized by fewer water-dependent species and more taxa that are typically associated with more mesic (moist) upland habitats. Bird communities in these areas are dominated by species that frequent trees and shrubs such as songbirds, woodpeckers and other cavity-nesting species, as well as neotropical migratory birds (warblers) and upland game birds (wild turkey). Additionally, these uplands support a different assemblage of mammals including a variety of bat species, rodents (groundhog, squirrels, chipmunks, white-footed mouse, etc.), and carnivorous species (red and gray fox, raccoon, striped skunk, etc.).

No communal wading bird colonies are known to occur in the immediate vicinity of the project site. Therefore, work activity would not affect heron rookeries or other aggregations of migratory birds. In addition, no caves have been documented at the Pucker Street Dam project area and none are known to occur within 3 miles of the project area.

3.6.2 Environmental Consequences

3.6.2.1 Alternative A – No Action Alternative

Under the No Action alternative, the dam would remain in place and current maintenance operations of the dam would continue. Under this alternative open water within the upper delta of the impounded area would continue to accrete sediment and create additional exposed bars and substrates. Over time, more stable lateral bars would develop additional fringe plant communities. As sediment accretion would continue, the plant community characteristics would gradually change in response to the transition in habitat types from emergent and woody wetland habitats to more upland habitats.

Wildlife species composition and usage within the project area are expected to shift in response to the anticipated changes in plant communities from aquatic dominated to more upland plant dominated habitats. However, most of the common wildlife present in the area utilize a variety of habitat types and would likely continue to utilize the area as it continues to undergo successional change.

3.6.2.2 Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment

Removal of the Pucker Street Dam would result in both direct and indirect conversion of vegetation communities and wildlife habitats. In conjunction with dam removal and river restoration activities, sediment removed from the excavated river channel would be placed within selected areas of the former impoundment for disposal. As a result, sediments would be deposited on approximately 14.5 acres of existing vegetation resulting in general plant community mortality (see Figure 2-2). Approximately 705 trees would be removed within these spoil areas and along access roads (Table 3-6 and Figure 2-6). The majority of the trees are between 6 - 18 inches (diameter at breast height). The cut trees will be disposed of properly and not burned. Mobile wildlife may be expected to avoid construction areas during ecosystem restoration activities, whereas less mobile species would be directly impacted by spoil placement. Subsequent to restoration activities, exposed spoil areas would undergo successional transition to re-establish upland plant and wildlife communities.

Table 3-6. Estimated Tree Removal by Project Area

Project Area	Estimated Tree Count for Removal			Total by Area
	6-18 inches	18-36 inches	> 36 inches	
Spoil Area A	168	20	13	**201**
Spoil Area B	91	45	12	**148**
Spoil Area C	165	27	12	**204**
Spoil Area D	33	61	16	**110**
Temporary Access Roads	28	12	2	**42**
Total by Size	**485**	**165**	**55**	**705**

All diameters measured at breast height

As part of channel reconstruction, a 20-foot wide floodplain bench would be constructed on both sides of the excavated river channel from the dam to a distance of 1,400 feet upstream. These areas would be seeded with approved native seed mixes designed to aid in the establishment of up to 4.1 acres of naturalized floodplain and wetland habitats.

Expansion of the distribution of terrestrial fauna into newly established habitats is anticipated for Alternative B. These species are expected to utilize the newly exposed bottomland on an intermittent basis immediately after drawdown and dam removal but would establish themselves within new habitats as riparian restoration progresses. Once vegetation is re-established, wildlife species are likely to make use of the project area again. Semi-aquatic species including frogs, toads, turtles, and wading birds may also be impacted by the removal of the dam and associated river restoration activities. The aquatic and semi-aquatic habitats that would be restored along with associated wetlands are expected to provide suitable habitat for many of these species.

Indirect impacts are also expected to occur following the removal of the dam. Lands within the former impoundment area upstream of the dam that are unaffected by spoil placement would undergo varying degrees of dewatering (depending on their distance from Pucker Street Dam) that would result in a shift to a community comprised of more upland plant and animal species. However, because of the demonstrated importance of groundwater as part of the base flow of the Dowagiac River (see Section 3.2), and because groundwater discharging along the valley wall is known to support existing floodplain communities, such indirect effects are expected to be reduced with increasing distance upstream of the dam.

Potential indirect impacts on nearby vegetation communities and wildlife could result from the transportation of sediment material and building material from the dam and powerhouse. Trucks hauling these materials along existing or constructed access routes would potentially result in minor increases of fugitive dust and exhaust emissions that could cause disturbance in terrestrial environments due to deposition. However, BMPs such as covering soil material and equipment maintenance would be followed to minimize impacts. Therefore, indirect impacts to wildlife and their habitats from the transport of soil material would be minor.

Both vegetation and wildlife are expected to benefit from indirect impacts associated with reduced habitat fragmentation associated with dam removal. Elimination of the dam and the associated impounded areas above the dam, coupled with the restoration of contiguous riverine habitats would benefit faunal species that use stream and river corridors as corridors for migration, foraging and dispersal. Consequently, biotic communities both downstream and upstream would be rejoined to result in an overall enhancement of the riverine ecosystem.

Overall, Alternative B is expected to result in short-term and localized adverse impacts to existing vegetation communities and wildlife habitats, but in the long-term the habitat restoration of the riparian floodplain forest would result in more ecologically diverse and contiguous plant and animal communities. Additionally, in context with the abundance and availability of similar habitats within the Dowagiac River Watershed, and the improved ecosystem function provided by dam removal and river restoration activities, overall impacts to terrestrial resources is small.

3.7 Sensitive Species

3.7.1 Affected Environment

The ESA; 16 USC §§ 1531-1543 was passed to conserve the ecosystems upon which endangered and threatened species depend, and to conserve and recover those species. An endangered species is defined by the ESA as any species in danger of extinction throughout all or a significant portion of its range, whereas threatened species are those that are at risk of becoming endangered within the foreseeable future throughout all or a significant part of its range. The ESA establishes programs to conserve and recover endangered and threatened species and makes their conservation a priority for federal agencies.

The state of Michigan provides protection for species considered threatened and endangered under the Endangered Species Act of the State of Michigan (Part 365 of PA 451, 1994 Michigan Natural Resources and Environmental Protection Act). The list of state protected species is developed and maintained by MDNR. This list also includes species of special concern, which are not afforded legal protection but are of concern due to their declining or relict populations in the state. MDNR also identifies extirpated species, which are those that can no longer be found in the state of Michigan, but which can be found elsewhere in the world. Within Berrien County, MDNR has identified 178 protected plant and animal species (MNFI 2017) (Table 3-7). Of these species in Berrien County, 26 are endangered, 78 are threatened, 65 are species of special concern, and 9 are presumed extirpated.

According to the MNFI database (2018), there are no known occurrences of state or federally listed endangered or threatened species within the area extending from Kinzie Road downstream to the confluence of the Dowagiac River with the St. Joseph River.

Table 3-7 lists the federally and state listed species in Berrien County and indicates which species could potentially have suitable habitat near the Pucker Street Dam project area.

Table 3-7. Species of Conservation Concern within Berrien County

Common Name	Scientific Name	Status: Federal[1]	Status: State[2] (Rank[3])	Suitable Habitat Present[4]
Birds				
Cerulean warbler	*Setophaga cerulea*	--	T (S3)	N
Dickcissel	*Spiza americana*	--	SC (S3)	N
Grasshopper sparrow	*Ammodramus savannarum*	--	SC (S4)	N

Common Name	Scientific Name	Status		Suitable Habitat Present[4]
		Federal[1]	State[2] (Rank[3])	
Henslow's sparrow	*Ammodramus henslowii*	--	E (S3)	N
Hooded warbler	*Setophaga citrina*	--	SC (S3)	P
King rail	*Rallus elegans*	--	E (S2)	N
Least bittern	*Ixobrychus exilis*	--	T (S3)	P (limited)
Louisana waterthrush	*Parkesia motacilla*	--	T (S2)	N
Marsh wren	*Cistothorus palustris*	--	SC (S3)	P (limited)
Osprey	*Pandion haliaetus*	--	SC (S4)	N
Piping plover	*Charadrius melodus*	LE	E (S2)	N
Prothonotary warbler	*Protonotaria citrea*	--	SC (S3)	P
Prairie warbler	*Setophaga discolor*	--	E (S3)	N
Red-shouldered hawk	*Buteo lineatus*	--	T (S4)	N
Rufa red knot	*Calidris canutus rufa*	LT	--	N
Western meadowlark	*Sturnella neglecta*	--	SC (S4)	N
Yellow-throated warbler	*Setophaga dominica*	--	T (S3)	N
Mammals				
Eastern pipistrelle	*Perimyotis subflavus*	--	SC (S1)	P
Indiana bat	*Myotis sodalist*	LE	E (S1)	P
Little brown bat	*Myotis lucifugus*	--	SC (S1)	P
Northern long-eared bat	*Myotis septentrionalis*	LT	SC (S1)	P
Prairie vole	*Microtus ochrogaster*	--	E (S3)	N
Woodland vole	*Microtus pinetorum*	--	D (S4)	N
Reptiles				
Blanding's turtle	*Emydoidea blandingii*	--	SC (S2S3)	N
Eastern box turtle	*Terrapene carolina*	--	SC (S2S3)	P
Eastern massasauga	*Sistrurus catenatus*	LT	SC (S3)	P
Gray ratsnake	*Pantherophis spiloides*	--	SC (S2S3)	N
Kirtland's snake	*Clonophis kirtlandii*	--	E (S1)	P
Spotted turtle	*Clemmys guttate*	--	T (S2)	N
Insects				
American burying beetle	*Nicrophorous americanus*	LE	X (SH)	N
Blazing star borer	*Papaipema beeriana*	--	SC (S2)	N
Culvers root borer	*Papipema sciata*	--	SC (S3)	N
Dune cutworm	*Euxoa aurulenta*	--	SC (S2S3)	N
Golden borer	*Papaipema cerina*	--	SC (S2)	N
Grey petaltail	*Tachopteryz thoreyi*	--	T (S1)	N
Maritime sunflower borer	*Papipema maritima*	--	SC (S2)	N
Mitchell's satyr	*Neonympha mitchellii*	LE	E (S1)	N
Regal fritillary	*Speyeria Idalia*	--	E (SH)	N
Silphium borer moth	*Papaipema silphii*	--	T (S1)	N
Spartina moth	*Photedes inops*	--	SC (S2S3)	N
Swamp metalmark	*Calephelis mutica*	--	SC (S1)	N
Tamarack tree cricket	*Oecanthus laricis*	--	SC (S3)	N

Common Name	Scientific Name	Status		Suitable Habitat Present[4]
		Federal[1]	State[2] (Rank[3])	
Amphibians				
Blanchard's cricket frog	*Acris blanchardi*	--	T (S2S3)	P
Marbled salamander	*Ambystoma opacum*	--	E (S1)	N
Mollusks				
Black sandshell	*Ligumia recta*	--	E (S1)	N
Brown walker	*Pomatiopsis cincinnatiensis*	--	SC (SH)	N
Campeloma spire snail	*Cincinnatia cincinnatiensis*	--	SC (S3)	N
Deertoe	*Truncilla truncata*	--	SC (S2S3)	P
Elktoe	*Alasmidonta marginata*	--	SC (S3)	N
Ellipse	*Venustaconcha ellipsiformis*	--	SC (S3)	N
Foster mantleslug	*Pallifera fosteria*	--	T (S1)	N
Kidney shell	*Ptychobranchus fasciolaris*	--	SC (S2)	N
Lilliput	*Toxolasma parvum*	--	E (S1)	P
Paper pondshell	*Utterbackia imbecillis*	--	SC (S2S3)	P
Proud globe	*Mesodon elevates*	--	T (SH)	N
Purplecap valvata	*Valvata perdepressa*	--	SC (SNR)	N
Purple wartyback	*Cyclonaias tuberculata*	--	T (S2)	P
Rainbow	*Villosa iris*	--	SC (S3)	N
Round pigtoe	*Pleurobema sintoxia*	--	SC (S3)	P
Slippershell	*Alasmidonta viridis*	--	T (S2S3)	N
Snuffbox	*Epioblasma triquetra*	LE	E (S1S2)	P
Threehorn wartyback	*Obliquaria reflexa*	--	E (S1)	P
Watercress snail	*Fontigens nickliniana*	--	SC (S2S3)	N
Fish				
Lake herring	*Coregonus artedi*	--	T (S3)	N
Lake sturgeon	*Acipenser fluvescens*	--	T (S2)	N
River redhorse	*Moxostoma carinatum*	--	T (S2)	N
Shortjaw cisco	*Coregonus zenithicus*	--	T (S2)	N
Starhead topminnow	*Fundulus dispar*	--	SC (S1)	N
Plants				
American lotus	*Nelumbo lutea*	--	T (S2)	N
Annual hedge hyssop	*Gratiola virginiana*	--	T (S1)	N
Annual wildrice	*Zizania aquatic*	--	T (S2S3)	N
Bald-rush	*Rhynochospora scirpoides*	--	T (S2)	N
Beach three-awned grass	*Aristida tuberculosa*	--	E (S1)	N
Beaked agrimony	*Agrimonia rostellata*	--	T (S2)	N
Beak grass	*Diarrhena obovate*	--	T (S2)	N
Black-fruited spike-rush	*Eleocharis melanocarpa*	--	SC (S3)	N
Bladderwort	*Utricularia sublata*		T (S1)	N
Blue-eyed Mary	*Collinsia verna*	--	SC (SNR)	N
Broad-leaved sedge	*Carex platyphylla*	--	E (S1)	N
Canadian milk vetch	*Astragalus canadensis*	--	T (S1S2)	N

Common Name	Scientific Name	Status		Suitable Habitat Present[4]
		Federal[1]	State[2] (Rank[3])	
Chestnut sedge	*Fimbristylis puberula*	--	X (SX)	N
Climbing fumitory	*Adlumia fungosa*	--	SC (S3)	N
Compass plant	*Silphium laciniatum*	--	T (S1S2)	N
Cranefly orchid	*Tipularia discolor*	--	E (S1)	N
Creeping whitlow grass	*Draba reptans*	--	T (S1)	N
Cross-leaved milkwort	*Polygala cruciate*	--	SC (S3)	N
Cup plant	*Silphium perfoliatum*	--	T (S2)	P
Cut-leaved water parsnip	*Berula erecta*	--	T (S2)	N
Davis's sedge	*Carex davisii*	--	SC (S3)	P
Downy sunflower	*Helianthus mollis*	--	T (S2)	N
Dwarf bulrush	*Lipocarpha micrantha*	--	SC (S3)	N
Eastern few-fruited sedge	*Carex oligocarpa*	--	T (S2)	N
Edible valerian	*Valeriana edulis var. ciliate*	--	T (S2)	N
Engelmann's spike rush	*Eleorcharis engelmannii*	--	SC (S2S3)	N
False boneset	*Brickellia eupatorioides*	--	SC (S2)	N
Few-flowered nut rush	*Scleria pauciflora*	--	E (S1)	N
Field dodder	*Cuscuta campestris*	--	SC (S1)	N
Floating bladderwort	*Utricularia inflata*	--	E (S1)	N
Frost grape	*Vitis vulpine*	--	T (S1S2)	N
Gentian-leaved St. John's wort	*Hypericum gentiancoides*	--	SC (S3)	N
Ginseng	*Panax quinquefolius*	--	T (S2S3)	N
Globe-fruited seedbox	*Ludwigia sphaerocarpa*	--	T (S1)	N
Goldenseal	*Hydrastis canadensis*	--	T (S2)	N
Goosefoot corn salad	*Valerianella chenopodiifolia*	--	T (S1)	N
Greenwhite sedge	*Carex albolutescens*	--	T (S2)	N
Green violet	*Hybanthus concolor*	--	SC (S3)	N
Hairy-fruited sedge	*Carex trichocarpa*	--	SC (S2)	N
Hairy mountain mint	*Pycnanthemum pilosum*	--	T (S2)	N
Hairy skullcap	*Scutellaria elliptica*	--	SC (S3)	N
Heavy sedge	*Carex gravida*	--	X (SX)	N
Hemlock-parsley	*Conioselinum chinense*	--	SC (SNR)	N
Hill's thistle	*Cirsium hillii*	--	SC (S3)	N
Hollow-stemmed Joe-pye weed	*Eutrochium fistulosum*	--	T (S1)	N
Jacob's ladder	*Polemonium reptans*	--	T (S2)	N
Leadplant	*Amorpha canescens*	--	SC (S3)	N
Leggettt's pinweed	*Lechea pulchella*	--	T (S1S2)	P
Marbleweed	*Lithospermum molle*	--	X (SX)	N
Meadow beauty	*Rhexia virginica*	--	SC (S3)	N
Missouri rock-cress	*Boechera missouriensis*	--	SC (S2)	N
Mountain mint	*Pycnanthemum muticum*	--	T (S1)	N

Common Name	Scientific Name	Status		Suitable Habitat Present[4]
		Federal[1]	State[2] (Rank[3])	
Needlepod rush	*Juncus scirpoides*	--	T (S2)	N
Netted nut rush	*Scleria reticularis*	--	T (S2)	N
Nodding pogonia	*Triphora trianthophora*	--	T (S1)	N
Northern appressed clubmoss	*Lycopodiella subappressa*	--	SC (S2)	N
Orange-or-yellow fringed orchid	*Platanthera ciliaris*	--	E (S1S2)	N
Panicled hawkweed	*Hieracium paniculatum*	--	T (S2)	N
Pitcher's thistle	*Cirsium pitcher*	LT	T (S3)	N
Prairie coreopsis	*Coreopsis palmata*	--	T (S2)	N
Prairie indian-plantain	*Arnoglossum plantagineum*	--	SC (S3)	N
Prairie trillium	*Trillium recurvatum*	--	T (S2S3)	P
Pumpkin ash	*Fraxinus profunda*	--	T (S2)	N
Purple milkweed	*Asclepias purpurascens*	--	T (S2)	N
Queen-on-the-prairie	*Filipendula rubra*	--	T (S2)	N
Rattlesnake-master	*Eryngium yuccifolium*	--	T (S2)	N
Raven's-foot sedge	*Carex crus-corvi*	--	E (S1)	N
Red mulberry	*Morus rubra*	--	T (S2)	P
Rock-jasmine	*Androsace occidentalis*	--	E (SX)	N
Rope dodder	*Cuscuta glomerata*	--	SC (SH)	N
Rosepink	*Sabatia angularis*	--	T (S2)	N
Rosinweed	*Silphium integrifolium*	--	T (S2)	N
Round-seed panic-grass	*Dichanthelium polyanthes*	--	E (S1)	N
Sand grass	*Triplasis purpurea*	--	SC (S2)	N
Shooting star	*Primula meadia*	--	E (S1)	N
Short-fruited rush	*Juncus brachycarpus*	--	T (S1S2)	N
Showy orchis	*Galearis spectabilis*	--	T (S2)	N
Soapwort gentian	*Gentiana saponaria*	--	X (SX)	N
Slender dayflower	*Commenlina erecta*	--	X (SX)	N
Smaller whorled pogonia	*Isotria medeoloides*	--	X (SX)	N
Small-fruited panic-grass	*Dichanthelium microcarpon*	--	SC (SX)	N
Small log fern	*Dryopteria celsa*	--	T (S2)	N
Spotted pondweed	*Potamogeton pulcher*	--	E (S1)	N
Squarrose sedge	*Carex squarrosa*	--	SC (S1)	P
Starry campion	*Silene stellata*	--	T (S2)	N
Stiff gentian	*Gentianella quinquefolia*	--	T (S2)	N
Swamp cottonwood	*Populus heterophylla*	--	E (S1)	N
Tall beakrush	*Rhynchospora macrostachya*	--	SC (S3S4)	N
Three-awned grass	*Aristida longespica*	--	T (S2)	N
Tinted spurge	*Euphorbia commutata*	--	T (S1)	N
Toadshade	*Trillium sessile*	--	T (S2S3)	P
Trailing wild bean	*Strophostyles helvula*	--	SC (S3)	N

		Status		Suitable Habitat Present[4]
Common Name	Scientific Name	Federal[1]	State[2] (Rank[3])	
Twinleaf	*Jeffersonia diphylla*	--	SC (S3)	N
Violet wood sorrel	*Oxalis violacea*	--	X (SX)	N
Virginia flax	*Linum virginianum*	--	T (S2)	N
Virginia snakeroot	*Endodeca serpentina*	--	T (S2)	P
Walking fern	*Asplenium rhizophyllum*	--	T (S2S3)	N
Waterthread pondweed	*Potamogeton bicupulatus*	--	T (S2)	N
Watermeal	*Wolffia brasiliensis*	--	T (S1)	N
Weak stellate sedge	*Carex seorsa*	--	T (S2)	N
Whiskered sunflower	*Helianthus hirsutus*	--	SC (S3)	N
White false indigo	*Baptisia lactea*	--	SC (S3)	N
White lady slipper	*Cypripedium candidum*	--	T (S2)	N
Whorled mountain mint	*Pycnanthemum verticillatum*	--	SC (S2)	N
Whorled pogonia	*Isotria verticillate*	--	T (S2)	N
Wild hyacinth	*Camassia scilloides*	--	T (S2)	N
Wild oats	*Chasmanthium latifolium*	--	E (S1)	N
Wild potato	*Ipomoea pandurate*	--	T (S2)	P (limited)
Wild sweet William	*Phlox maculate*	--	T (S1)	N
Winged monkey flower	*Mimulus alatus*	--	X (S1)	N
Wisteria	*Wisteria frutescens*	--	T (S1)	N
Yellow-flowered leafcup	*Smallanthus uvedalia*	--	T (S1)	N
Yellow fumewort	*Corydalis flavula*	--	T (S2)	N

Sources: MNFI 2017 and USFWS IPaC 2017

[1] Federal Status Codes:
- LE = Listed Endangered
- LT = Listed Threatened
- -- = Not Listed by USFWS

[2] State Status Codes:
- E = Listed Endangered
- T = Listed Threatened
- SC = Species of special concern

[3] State Rank:
- S1 = Critically Imperiled
- S2 = Imperiled
- S3 = Vulnerable
- S4 = Apparently Secure
- S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)
- Migratory Species may have separate ranks for different population segments (e.g. S1B, S2N, S4M);

[4] Habitat Codes:
- Y = Yes, species has been documented in existing habitats in study area and suitable habitat is present
- N = No, no records of species within study area and no suitable habitat is present
- P = Potentially suitable habitat is present, but no records of species in study area

In Michigan, MDNR has reported 178 state threatened or endangered species from Berrien County including 66 animal species and 112 plant species (MNFI 2017). Even though there is potential suitable habitat for some state listed terrestrial and aquatic fauna within the vicinity, habitats of the immediate project area are either disturbed/developed habitats associated with Pucker Street Dam, or are disturbed areas recently exposed by the drawdown of the impoundment in 1999. Additionally, a previous vegetation survey did not find any state listed plant species within the Pucker Street Dam project area (Environmental Consulting & Technology, Inc. 2016).

USFWS has reported nine federally threatened or endangered species from Berrien County including seven animal species and two plant species (USFWS 2017) (Table 3-6). However, five species (piping plover, rufa red knot, Mitchell's satyr butterfly and pitcher's thistle) are limited to specific habitats including the Great Lakes shoreline and rare wetlands such as bogs and fens (MNFI 2007). Additionally, the American burying beetle and small whorled pogonia are more typically associated with grasslands and/or rich mesic woodlands and are not characteristic of floodplain environments. Therefore, these species are not expected to occur in the project area.

As described in Section 3.5.1.1.3, based on mussel modeling efforts completed by MDNR for the Wildlife Action Plan, the Maxent models used to map suitable mussel habitats for special concern, threatened and endangered mussels across the state, indicate that this portion of the Dowagiac River is not expected to support mussels (Gunderman personal communication 2017).

Species potentially present in the vicinity of the project area include the eastern massasauga rattlesnake, Indiana bat, and northern long-eared bat. A description of the federally listed species and their preferred habitat is discussed below. It should be noted that no designated critical habitats for any listed species of ecologically sensitive areas have been documented within the project area.

Eastern Massasauga Rattlesnake: This species is federally listed as threatened and is a species of special concern in Michigan. Populations in southern Michigan are typically associated with open wetlands, particularly prairie fens, while those in northern Michigan are known from open wetlands and lowland coniferous forests, such as cedar swamps. Eastern massasauga habitats generally appear to be characterized by (1) open, sunny areas intermixed with shaded areas, presumably for thermoregulation; (2) presence of the water table near the surface for hibernation; and (3) variable elevations between adjoining lowland and upland habitats. This species was last observed in Berrien County in 2016 (MNFI 2017).

Indiana Bat: The Indiana bat is listed both federally and by the state as endangered. Indiana bats roost and form maternity colonies under loose bark or in hollows and cavities of mature trees in the floodplain forest. In Michigan, the Indiana bat usually roosts in trees in riparian, bottomland, and upland forests that range from highly altered landscapes to intact forests. Southern Michigan maternity roost trees are typically in open areas exposed to solar radiation to maximize warmth (USFWS 2007). In winter, Indiana bats primarily hibernate in caves in Kentucky, Indiana, and Missouri (USFWS 2006).

Northern Long-Eared Bat: This bat species is listed as federally threatened and as a species of special concern in Michigan. In general, habitat use by northern long-eared bat is thought to be similar to that by Indiana bat, although northern long-eared bats appear to be more opportunistic in selection of summer habitat. Suitable winter habitat includes underground caves and cave-like structures (e.g., abandoned or active mines, railroad tunnels). During summer, this species roosts singly or in colonies in cavities, underneath bark, crevices, or hollows of both live and dead trees. The northern long-eared bat forages in upland and lowland woodlots, tree-lined corridors, and water surfaces, feeding on insects (USFWS 2015).

3.7.2 Environmental Consequences

3.7.2.1 Alternative A – No Action

Under the No Action alternative, there would no impacts to threatened and endangered species. Pucker Street Dam is expected to remain in place and no construction activities are expected to occur that would potentially result in the disturbance of sensitive species habitats.

3.7.2.2 Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment

The eastern massasauga rattlesnake is a species of special concern in Michigan and there have been reported occurrences in Berrien County. Although there is potentially suitable habitat in the emergent wetlands and low areas adjacent to the Dowagiac River and in adjacent upland areas, there are no known eastern massasauga rattlesnake occurrences in these areas nor is there habitat considered by USFWS to have a high potential to be occupied. Further, any potential for affects to the species will be reduced by incorporating BMPs into the contract award. The removal of the Pucker Street Dam would likely not alter the upland areas near the project site but would impact wetlands and associated habitats from the placement of sediments during ecosystem restoration on the river. However, ecosystem restoration efforts after dam removal would restore up to 4.1 acres of naturalized floodplain and wetland habitats that the eastern massasauga may use. Furthermore, after removal of the dam water levels will not be artificially manipulated during the eastern massasauga rattlesnake inactive season. Project related impacts to the eastern massasauga are expected to be minor in the short-term due to potential disturbance from construction activities but would provide minor benefits in the long-term with the development of additional wetland habitat areas. Based on this, the removal of Pucker Street Dam and Dowagiac River restoration project **“May Affect but Not Likely to Adversely Affect”** the eastern massasauga rattlesnake.

Both the Indiana bat and northern long-eared bat are federally and state listed. There is one known hibernaculum for northern long-eared bat in Berrien County, however it is not within Niles Charter Township. Potential summer roosting trees may exist within the project area, therefore tree removal activities required for the project would be limited to the October to March timeframe to avoid the bat roosting season. Locations where tree removal may be required include the spoil areas and access roads, as shown in Figure 2-6. It is estimated that approximately 705 trees would need to be removed, however over half of these (485 trees) are smaller saplings with a diameter at breast height of less than 18 inches (Table 3-6). The amount of tree clearing required for the project is not significant given the 11,587 acres of forested land cover within a 3-mile radius of the project (Table 3-5). The removal of up to 705 trees during October 1 to March 31 from the spoil areas and access roads when bats are not present **“May Affect but Not Likely to Adversely Affect”** the Indiana and northern long-eared bats.

In the long-term, the establishment of a riparian area and the enhancement of wetland and upland habitats along the Dowagiac River would likely provide a more ecologically diverse and contiguous habitat for listed species. In addition, the reconnection of the upstream and downstream reaches of the Dowagiac River would expand potential habitat for some threatened and endangered aquatic species.

3.8 Invasive Species

3.8.1 Affected Environment

Invasive species, as defined by EO 13112, are any species that are not native to a particular ecosystem and whose introduction does or is likely to cause economic or environmental harm to human, animal, and plant health. Invasive species are often common in previously disturbed areas. Invasive plants can include trees, shrubs, vines, grasses, ferns and forbs. These species have the potential to affect the native plant communities adversely because of their ability to spread rapidly and displace native vegetation. According to EO 13112, each federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law, prevent the introduction of invasive species; detect and control populations of such species; monitor invasive species populations; and provide for the restoration of native species in ecosystems that have been invaded.

Invasive plant species within wetland portions of the project area include reed canary grass, purple loosestrife *(Lythrum salicaria)*, and common reed (*Phragmites australis*). During the wetland delineation survey, reed canary grass was observed to be the dominant species within emergent wetlands. Purple loosestrife and common reed were also noted to be occasionally common. Common buckthorn *(Rhamnus cathartica)*, autumn olive *(Elaeagnus umbellata)*, multiflora rose (*Rosa multiflora*), and dames rocket *(Hesperis matronalis)* are commonly encountered within upland areas adjacent to the project area (Environmental Consulting & Technology, Inc. 2016).

Several invasive aquatic species have been intentionally or inadvertently introduced into the Great Lakes system and have a strong influence on aquatic communities through predation or competition. Round goby, sea lamprey, zebra mussel, and Asian clam are examples of invasive species that could access the St. Joseph River Watershed and its tributaries. The only invasive fish species currently in the project area is the common carp *(Cyprinus carpio)* (Wesley and Duffy 2003). Common carp inhabit a wide variety of habitats and in Michigan, they are found in the Great Lakes, large inland lakes and reservoirs, large and small rivers, swamps, canals, and drains (MDNR 2017). Common carp occurs both upstream and downstream of the Pucker Street Dam. Sea lampreys cannot move upstream past the first dam on the St. Joseph River (Berrien Spring Dam) and do not have access to the Dowagiac River.

3.8.2 Environmental Consequences

3.8.2.1 Alternative A – No Action

Under the No Action alternative, the dam would remain in place and current maintenance operations of the dam would continue. In the short-term, there would be no change in current conditions of invasive species under this alternative. However, over time, sediment accretion within the impoundment would continue to occur resulting in a gradual successional change from open aquatic habitats, emergent, and woody wetland habitats to more upland habitats. The exposure of backwater areas and bare soil would likely support the continued establishment of invasive plant species throughout the project area. Distribution and abundance of invasive fish species populations would not change as their populations are currently established both upstream and downstream of the dam.

3.8.2.2 Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment

Removal of the Pucker Street Dam would result in the disturbance of plant and fish communities due to the excavation of sediments, grading of the streambank, inundation of previously terrestrial areas, and land disturbance by heavy equipment use. Due to the disturbance of soil in the project area, there is potential for the introduction and/or spread of invasive species. Exposed sediment disposal areas represent the largest potential for establishment of invasive species due to the predominance of relatively low fertility substrates within the disposal sites.

BMPs consisting of erosion control measures and the use of approved seed mixes designed to aid in establishing desirable native vegetation would mitigate for the potential spread of invasive plant species throughout the area. Following construction, the riparian areas and steep streambanks would be restored with an approved, native seed mix to prevent the introduction and/or spread of invasive plant species.

Common carp are already present upstream and downstream of the dam and it is not expected that increased colonization of invasive fish species would occur after the dam is removed. The project partners plan to work with the SW x SW Corner Cooperative Invasive Species Management Area (CISMA) staffed by the Berrien, Cass and Van Buren County Conservation Districts and a volunteer strike team to monitor any spread of invasive species during construction and following dam removal. The CISMA staff and volunteer strike team will be instrumental in preventing invasive species from becoming a serious threat to native ecosystems.

Potential indirect impacts could result from the transportation of demolition material from the dam and powerhouse. Additionally, construction equipment used to reconstruct the river and manage sediment (excavators, trucks, etc.) would be used within construction zones and along access routes. Such equipment use would potentially result in the inadvertent transport of invasive plant propagules (seeds) across the project area. However, BMPs such as covering building material, equipment maintenance, and decontaminating equipment after use would minimize conditions that would support the introduction and/or spread of invasive species throughout the project area. Therefore, indirect impacts on invasive species from the transport of construction material would be minor.

Overall, Alternative B is expected to result in potential short-term conditions where areas of soil are exposed that may be conducive to the establishment of invasive plant species. However, in the long-term, the establishment of native plant communities and the routine monitoring and management of invasive plant species would reduce the presence of invasive species within the project area. Additionally, the invasive fish communities present in the Dowagiac River are expected to remain stable due to their population presence upstream and downstream of the dam. Therefore, impacts associated with invasive species from the implementation of Alternative B are considered to be minor.

3.9 Wetlands

3.9.1 Affected Environment

Wetlands are those areas inundated by surface or groundwater such that vegetation adapted to saturated soil conditions is prevalent. Examples include swamps, marshes, bogs, and wet meadows. Wetland fringe areas are also found along the edges of most watercourses and impounded waters (both natural and man-made). Wetland habitat provides valuable public benefits including flood/erosion control, water quality improvement, wildlife habitat, and recreation opportunities.

In the state of Michigan, the MDEQ regulates the discharge of fill material into wetlands under Part 303, Wetlands Protection, of the Natural Resources and Environmental Policy Act, 1994 PA 451, as amended. In accordance with the rule, wetlands are regulated by the state of Michigan if they are:

- Connected to one of the Great Lakes or Lake St. Clair.
- Located within 1,000 feet of one of the Great Lakes or Lake St. Clair.

- Connected to an inland lake, pond, river, or stream.
- Located within 500 feet of an inland lake, pond, river or stream.
- Not connected to one of the Great Lakes or Lake St. Clair, or an inland lake, pond, stream, or river, but are greater than 5 acres in size.
- Not connected to one of the Great Lakes or Lake St. Clair, or an inland lake, pond, stream, or river, and less than 5 acres in size, but the MDEQ has determined that these wetlands are essential to the preservation of the state's natural resources and has notified the property owner.

In 1984, Michigan received authorization from the federal government to administer Section 404 of the Clean Water Act in most areas of the state. As such, wetlands in the project area are regulated at both the state and federal level by the MDEQ. Additionally, the purpose of EO 11990 (Protection of Wetlands) is to "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands." To meet these objectives, the Order requires federal agencies to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided.

The MDEQ defines a wetland as "land characterized by the presence of water at a frequency and duration sufficient to support, and that under normal circumstances does support, wetland vegetation or aquatic life, and is commonly referred to as a bog, swamp, or marsh" (Act 451 of 1994 Part 303 Section 324.30301). This protection and definition applies to both public and private lands regardless of zoning or ownership.

Construction of the dam was completed in 1928, resulting in the impoundment of over 60 acres of open water between the dam and the Kinzie Road crossing. Based on photo interpretation from 1980 and 1996, it is estimated that between 23-26 acres of vegetated wetlands were found within or adjacent to the river system prior to the drawdown (Environmental Consulting & Technology, Inc. 2018). The partial and permanent drawdown of the dam in 1999 resulted in a 5-foot reduction of water surface elevation, a decrease in the surface water area, and an increase in wetlands due to new areas being exposed (Figure 3-6).

A wetland delineation of the project area was conducted on July 15 and July 28, 2016 to identify, delineate, and characterize wetlands and water features and assess their regulatory status (Environmental Consulting & Technology, Inc. 2016). In total, apart from the Dowagiac River, approximately 60.8 acres of wetlands were delineated within the project area (Figure 3-7).

The Dowagiac River valley includes a mix of emergent and forested wetlands that create a large, contiguous wetland associated with the floodplain on both banks. The dominant plant species observed within the wetland areas are common wetland species generally found in riparian corridors and typical of disturbed landscapes, such as the bank of a river. Dominant herbaceous species in emergent communities included reed canary grass, spotted touch-me-not, wood nettle, side-flowering aster, narrow-leaved cattail, common arrowhead, and smartweed. Forested portions of the wetland were found in the northern portion of the project area, just south of Kinzie Road and in the peninsula south of Pucker Street Dam. Dominant species in these areas included green ash, red maple, box elder, American hornbeam, and American elm. In addition, wetland shrub species observed included elderberry, spicebush, and gray dogwood. Based on the species observed, wetlands within the project area are considered to be of low to moderate quality.

Wetland communities near the Dowagiac River, but outside of the floodplain, are supported by direct rainfall and surface water runoff and in certain areas, surficial groundwater. In particular, based on an analysis of well logs from local residential wells, static water levels within nearby wells are relatively shallow, ranging from 13 to 21 feet below ground surface. When interpreted by USGS topographic mapping it is evident that groundwater levels intersect with the valley wall at or near the base elevation of the valley. This was evident during field reconnaissance activities in which wet and saturated soils were evident at the base of the valley wall nearly 500 feet from the edge of the river. As such, it is expected that groundwater discharge represents an important contributor to wetland development within the Dowagiac River valley.

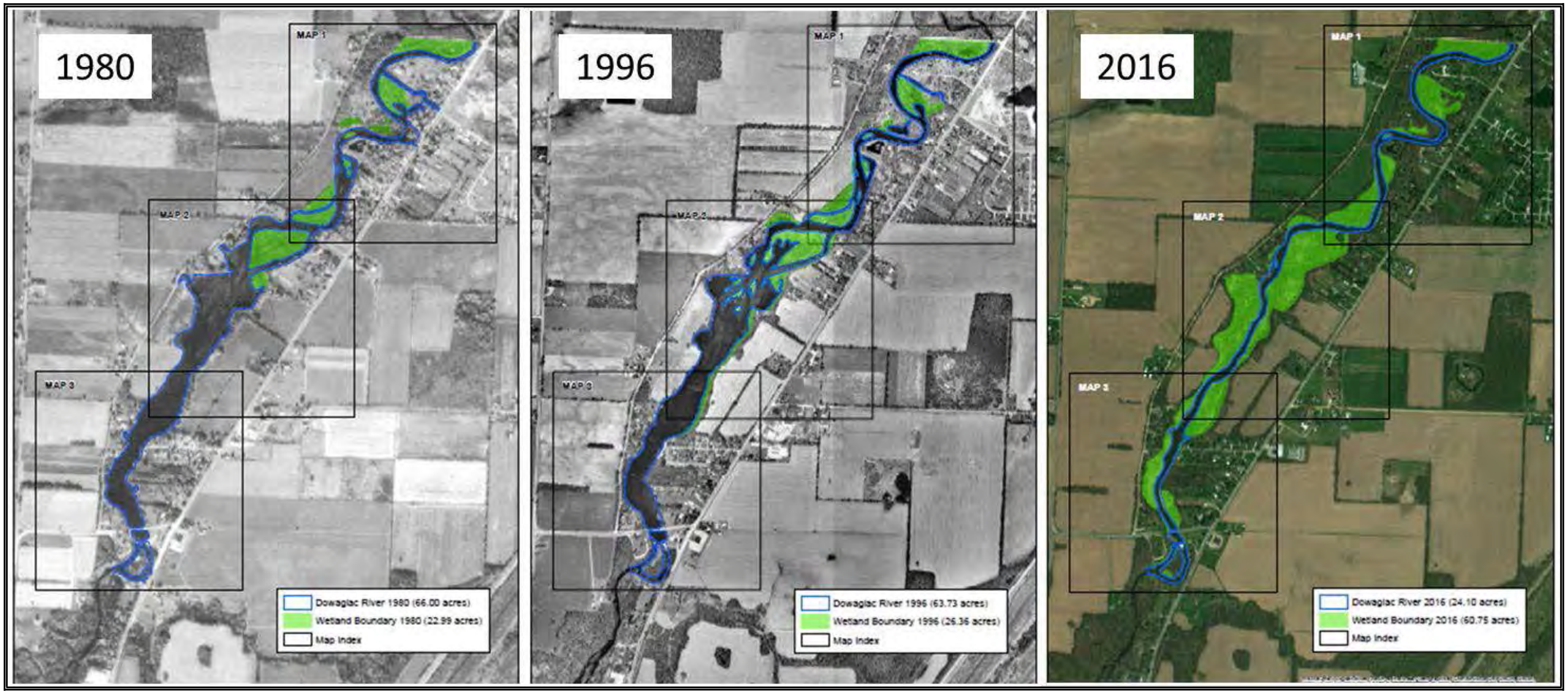


Figure 3-6. Pre- and Post- Drawdown Wetland Conditions Upstream of Pucker Street Dam

Source: Environmental Consulting & Technology, Inc. 2018

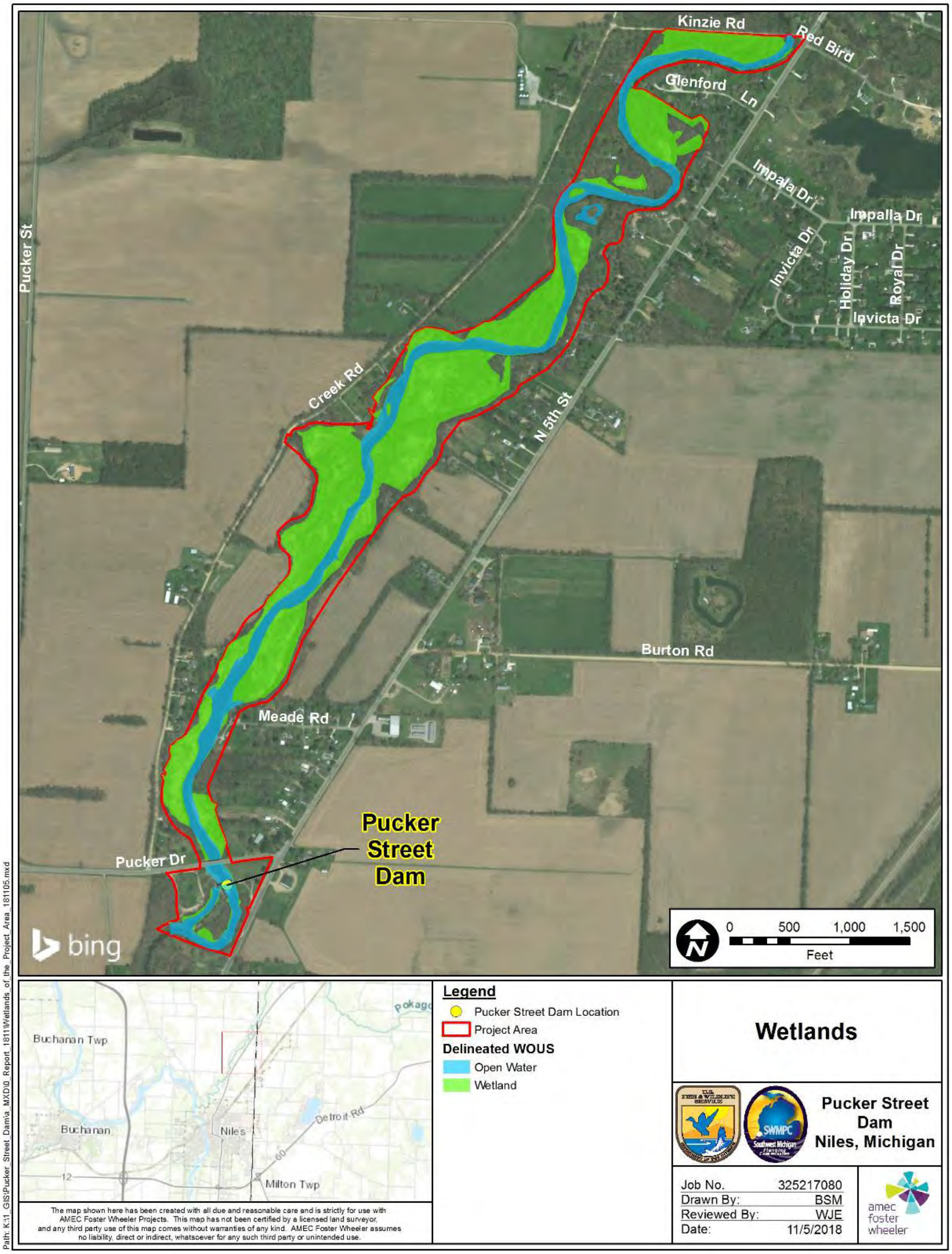


Figure 3-7. Delineated Wetlands within the Project Area

Source: Environmental Consulting & Technology, Inc. 2016

3.9.2 Environmental Consequences

3.9.2.1 Alternative A – No Action

Under the No Action alternative, Pucker Street Dam is expected to remain in-place for some indeterminate period. Additionally, no construction activities within wetlands or reduction of water levels would occur with this alternative. Therefore, no impacts to wetlands would occur under the No Action alternative.

3.9.2.2 Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment

Under this alternative, there would be 0.38 acres of temporary impacts to wetlands due to the construction of access roads through private property (Table 3-8). After dam removal activities are complete, these areas would be restored in accordance with the individual easement agreements with landowners.

Direct wetland impacts would result from placement of fill material obtained from sediment management activities within wetlands associated with the valley floor of the former impoundment area. Approximately 8.7 acres of lands previously mapped as wetlands are located within the proposed disposal areas (Table 3-8 and Figure 3-8). However, those wetlands did not preexist the development of the Pucker Street Dam nor would they have become established if continued drawdown of the impoundment or immediate removal of the dam had occurred in 1999 or shortly thereafter. These recently exposed areas represent a landform that has effectively been created by nearly 90 years of dam-related sedimentation. As such, these lands support wetland communities that have adapted and naturalized to the unnatural conditions created by impoundment of the Dowagiac River.

Table 3-8. Wetland Impacts and Restoration under Alternative B

Project Area	Existing Wetland Area (acres)	Post-Dam Removal Wetland Area (acres)	Wetland Restoration (acres)
Spoil Area A	0.82	0.0	--
Spoil Area B	2.31	0.0	--
Spoil Area C	3.08	0.0	--
Spoil Area D	2.53	0.0	--
Temporary Access Roads	0.38	0.0	--
Floodplain Benches	--	--	4.1
Total Impacts	**8.7**	**0.0**	**--**
Total Restoration	**–**	**--**	**4.1**

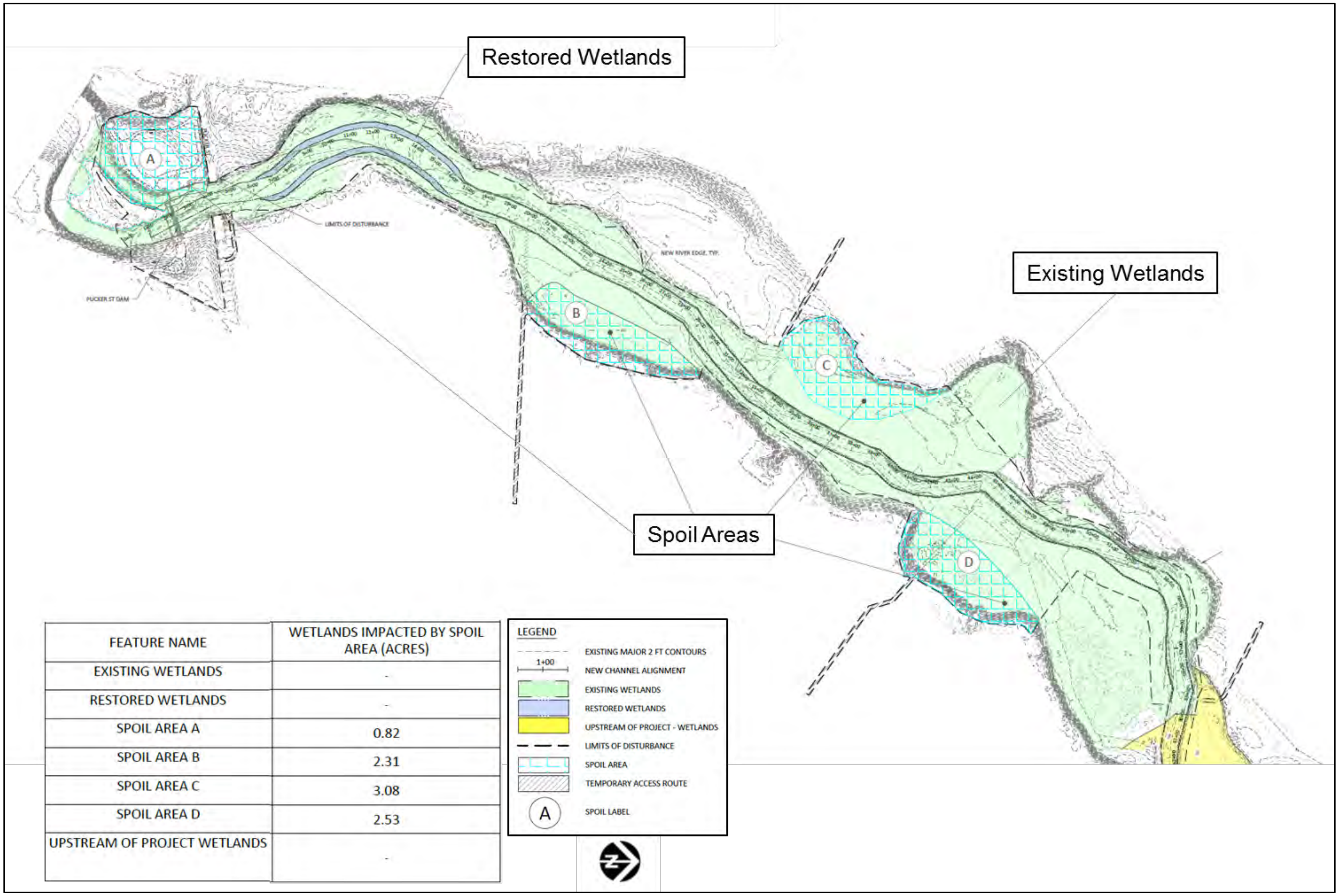
Fill areas identified in Figure 2-2 represent a minimized footprint of potential impact. Two other options for reducing the areas of direct wetland were considered. One option included more expanded fill areas that were more suitable for ease of construction. Under this alternative, fill depths would be between 1 and 5 feet and would encompass virtually all exposed lands of the former impoundment. This alternative, however, was eliminated from further consideration based on the desire to preserve as many lands for future wetland development as possible. Another alternative considered, but eliminated from further consideration, included excavation of sediments and transport by trucking to an offsite disposal facility. While this option would have reduced the area of wetland impact, it would result in excessive project costs that would undermine project feasibility.

In an effort to further reduce wetland impacts, staging areas and temporary access roads would be sited to avoid the dredging of or placement of fill material in existing wetlands (see Chapter 2). Accidental fuel/oil tank leaks and stormwater runoff that could enter wetlands and impair water quality and damage wetland plants and wildlife would be mitigated by implementation of appropriate BMPs and establishment of staging/refueling areas in uplands.

Removal of Pucker Street Dam would eliminate the pool behind the dam and would restore the natural flow line of the river. The indirect impacts of this action would cause a shift in composition or loss of lateral fringing wetlands that have a river-dependent hydrology. With the reduction in water elevation within the river, it is possible that the groundwater table providing baseflow to the Dowagiac River would adjust and drop accordingly with the channel depth. Emergent wetlands found near the southern extent of the project area would experience a significant lowering in water elevation and would likely lose hydrology capable of supporting wetlands. The forested wetlands found in the northern portion of the project area near Kinzie Road would likely see no change in the current hydrology and remain unaffected by the removal of the dam. Wetland areas located between these two areas may still receive enough water from flooding events and groundwater seeps to maintain sufficient wetland hydrology, though the plant community and species compositions may shift from standing water emergent communities towards scrub-shrub and forested conditions.

In contrast, it is expected that up to 4.1 acres of additional wetlands would be created along the revealed river shoreline along the length of the excavated river channel, which includes the newly constructed floodplain benches (Table 3-8 and Figure 3-8). Given the low profile (see Figure 2-4) of the 20-foot benches along the channel bankline, these areas are expected to benefit from a reestablished potentiometric surface and develop as wetlands. Wetlands would naturally develop in areas having a low landscape position and sufficient source of hydrology (groundwater or surface water) to promote the development of a wetland community dominated by hydrophytic species. No spoil materials would be placed in areas where these wetlands are expected to be formed (Figure 3-8).

Alternative B therefore, while undergoing unavoidable wetland losses from river restoration activities (excavated spoil deposition), includes measures for impact minimization and restoration that would preserve and restore wetlands. Furthermore, losses are associated with wetlands that are located on a landform that has been created as a result of the long-term alteration of sediment transport processes. Such losses are considered to be minor in the context of the wetland resource within the watershed (approximately 17,000 acres after dam removal). Consequently, impacts to wetlands are considered minor and would be offset by re-creation of fringing wetlands along the excavated river channel, overall improvements in ecosystem health and functionality, and restored connectivity between both upstream and downstream reaches of the Dowagiac River Watershed that would provide overall improvements in wetland quality and function. In addition, no fill would be placed in areas expected to remain as wetlands after dam removal. Therefore, based on initial consultation with MDEQ, mitigation is not expected to be required due to the overall benefits of the project and that no spoil materials would be placed in areas where the wetlands are expected to be formed. Records of consultation with MDEQ regarding impacts to wetlands and compensatory mitigation are included in Appendix B.



FEATURE NAME	WETLANDS IMPACTED BY SPOIL AREA (ACRES)
EXISTING WETLANDS	-
RESTORED WETLANDS	-
SPOIL AREA A	0.82
SPOIL AREA B	2.31
SPOIL AREA C	3.08
SPOIL AREA D	2.53
UPSTREAM OF PROJECT WETLANDS	-

Figure 3-8. Proposed Wetland Restoration and Spoil Placement Areas

Source: Inter-Fluve

3.10 Socio-Economic Environment

3.10.1 Affected Environment

Socioeconomic characteristics of resident populations are assessed using 2010 Census and 2011-2015 American Community Survey (ACS) 5-year estimates provided by the U.S. Census Bureau (USCB) (USCB 2017a and 2017b). Employment and housing data are provided by the 2011-2015 ACS.

Data were used from a spatial extent and scale sufficient to characterize socioeconomic conditions in the vicinity of the proposed actions. Socioeconomic data are assessed for Niles Charter Township and the City. This geographic area provides an appropriate context for analysis of the socioeconomic conditions in the vicinity of the proposed action. Additionally, Berrien County, Cass County, and the state of Michigan is included as a secondary geographic area of reference.

3.10.1.1 Demographics

Table 3-9 summarizes the demographic characteristics of the project area and project setting. There are approximately 25,458 people located within Niles Charter Township and the City. This represents 16.4 percent of the population of Berrien County (155,565 people), but only 0.3 percent of the population of Michigan (9,900,571 people). From 2010 to 2015, the populations of Niles Charter Township and the City have declined 1.1 percent and 1.3 percent, respectively. Similarly, the populations of Berrien and Cass counties have declined 0.8 percent and 0.7 percent, respectively, in the same time frame, while the statewide population was relatively static (USCB 2017a and 2017b).

Numbers of persons younger than 18 years old within Niles Charter Township (22.4 percent), Berrien County (22.7 percent), Cass County (21.8 percent), and the state of Michigan (22.7 percent) are comparable, while Niles Charter Township has a larger population of people under 18 (27.6 percent). Niles Charter Township (16.9 percent) and the City (16.2 percent) have slightly smaller populations of persons 65 years and older than Berrien County (17.3 percent) and Cass County (18.4 percent), but slightly higher than that of the state of Michigan (15.0 percent) (USCB 2017b).

As shown in Table 3-9, populations within Niles Charter Township and the City are predominantly white (88.5 percent and 85.2 percent, respectively). This is comparable to Cass County (88.3 percent white), but slightly more than Berrien County (78.1 percent white) and the state of Michigan (79.0 percent white). Black or African Americans make up 4.5 percent and 8.9 percent of the populations in Niles Charter Township and the City, respectively, which is lower than Berrien County (15.0 percent) and statewide (14.0 percent). Niles Charter Township and the City have slightly larger populations of people identifying as Two or More Races (4.2 percent and 3.9 percent, respectively) than Berrien County (2.8 percent), and the state of Michigan (2.6 percent). Populations of Hispanic or Latino people within Niles Charter Township (4.8 percent) are comparable to those within Berrien County (5.0 percent) and statewide (4.7 percent), while the City has a slightly larger population of Hispanic or Latinos (6.1 percent). Native American populations within most geographic and political reference areas account for 1.5 percent or less of the total population. Within Cass County however, Native Americans represent 1.1 percent of the county population and are represented by members of the Pokagon Band of Potawatomi.

Table 3-9. Demographic Characteristics

	Niles Charter Township	City of Niles	Berrien County	Cass County	State of Michigan
Population[2]					
Population, 2015 estimate	14,008	11,450	155,565	51,952	9,900,571
Population, 2010[1]	14,164	11,600	156,813	52,293	9,883,640
Population Change 2010-2015	-1.1%	-1.3%	-0.8%	-0.7%	0.2%
Persons under 18 years, 2015	22.4%	27.6%	22.7%	21.8%	22.7%
Persons 65 years and over, 2015	16.9%	16.2%	17.3%	18.4%	15.0%
Racial Characteristics[1]					
White alone, 2015 (a)	88.5%	85.2%	78.1%	88.3%	79.0%
Black or African American, 2015 (a)	4.5%	8.9%	15.0%	4.7%	14.0%
American Indian and Alaska Native, 2015 (a)	0.3%	0.2%	0.3%	1.1%	0.5%
Asian, 2015 (a)	0.7%	1.1%	1.8%	0.8%	2.7%
Native Hawaiian and Other Pacific Islander, 2015 (a)	0.0%	0.0%	0.0%	0.0%	0.0%
Some Other Race, 2015 (a)	1.8%	0.7%	1.9%	1.8%	1.1%
Two or More Races, 2015	4.2%	3.9%	2.8%	3.3%	2.6%
Hispanic or Latino, 2015d (b)	4.8%	6.1%	5.0%	3.3%	4.7%
Housing & Income[2]					
Housing units, 2015	5,739	5,262	76,769	25,849	4,529,311
Median household income, 2011-2015	$43,344	$33,651	$44,993	$46,570	$49,576
Persons below poverty level, 2011-2015	16.1%	27.6%	17.2%	14.6%	16.3%

(a) Includes persons reporting only one race.

(b) Hispanics may be of any race, so also are included in applicable race categories.

Sources: [1]USCB 2017a; [2]USCB 2017b;

3.10.1.2 Economic Setting

The project area is located in a rural portion of Berrien County that is characterized by low-density residential development and agricultural uses. Berrien County has a diverse economic base, including manufacturing, agricultural products, health care and tourism. The closest urban area is the City. The City is an industrial center and has an active economic base that includes over 1,300 businesses. They include a wide variety of firms, wholesale, retail, and manufacturing. In addition, recreational use of the Dowagiac River, including fishing and paddling, contributes to the economic base of the City and Niles Charter Township.

As shown in Table 3-9, median household income in the City is $33,651, which is roughly $11,000 less than the median household income in Berrien County and $16,000 less than the state of Michigan. Median household income within Niles Charter Township is $43,344, which is comparable to the median household income of Berrien County, but roughly $6,000 less than the statewide median. Persons living below the poverty line in Niles Charter Township (16.1 percent) are similar to the statewide average of 16.3 percent, while there are more persons below poverty level within the City (27.6 percent) than within the state of Michigan (USCB 2017b).

Employment characteristics are shown on Table 3-10. In Niles Charter Township and the City, unemployment is 6.3 percent and 7.0 percent of the eligible population (respectively), which is similar to the statewide average of 6.0 percent. Unemployment rates within the civilian labor force for Niles Charter Township (10.4 percent) are similar to the state of Michigan rate of 9.8 percent, while unemployment rates within the civilian labor force for the City (12.0 percent) are slightly higher than the reference geographies (USCB 2017b).

Table 3-10. Employment Characteristics

	Niles Charter Township	City of Niles	Berrien County	Cass County	State of Michigan
Population ≥16 years	11,236	8,452	124,476	42,122	7,925,988
Civilian Labor Force					
Employed	6,110	4,365	68,463	22,556	4,373,518
Unemployed	707	594	7,062	2,435	477,746
Subtotal	6,817	4,959	75,525	24,991	4,851,264
Unemployment					
% of Population ≥16 years	6.3%	7.0%	5.7%	5.8%	6.0%
% of Civilian Labor Force	10.4%	12.0%	9.4%	9.7%	9.8%

Source: USCB 2017b

3.10.1.3 Community Facilities/Services

Community services and facilities refer to those services provided to support residential developments that include law enforcement, fire and emergency services, hospitals, cemeteries, churches, and educational facilities. The City owns Pucker Street Dam and is responsible for the maintenance of the dam and ancillary structures. Other community facilities, such as emergency services, churches, and educational facilities are found within the City and the surrounding area; however, none of these facilities would be directly impacted by the proposed action.

3.10.1.4 Environmental Justice

On February 11, 1994, President Clinton signed EO 12898 federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. EO 12898 mandates some federal-executive agencies to consider Environmental Justice (EJ) as part of the NEPA. EJ has been defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income (EPA 2018) and ensures that minority and low-income populations do not bear disproportionately high and adverse human health or environmental effects from federal programs, policies, and activities.

Guidance for addressing EJ is provided by the CEQ's Environmental Justice Guidance under the National Environmental Policy Act (CEQ 1997). The CEQ defines minority as any race and ethnicity, as classified by the USCB, as: Black or African American; American Indian or Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; some other race (not mentioned above); two or more races; or a race whose ethnicity is Hispanic or Latino (CEQ 1997). Low-income populations are based on annual-statistical poverty thresholds also defined by the USCB.

Identification of minority populations requires analysis of individual race and ethnicity classifications as well as comparisons of all minority populations in the region. Minority populations exist if either of the following conditions is met:

- The minority population of the impacted area exceeds 50 percent of the total population.
- The ratio of minority population is meaningfully greater (i.e., greater than or equal to 20 percent) than the minority population percentage in the general population or other appropriate unit of geographic analysis (CEQ 1997).

Low-income populations are those with incomes that are less than the poverty level, which varies by the size of family and number of related children under 18 years (CEQ 1997). The 2015 USCB Poverty Thresholds states the poverty threshold as an annual household income of $24,257 for a family of four (USCB 2017c). For an individual, an annual income of $12,082 is the poverty threshold. A low-income population exists if either of the following two conditions is met:

- The low-income population exceeds 50 percent of the total population.
- The ratio of low-income population significantly exceeds (i.e., greater than or equal to 20 percent) the appropriate geographic area of analysis.

For this assessment, three geographic areas of analysis (i.e., township/city, county and state) were used to determine potential EJ populations. Potentially affected communities were defined as the region surrounding the project, Niles Charter Township and the City. Demographic data were then compared to county and statewide data.

Total minority populations (i.e. all non-white racial groups and Hispanic or Latino, combined) comprise 14.6 percent of the population of Cass County, 17.2 percent of the population of Berrien County, and 25.7 percent of the population of Michigan. Minorities comprise 16.3 percent of the population of Niles Charter Township and 20.8 percent of the population of the City. Neither Niles Charter Township nor the City exceed EJ thresholds when compared to the reference geographies.

The poverty rate in Cass County is 14.6 percent, Berrien County is 17.2 percent, and statewide is 16.3 percent. Niles Charter Township has a poverty rate of 16.1 percent, and the City has a poverty rate of 27.6 percent. Neither Niles Charter Township nor the City exceed the EJ threshold when compared to the reference geography.

3.10.2 Environmental Consequences

3.10.2.1 Alternative A – No Action

Under the No Action alternative, there would be no change in the demographics, employment, and local economy within the vicinity of the Pucker Street Dam. The City would continue to be financially liable for the dam and, based upon the requirements of the MDEQ, would be obligated to undertake major repairs and maintenance.

3.10.2.2 Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment

3.10.2.2.1 Demographic Impacts

A relatively small labor force (less than 25 workers) would be required to remove the Pucker Street Dam and implement the proposed restoration measures identified for Alternative B. The required labor is expected to be available from the regional area and no changes to resident populations are expected. Consequently, no temporary or long-term impacts to local demographics are expected.

3.10.2.2.2 Economic Impacts

Construction activities would temporarily contribute to employment and associated payrolls and would require the purchase of materials and supplies. Capital costs associated with the proposed action would therefore have a minor, direct economic benefit to the local and regional area. Additionally, some beneficial secondary impacts to the economy are also expected in conjunction with the multiplier effects of construction activities. For example, the hospitality and service industries would benefit from the demands brought by the increased construction work force. However, given the relatively small magnitude of the anticipated construction and workforce, temporary, beneficial impacts under Alternative B would be minor. In addition, if the dam is removed, the City would avoid any future maintenance, environmental, and liability costs associated with the dam.

While the concentrated angler use of the lower Dowagiac River for steelhead or salmon may be transferred to other regional destinations under this alternative, angler use of the Dowagiac River for brown trout is expected to remain stable. In addition, removal of the Pucker Street Dam is expected to increase paddler use of the Dowagiac River. Therefore, adverse economic impacts associated with a potential reduction in angler use are expected to be offset by an increase in paddlers and would be minor overall.

3.10.2.2.3 Community Facilities and Services

Removal of the Pucker Street Dam is expected to be carried out by regionally-based contractors, and no relocations to the area are anticipated. Under the proposed action, local fire, police and medical services would not be affected since no relocations to the area are expected from the removal action. Future uses of the project location would continue to be non-residential recreational/open space. Consequently, there would be no impacts to community services.

3.10.2.2.4 Environmental Justice

No sensitive populations subject to EJ considerations were identified in Niles Charter Township or the City. Therefore, there would be no impacts to low-income or minority populations under this alternative. Notably however, the removal of the Pucker Street Dam is consistent with the objectives established by the Pokagon Band of Potawatomi with respect to restoration of tribal lands and ecosystems as the band continues to restore the hydrologic and ecological integrity in the watershed of the Dowagiac River (see Appendix B).

3.11 Parks and Recreation

3.11.1 Affected Environment

This section addresses parks and recreational facilities that are on, immediately adjacent to (within 0.5 mile), or within the vicinity of the Pucker Street Dam (3-mile radius). Parks and recreation facilities include open areas, boat ramps, community centers, swimming pools, and other public places.

3.11.1.1 Parks

Several parks are located within the vicinity of Pucker Street Dam. The island adjacent to Pucker Street Dam formed by the spillway was formerly leased by Niles Charter Township for use as Losensky Park. In 2013, the footbridge that provided access to the park was closed for safety reasons. The area is currently known as the Pucker Street Dam Site and is owned by the City (City of Niles, Michigan 2016).

Birkholm Park, Island Park, and Saathoff Park, are all small neighborhood parks within the City that feature playground equipment and picnic areas (City of Niles, Michigan 2016). North Fireman’s Park is a small park managed by Niles Charter Township, located approximately 0.7 mile south-southwest of the project area that offers playground equipment and picnic areas (Niles Charter Township 2014).

Arthur Dodd Memorial Park, managed by Cass County, is located approximately 4 miles upstream of the Pucker Street Dam, or 1.6 miles upstream of the northern limits of the project area. Amenities found at this park include picnic areas, playground equipment, fishing, horseshoe pits, a hiking trail, volleyball court, and carry-in boat access (Cass County, Michigan 2017). Recent improvements at Dodd Park include rental cabins, a new bridge, and accessible paths and kayak/canoe launch. An ecosystem restoration project to re-establish a historic channel meander to the Dowagiac River in a once-channelized reach was completed in 2007 with assistance from a local watershed organization called Partnership with Meeting the Ecological and Agricultural Needs of the Dowagiac River System (MEANDRS).

Plym Park is a community park located approximately 1.7 miles southwest of Pucker Street Dam along the Dowagiac River in the City. This 19-acre park features picnic areas, a golf course, sports facilities, and access to the Indiana-Michigan River Valley Trail (City of Niles, Michigan 2016).

Riverfront Park is located approximately 2.5 miles southwest of Pucker Street Dam and is managed by the City. This park stretches two miles along the St. Joseph River and features picnic areas, fishing spots, a skate park, playgrounds, access to the Indiana-Michigan River Valley Trail, and a boat launch (City of Niles, Michigan 2016).

Riverfront Park Campground is a privately-owned camping area located approximately 1.5 miles southwest of Pucker Street Dam along the Dowagiac River. The campground is located on over 50 acres and has approximately one mile of river frontage (Riverfront Park Campground 2017).

The Indiana-Michigan River Valley Trail is an approximately 34-mile bicycle and walking trail that connects Niles, Michigan to Mishawaka, Indiana. This trail connects several cities, universities, business, and attractions (City of Niles, Michigan 2016).

The Dowagiac River and St. Joseph River are both considered Michigan Water Trails. The Michigan Water Trails link regional trail waters to coastal waterways and form a statewide water trail system along the Great Lakes shoreline (Michigan Water Trails 2017a).

3.11.1.2 Recreation

The Dowagiac River is part of the Michigan Water Trails network and includes a 19-mile reach that extends from upstream of the town of Dowagiac to the mouth on the St. Joseph River.

A large number of recreational users of the Dowagiac River in the summer consist of non-angling activities, such as tubing, canoeing, and kayaking. These activities are currently limited to the areas upstream and downstream of Pucker Street Dam and require portage from Pucker Street to the boat launch downstream of the dam. The presence of the dam represents an impedance in the trail network that deters use. Consequently, little effort has been expended to remove log obstructions across the river within reaches upstream of the dam. Other public boat launches within 3 miles of Pucker Street Dam that provide access to the Dowagiac include a carry-in boat access location downstream at Losensky Park, a small gravel boat ramp at M-139, two boat launches on the St. Joseph River in Niles, and a carry-in boat launch upstream at Arthur Dodd Memorial Park (Michigan Water Trails 2017b and 2017c).

Angling is recognized as an important aspect of recreation that is connected to the Dowagiac River. As described in Section 3.5 important recreational species include steelhead, Chinook salmon, walleye, coho salmon, and brown trout. Anglers who fish the river include both regional fishermen and those who come to Niles as a fishing destination. Because Pucker Street Dam impedes the upstream movement of steelhead and salmon, brown trout is the dominant recreational sport fish above Pucker Street Dam. In contrast, all five species are sought after by anglers within downstream waters.

3.11.2 Environmental Consequences

3.11.2.1 Alternative A – No Action

Under the No Action alternative, the dam would remain in place and current maintenance operations of the dam would continue. Therefore, there would be no direct impacts on parks or recreation. However, under this alternative the interruption in the Dowagiac River trail network would remain.

3.11.2.2 Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment

3.11.2.2.1 Parks

Under Alternative B, the raceway adjacent to the dam would be filled, and the deteriorating footbridge would be replaced by a wider land bridge created from fill material. Because access would be restored to this area, this alternative is anticipated to have a minor beneficial impact to the Pucker Street Dam site. No other parks would be directly impacted under this alternative.

As described in Section 3.2, the proposed action would not have an impact on flood storage and peak discharge downstream of the dam. Therefore, there would be no impacts to the Riverfront Park Campground and Plym Park associated with flooding.

3.11.2.2.2 Recreation

Recreational use of the Dowagiac River within the project area would be restricted during the construction phase. The carry-in boat launch on the City owned property adjacent to Pucker Street Dam would likely be inaccessible during demolition activities. However, additional boat launches are available upstream at Arthur Dodd Memorial Park and at the new MDNR access site on Peavine Street and downstream at MDNR's M-139 access site. Access to the boat launch and use of the river by canoers and kayakers would be restored following demolition activities. Therefore, impacts to recreational users and the boat launch would be considered temporary and minor.

Canoeing and kayaking on the Dowagiac River is currently limited to the areas upstream and downstream of Pucker Street Dam and require portage from Pucker Street to the boat launch downstream of the dam. Under Alternative B, the interruption of the water trail on the Dowagiac would be eliminated and paddlers and floaters would be able to expand their use of the river. Other dam removal projects have experienced similar increases in paddling use after the project is complete. For example, after the removal of the Brown Bridge Dam on the Boardman River there has been a definite increase in the number of paddlers who are putting in upstream of the former dam location (Steve Largent, Personal communication, 2019). Similarly, paddling has increased on the Grand River after the removal of Lyons Dam (Rick Westerhof, Personal communication, 2019). Wading access is currently available at Dodd Park and will continue to be so following dam removal. In addition, MDNR has closed the Sink Road access site and is developing a more user-friendly site on Peavine Street in 2019 that will include parking, therefore increasing access for recreational users. After completion of the project, planned river depths at the former impoundment will also be wadable. There will be more wadable waters after the completion of the Pokagon Band of Potawatomi restoration from Crystal Springs to Peavine Street.

In order to support increased paddling, management activities outside the scope of the proposed project must be undertaken to eliminate treefalls that obstruct passage along the river channel and that may pose a safety hazard upstream of Kinzie Road. Subject to such management activities, it is expected that the Dowagiac River would become an attractive destination for paddlers that would bring additional recreators to the local project area. These other activities are discussed further in Section 3.16 as part of the Cumulative Effects.

Under this alternative it is expected that the physical changes in structures and habitat of the Dowagiac River that would be altered by dam removal would have associated effects on the aquatic ecosystems of the project area. In the short-term, some habitat alteration downstream of the dam may be expected as a result of sediment transport and deposition. However, under this alternative extensive sediment management activities would be undertaken to reduce and minimize excessive sedimentation downstream. As described in Section 3.4.2, dam removal is generally considered to result in beneficial long-term effects in terms of ecosystem sustainability and health. With the removal of the Pucker Street Dam, steelhead, walleye and salmon that previously aggregated below Pucker Street Dam would disperse to the upper reaches of the watershed. Consequently, the concentrated angler use of the lower Dowagiac may therefore be expected to be similarly dispersed or transferred to other productive angling destinations. Notably however, the harvestable brown trout populations upstream of Pucker Street are expected to remain relatively stable as these fish are sustained primarily by annual stocking by the MDNR rather than from natural reproduction.

In summary, Alternative B would result in short-term direct effects to the Pucker Street Dam site (also known as Losensky Park) that would be restored following dam deconstruction. Additionally, some of the angler use that is driven by steelhead and salmon fishing may be expected to shift to other accessible reaches of the watershed or to other regional destinations. However, the angler use of the Dowagiac River that is based on brown trout is still expected to remain. Finally, it is expected that dam removal may result in an increase in paddler use of the river due to dam removal. However, this increase is dependent upon management measures to remove obstructions in the river upstream of Kinzie Road (treefalls, etc.). Therefore, impacts to recreational use by anglers may be adverse but offset by expanded use by paddlers and would be minor overall.

3.12 Cultural and Historical Resources

3.12.1 Affected Environment

3.12.1.1 Historic Architecture

The Pucker Street Dam and associated powerhouse were reviewed for potential eligibility to the National Register of Historic Places (NRHP). It was not considered eligible for inclusion on the NRHP as it lacks the required level of integrity, design, materials, or association required to meet NRHP listing criteria. Concurrence from the State Historic Preservation Office (SHPO) and USFWS Regional Historic Preservation Officer/ Archaeologist regarding the ineligibility of the dam NRHP listing is included in Appendix B.

3.12.1.2 Archaeological Resources

A review of the state records, as well as the extant professional and historical literature was conducted to identify any previously known cultural resources that may exist with the Dowagiac River Watershed and Pucker Street Dam project area that would be potentially affected by the proposed dam removal.

No previously recorded archaeological sites were identified in the immediate project area. The Pokagon Band of Potawatomi have indicated that the project area is within their traditional tribal lands used by their people.

3.12.2 Environmental Consequences

3.12.2.1 No Action Alternative

There would be no change in the current conditions under this alternative. Therefore, no impacts to cultural resources would occur under the No Action alternative.

3.12.2.2 Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment

In consideration of the absence of both NRHP-eligible archaeological or architectural sites in the project area, no impacts to historic properties are expected under this alternative. In a letter dated November 30, 2016, Mr. Brian Grennell (SHPO) and Mr. James Myster, USFWS Regional Historic Preservation Officer/ Archaeologist concurred that the removal of Pucker

Street Dam and the associated ecosystem restoration activities would have no effect on historic properties (see Appendix B).

While no recorded archaeological sites are known from the project area, the Pokagon Band of Potawatomi requested that they be notified if any artifact was found during construction activities. In response to this request, a procedure will be included in project bid documents describing actions and follow up that should occur if any artifacts are found on site during construction.

3.13 Solid and Hazardous Waste

3.13.1 Affected Environment

Solid waste consists of a broad range of materials that include refuse, sanitary wastes, contaminated environmental media, scrap metals, nonhazardous wastewater treatment plant sludge, nonhazardous air pollution control wastes, various nonhazardous industrial waste and other materials (solid, liquid, or contained gaseous substances). Subtitle D of the Resource Conservation and Recovery Act (RCRA) and its implementing regulations establish minimum federal technical standards and guidelines for nonhazardous solid waste management. States are primarily responsible for planning, regulating, implementing, and enforcing solid waste management.

Hazardous materials are defined as any substance or material that has been determined to be capable of posing an unreasonable risk to health, safety and property. Hazardous materials include hazardous substances and hazardous waste. Under RCRA, a solid waste is hazardous if it is listed as a known hazardous waste, or meets the characteristics described in 40 CFR Part 261, including ignitability, corrosivity, reactivity, or toxicity.

Hazardous materials are regulated under a variety of federal laws including the Occupational Safety and Health Administration standards, Emergency Planning and Community Right to Know Act, RCRA, the Comprehensive Environmental Response, Compensation and Liability Act of 1980, and Toxic Substances Control Act.

There are no hazardous waste sites or facilities located within the project area. However, asbestos and lead-based-paints were identified within the Pucker Street Dam (Wightman Environmental, Inc. 2014a and Wightman Environmental, Inc. 2014b).

3.13.2 Environmental Consequences

3.13.2.1 Alternative A – No Action Alternative

Under the No Action alternative, Pucker Street Dam is expected to remain in-place for some indeterminate period. For that period, solid and hazardous waste generation would remain unchanged. Materials are considered to be generally stable and not subject to release to the environment. As such, there would be no solid or hazardous waste impacts from this alternative on either human or environmental receptors.

3.13.2.2 Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment

Construction activities would generate solid waste in the form of demolition debris from removal of the Pucker Street Dam. Solid waste generated during project activities would be transported for disposal at a licensed waste management facility.

Asbestos and lead based paints were detected within the Pucker Street Dam and would need to be mitigated as part of the powerhouse demolition process. All hazardous materials would be removed in accordance with all state and federal laws, rules, and regulations in force at the time of the demolition. The hazardous waste cleanup shall take place prior to any other demolition activity. These materials would be disposed of at an approved landfill.

In addition, various hazardous wastes, such as fuels, lubricating oils, and other hazardous materials could be produced during demolition. Oily wastes generated during servicing of heavy equipment would be managed by off-site vendors who service on-site equipment using appropriate self-contained used oil reservoirs. Notably equipment operating in water would be required to utilize vegetable oil (e.g., rapeseed or canola) as a lubricant to reduce potential impacts to water quality. Appropriate spill prevention, containment and disposal requirements for hazardous wastes would be implemented to protect construction workers, the public and the environment. If leaks or spills of hazardous materials occur, the workers responding to the incident are required to have the appropriate level of training, as mandated by the Occupational Safety and Health Administration at 29 CFR, Part 1910.

There would be a minor increase in solid and hazardous waste generated during demolition. All solid waste and hazardous wastes generated from implementation of this alternative would be handled and disposed of per applicable local, state, and federal requirements.

3.14 Visual Quality and Aesthetics

3.14.1 Affected Environment

The project area contains a combination of human created and natural features that contribute to the overall visual composition of the site. The installation of Pucker Street Dam and associated structures altered the flow of the Dowagiac River creating an impoundment upstream, which reshaped the surrounding natural viewscape. While aesthetics are subjective, it should be noted that long pools are visually pleasing to some individuals. However, the aesthetics of the river corridor upstream of the dam are currently diminished with the formation of large depositional areas within the delta of the former impoundment. The low-lying vegetated islands and bars of fine materials that have formed detract from the pool-like aesthetics typically associated with impoundments.

The dam was originally constructed to provide hydropower for the local community. Though it is no longer actively in use for electricity production, the dam and powerhouse add to the visual interest of the site at a landscape perspective, but detract from the natural aesthetics of the river when viewed up close due to their current state of decay and disrepair. During a dam safety inspection in 2013, it was recorded that the tainter gates exhibited moderate corrosion, the concrete structures had significant cracks and spalling, and that vegetation has begun to grow from the cracks in the abutment walls, overflow spillways, and spillway bay piers (Trumble 2013). Therefore, most viewers of the project site would find that the views of the dam and powerhouse diminish the overall visual quality.

3.14.2 Environmental Consequences

3.14.2.1 Alternative A – No Action

There would be no change in the current conditions under this alternative; therefore, there would be no direct impact to the current aesthetics of the site. However, given the current state of disrepair, the aesthetics of the dam and powerhouse would continue to decline until the required repairs are made by the City.

3.14.2.2 Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment

Aesthetics are often very difficult to quantify and differentiate. For example, while the aesthetics of flowing versus still water may be subjective, and based solely on the opinion of the observer, the change in the quality of the scenery and subsequent appeal will only slightly vary from one group to another. Furthermore, users of and visitors to the Dowagiac River near the Pucker Street Dam generally expect flowing water conditions typical of a river setting, which are currently being reduced by the present conditions. Therefore, under this alternative the Dowagiac River would revert back to a free-flowing stream and the associated natural aesthetics would be restored both at the dam and the upstream impoundment.

The construction equipment, staged materials and construction activities prior to and during dam removal would result in a short-term alteration in the visual quality of the site. Impacts from additional vehicular traffic are expected to be minor as the work would occur in phases. This increase in visual discord would be temporary and only last until construction is completed.

During and following the drawdown of the river, the majority of the land previously submerged along the banks and lands identified as dredge disposal sites would be exposed and would likely be unsightly in the short-term. Early successional species from the seed bank and carried in by wind, water and wildlife would re-vegetate these exposed areas. Slowly over time, these areas would begin to resemble the existing floodplains and riparian zones that presently exist upstream and downstream along the Dowagiac River. Views would transition over time as the exposed bottomland initially characterized as an herbaceous community gives way to scrub shrub and eventually forested communities.

While the removal of the dam and subsequent lowering of the river level would diminish the visual quality of the project site for some visitors, the river corridor would in time be returned to near natural, pre-dam flow conditions, and the natural scenic aesthetics of the river ecosystem would be restored. Additionally, due to the current state of decay of the powerhouse and associated structures, the removal of these components would improve the aesthetics of the project area. Impacts from Alternative B are therefore considered to be somewhat disruptive during the construction period, but beneficial in the long-term.

3.15 Air Quality

3.15.1 Affected Environment

The Clean Air Act regulates the emission of air pollutants and, through its implementing regulations, establishes standards (National Ambient Air Quality Standards [NAAQS]) for several criteria pollutants that are designed to protect the public health and welfare with an ample margin of safety. The criteria pollutants are ozone, particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxide and lead. Specified geographic areas are designated as attainment, nonattainment or unclassifiable for specific NAAQS. Areas with ambient concentrations of criteria pollutants exceeding the NAAQS are designated as nonattainment areas, and new emissions sources to be located in or near these areas are subject to more stringent air permitting requirements.

According to the U.S. Environmental Protection Agency (USEPA)'s Green Book (USEPA 2018) and MDEQ websites, Berrien County is currently in attainment of the NAAQS for all criteria pollutants with the exception of ozone. Berrien County exceeded the 8-hour ozone levels in 2004, 2005, and 2006 under standards set in 1997. For certain programs like Congestion Mitigation and Air Quality Improvement Program, Berrien County is considered to be a

"Maintenance Area", which means that the county previously was non-attainment. Under the revised standard set in October 2015, the ozone measuring station in Coloma exceeded the new ozone standard. As a result, the MDEQ has recommended that Berrien County, along with Allegan and Muskegon counties, each be designated separately as nonattainment for ozone. However, air quality and meteorological data indicate that the elevated ozone levels recorded do not appear to significantly contribute to ozone concentrations in the area and that out-of-state emissions are being transported over Lake Michigan.

3.15.2 Environmental Consequences

3.15.2.1 Alternative A – No Action

There would be no change in the current conditions under this alternative, therefore there would be no impact to air quality.

3.15.2.2 Alternative B – Dam Removal with Blended Restoration Using Existing Channel Alignment

The proposed project would have no long-term impacts on air quality. Construction of the project may cause a temporary reduction in local ambient air quality due to emissions generated by construction equipment. Equipment operating on the site would emit pollutants that contribute to temporary and localized increased levels of criteria pollutants such as carbon monoxide, nitrogen oxides, and ozone. Because equipment use is relatively limited (excavators, trucks, etc.) and of relatively short duration (up to seven months), emissions from construction vehicles and related equipment should have an insignificant, temporary impact to local air quality. Additionally, emissions from construction equipment would be controlled by compliance with any applicable state and local requirements. The emissions are expected to be of short duration, and not result in a degradation of local or regional air quality. Consequently, impacts to air quality are expected to be non-significant and small. Therefore, in accordance with the General Conformity Rule established under CAA Section 176(c)(4), this project would not interfere with the state's plans to attain and maintain national standards for air quality.

3.16 Cumulative Effects

This section supplements analyses in preceding sections that either explicitly or implicitly considered cumulative impacts resulting from the removal of Pucker Street Dam and associated restoration activities. These analyses are based on baseline conditions, which reflect the impacts of past and present actions and how they have shaped the existing environment. The CEQ regulations (40 CFR §§ 1500-1508) implementing the procedural provisions of the NEPA of 1969, as amended (42 USC § 4321 et seq.) define cumulative impact as: "…the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR § 1508.7). Therefore, this section will analyze the incremental impact of the proposed action and any cumulative effects when added to other identified past, present and reasonably foreseeable future actions.

3.16.1 Identification of "Other Actions"

There is one known transportation and one utility improvement project in the vicinity of Pucker Street Dam that would contribute to potentially additive effects on environmental resources impacted by the project. Improvements to the Sink Road Bridge are planned for 2019 and include replacement of the bridge, approach roadway, and improved safety features. Additionally, TransCanada recently relocated two natural gas pipelines that are 22 inches and 24 inches in diameter where they cross the Dowagiac River approximately 3,000 feet upstream of the dam. TransCanada installed approximately 1,400 feet of both pipes adjacent to the existing pipes at a depth of approximately 30 feet below the expected grade of the proposed channel. These pipes were installed via directional drilling to avoid any disturbance to the river or its banks.

TransCanada has abandoned the current pipelines with plans to remove them in the summer of 2019. The abandoned pipelines are buried below the channel, and a 2015 inspection indicated a minimum cover of 3.9 feet over the 22-inch pipe and 3.1 feet over the 24-inch pipe. Depth-of-refusal probing in this section of river suggests the pre-dam channel bed is likely 5 to 7 feet below the existing bed, which indicates the pipes were buried in post-dam reservoir sediment. If the channel is allowed to passively achieve its pre-dam bed elevations, the pipes would eventually be exposed and elevated above the bed. This would be an unacceptable condition that risks the integrity of the pipes and the safety of recreational users.

Additionally, the Pokagon Band of Potawatomi are planning a river restoration project upstream of Arthur Dodd Park on the Dowagiac River. From 1901 to 1928 this section of the river was straightened, lowered, and channelized to drain the surrounding wetlands, making land more suitable for agriculture. The goals of the Pokagon Band of Potawatomi restoration include restoring sinuosity and meanders to near pre-channelization conditions, re-establishing more natural patterns of scour and deposition, and increasing the frequency and extent of floodwater accessing the floodplain. By restoring the meanders and lifting the river bottom back to its original channel depth, the hydrologic function in the study area can be restored, leading to improved conditions for native species to thrive.

The Pokagon Band of Potawatomi is currently working on the first phase of this effort, which would take an existing 0.66 miles of river and restore it to 1.29 miles with the addition of meanders. The project is currently scheduled to begin during the winter of 2019-2020, depending on permit approvals. After successfully implementing this first phase, the Pokagon Band of Potawatomi would continue to restore additional reaches of the river and eventually 3 miles to 5 miles from Peavine Street to Crystal Springs Street.

3.16.2 Analysis of Cumulative Impacts

Cumulative impacts associated with these other identified actions are related to water quality, aquatic ecology, wetlands, and floodplain. Potential cumulative impacts as a result of the bridge improvements include generation of construction debris, sedimentation, and direct impacts to aquatic organisms. Indirect impacts include the temporary reduction in water quality due to re-suspension of sediment that could increase the risk to downstream organisms and/or temporary loss of habitat through deposition and smothering of habitat. However, these impacts were temporary and limited to the active phase of the project. Therefore, there would be no cumulative effects to water quality and aquatic resources as a result of the bridge improvements.

The new TransCanada pipelines have been installed under the river using directional drilling, with the entry and exit points approximately 500 feet away from the stream banks; therefore, there was no instream work or disturbance to the aquatic environment. The removal of the abandoned pipes would be done in the summer of 2019 by TransCanada in accordance with the required local, state, and federal permits. Therefore, it is assumed that TransCanada will implement the necessary BMPs to reduce sedimentation and water quality disturbances as a result of this action. As TransCanada plans to complete this work prior to the commencement of dam removal activities, any additional sedimentation that moves downstream would remain in the impoundment upstream of the dam. During dam removal activities this sediment would be dredged or recovered in the sediment trap that will be regularly monitored and cleaned out as part of the Pucker Street Dam removal project. Therefore, cumulative effects to water quality and aquatic ecology are expected to be minor.

The river restoration efforts planned by the Pokagon Band of Potawatomi would complement the proposed action in improving overall river conditions. The proposed restoration would benefit aquatic organisms by increasing the frequency of pool, riffle, and large woody debris habitats. Water quality would be improved through the re-establishment of natural patterns of scour and sediment deposition. The planned efforts would also help to reestablish the connection to the floodplain by increasing the frequency and extent of floodwater accessing the floodplain. The restoration efforts done by the Pokagon Band of Potawatomi would also provide for more opportunities to wade upstream of the removed dam due to the removal of the built up silts and sediments and improved channel morphology. The project includes measures to stabilize the banks and address sedimentation downstream. Therefore, it is assumed that cumulative impacts would be minor during the construction phase and adhere to all permit requirements. In the long-term, the cumulative impacts would be beneficial to the Dowagiac River Watershed as a whole.

4 REFERENCES

Allan, J.D. and M.M. Castillo. 2007. Stream Ecology: Structure and Function of Running Waters Second Edition. Springer, Dordrecht, The Netherlands.

Brennan, P. O. and C. Stamm, 1991. Dowagiac River Watershed Non-point Pollution Inventory and Implementation Plan. Sauk Trails Resource Conservation and Development Area Council, Mattawan, Michigan.

Cass County Conservation District. 2002. Dowagiac River Watershed Management Plan. Cassopolis, Michigan.

Cass County, Michigan. 2017. Arthur Dodd Memorial Park. http://www.casscountymi.org/CountyParks/ArthurDoddMemorialPark.aspx (accessed September 29, 2017).

City of Niles, Michigan. 2016. Community Recreation Plan, 2016-2010. http://www.nilesmi.org/document_center/community/Park%20recreation/RecreationPlanBinder2016.pdf (accessed September 25, 2017).

Clarke, G.P.A., J.R. Batres-Marroquin, B.L. Braden, H. Kato, A.M. Perot. 1998. Feasibility Assessment for Rehabilitating the Dowagiac River System in Southwestern Michigan. A Watershed Analysis of Potential Changes to the Ecology and Community. The University of Michigan School of Natural Resources and Environment. Ann Arbor, Michigan.

Council on Environmental Quality. 1997. Environmental Justice Guidance under the National Environmental Policy Act, Executive Office of the President, Washington, DC. Available at: https://www.epa.gov/sites/production/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf

Cummings, T. R., F. R. Twenter, and D. J. Holtschlag, 1984. Hydrology and Land Use in Van Buren County, Michigan. United States Geological Survey Water-Resources Investigation Report 84-4112. Lansing, Michigan.

Environmental Consulting & Technology, Inc. 2016. Wetland Determination Report for Pucker Street Dam Removal Project Niles Township (T07S-R17W), Berrien County, Michigan (Project No. 16-0472).

Environmental Consulting & Technology, Inc. 2018. Pucker Street Dam Removal Project-Wetlands Analysis. Prepared for Wightman and Associates, Inc. March 28, 2018

Gordon, N.D., T.A. McMahon, B.L. Finlayson. 1992. Stream Hydrology: an Introduction for Ecologists. John Wiley and Sons, West Sussex, England.

Gunderman, B. 2011. Dowagiac River 2011 Survey Report. Michigan Department of Natural Resources, Fish Collection System.

Gunderman, B. J. 2017. Sport fishing catch and effort and an economic analysis of the lower St. Joseph River fishery. Michigan Department of Natural Resources, Fisheries Report 16, Lansing.

Homer, C.G., J.A. Dewitz, L. Yang, S. Jin, P. Danielson, G. Xian, J. Coulston, N.D. Herold, J.D. Wickham, and K. Megown, K. 2015. Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information. Photogrammetric Engineering and Remote Sensing, v. 81, no. 5, p. 345-354. Retrieved from http://www.mrlc.gov/nlcd2011.php (accessed September 2017).

Hupp, C. R. and W.R. Osterkamp 1985. Riparian vegetation and fluvial geomorphic processes. Geomorphology. Vol 14 Issue 4, January 1996. Pages 277-295.

Inter-Fluve, Inc. 2016. Pucker Street Dam Removal and River Restoration: Draft Design Report. Prepared for City of Niles, Michigan. Madison, Wisconsin.

Kerr, S. J., B. W. Corbett, N. J. Hutchinson, D. Kinsman, J. H. Leach, D. Puddister, L. Stanfield, and N. Ward. 1997. Walleye habitat: a synthesis of current knowledge with guidelines for conservation. Percid Community Synthesis, Walleye Habitat Working Group, Ontario Ministry of Natural Resources, Peterborough, Ontario.

Kincare, K.A. 2010. The late Wisconsin and Holocene development of the St. Joseph River. Dissertation for PhD, Michigan State University, Dept of Geology. ProQuest Dissertations and Theses; 2010. 179p.

Lyons, J., T. Zorn, J. Stewart, P. Seebach, K. Wehrly, and L. Wang. 2009. Defining and Characterizing Coolwater Streams and their Fish Assemblages in Michigan and Wisconsin, USA. North American Journal of Fisheries Management 29: 1130-1151.

Michigan Department of Environmental Quality. 1997a. A Biological Survey of the Dowagiac Creek and Dowagiac River Watersheds, Berrien, Cass, and Van Buren Counties, Michigan, August 27-28, 1990 and July 15-19, 1991. Staff Report No. MI/DEQ/SWQ-96/006, Michigan Department of Environmental Quality, Surface Water Quality Division, Lansing, Michigan.

Michigan Department of Environmental Quality. 1997b. A Biological Survey of the Dowagiac Creek and Dowagiac River Watersheds, Berrien, Cass, and Van Buren Counties, Michigan, August 19-20, 1996. Staff Report No. MI/DEQ/SWQ-97/074, Michigan Department of Environmental Quality, Surface Water Quality Division, Lansing, Michigan.

Michigan Department of Environmental Quality. 2011. Dowagiac River Meander Reconnection Improves Macroinvertebrate Populations.

Michigan Department of Environmental Quality. 2016. Water Quality and Pollution Control in Michigan Section 303(d) – Appendix B1: Comprehensive list of assessment unit designated use support (HUCs 0410302 – 04050007). Available online: http://www.michigan.gov/documents/deq/wrd-swas-ir2016-appB1_541405_7.pdf Accessed October 2017.

Michigan Department of Natural Resources. 2017. Michigan Natural Rivers Inventory. Designated Rivers and Tributaries. Available at: http://www.michigan.gov/documents/dnr/DesignatedRivers_513835_7.pdf (accessed October 2017).

Michigan Natural Features Inventory. 2017. Rare Species Explorer (Web Application). Retrieved from http://mnfi.anr.msu.edu/explorer/search.cfm Accessed October 2017.

Michigan Water Trails. 2017a. About. http://www.michiganwatertrails.org/about.asp (accessed September 29, 2017).

Michigan Water Trails. 2017b. St. Joseph River Water Trails. http://www.michiganwatertrails.org/trail.asp?ait=cv&cid=141 (accessed September 29, 2017).

Michigan Water Trails. 2017c. Dowagiac River Water Trail. http://www.michiganwatertrails.org/trail.asp?ait=cv&cid=155 (accessed September 29, 2017).

Niles Charter Township. 2014. Niles Charter Township Community Parks, Recreation, Open Space, and Greenway Plan, 2014-2019, Draft. http://www.swmpc.org/downloads/niles_recreation_plan_update3.pdf (accessed September 25, 2017).

Nuhfer, A.J., T.C. Willis, and T.G. Zorn. 2014. Changes to a Brown Trout Population after Introducing Steelhead in a Michigan Stream. North American Journal of Fisheries Management 34: 411-423.

Omernik, J. and S. Bryce. 2007. Level III and IV Ecoregion Descriptions / Mapping Issue. Retrieved from ftp://newftp.epa.gov/EPADataCommons/ORD/Ecoregions/mi/MI_DRAFT_Desc-Issues12-27-07.pdf.

O'Neal, R. P., and T. Kolb. 2015. Muskegon River angler survey report, 1985-2005. Michigan Department of Natural Resources, Fisheries Division, Lansing. Available at: https://www.michigan.gov/documents/dnr/MuskegonRiver-CreelReport-2005_521384_7.pdf

Riverfront Park Campground. 2017. Home Page. http://www.riverfrontparkcampground.com/Home_Page.html (accessed September 29, 2017).

Rogers, H.S. 1875. History of Cass County, Michigan from 1825-1875. Cassopolis, MI: WH Mansfield Vigilant Book and Job Printing (1875).

Salamova A., J.J. Pagano, T.M. Holsen, and R.A. Hites. 2013. Post-1990 temporal trends of PCBs and organochlorine pesticides in the atmosphere and in fish from lakes Erie, Michigan, and Superior. Environmental Science & Technology 47(16): 9109-9114.

Stone, B.D., Kincare, K.A., OLeary, D.W., Lundstrom, S.C., Taylor, E.M., and S.E. Brown. 2003. Glacial and postglacial geology of the Berrien County region of Michigan. 49th Midwest Friends of the Pleistocene Field Conference: Benton Harbor, Michigan, May 16-18, 2003.

Trumble, Lucas. 2013. Dam Safety Inspection Report Niles Dam, Dam ID No. 537, Dowagiac River, Berrien County. September 13, 2013.

U.S. Census Bureau. 2017a. 2010 Census. Detailed Tables. Retrieved using American FactFinder: http://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t (accessed September 2017).

U.S. Census Bureau. 2017b. American Community Survey 2011-2015. Detailed Tables. Retrieved using American FactFinder: http://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t (accessed September 2017).

U.S. Census Bureau. 2017c. Poverty Thresholds for 2015. Detailed Table. Retrieved from: http://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html (accessed February 2017).

U.S. Department of Agriculture, Natural Resources Conservation Service. 2017. Official Soil Series Descriptions. Available online at https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2_053587. Accessed September 2017.

U.S. Environmental Protection Agency. 2016. Environmental Justice. Retrieved from: https://www.epa.gov/environmentaljustice/learn-about-environmental-justice (accessed: February 2017).

U.S. Environmental Protection Agency. 2018. Environmental Justice. Retrieved from https://www.epa.gov/environmentaljustice (accessed November, 2018).

U.S. Environmental Protection Agency. 2018. Nonattainment Areas for Criteria Pollutants (Green Book). Retrieved from: https://www.epa.gov/green-book

U.S. Fish and Wildlife. 2006. Indiana Bat (*Myotis Sodalis)* Fact Sheet. Retrieved from https://www.fws.gov/midwest/endangered/mammals/inba/inbafctsht.html

U.S. Fish and Wildlife. 2007. Indian Bat Summer Life History Information for Michigan. Retrieved from https://www.fws.gov/midwest/endangered/section7/s7process/mammals/inba/inbaMIlifehist.html

U.S. Fish and Wildlife. 2015. Northern Long-Eared Bat (Myotis septentrionalis). Retrieved from https://www.fws.gov/midwest/endangered/mammals/nleb/nlebFactSheet.html

U.S. Fish and Wildlife. 2017. Information for Planning and Consultation. Retrieved from https://ecos.fws.gov/ipac/location/index

Walterhouse, M. 2012. A biological survey of sites in the lower St. Joseph River watershed, Berrien, Cass, and Van Buren counties, Michigan, August 2011. Michigan Department of Environmental Quality, Water Resources Division, Lansing.

Wesley, J.K. and J.E. Duffy. 2003. A Fisheries Survey of the Dowagiac River, July 1988 and 1989. Michigan Department of Natural Resources, Fisheries Technical Report 2001-3.

Wightman Environmental, Inc. 2014a. Asbestos Inspection Report for Pucker Street Dam, Niles, Michigan.

Wightman Environmental, Inc. 2014b. Lead-Based Paint Inspection, Pucker Street Dam Building, Niles, Michigan.

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Appendix A

Scoping Meeting Summary and Comments

U.S. Fish & Wildlife Service

News Release

Midwest Region

5600 American Boulevard West, Suite 990, Bloomington, MN 55437
612-713-5360

FOR IMMEDIATE RELEASE – April 7, 2016

Contact: Rick Westerhof, 231-584-3553, Rick_Westerhof@fws.gov
Marcy Hamilton, 269-925-1137 ext. 1525, hamiltonm@swmpc.org

Open House on Pucker Street Dam Removal Project
April 14, 2016

The U.S. Fish and Wildlife Service in partnership with the City of Niles, Southwest Michigan Planning Commission, Michigan Department of Natural Resources, Wightman & Associates and Inter-Fluve, will host an open house from 6:00 p.m. to 8:00 p.m. on Thursday, April 14, 2016 at the Law Enforcement Complex to receive input and comments from the public as part of an Environmental Assessment (EA) on the environmental impacts of the proposed removal of Pucker Street Dam.

What:	Public open house on proposed Pucker Street Dam Removal
When:	Thursday, April 14, 2016 at 6:00 p.m. EST
Where:	Law Enforcement Complex, 1600 Silverbrook Avenue, Niles, Michigan 49120
Who:	U.S. Fish and Wildlife Service, Southwest Michigan Planning Commission, Michigan Department of Natural Resources, Wightman & Associates and Inter-Fluve

The EA under consideration will evaluate three proposed actions as pursuant to the National Environmental Policy Act (NEPA) process. These actions are:

- *No Action*: Leave dam in-place, maintain current water level above Pucker Street Dam.
- *Dam Removal with Active Restoration*: Actions would include removing the dam and associated structures, filling in the spillway and actively construct restored river/wetland complexes within dewatered pond area.
- *Dam Removal without Active Restoration*: Actions would include removing the dam and associated structures, filling in the spillway and allow passive/natural processes to establish river channel and associated bottomland wetlands.

Written comments may be made on forms provided at the meeting or may be directed by Thursday April 29, 2016 to:

Ms. Marcy Hamilton
Southwest Michigan Planning Commission
376 W. Main St, Ste 130
Benton Harbor, MI 49022
Email: hamiltonm@swmpc.org

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people. We are both a leader and trusted partner in fish and wildlife conservation, known for our scientific excellence, stewardship of lands and natural resources, dedicated professionals and commitment to public service. For more information on our work and the people who make it happen, visit http://www.fws/gov.

Connect with our Facebook page at facebook.com/usfwsmidwest, follow our tweets at twitter.com/usfwsmidwest, watch our YouTube Channel at youtube.com/usfws and download photos from our Flickr page at flickr.com/photos/usfwsmidwest.

You're Invited.....

Open House on Pucker Street Dam Removal Project April 14, 2016

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Ms. Marcy Hamilton
Southwest Michigan Planning Commission
376 W. Main St, Ste 130
Benton Harbor, MI 49022
Email: hamiltonm@swmpc.org

SUMMARY OF SCOPING COMMENTS

A total of 41 people submitted written comments during or after the scoping meeting held on April 14, 2016.

Twenty seven comments were received from fishermen that opposed the removal or were concerned about the dispersal of salmon/steelhead making catching fish more difficult, the impacts of sediment on the downstream fishery, the brown trout fishery upstream being negatively impacted and the potential negative impact to the Niles economy if the fishing opportunities were degraded.

There were 4 nearby landowners that support the dam removal. They cited the following reasons for support: improved view, remove an eyesore, a healthier river, and decrease silt buildup behind dam. A landowner did have a question about what the landscape would look like after dam removal. Two landowners had a concern about the amount of water that will be in the river after dam removal. One of these landowners supported the removal, but wanted the dam to be replaced with dirt and rock to create a waterfall. One landowner stated that removal was not happening quickly enough.

Six fishermen and fishing guides submitted comments in favor of dam removal. Michigan Trout Unlimited also submitted an email in support of the dam removal project. The reasons stated in these comments included support of native species, increase in fishing opportunities, increase in spawning area for steelhead and salmon, a healthier river, increase in tourism dollars from fishermen and kayakers, increase in safety downstream of dam and remove an eyesore.

There was one comment submitted that supported the dam removal, but suggested that a whitewater park be developed for increased tourism and improved fish habitat.

The content of the comments are summarized below.

Issue	Number of Comments
A decrease in fishing opportunity due to dispersed fish, sediment impacts downstream, destroyed brown trout fishery upstream will negatively impact local economy	27
Increase in fishing opportunities and support of native species	7
Increase in health of river	4
Improve views/remove eyesore	3
Decrease of silt behind dam	2
Improve safety below dam	2
Uncertain about amount of water in river after dam removal	2
Uncertain about appearance of landscape	1
Increase in tourism dollars	1
Removal has not been fast enough	1
Remove dam, but develop whitewater park	1

PUCKER STREET DAM REMOVAL
PROPOSED CONCEPT PLAN
COMMENT CARD

Thank you for your interest in the Pucker Street Dam Removal project. The proposed plan is intended to represent concepts in restoring the river habitats and resources that were altered and over time have degraded since the dam was constructed, thus becoming a more natural, free-flowing river.

After reviewing the proposed plan for the Pucker Street Dam Removal project, please give us your comments below.

Please PRINT the following information:

Name: JAMES BRITTON

Address: 2934 N. 5TH. ST.

City/State/Zip: NILES, MI. 4912C

Phone: 269-683-8892

E-mail: JWBRITTON47 @ GMAIL.COM

What aspects do you **like** about the proposed plan?

GETTING RID OF THE SILT

What are aspects you **do not like** about the proposed plan?

NOT FULLY UNDERSTANDING WHAT IS GOING TO HAPPEN TO MY PROPERTY AT THE RIVER.

Other comments you would like to share?

I WOULD LIKE TO HAVE A MEETING OF PROPERTY OWNERS WITHOUT THE OUTSIDE INTRESTS DOMINATING THE MEETING BETTER EXPLAINING OUR PROPERTYS AND WHAT WE AS HOME OWNERS CAN DO TO LANDSCAPE AFTER THE RESTORATION IS COMPLETE

THANK YOU FOR YOUR INPUT AND PARTICIPATION!

Marcy Hamilton

From:	Martin Hiller [marty@hillerfamily.us]
Sent:	Wednesday, April 20, 2016 3:37 PM
To:	mccauslin.2@nd.edu
Cc:	Marcy Hamilton; rhuff@nilesmi.org; nan3738@aol.com; GretchenCbutlergg@aol.com; dvanden@qtm.net; domerdurm@hotmail.com; dmann@nilesmi.org; zmwrent@sbcglobal.net; wskalla@sbcglobal.net; John_DiCostanzo@comcast.net; Joe Donnelly
Subject:	Please vote in favor of Tourism and Michigan Fisherman

Dear Planning Commission, Elected Officials, and City Employees,

I am writing you today to ask for your vote against removing the dam at Pucker Street. There must be other alternatives which align with multiple interests of all citizens. History has shown that removing a dam, like the one at Pucker Street, will harm fishing for a very long time. To be candid, I am an avid fly fisherman with a home in South Bend. Each year, I bring over 50 people to the river to experience the finest in salmon, steelhead, and trout fishing. We are a catch and release group. I am estimating that my group of anglers has an economic impact on Michigan and the City of Niles of 100 hotel rooms, 400 meals, plus additional spending in the local stores. A conservative figure would place just this group at an economic impact to the City of Niles of at least $50,000. Ow much is the fishing of others contributing to the local economy?
Often, we are on the river in the river in the Fall when little other economic impact occurs. The local merchants have shared this with me. Other times of the year, we share the river with kayakers, floating inter-tubers, and others. We peacefully coexist.

Should the dam be removed, we will find fishing elsewhere and will not be coming to your fine city.

I will participate in saving the dam, including fundraisers to rebuild or replace it with a new one that is a fully functioning hydropower. Please don't destroy a wonderful, natural gift that exists.

Sincerely,

Martin Hiller
53438 Hansel lane
South Bend, IN
813.992.8820

Marcy Hamilton

From:	jet.dds@frontier.com
Sent:	Thursday, April 21, 2016 8:48 AM
To:	Marcy Hamilton
Subject:	fishing the Dowagiac

To whom it may concern
I am a fisherman; I live in Ft Wayne, IN. I come to your neck of the woods to fish for Steelhead and Brown Trout. I understand you have plans to remove a dam just upstream of where I fish. Do you realize what a disaster it would mean for the fishing in the Dowagiac if that dam is removed. Please reconsider your plan, as I and others who fish in your river, will not longer be coming to Niles and that will most definitely impact your economy.

John Trok

Marcy Hamilton

From:	Ken Mitchell [kamgjm@verizon.net]
Sent:	Thursday, April 21, 2016 10:20 AM
To:	Marcy Hamilton; mccauslin.2@nd.edu; rhuff@nilesmi.org; nan3738@aol.com; GretchenCbutlergg@aol.com; dvanden@qtm.net; domerdurm@hotmail.com; dmann@nilesmi.org; zmwrent@sbcglobal.net; wskalla@sbcglobal.net; John_DiCostanzo@comcast.net
Cc:	rippleguides@hotmail.com; marty@hillerfamily.us
Subject:	Dowagiac River Fishing

I just received notice that the dam at Puckers Street is being considered for removal. I understand that if this takes place the fishing on the Dowagiac River will be mostly eliminated.

This is most disturbing.

Many businesses will suffer including the direct impact on the city of Niles. I have enjoyed fishing the Dowagiac and visiting your city and will not return to Niles and the area if this happens.
The fishing on the Dowagiac is very special and cannot be disrupted.
Please note my direct objection to this decision to remove the dam virtually destroying the Dowagiac fishing.

Sincerely,
Ken Mitchell

Marcy Hamilton

From: Mark Ozog [ozogmark@gmail.com]
Sent: Thursday, April 21, 2016 10:43 AM
To: Marcy Hamilton
Subject: city of Niles plans to remove the dam at Pucker Street

I want to speak against this plan.

I am a fly fisherman who lives in Great Falls MT and I travel to Niles MI to fish the Dowagiac River for the Steelhead and Salmon.

I meet friends from Chicago to fish this river and it is one on the most beautiful rivers I have fished in the Midwest.

When I go there, I stay at Motel in Niles, eat at local restaurants and go to local stores for supplies.

If this plan goes through the fishery will most likely never be the same and those tourist dollars will be lost.

I ask that this idea be abandon and steps be done to protect this resource.

Sincerly

Mark F. Ozog
Great Falls MT

Marcy Hamilton

From: wmkjgreenwald@comcast.net
Sent: Thursday, April 21, 2016 7:01 PM
To: Marcy Hamilton; mccauslin 2; rhuff@nilesmi.org; nan3738@aol.com; GretchenCbutlergg@aol.com; dvanden@qtm.net; domerdurm@hotmail.com; dmann@nilesmi.org; zmwrent@sbcglobal.net; wskalla@sbcglobal.net; John DiCostanzo
Subject: Dowagiac Riv Dam at Pucker St.

To City of Niles:
My local conservation clubs say that there are plans to remove the dam at Pucker Street which will disperse the steelhead and salmon over 150 more miles of streams in the Dowagiac watershed. This will virtually end the steelhead and salmon fishing on the Dowagiac River for many years to come. I oppose the removal of this dam.

Up to eight feet of sediment is trapped upstream of the dam and may cover vital spawning gravel when the dam is removed. This happened in a much smaller scale than what is now probable when the dam was opened in 1999, and the river is just now recovering from that disaster.

Removing the dam will also drastically impact the brown trout fishery above the dam. The dam acts as an upstream barrier for the predator fish that enter from the St. Joe. During the summer months, pike, walleye, and smallmouth enter the Dowagiac and feed on the brown trout below the dam. Trout fishing below the dam is very poor.
Fishermen like me spend our dollars in Niles when we make the trip up for seasonal fishing. Please conserve this valuable fishery.

Bill Greenwald
847-698-2126

PUCKER STREET DAM REMOVAL
PROPOSED CONCEPT PLAN
COMMENT CARD

Thank you for your interest in the Pucker Street Dam Removal project. The proposed plan is intended to represent concepts in restoring the river habitats and resources that were altered and over time have degraded since the dam was constructed, thus becoming a more natural, free-flowing river.

After reviewing the proposed plan for the Pucker Street Dam Removal project, please give us your comments below.

Please PRINT the following information:

Name: Timothy + Diana Mead

Address: 402 Mead Rd.

City/State/Zip: Niles, MI 49120

Phone: 269-687-8360

E-mail: Tmead e rmmFgco.com

What aspects do you **like** about the proposed plan?

We would Like To The Removal OF The Dam + The dreging OF The Silt up The River.

What are aspects you **do not like** about the proposed plan?

Time Frame, would like To See The Project Move Faster.

Other comments you would like to share?

N/A

THANK YOU FOR YOUR INPUT AND PARTICIPATION!

Marcy Hamilton

From: Byrnes, Daniel [dpbyrnes@bsu.edu]
Sent: Friday, April 22, 2016 4:36 PM
To: Marcy Hamilton; mccauslin.2@nd.edu; rhuff@nilesmi.org; nan3738@aol.com; GretchenCbutlergg@aol.com; dvanden@qtm.net; domerdurm@hotmail.com; dmann@nilesmi.org; zmwrent@sbcglobal.net; wskalla@sbcglobal.net; John_DiCostanzo@comcast.net
Subject: Dowagiac River

Mayor, City Planners and Administrators:

The Dowagiac River fishery needs your help. I understand the city of Niles plans to remove the dam at Pucker Street. This plan, as you may or may not know, will disperse the steelhead and salmon over 150 more miles of streams in the Dowagiac watershed. The vast majority of these miles are inaccessible due to deep water, no stream access, and private property. This will virtually end the steelhead and salmon fishing on the Dowagiac River for many years to come.

Up to eight feet of sediment is trapped upstream of the dam and may cover vital spawning gravel when the dam is removed. This happened in a much smaller scale than what is now probable when the dam was opened in 1999, and the river is just now recovering from that disaster.

Removing the dam will also drastically impact the brown trout fishery above the dam. The dam acts as an upstream barrier for the predator fish that enter from the St. Joe. During the summer months, pike, walleye, and smallmouth enter the Dowagiac and feed on the brown trout below the dam. The only thing that keeps this from happening in the quality trout fishery above the dam is the barrier that the dam provides. If you want to see what will happen to the trout fishery above the dam, look at the trout fishing below the dam. Unfortunately, the trout fishing below the dam is very poor.

I want to personally let the city and the planners and administrators know of this disastrous plan and how I feel about the end of your/our fishery. You should also know that while I fish there, I stay at hotels in Niles, fill my gas tanks in Niles, and eat at restaurants in Niles. I hope you let the businesses know that the spend that money I spend will end as I won't be coming into your area anymore if there aren't fishable numbers of fish in the river.

Thanks for your consideration of my comments.

Dan

Dan and Dina Byrnes
2012 W. Petty Road
Muncie, IN 47304
765.717.3878

PUCKER STREET DAM REMOVAL
PROPOSED CONCEPT PLAN
COMMENT CARD

Thank you for your interest in the Pucker Street Dam Removal project. The proposed plan is intended to represent concepts in restoring the river habitats and resources that were altered and over time have degraded since the dam was constructed, thus becoming a more natural, free-flowing river.

After reviewing the proposed plan for the Pucker Street Dam Removal project, please give us your comments below.

Please PRINT the following information:

Name: JEANNINE E. GREGORY

Address: 2851 CREEK RD.

City/State/Zip: NILES, MICHIGAN, 49120

Phone: 1-269-684-8589

E-mail:

What aspects do you like about the proposed plan?

AN "EYE-SORE", FROM YEARS OF NEGLECT, WILL BE GONE.
"BACK TO NATURE" WILL TAKE OVER, WITH HOPEFULLY ENOUGH WATER TO MAINTAIN A BEAUTIFUL VIEW.

What are aspects you do not like about the proposed plan?

MY MAIN CONCERN IS HOW MUCH WATER THERE WILL BE LEFT TO NATURALLY KEEP A STREAM OR RIVER OF DECENT SIZE — NOT JUST A TRICKLE.

Other comments you would like to share?

AS FOR "FISHERMEN" — THERE IS NOT A SHORTAGE OF PLACES TO FISH. GO ELSEWHERE OR "UP" THE LICENSE FEES IN ORDER TO PROPERLY MAINTAIN EXISTING BLDGS.

THANK YOU FOR YOUR INPUT AND PARTICIPATION!

Marcy Hamilton

From: Lenn Grant [lenngrant911@yahoo.com]
Sent: Tuesday, April 26, 2016 10:43 AM
To: Marcy Hamilton
Subject: Dowagiac river

Please consider leaving the dam at Pucker Ave. in place. There are many reasons that the dam should remain: keeping my plea simple :consider the economic impact. And consider that many fishermen are from other states , such as myself; that spend the time and money to visit the wonderful resources of your area: Thank you

Sent from my iPhone

Marcy Hamilton

From: David Holecek [davidholecek@me.com]
Sent: Monday, April 25, 2016 4:31 PM
To: Marcy Hamilton; mccauslin.2@nd.edu; nan3738@aol.com; GretchenCbutlergg@aol.com; dvanden@qtm.net; domerdurm@hotmail.com; dmann@nilesmi.org; zmwrent@sbcglobal.net; wskalla@sbcglobal.net; John_DiCostanzo@comcast.net
Subject: Dowagiac River Fishery

Dear Government Officials,

Please carefully consider the impact of the dam removal on the Dowagiac River Fishery . I travel 100s of miles from Illinois just for steelhead and salmon fishing on that river. Please don't destroy anything without careful environmental, biological, and economic considerations.

thanks,

David Holecek,
Northern Illinois resident an Dowagiac River fishing enthusiast

Marcy Hamilton

From: Byrnes, Daniel [dpbyrnes@bsu.edu]
Sent: Monday, April 25, 2016 3:55 PM
To: Marcy Hamilton; mccauslin.2@nd.edu; rhuff@nilesmi.org; nan3738@aol.com; GretchenCbutlergg@aol.com; dvanden@qtm.net; domerdurm@hotmail.com; dmann@nilesmi.org; zmwrent@sbcglobal.net; wskalla@sbcglobal.net; John_DiCostanzo@comcast.net
Subject: RE: Dowagiac River

All:
Thanks to those of you who responded.
After further investigation, I understand there is an option to repair the damn in lieu of demolishing it. I hope repairs are being considered.
Thanks again for your consideration of saving the fishery of the Dowagiac and future trips to your area.
Dan

Dan and Dina Byrnes
2012 W. Petty Road
Muncie, IN 47304
765.717.3878

From: Byrnes, Daniel
Sent: Friday, April 22, 2016 4:36 PM
To: 'colcloughm@swmpc.org' <colcloughm@swmpc.org>; 'mccauslin.2@nd.edu' <mccauslin.2@nd.edu>; 'rhuff@nilesmi.org' <rhuff@nilesmi.org>; 'nan3738@aol.com' <nan3738@aol.com>; 'GretchenCbutlergg@aol.com' <GretchenCbutlergg@aol.com>; 'dvanden@qtm.net' <dvanden@qtm.net>; 'domerdurm@hotmail.com' <domerdurm@hotmail.com>; 'dmann@nilesmi.org' <dmann@nilesmi.org>; 'zmwrent@sbcglobal.net' <zmwrent@sbcglobal.net>; 'wskalla@sbcglobal.net' <wskalla@sbcglobal.net>; 'John_DiCostanzo@comcast.net' <John_DiCostanzo@comcast.net>
Subject: Dowagiac River

Mayor, City Planners and Administrators:

The Dowagiac River fishery needs your help. I understand the city of Niles plans to remove the dam at Pucker Street. This plan, as you may or may not know, will disperse the steelhead and salmon over 150 more miles of streams in the Dowagiac watershed. The vast majority of these miles are inaccessible due to deep water, no stream access, and private property. This will virtually end the steelhead and salmon fishing on the Dowagiac River for many years to come.

Up to eight feet of sediment is trapped upstream of the dam and may cover vital spawning gravel when the dam is removed. This happened in a much smaller scale than what is now probable when the dam was opened in 1999, and the river is just now recovering from that disaster.

Removing the dam will also drastically impact the brown trout fishery above the dam. The dam acts as an upstream barrier for the predator fish that enter from the St. Joe. During the summer months, pike, walleye, and smallmouth enter the Dowagiac and feed on the brown trout below the dam. The only thing that keeps this from happening in the quality trout fishery above the dam is the barrier that the dam provides. If you want to see what will happen to the trout fishery above the dam, look at the trout fishing below the dam. Unfortunately, the trout fishing below the dam is very poor.

I want to personally let the city and the planners and administrators know of this disastrous plan and how I feel about the end of your/our fishery. You should also know that while I fish there, I stay at hotels in Niles, fill my gas tanks in Niles, and eat at restaurants in Niles. I hope you let the businesses know that the spend that money I spend will end as I won't be coming into your area anymore if there aren't fishable numbers of fish in the river.

Thanks for your consideration of my comments.

Dan

Dan and Dina Byrnes
2012 W. Petty Road
Muncie, IN 47304
765.717.3878

Marcy Hamilton

From: Ric Huff [rhuff@nilesmi.org]
Sent: Wednesday, April 27, 2016 9:54 AM
To: Marcy Hamilton
Subject: FW: Pucker street dam

Richard A. Huff
City Administrator
333 N. 2nd Street
Niles, Michigan 49120
(269) 683-4700 X-3011

From: Zick's Specialty Meats <office@zicksmeats.com>
Date: Wednesday, April 27, 2016 at 7:48 AM
To: Ric Huff <rhuff@nilesmi.org>
Subject: Pucker street dam

I would like to throw my 2 cents in about the dam. There is a lot of confusion about the distruction of he dam. Most of it negative. Being a fisherman for 40 years on the Dowagiac above and below the dam I can tell you that it would be a very pad move to take it out. Listen to the fish biologist and fishing experts on this move and you will find that the bottom line is that it will hurt the trout fishery we have on both ends of the dam.
Thank you
Garry Zick

--
Zick's Specialty Meats, Inc.
215 N. Mechanic Street
Berrien Springs, MI 49103
269.471.7121
office@zicksmeats.com

Marcy Hamilton

From: Kory Boozer [info@boozersguideservice.com]
Sent: Wednesday, April 27, 2016 11:21 AM
To: Marcy Hamilton
Subject: Pucker Street

Hello,

I just wanted to take a moment and drop you a note regarding the removal of the Pucker Street Dam.

I support the removal 100%

Not going to go into detail, but I believe it is what is best for the environment and we have a duty to the native species that will benefit from this removal to move forward with it.

Thank you,

Kory Boozer
9828 Casey Ln
Berrien Springs, MI 49103

C. 269.235.0664

E. info@boozersguideservice.com

W. www.boozersguideservice.com

Marcy Hamilton

From:	Steve Palbykin [skpalb@cox.net]
Sent:	Wednesday, April 27, 2016 4:37 PM
To:	Marcy Hamilton
Subject:	Dowagiac River Pucker Street dam

Sirs,

I am writing out of concern about the Dowagiac River fishery and plans to remove the dam at Pucker Street in Niles.

Removing the dam will dramatically impact the extremely valuable natural resource of the wild fishery and I fear damage it forever. The dam acts as an upstream barrier for the predator fish that enter from the St. Joe. During the summer months, pike, walleye, and smallmouth enter the Dowagiac and feed on the brown trout below the dam. The only thing that keeps this from happening in the quality trout fishery above the dam is the barrier that the dam provides.

Allowing the dam to be removed will undoubtedly negatively impact the economics of the area by removing any incentive for fishermen from around the country to fish this productive and wonderful natural wildlife resource.

Please consider this plea to prevent the removal of the dam.

Respectfully,
Stephen J. Palbykin
1441 E. Caroline Ln.
Tempe, AZ 85284

Marcy Hamilton

From:	Brett Hartford [hartford.brett@gmail.com]
Sent:	Thursday, April 28, 2016 7:29 AM
To:	Marcy Hamilton
Subject:	Pucker Street Dam Removal
Attachments:	P1010538.JPG

Hello:

My name is Brett Hartford, and I wanted to strongly express my support for Pucker Street dam removal. I am an avid angler, and travel all around the region chasing steelhead, trout, and salmon. I often by-pass the Dowagiac system and head to other systems due to the limited amount of water to fish below Pucker Street. Removal of this dam would bring me to the watershed many more times throughout the year, and is something that I would really be looking forward to.

Obviously I'm interested in the angling opportunities, but this is the right thing to do ecologically as well. Please put my vote in to remove Pucker Street Dam.

Thanks,

Brett Hartford
hartford.brett@gmail.com

Marcy Hamilton

From: tomgcouston [tomgcouston@att.net]
Sent: Thursday, April 28, 2016 12:16 PM
To: Marcy Hamilton
Subject: Dowagiac River Pucker Street Dam Removal

I would like to offer a comment on the pending removal of the Pucker St. dam on the Dowagiac River near Niles. I fished the river regularly soon after the ladders opened, initially wading but eventually floating with our driftboat. We enjoyed great success with summer steelhead, fall salmon, and even a few fall/winter Michigan strain steelies. A few resident brown trout showed up from time to time. As the years went by, more boats floated the stretch, and we also saw fishing decline. We experienced the draw down and the years of resulting siltation.

I don't know if the decline was fishing pressure, the siltation, or the overall lower numbers in the Lake Michigan returns in general, but any potential increase in natural reproduction would, IMO, be welcome. This, it would seem, would involve removing the dam. More spawning areas would open up, and the river would eventually clear itself up. Of course, access and boat passibility would be key, especially upstream. This might also spread some of the fishing pressure.

In conclusion, I can't seem to recall a situation where dam removal hurt fishing or river quality overall. The only "bad" thing is it may spread the fish out more, but so will the crowds. So, as long as upstream access is addressed, I am in favor of the Pucker Street Dam removal.

Sent from my Verizon Wireless 4G LTE smartphone

Marcy Hamilton

From:	David Koo [dkoo@roundtablehp.com]
Sent:	Thursday, April 28, 2016 1:54 PM
To:	Marcy Hamilton; mccauslin.2@nd.edu; nan3738@aol.com; GretchenCbutlergg@aol.com; dvanden@qtm.net; domerdurm@hotmail.com; dmann@nilesmi.org; zmwrent@sbcglobal.net; wskalla@sbcglobal.net; John_DiCostanzo@comcast.net
Subject:	Dowagiac River Dam

To: Southwest Michigan Planning Commission, Mayor of Niles, Niles City Administrator, Niles City Council Members

The Dowagiac River is a vibrant year-long fishery for anglers who enjoy catch and release fishing for steelhead, salmon and trout among other species. I fish the river 4-6 times per year and pay a professional fishing guide every time. I drive from Chicago, IL to come specifically to fish the Dowagiac so my fishing passion supports the local Niles economy. I understand discussions are underway which might result in removing the dam and as a result, this fishery will be destroyed for years to come. The dam protects the habitat for trout above the dam and steelhead and salmon which migrate to reproduce below the dam.

Niles has a jewel today in the Dowagiac River, and this economy supporting asset will be lost for decades if the dam is removed.

Thank you for your consideration,
David Koo

1834 N. Wolcott Ave.
Chicago, IL 60622
C: (312) 961-6333

Marcy Hamilton

From:	radiantpex@aol.com
Sent:	Thursday, April 28, 2016 4:03 PM
To:	Marcy Hamilton; mccauslin.2@nd.edu; rhuff@nilesmi.org; nan3738@aol.com; dvanden@qtm.net; domerdurm@hotmail.com; dmann@nilesmi.org; zmwrent@sbcglobal.net; wskalla@sbcglobal.net; John_DiCostanzo@comcast.net
Subject:	DOWAGIAC RIVER REMOVAL

To whom it may concern

I am going to keep this short and sweet.

The push to remove the Dowagiac Dam is wrong IMHO. As someone who regularly floats (boat) and fishes the waters below the seawall to the end of the park island (4 days a week) when the steelhead are in (July-May) your plan is going to destroy a very special section of river. This is much like the Pere Marquette river in Northern Michigan, very rare. The silt from the upper will change forever the gravel sections of the lower. Please see Dustan and Jakes comments below (Ripple Guide Service)

This plan, as you know, will disperse the steelhead and salmon over 150 more miles of streams in the Dowagiac watershed. The vast majority of these miles are inaccessible due to deep water, no stream access, and private property. This will virtually end the steelhead and salmon fishing on the Dowagiac River for many years to come.

Up to eight feet of sediment is trapped upstream of the dam and may cover vital spawning gravel when the dam is removed. This happened in a much smaller scale than what is now probable when the dam was opened in 1999, and the river is just now recovering from that disaster.

Removing the dam will also drastically impact the brown trout fishery above the dam. The dam acts as an upstream barrier for the predator fish that enter from the St. Joe. During the summer months, pike, walleye, and smallmouth enter the Dowagiac and feed on the brown trout below the dam. The only thing that keeps this from happening in the quality trout fishery above the dam is the barrier that the dam provides. If you want to see what will happen to the trout fishery above the dam, look at the trout fishing below the dam. Unfortunately, the trout fishing below the dam is very poor.

What we need to do is let the city and the planners of this disastrous plan know how we feel about the end of our fishery. Let them know that while you are here fishing that you stay at hotels in Niles, fill your gas tanks in Niles, and eat at restaurants in Niles. Let the businesses that you spend that money with know you won't be coming in anymore if there aren't fishable numbers of fish in the river.

If you enjoy fishing on the Dowagiac for migratory fish, your time to enjoy it is nearing an end unless we can get this dam removal stopped.

We who fish Pucker also had no idea you were having a final discussion meeting. Why was it not posted at Pucker/Losensky? Did you really want to hear from the people that actually use this area daily?

Please reconsider other options before destroying our beloved Dowagiac River.

CT Buck

Marcy Hamilton

From: Bryan Burroughs [bryanburroughs@michigantu.org]
Sent: Thursday, April 28, 2016 5:21 PM
To: Marcy Hamilton
Cc: Ed Hoover
Subject: Dowagiac River Dam Removal

Hello Marcy,

I hope all is well for you.

I received an email forward from a member, that identified you as the targeted recipient of public input for the Dowagiac River dam removal project.
I'm am writing to let you know, that Michigan Trout Unlimited, with 7,500 members in Michigan, including its member chapter the Kalamazoo Valley Chapter of Trout Unlimited (where this river is located), support the dam removal. We understand the tremendous number of miles of stream that will be connected due to this project, and its predicted benefits to the longterm health of the fish community found in it.

Please accept this email as a form of our support for the project. If you seek any additional detailed comments or clarifications, please do not hesitate to contact me personally. It would be my honor to discuss the project in detail. Ed Hoover, from our local chapter where this river is located, is copied on this email if you have need to contact him as well. Please inform us if any modifications to the dam removal plans occur that would significantly modify sediment management plans, or result in less than complete fish passage.

Thank you,

Bryan

Bryan Burroughs, Ph.D.
Executive Director
Michigan Trout Unlimited
P.O. Box 442, Dewitt, MI 48820
www.michigantu.org
517-599-5238

Marcy Hamilton

From: Ray laudano [rjlaudano@comcast.net]
Sent: Thursday, April 28, 2016 6:28 PM
To: Marcy Hamilton
Subject: PROPOSED REMOVAL OF THE PUCKER STREET DAM

Dear Marcy Hamilton,

My name is Ray Laudano and I am a non-resident angler who has had the pleasure of enjoying the wonderful ecosystem of the Dowagiac River. I mention that I am a non-resident angler because of the time, energy, and funds that I invest in the surrounding communities while fishing the Dowagiac. It is a place I want to return to for many years to come and bring my many Trout Unlimited angler friends to its banks so they too, can experience the beauty of the Dowagiac.

My time on the Dowagiac has been spent with resident angler, guide, and I would go as far as to say 'Steward' of the Dowagiac, Jay Anglin. Jay has shown me the beauty and interconnectedness of life on the Dowagiac and I understand now that with the proposed removal of the Pucker Street dam, the Dowagiac may be in distress for quite some time in the future.

With the inevitability of the dam removal looming, I will quote Jay below because we both want the same things for the river and Jay has already stated it better than I could have done.

Thank you for your time to review this email.

Ray Laudano
Gary Borger Trout Unlimited Chapter
527 Lothair Drive
Libertyville, IL. 60048

Mobile: 224 425 8664

Key Points Looking Forward

-Minimize impact on the lower river with appropriate measures taken during sediment and dam removal upstream

- Identify problem areas downstream of the dam and implement projects to assure this section is capable of efficiently clearing the sedimentation that will take place during and after the project

- Organize volunteer, conservation organizations, state, federal and tribal resource for project work - form alliances

-Clear log jams that block the river upstream of the dam to allow recreational paddler and angler passage

-Acquire additional access sites upstream and work with and assist private landowners, offer access incentives (see MDNR Hunter Access Program, "HAP")

-Select high quality sections of river and implement stricter fishing regulations to encourage establishment of wild fish and improve the size and number of resident trout (no-brainer revenue stream for state and local community)

-Encourage river users to clean-up after themselves (see Kickapoo

River - Wisconsin cooperative effort)
-Encourage the public to contact/assist law-enforcement when illegal activity occurs at the various access sites

These are just a few of the thoughts that come to mind when I brainstorm the future of the Dowagiac River. There is much work to be done - LET'S DO THIS!

Sincerely,

Jay Anglin - Anglin Outdoors
574-210-2844
jay@anglinoutdoors.com
www.anglinoutdoors.com

Marcy Hamilton

From: Roger Meyers [meyers.roger@gmail.com]
Sent: Friday, April 29, 2016 9:57 AM
To: Marcy Hamilton
Subject: Dowagiac river dam

Sent from my iPhone
I enjoy fishing on the Dowagiac River for migratory fish, l hope your Committee reconsiders the removal of the dam on the Dowagiac River. When I go to the Dowagiac River to fish I also support the near by communities with purchases of gas, food and licenses for fishing.
Roger Meyers

Marcy Hamilton

From: Dan [dzambon@woh.rr.com]
Sent: Friday, April 29, 2016 12:56 PM
To: Marcy Hamilton
Cc: 'Dan'; 'Eikerenkotters'
Subject: Please do not remove the dam!

Hello,

As a long time fly fisherman, I have enjoyed many days fishing for steelhead and salmon on the Dowagiac River. Even though I live near Dayton, Ohio, it has always been well worth it to make the trip. For years, fishing buddies and I would make trips to fish the Dow, and still do.

It has been called to my attention that the city of Niles plans to remove the dam at Pucker Street. Please, reconsider this effort.

I think it will spread out the fish too thin, making fishing very poor - much like the Mad River is near me in Urbana, Ohio. I have been told it will disperse the fish approximately one hundred and fifty more miles, and that access will be more limited. This I would very much not like to see.

Please keep in mind I travel to your area because of the great fishing. I stay at local hotels and eat at local restaurants, again, because of the great fishing. If that fishing is gone, then so am I.

The bottom line is I am opposed to any effort that will negatively affect the quality of this fishery. Again, please reconsider removing the dam at Pucker Street.

Thank you for your consideration,
Dan Zambon
91 Grand Valley Drive
Enon, OH 45323
dzambon@woh.rr.com

Marcy Hamilton

From: dustan harley [rippleguides@hotmail.com]
Sent: Friday, April 29, 2016 6:18 PM
Subject: Dowagiac River Dam Removal

To Whom It May Concern:

My name is Dustan Harley, and I own Ripple Guide Service. We are a fly fishing guide service that has operated on the St. Joe system including the Dowagiac River in Niles since 1999. We are privileged to guide people from all over the country on this unique fishery. This spring alone we have guided people from Connecticut, Indiana, Illinois, Ohio, Kentucky, Michigan, Wisconsin, Florida, Iowa, Arizona, and even a gentleman from England for three days. Most of these fishermen come to your city multiple times each year. In fact, we have one client who comes to fish the Dowagiac 15 times a year from Florida and brings friends in from all over the country each time! All of these folks visit your city for one reason - to catch fish! If the dam at Pucker Street is removed, it will spread the steelhead and salmon out over 40 times more river miles. This will make catching fish very difficult on the Dowagiac. The fish will be so spread out that finding them will be nearly impossible. What will this mean for our clients? They will still come to fish, but we will no longer have the Dowagiac as a viable option. This will mean that the hundreds of people that we bring into Niles each year will be staying at hotels in South Bend instead of Niles. They will be filling their gas tanks and eating at restaurants outside of Niles as well. These visiting fishermen will have no reason to come back to Niles because trying to catch fish in the Dowagiac will be an exercise in futility.

There has been talk about the Dowagiac bringing in busloads of people to kayak the river once the dam is removed. If you have ever been upstream of the dam, you know that just above Kinzie Road the river has been channelized. Not only has the river been channelized, but it is also filled with log jams that require numerous portages. The river banks are lined with dead ash trees because of the ash boring beetle. Every month these trees fall and are making more blockages to floating the river. Kayakers will not travel to Niles to float a dredged ditch with multiple portages. In order for people to float the river, there will need to be constant clearing of log jams to keep the river open for boaters. This will be an added cost that will need to be picked up by someone. There is a reason that in the last decade we have seen multiple canoe liveries go out of business on this river, and that reason is the upper river is too difficult for the recreational floater. People don't want to get stuck in log jams nor do they want to float a channelized river.

I just don't see an economic upside to this plan for the city of Niles. If repairs can be accomplished for $1.3 million cost to the city and taking the dam out is going to cost the city $2.1 million, where is the $800,000 being made up? Keep the dam; save the money; keep fishermen spending money in your great city. Keep Niles as a destination for fishermen and the Dowagiac as a spotlight for your city.

Tight lines,

Dustan Harley
Ripple Guide Service
574-993-7453
www.rippleguides.com

Check us out on Facebook

Marcy Hamilton

From:	lransom1764@comcast.net
Sent:	Friday, April 29, 2016 6:45 PM
To:	Marcy Hamilton; mccauslin.2@nd.edu; rhuff@nilesmi.org; GretchenCbutlergg@aol.com; nan3738@aol.com
Subject:	Pucker St. Dam

To Whom It May Concern:

I am writing to voice my objection to the removal of the damn at Pucker Street. My husband and I venture to Niles to fish and stay a few times a year. Our objective is fishing the Dowagiac River. Removal of the dam would greatly inhibit our ability to catch fish. If you forge ahead with removal plans, I guess we'll no longer be visiting your fine town as our main reason for staying, shopping, and eating in Niles is catching fish!

Sincerely,

Linda Ransom

The Dowagiac River in Southwest Michigan is currently being targeted for major changes. The Pucker Street Dam on the north side of the City of Niles is old, non-functional and a liability. It has been on the short list for removal for many years and the powers that be have decided they want the dam gone.

I have pondered this over the years and especially the past few weeks. There are a host of opinions on this matter, and while I agree with many friends and peers on certain aspects of removing this dam, I whole-heartedly disagree with some of their opinions as well. Whether you're an angler, recreational paddler, resident/landowner or, in my case, professional fishing guide, the opportunity to say your piece on this matter is quickly coming to a close. Comments must be received by Thursday, April 28th, email Marcy Hamilton colcloughm@swmpc.org. Click Here to read the official proposal. Read my comments below.

While many of you are well aware of the unique background of the Dowagiac River and Pucker Street Dam, some are not. I think it's important to cover some basic history and, in the process, explain to some degree, the reasoning for my decision on this matter. My opinion is based on a scientific perspective honed by over twenty years of guiding on the Dowagiac. Brevity has never been my strong suit and, in this case, being succinct is hardly advisable. While I encourage you to read my detailed comments, if you'd prefer not to, simply skip below to "The Bottom Line".

Here goes...

Historically, the Pucker Street Dam held back sediment that had accumulated over the course of many decades in the small impoundment upstream. Sixteen years ago the gates that controlled the river's flow were unceremoniously opened and the impoundment was quickly drained. The consequence of this was one of the most horrifying things I've ever encountered as a conservationist and an angler: Much of the loose silt and sand held back by the dam migrated into the lower Dowagiac, covering the riverbed with several feet of muck. I will never forget standing on the bank and witnessing the catastrophic result. My eyes welled with tears as I took full stock of the "new" Dowagiac.

For months, a slurry of sediment and water slowly worked its way down to the St Joseph River. Inevitably, the Dowagiac cleared, but for years afterward periodic use of a "dragline" to remove sediment immediately above the dam would turn the water the color of mud in a matter of minutes. Eventually, after several years, the *stream stabilized to some degree and began the lengthy process of finding its new identity.*

As the Dowagiac healed, cold-water species such as resident brown trout, as well as migratory steelhead and salmon, responded well and began to spawn in the gravely stretches within the three miles or so of river they could access below the dam. It wasn't long before wild trout, salmon and steelhead parr filled the quiet, woody edges of the stream in the new "rearing habitat" created as trees collapsed into the river - their roots scoured by unremitting "run of the river" flows. I would often update Michigan DNR biologists with my observations, which were by and large positive.

These species are not native to the Dowagiac watershed, and while "browns" were originally stocked in the late 1800's, steelhead and salmon did not gain access to this stream until the late 1980's, when fish-ladders that allow fish passage were installed on the Buchannan and Berrien Springs dams (interestingly, fish and wildlife personnel claim that Brook Trout are not native to the Dowagiac watershed either though I question this assessment). All of these species currently exist within the watershed to some degree, including an abundance of naturally-reproduced, wild fish.

Currently, the lower-river is far from "sediment starved", as has been claimed by officials in the past who have spent virtually zero time on the stream prior, or for that matter, after the dam gates were opened. In fact, this statement could not be further from the truth. The shifting bedload coupled with dozens of fallen mature hardwood trees that litter the river in every stretch confirm that this remarkable fishery is in a constant state of flux. While the general character of the stream remains intact, the best holes and runs typically morph into something entirely different every year or so.

The past six months, I have noticed the lower river show signs of excessive sedimentation once again. While muck and topsoil tends to come from ditch dredging and agricultural activity upstream, the bulk of sand appears to be coming from directly above the dam where it has remained latent for nearly a century. The large "sediment trap" that was excavated after the dam gates were opened has filled and, yet again, the lower river is guzzling down heavy doses of sediment that moves past the dam. This is a huge problem that will only get worse. Regardless of what is done to prevent this issue, there will always be additional sediment entering the system.

There are three primary options have been proposed for this dam: 1) Remove the dam and sediment upstream and allow the river to flow unimpeded in hopes that it will eventually find an appropriate balance more true to its original character, 2) Repair the dam (and ideally dredge a new sediment trap immediately upstream which would require periodic cleaning), or, 3) Take no action at all.

An incredible amount of sediment is said to be present within the old impoundment section of the river - an area roughly a mile long and much wider than the actual river channel. It is imperative that this sediment is removed if the dam is razed. While dam removal is expensive, dealing with the sediment immediately upstream will require a lot more money and, of course, wreak havoc on the lower river once the buckets start digging.

Why is sediment removal so important? Besides aesthetics and filthy drift boats, sediment choked streams are not terribly productive from a cold-water fisheries standpoint, as the building blocks of the food chain such as aquatic insects and baitfish (including juvenile trout and salmon) are relegated to low-density status when insect habitat is smothered and spawning "redds" full of eggs are filled-in and suffocated. Furthermore, river temperatures tend to increase on average as "turbidity", ie suspended sediment in the water, reduces clarity and absorbs solar heat, often elevating summertime water temperatures into the lethal range for cold-water species.

When the Dowagiac runs clean and clear during summer months, it is not unusual for the water temperature to be cooler than the more notable trout streams such as the Manistee and Au Sable in Northern Michigan, as well as other famous trout streams throughout the US. This is true even during stifling hot weather, which is remarkable considering the watershed's latitude and general terrain. This is indicative of a significant and constant influx of cool groundwater, which provides a livable environ for resident brown and brook trout, as well as migratory salmonids from Lake Michigan that find their way into the Dowagiac via the St Joseph River.

Removing the Pucker Street Dam will likely solve many of the river's problems, but there are a host of other questions associated with a project of this magnitude. Fish regularly concentrate immediately below dams, which often supports excellent angling opportunities (as well as illegal angling activity such as snagging), but dams also act as a barrier for migratory fish species. These "non-resident" fish tend to be larger and produce plentiful offspring. Theoretically, they compete with or even feed on resident trout and forage minnow species upstream.

While migratory trout and salmon will likely move into the far reaches of the upper watershed after the dam is removed, there is also potential for predatory species such as walleye and smallmouth bass to venture into areas that currently support a healthy resident trout population.

Many anglers that enjoy fishing for resident trout upstream are less than pleased with the prospect of steelhead, salmon and warm-water predatory species holding and spawning in the upper reaches of the watershed, which includes several tributaries. There is a belief that these fish will destroy the trout fishing that now exists directly through predation and competition, as well as indirectly through angling pressure.

I believe the impact these large fish have on the trout fishery is largely exaggerated. The fact is, with good spawning habitat prevalent in many sections of the Dowagiac and its tributaries, natural reproduction is bound to boost biomass and provide a nearly unending protein source for resident species to feed upon. This includes salmon and steelhead eggs, parr and even the flesh of dead adult salmon.

Keep in mind, while stream-bound spawning salmon may instinctively take a fly or lure, they are not capable of real feeding at the end of their life-cycle, so they will not actively prey on resident species. Furthermore, the vast majority of feeding done by stream-bound steelhead is on insects and fish eggs. While the overall population of resident fish may or may not drop, clearly the size of resident browns will increase as their largely insect based diet is boosted with the aforementioned buffet of high-protein forage.

It should be noted that while steelhead fingerlings and smolts do compete with resident trout to some degree, juvenile steelhead (rainbow trout) and salmon tend to be associated with fast riffles. To the contrary, resident brown trout typically concentrate in slower, deeper sections characterized by woody cover and undercut banks - further reducing the overall impact of migratory species on resident trout.

Sadly, only an infinitesimal amount of public access exists upstream of the dam within the roughly 160 miles of watershed. This will relegate fishing activity to landowners and a handful of privileged anglers who have access to these private stretches of water unless more access is opened up. This is, and always has been one of my big hang-ups with removing this dam. An undertaking of this magnitude and expense should offer more benefit to the public, plain and simple.

Directly downstream of Losensky Park and Pucker Street Dam, both banks of the lower Dowagiac are private and angler trespassing is a huge issue. This is why savvy anglers and guides use watercraft to access the river and target fish downstream. Unfortunately, the upper-river is not easily drifted with larger watercraft and frankly there is not feasible access for anything that requires trailering such as a drift boat or large raft. Floating the upper stretches requires portaging around massive log jams and is typically done with canoes and kayaks.

Future acquisition of upstream river access and clearing log-jams should be considered a mandatory aspect of dam removal. In addition, it is highly advisable to establish stricter fishing regulations that will encourage the rapid establishment of a naturally reproduced, wild fish-based fishery, as well as enhance the quality of the fishery with a net increase of desirable trophy-sized resident trout.

While in the past I believed that once the dam was removed very few fish would remain in the lower river to provide angling opportunities, admittedly, I have largely changed my thinking on this matter. While there will surely be a huge number of migratory fish that move directly upstream without pausing to take a look at the scenery, I feel that many fish will still hold in the lower river. It's clear that plenty of steelhead never see the dam now, so whether it exists or not is a non-issue for a reasonable percentage of returning adult steelhead and salmon. It is safe to assume that post-dam-removal-natural-reproduction will increase dramatically, and though "recruitment" always varies when dealing with dammed rivers such as the St Joe, the number of wild fish that return to the Dowagiac as adults is surely to increase within a few years of dam removal.

The local and state economic impact of the current lower river fishery is often touted and certainly should not be ignored. Migratory fish often draw anglers from out of town including adjacent states, and myself, as well as other guides, host anglers from around the world who enjoy the excellent fishery that exists below the dam. The lower Dowagiac River is typically bustling with activity during peak migratory fish runs, and the summer months see an ever-increasing number of recreational paddlers and tubers using the river as well.
The impact these activities have is not simply economic; recreational usage is clearly evident as the river banks are well worn from foot traffic and often covered with garbage. Over the years I have personally removed a ridiculous number of garbage bags full of refuse, only to see an entirely new batch appear virtually overnight.

The Bottom Line: When I ask myself what the best option is for the Dowagiac River, I try to examine the issue with an open mind. I have always preferred to ignore my occupation and form opinions based on science, conservation and common sense, then hopefully arrive at a reasonable and ethical place. In this case, I have not been enamored with some of the rhetoric that has been coming from both sides of the issue, but I believe in the will of the people to the do the right thing.

Comparisons to similar streams is inevitable, but hardly quantitative, as each river possesses its very own set of circumstances. I tend to err on the side of caution, but it's hard for me to deny the ultimate outcome of dam removal that, theoretically, will alleviate many of the issues that currently hang over the Dowagiac like a cloud of toxic smoke. As a guide, I know it is highly likely that any heavy project activity will result in unfishable conditions downstream. Essentially, myself and other guides will be out of business for an undetermined amount of time as far the Dowagiac is concerned. Furthermore, recreational anglers who enjoy fishing the stretch of water below Pucker Street dam are sure to find another place to fish for a while. In a nutshell, everybody will take their money elsewhere.

Lost in this discourse, to some degree, is the general lack of concern for the lower river. This is no time to throw the baby out with the bathwater. The lower Dowagiac is like an old friend that will soon be in need. Those of us who cherish so many great memories this stream has given us would be fools not to do everything in our power to assure that future generations may one day also swing a fly through its deep tail-outs and feel the exhilaration of a throbbing steelhead at the end of the line. We owe this stream everything, and frankly, it doesn't owe us a damn thing.

A couple weeks ago, I sat and stared at the decrepit dam like I had never done before. For whatever reason, in all the years of parking my truck right next to it, I'd never really given it a thorough look. It's in rough shape. It stands as an epitaph to man's seemingly inexhaustible desire to harness the earth's resources - regardless of how insignificant they are in the big scheme of things. What once was considered progress is now a deteriorating eyesore - a relic from a time when it made sense.

I have spent many sleepless nights wondering how my livelihood will be impacted if this dam disappears from the face of our planet. Considering that for nearly half of my life I have guided anglers on the Dowagiac River, it should be easy to understand why.

My thoughts are simple, I believe it is time to do the right thing and stop squabbling over whether or not to remove this dam. I feel that it is inevitable and, instead of looking back, I have chosen to look forward and dedicate my resources and my knowledge to the effort. I want to make sure this project is done right and, in particular, that the lower river is given a new lease on life as well. There are many projects that can be done concurrent with dam removal that will minimize the overall impact on the fishery. Ideally, the heavy lifting will all take place in the least amount of time so one day in the near future we can all look back and say it was well worth our time, money and effort.

The time has come to join forces and attack this as a team.

Key Points Looking Forward

-Minimize impact on the lower river with appropriate measures taken during sediment and dam removal upstream

- Identify problem areas downstream of the dam and implement projects to assure this section is capable of efficiently clearing the sedimentation that will take place during and after the project

- Organize volunteer, conservation organizations, state, federal and tribal resource for project work - form alliances

-Clear log jams that block the river upstream of the dam to allow recreational paddler and angler passage

-Acquire additional access sites upstream and work with and assist private landowners, offer access incentives (see MDNR Hunter Access Program, "HAP")

-Select high quality sections of river and implement stricter fishing regulations to encourage establishment of wild fish and improve the size and number of resident trout (no-brainer revenue stream for state and local community)

-Encourage river users to clean-up after themselves (see Kickapoo River - Wisconsin cooperative effort)

-Encourage the public to contact/assist law-enforcement when illegal activity occurs at the various access sites

These are just a few of the thoughts that come to mind when I brainstorm the future of the Dowagiac River. There is much work to be done - LET'S DO THIS!

Sincerely,

Jay Anglin

April 20, 2016

Southwest Michigan Planning Commission
376 W Main St., Suite 130
Benton Harbor, MI 49022

Dear Commission:

I have been made aware that the City of Niles is planning to remove the dam at Progress Street.

As you may or may not know, this dam allows a development of a destination for steelhead and salmon fishery on the Dowagiac River.

I have traveled from Great Falls, Montana, to the Dowagiac River to fish on multiple occasions for destination fly fishing. If the dam is removed, it would have a detrimental effect on the salmon fishery. Also, removal of the dam would also affect the brown trout fishery above the dam. MX is an upstream barrier for the predator fish that enter the St. Joseph's river. If the dam is removed, the trout fishery will basically die above the dam.

I need you to know that I travel to Niles for fishing. I stay at hotels in the area, I buy food and supplies in Niles. I hire local guides to take me fishing. If the fisheries are damaged or destroyed, I will not return to Niles Michigan. Likewise, other fishermen, like myself, will no longer have a reason to return to the area. This will negatively affect the business economics in Niles and the surrounding area.

Therefore, I am asking that you reconsider your plans and rather formulate plans that keep the fisheries of steelhead, salmon and trout in place. Potentially, you are tarnishing a gem of a tourist industry with potential poor reputations and economic hardships for your community and the surrounding area.

Sincerely,

Mark F. Ozog, M.D.
MFO/syd

Mark F. Ozog, M.D.
Board Certified
Ophthalmology

1417 9th Street South #100
Great Falls, Montana 59405
Phone (406) 453-1613 • 1-800-541-2417 • Fax: (406) 453-3717
Email: ozogeye@imt.net • Web: www.ozogeye.com

PUCKER STREET DAM REMOVAL

PROPOSED CONCEPT PLAN

COMMENT CARD

Thank you for your interest in the Pucker Street Dam Removal project. The proposed plan is intended to represent concepts in restoring the river habitats and resources that were altered and over time have degraded since the dam was constructed, thus becoming a more natural, free-flowing river.

After reviewing the proposed plan for the Pucker Street Dam Removal project, please give us your comments below.

Please PRINT the following information:

Name: Rod Snow

Address: 403 Meade St.

City/State/Zip: Niles MI 49120

Phone: (269) 683-5048

E-mail: rodsnow4 @ comcast. net

What aspects do you **like** about the proposed plan?

Making the river Healthy + Clean

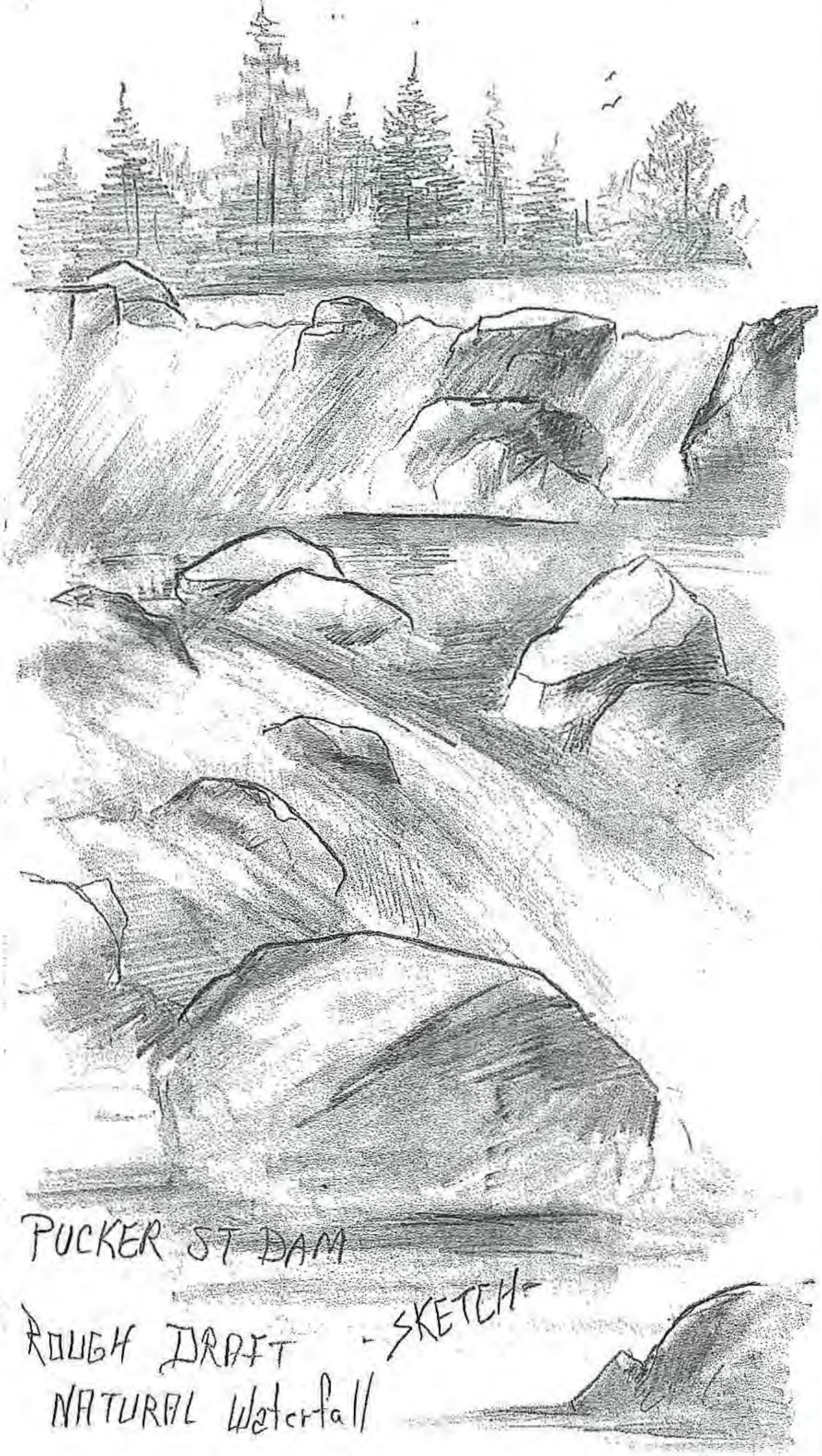
What are aspects you **do not like** about the proposed plan?

It might have the possibility to make the river even more narrow - Last draw down caused much water to leave, I lost a small lake (back water that looked like a small lake) ☹

Other comments you would like to share?

Attached - Option #4 back fill dam with Rock + create a natural waterfall

THANK YOU FOR YOUR INPUT AND PARTICIPATION!


PUCKER ST DAM
ROUGH DRAFT -SKETCH-
NATURAL Waterfall

4/24/16

Hi Marcy-

I attended the meeting April 14th about the DAM - You lead the meeting - GOOD JOB! :)

Asked people to send you idea's - I am!

I suggested filling in with Rock/cement Chunks behind DAM to create a waterfall - maybe 3 tier - Enclosed is a quick sketch I did - Just to be able to see the vision -

Here is what I see as a positive

1) Creates Beauty
2) the old dam will be stable with the backfill -
3) Save the City much $
4) Creates a natural Fish ladder
5) Filters the water with Oxegen

The negative I see is -

1) Still will hold back silt
   may still have to dreg (sp?) now + then -

"JUST AN IDEA!" HAVE a good DAY! Rod

Marcy Hamilton

From: Eikerenkotters [theeik@att.net]
Sent: Saturday, April 23, 2016 8:56 PM
To: Marcy Hamilton
Subject: Removal of Pucker Street Dam - Niles, Michigan

Southwest Michigan Planning Commission,

I am very concerned. I have recently heard of a plan to remove the city owned Pucker Street dam on the Dowagiac River. While I have long been a proponent of removing unneeded dams on rivers in the west to promote salmon & steelhead migration – I believe removal of this dam could damage more than one current quality fishery. I have been fishing the Dowagiac for about 15 years and currently come up from southern Ohio twice a year to fish the river for salmon or steelhead using a local guide and spending my tourist dollars in local establishments. By the way – I do all catch and release – it is all in the sport.

Removal of the dam will cause an immediate effect of destroying the quality spawning gravel beds and deep holes below the dam. Because of its lower flow and gradient, it will take years for the river to re-establish itself in this area. Dam removal will of course allow the salmon and steelhead to move on upstream and spread out along the remainder of the watershed. The size of the runs in the Dowagiac are not sufficient to support this as it will simply spread a dwindling run over a larger area reducing the chances of catching a fish by the sportsman. In addition, removing the dam will also drastically impact the brown trout fishery above the dam. The dam currently acts as an upstream barrier for the predator fish that enter from the St. Joseph River. During the summer months, pike, walleye, and smallmouth enter the Dowagiac and feed on the brown trout below the dam. The only thing that keeps this from happening in the quality trout fishery above the dam is the barrier that the dam provides. If you want to see what will happen to the trout fishery above the dam, just look at the trout fishing below the dam – it is unfortunately very poor.

The dam should not be removed without a plan to remove the sediment above it prior to removal, then replacing it with a small coffer dam or other barrier that will preclude upstream migration (even during periods of high water) of salmon and steelhead and the dreaded pike and walleye that are sure to destroy the fishery above the existing dam. I personally want to continue to enjoy the lower Dowagiac for many years as a salmon and steelhead fishery. Tom Eikerenkotter, Beavercreek, Ohio

PUCKER STREET DAM REMOVAL

PROPOSED CONCEPT PLAN

COMMENT CARD

Thank you for your interest in the Pucker Street Dam Removal project. The proposed plan is intended to represent concepts in restoring the river habitats and resources that were altered and over time have degraded since the dam was constructed, thus becoming a more natural, free-flowing river.

After reviewing the proposed plan for the Pucker Street Dam Removal project, please give us your comments below.

Please PRINT the following information:

Name: Paul Schimel

Address: 2918 N 5th St

City/State/Zip: Niles Mich

Phone:

E-mail:

What aspects do you **like** about the proposed plan?

How FAR BACK will you go For Restoration (years)

What are aspects you **do not like** about the proposed plan?

Other comments you would like to share?

COME WALK MY BANK

THANK YOU FOR YOUR INPUT AND PARTICIPATION!

Marcy Hamilton

From: littlelooie@comcast.net
Sent: Thursday, April 14, 2016 9:33 PM
To: Marcy Hamilton
Subject: Tonight's presentation...

...was gr8...I must confess to ending up paying less attention to content and more focus on rooting for you as you navigated through the collection of self interested folks in the audience! You were fab!

how can I catch up with you to learn more?

Pete
the guy with the floppy hat talking with you and colleagues after the presentation about the benefit of having DNR and their passion more visible.

Marcy Hamilton

From: Martin Goodman [1martingoodman@gmail.com]
Sent: Wednesday, April 20, 2016 6:15 PM
To: Marcy Hamilton
Subject: Dam removal

Please do not remove the dam. The impact will have serious repercussions on fishing and fisherman coming to your city and the money spent locally.
Thank you.

Sent from my iPhone

Marcy Hamilton

From: Niall McCarthy [niall.callahan@gmail.com]
Sent: Saturday, April 16, 2016 10:18 AM
To: Marcy Hamilton
Subject: Pucker Street Dam

Dear Ms. Hamilton,
The removal of the pucker street dam would be economically beneficial to the area of Niles Michigan and the removal would be environmentally beneficial to the entire watershed.

I live in Chicago and travel to the river a number of times each year, I also fish other Michigan rivers like the Pere Marquette which has no dams and is very healthy river. Removal of the dam would make the river healthier and that would attract a large number of tourist dollars. The removal would also make residents downstream of the aging dam safer.

Sincerely,
Niall McCarthy

Marcy Hamilton

From: John Barnhart [jrbarnhart_mi@comcast.net]
Sent: Monday, April 18, 2016 9:58 PM
To: Marcy Hamilton
Subject: Pucker Street Dam Removal Comments

Dear Ms. Hamilton,

I have read with interest the comments by Mr. Harley reported in the South Bend Tribune regarding the impact on the anadromous fishery in the Dowagiac River and I believe his comments have merit in the short term.
However, the removal of the dam will make available long reaches of the river to spawning fish may may result in major increases in natural reproduction in the Dowagiac River System and in the survival of the resulting fry and smolts.

Currently, steelhead reproduction is limited to the short reach of the river below the Pucker Street Dam where spawning fish are subject to intense fishing pressure and to the destruction or degradation of spawning redds by the large numbers of careless waders. Removing the dam will allow many fish to find appropriate spawning habitat that is not subject to the intense traffic of the lower river and should result in greater numbers of fry survival. From my own observations, I believe that some natural reproduction occurs in the lower river because I have seen and inadvertently caught steelhead parr in that section of the river. I think that it is likely that greater numbers of steelhead offspring will survive if more habitat is available that is not as pressured as the current habitat.

Consequently, I believe that, as Mr. Harley states, catch rates will decrease for at least the first three years after dam removal. However, as the number of surviving fish increase, I would expect the fishery to rebound and even improve as more fish hatch and mature to migrate to Lake Michigan and, ultimately, return to their natal water to spawn.

I believe the impact on the upstream fishery will not be as severe as some people claim. Currently, there is a fairly good brown trout fishery downstream of the dam and those fish are subject to predation from pike, walleye, and smallmouth bass that migrate up from the St. Joseph River.
The trout fishery upstream of the dam may see some decrease due to predation, but I believe it will be offset by an increase in the food supply provided by anadromous fish eggs, fry and parr and the decaying carcasses of spawned out salmon.

The full effects on the fishery will not be realized for several years until some equilibrium is reached. With careful management, the fishery has the potential to be an even greater asset to the community of southwest Michigan.

Furthermore, the dam is an eyesore, a liability, and a hazard.
Regardless of its affect on the fishery and short term fishing success, it is time to remove this blemish on a beautiful river and make some amends for the damage that earlier generations have bequeathed us.

John R. Barnhart
24729 US 12 East
Edwardsburg, MI
Member St. Joseph River Fly Fishers & Trout Unlimited

Marcy Hamilton

From: jason tharp [jastharp@yahoo.com]
Sent: Monday, April 18, 2016 1:47 PM
To: Marcy Hamilton
Subject: Pucker Street Dam Removal

Marcy

I have continued to look at the Pucker Street Dam removal in ways that include recreation within the current public lands at the dam. I'm looking at ways to work with the the current plans for dam removal. I see that finding a more natural design that fits with river restoration is important. I have looked at other dam removals in southern Michigan and have found several that show how this would work. These other rivers/dam removals include the Coldwater at Freeport, the Thornapple at Nashville, the Red Cedar at Willamston, and Mill Creek at Dexter. Dexter is a good example because it included dam removal, river restoration, public park space, paddling, and fishing as a cold water stream. All these are parts of the plan.

Here is a video of these sites. https://www.youtube.com/watch?v=ibcCyvqjVns

These examples show examples of how this would work. The natural gradient and flow of the Dowagiac would support this. These dam removals and designs were supported by the DNR, Fish&Wildlife, Trout Unlimited, and other conservation and river groups. I'm looking at doing the same things but calling it a whitewater park. These examples show how it would work and has worked for other dam removals.

How this fits with river restoration is the same as these other former dams. These structures placed into the stream have a function of sediment and erosion control. The use of the cross vain helps control and direct the flow. Using these same structures and principals would help control the same issues that will be present on the Dowagiac. M-51 was moved a few feet because of erosion to the bank. Doing something to protect that bank and the state highway above may open up another funding source.

Fishing is also important and heavily done at this location. With the taking out of the dam there will be an impact. Also the Dowagiac has a lot of private property along it and this is one of the public areas. Putting in structures will create habitat for fish and fishing. The eddie lines, fast water, and pools that are good for kayaking are good for fishing. Looking at Mill Creek in Dexter, Ann Arbor Trout Unlimited has made this creek into a trout stream and host a trout fest. Video link https://www.youtube.com/watch?v=T7C_XRnt-2M Trying to keep fishing its best at this location is important. You don't want equate dam removal with destroying a fishing spot. The inclusion of rapids will make this spot something special to fish. I would also include a good drift boat launch at this location. They already do this but the current way is not the easiest or safest way of putting a boat in the water.

Funding is always an issue with any project. When I started looking at Pucker Street dam I was looking for a cheaper way to remove it. This is a way to fit with the current plans as an add on to the project. Just small changes within the current park that will fit with the dam removal. If funding can not be obtained for this part of the project it could easily be removed and the dam removed without it. I think there are ways to fund it as a add on to the dam removal. The recreational grant Dodd park got is an example of another funding source. I believe Niles would support this.

I do believe dam removal is important. There are many ways to remove a dam. Finding the best way that fit the river and conditions on the each river is important. Recreation is important on the Dowagiac and should be a consideration with dam removal.

Thanks for any consideration
Jason Tharp

Marcy Hamilton

From: John F Trout III [jftrout@aep.com]
Sent: Wednesday, April 20, 2016 9:06 AM
To: Marcy Hamilton
Subject: dowagiac

I understand there are plans to remove the dam. Just allow me to say that if this proves to destroy the fishing on the river, which most everyone agrees it will, then my tourist dollars won't be set aside for your area any longer.
I have had wonderful fishing trips on the Dowagiac and find it worth every penny I spent. I do hope everyone involved considers the dollars fishermen spend for quality fishing in your area. That money will be missed.

Sincerely,
John Trout
(Ohio Valley Fly Rod Club)

Marcy Hamilton

From: Andy Dziengel [dziengel3@hotmail.com]
Sent: Tuesday, April 19, 2016 10:07 PM
To: Marcy Hamilton
Subject: Niles dam

I am sending this in regards to the elimination of the Niles dam. My family and I spend a minimum of two weeks in the area in order to fish the dowagiac river, which I find easily fishable with my family. We also enjoy the relative proximity to the Chicago area and South Bend.
It has come to my attention that once the damn is gone so with it will go the accessible steelhead fishing. If there are no steelhead then we will have to fish elsewhere and spend our money outside the Niles area. This is something that I would rather not do but without the easy access to fish we will go elsewhere.
In closing, please reconsider and keep the dam as is.

Sent from Outlook Mobile

Marcy Hamilton

From: Jon Romano [jromano@darwill.com]
Sent: Tuesday, April 19, 2016 10:12 PM
To: Marcy Hamilton
Subject: Pucker street dam

Hi, my name is jon, I live in Chicago and I own a camper and have it year round at the campground in niles on the Dowagiac. We spend a lot of time up there fishing with family and friends and eat in niles quite often. We spend money at the grocery stores and many other local places.. If the fishing goes bad because of the dam removal, that would be terrible... Do you know how this removal will impact fishing for steelhead and trout?

Please advise - Very concerned

Jon Romano
jroma@darwill.com
708.236.4953

Marcy Hamilton

From: Steve Hawkins [hawkinsart@sbcglobal.net]
Sent: Wednesday, April 20, 2016 10:16 AM
To: Marcy Hamilton
Subject: Dowagiac dam plans (continued)

Please reconsider the long term negative impacts of the demolition of the Pucker Street dam in Niles. The damage to the trout fishery and subsequent economic repercussions to many businesses in Niles and the surrounding areas from reduced tourism should be of utmost concern.
My fishing friends and I will not be returning to Niles if the Pucker Street dam is removed.

Respectfully,

Steve Hawkins

Marcy Hamilton

From: Dan Kuksa [dan@hthconsultants.com]
Sent: Wednesday, April 20, 2016 11:22 AM
To: Marcy Hamilton; mccauslin.2@nd.edu; rhuff@nilesmi.org; nan3738@aol.com; GretchenCbutlergg@aol.com; dvanden@qtm.net; domerdurm@hotmail.com; dmann@nilesmi.org; zmwrent@sbcglobal.net; wskalla@sbcglobal.net; John_DiCostanzo@comcast.net; dustan@rippleguides.com; Adam Marton; Brandon Dillard; Robert Tomes; jon@chifly.com; bbeckner313@gmail.com
Subject: Dowagiac River Dam

Fellow Citizens,

It is with much distress that I have been informed of your plan to remove the dam located on the Dowagiac River. I have been traveling from the far northern suburbs of Chicago to fish for migratory steelhead and salmon for the past 13 seasons. I spend several river days each spring and fall to fish this incredible watershed and plan on continuing to do so...if the current ecosystem remains unchanged!

I addition I have brought many clients, friends, and associates along in order to enjoy the magic that has been the Dowagiac. These individuals have come with me from all over the country in order to experience a place almost unlike any other in the United States. Each trip we patronize the local businesses by eating at their restaurants, staying in their hotels, shopping at their stores, using their services, and buying their gas.

I know that **I am not** the only individual. I would bet the numbers reach into four digits that help cycle part of a local economy... all because of the presence of such a unique fishery. I am a "catch-and-release" angler who encourages the same practice for others, in order to do our part and help maintain the dynamic steelhead population which exists in the lower Dowagiac. The environmental impact of releasing some unknown quantity of metric tons of sediment downstream will do more to destroy a healthy population of species, plus their breeding grounds, than any fisherman ever could.

Sometimes a dam needs to go. But you are very, very wrong in this case. I can choose to fish anywhere in the midwest (or country for that matter). However, myself, along with thousands of others, have made a decision to support and preserve the Dowagiac watershed and its local economy. It would be highly unfortunate to have uninvolved legislators and decision makers be the parties responsible for the destruction of a thriving ecosystem.

Please consider my comments, and those of any other individual and/or organization, in your final decision. I thank you for the opportunity to express my deep concerns. I am confident that the feedback you receive will be sufficient grounds to reject the project.

Good Day.

--

dan kuksa - business director

office 847.247.0200 / direct 847.247.8970

Marcy Hamilton

From:	Adam Marton [adam@fieldworkersclub.com]
Sent:	Wednesday, April 20, 2016 6:21 PM
To:	Marcy Hamilton; mccauslin.2@nd.edu; rhuff@nilesmi.org; nan3738@aol.com; GretchenCbutlergg@aol.com; dvanden@qtm.net; domerdurm@hotmail.com; dmann@nilesmi.org; zmwrent@sbcglobal.net; wskalla@sbcglobal.net; John_DiCostanzo@comcast.net
Subject:	Dowagiac River Damn Removal

Dear Southwest Michigan Planning Commission, Mayor Michael McCauslin and Niles City Counsel Members,

I am writing to share my opposition to the proposal to remove the Pucker Street Damn on the Dowagiac River. I feel this plan jeopardizes the quality of the recreational trout, salmon and steelhead fishing on the lower river below the damn. Should this fishery be destroyed by the removal of the damn myself and the hundreds (of maybe thousands) of other people who spend time in Niles will no longer come there to fish. This will also mean myself and the other fisherman will no longer utilize any of the business (hotels, gas stations, restaurants, taverns, markets and tackle shops) we have been come to depend on while we are in your community.

The Dowagiac River offers a very unique fishery for many reasons and should be considered as such by the group of decision makers who are considering making a change. Facts should be used to support any changes and it is my hope that complete economic, scientific, usage and environmental studies will be conducted to collect these facts and support any decisions. Simple watershed comparisons, new utilization projections or economic guesses are in my opinion not adequate to support any change decisions at this time.

Just one of the facets that makes the Dowagiac so unique is it's draw for anglers from outside of the area. People travel great distances on a regular basis to fish on this river and as a result stay and patronize businesses on the community of Niles, Michigan. I have personally fished with friends from Texas, Wisconsin, Indiana and Illinois on this river. In all cases we overnighted in Niles, ate at the restaurants, purchased groceries, gas and tackle. Many of my friends regally come from Chicago, Milwaukee, Rockford, Peoria, Indianapolis and Ohio.

Lastly, I hope that this group of decision makers will consider all that is at stake should a change occur. Beyond everything I've mentioned above should that damn come out is this there a complete understanding of the true environmental impact this could have? Does the committee know what is in the years of silt and agricultural run-off buried behind the damn that will get dislodged and flow down stream into the St Joe, Lake Michigan and beyond?

Please do not take out the Pucker Street Damn.

Thank you for considering my opinions.

Adam Marton
The Fieldworkers Club
5985 Trail End Road
Three Oaks, MI 49218
adam@fieldworkersclub.com
312-440-1200
312-213-2324/mobile
www.fieldworkersclub.com

Marcy Hamilton

From: Richard Kasvin [rkasvin@Prints-Posters.com]
Sent: Wednesday, April 20, 2016 6:58 PM
To: Marcy Hamilton
Subject: Dowagiac river Dam removal.

To whom this concerns, I have been told that the dam on the Dowagiac river, upstream from Niles, is in danger of being removed. I hope you reconsider this. We have been coming to the Dowagiac for 15 years, twice a year, fishing for the migratory steelhead. We stay at local hotels, eat at restaurants, and have even gone antique shopping in Niles on these trips. It would be a great loss to the area to see this come to an end. Also, a great Steelhead stream would be destroyed. I sincerely hope you and your council members reconsider this. I don't want to have to go steel heading further north in Michigan.

Thank You,
Richard Kasvin
Owner
Chicago Center for The Print
1509 W. Fullerton Ave.
Chicago, Il 60614
773-477-1585
www.prints-posters.com
rkasvin@prints-posters.com
Gallery Hours
Tues-Sat 11:30- 5:00, Sun 12- 5
Charter Member
International Vintage Poster Dealers Association

To: hamiltonm@swmpc.org
From: Kory Boozer <koryboozer@icloud.com>
Subject: Pucker Street Dam Removal
Date: Tue, 25 Oct 2016 11:52:46 +0000 (GMT)

Hi Marcy,

My name is Kory Boozer, I am a native and resident of Berrien County, born and raised on the St. Joseph River in Berrien Springs and licensed fishing guide here in Southwest Michigan. I run more guided trips in Berrien County than any other guides hands down, but my main focus is on the St. Joseph River, not the Dowagiac River.

I was actually the one that with the direction of Jay Wesley, began creating a stir with the City of Niles to get them to begin thinking seriously about dam removal which has obviously lead to them finally doing so and the number of steps that you all have taken from there to get to where we are now.

For starters, I am not a biologist, I have a lot of knowledge on the matter but hold no degree. I have no dog in this fight other than wanting what is best for my local environment. Obviously anything non-natural is often times not great for the environment, in the case of Pucker Street Dam, I feel it is essentially holding the river hostage.

I was under the assumption that the dam removal process was moving forward as planned, but as of late have heard some mixed statements regarding this matter.

It seems to me, the movement is being stunted by the desires of a few anglers pocket books, on one side you have Dustan Harley and company wanting the dam or at least some sort of blockage to remain to keep fish bottled up in the lower river. On the other side you have anglers wanting the dam removed, but only if there is funding to do restoration work on the lower river once the dam is removed. Which is obviously not a bad idea, but I don't think it is as necessary as some are trying to portray it and seemingly holding the removal process up in doing so. The most disturbing fact of all this to me is, essentially none of these entities are actually locals and they all have something to gain by their ideology being utilized.

If that dam was removed as the plans that were made stated, within a year that lower river would be back to normal, the first and foremost goal should be getting the dam removed here, not complicating the process with a hundred other ideas.

As far as groups spearheading the project, MEANDRS should be the only group doing so, for a variety of reasons. This project should be based on bringing the watershed back to its natural environment with the focus on enhancing the watershed and environment for native species, groups like Trout Unlimited, etc... should not have an official affiliation with any of this. Trout are not native here and the project should not be complicated by considering such things, it should be black & white, this project is best for the local environment and native species that inhabit it. By keeping it that way, nobody can argue whether it is good or bad or anything else, our only goal here should be bringing the environment back to its most natural form. This also keeps all these guys wanting to make a name for themselves out of the picture and removes any bias. MEANDRS is also a locally based group, not some national deal that many many people have negative thoughts about, the fact is, fly fisherman are the minority and TU does not have a great reputation with non fly fisherman, keep in mind, I am a fly fishing guide. You keep it local and non-biased and all the BS goes out the window. Jay Anglin is a Friend of mine and has the best interest of the watershed in mind, but is also an extremely controversial entity, you will have folks disagree with the removal simply based on the fact he supports it, which is why it is very important to stick with this being a MEANDRS project as it is without a doubt the most "middle of the road" entity we could pick to spearhead this and future enhancement projects. I heard rumors of a TU Chapter being created, etc... that would in my opinion, do more damage than good...

I would appreciate it if I could be kept in the loop and attend any meetings that there may be, many of the statements I have heard as of late I find very disturbing as I don't think many of these folks really have the best interest of the native environment at hand, more than anything I feel they simply want to make a name for themselves and that is not right at all.

Thank you for your time,
Sincerely,

Kory W. Boozer

Cell: 269.235.0664

eMail: info@boozersguideservice.com

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

MAY 03 2016

REPLY TO THE ATTENTION OF:

E-19J

Rick Westerhof
U.S. Fish and Wildlife Service
Midwest Region Office Fisheries
6644 Turner Road
Elmira, Michigan 49730

RE: Scoping – Preparation of an Environmental Assessment for the Proposed Removal of the Existing Pucker Street Dam (aka Niles Dam) on the Dowagiac River; City of Niles, Berrien County, Michigan

Dear Mr. Westerhof:

The U.S. Environmental Protection Agency (EPA) has recently learned of the U.S. Fish and Wildlife Service's (USFWS) proposal to prepare an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA) for the proposed removal of the existing Pucker Street Dam (also known as the Niles Dam) located on the Dowagiac River (River) in Niles, Michigan. EPA has reviewed early project information provided by USFWS on the proposed project, including the Draft Design Report (dated April 7, 2016), and other project specifications provided via email to EPA by USFWS on April 19, 2016. This letter provides EPA's scoping comments, pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality's NEPA Implementing Regulations (40 CFR 1500-1508), and Section 309 of the Clean Air Act.

The proposed project site on the Dowagiac River is approximately three miles upstream of its confluence with the St. Joseph River. The existing concrete Pucker Street Dam, wingwalls, and powerhouse were built in 1928. The site has not produced power in many years due to maintenance costs, sedimentation in the upstream impoundment, and damaged turbines. Before the construction of the current Dam, a log dam was built just upstream of the existing structure in 1828 and was in place for many years.

The Dowagiac River runs along a former glacial lake bed, and the river bed and much of the watershed is made up of coarse glacial material, which is responsible for storing tremendous volumes of cold groundwater. This cold groundwater comprises the River's baseflow, and also sustains floodplain wetlands and ground-water fed wetland seeps adjacent to the River.

The project was initiated because of structural issues that have created safety concerns both at the Dam and downstream, leading to initial investigations into its removal. In 1996, the City of Niles (City) announced the generators were no longer operational due to major damage to the turbines from silt and sand. At that time, the City decided that the best option was to create run of the river flow. An initial drawdown and passive sediment release occurred at the Dam in May of 1999, when three of the five existing sluice gates were permanently opened. Water levels dropped five feet and hundreds of thousands of cubic yards of sediment were released into the River downstream of the Dam. Because the 1999 drawdown produced such a significant sediment release, and because of fishery, recreational, and infrastructure considerations downstream, active sediment management is desired for the Pucker Street Dam project.

In addition to safety concerns, the Dam also impedes fish migration within the River, blocking almost the entire River watershed and its tributaries (159 miles of mainstem and tributary habitat) to fish passage from the St. Joseph River and Lake Michigan. Removing the existing Dam would eliminate that barrier and allow for restoration of two miles of high-gradient cold water aquatic habitat, which is a rare resource in this region. The project area includes approximately 11,000 feet of river upstream of the Dam and 300' downstream of the Dam.

Information presented by USFWS at a public meeting held April 14, 2016 included discussion of proposed activities at the project location, which include the removal of the Dam and associated structures; filling of the existing raceway channel west of the Dam; active sediment management to excavate hundreds of thousands of cubic yards of sediments that have been trapped behind the Dam for decades; and stabilization of the existing Pucker Street bridge over the River. The project would also entail large amounts of earthwork and grading to slope the banks of the riverbank upstream of the Dam post-removal, as well as the potential for construction of associated access roads and staging areas for project implementation. Removal of the Dam is expected to drop the upstream river pool elevation by several feet, and further drops may be expected during summer months.

To help USFWS prepare going forward, EPA would like to emphasize the role and importance of the statement of purpose and need that will be required in forthcoming NEPA documentation for this project. The purpose and need statement should be specific enough that the range of alternatives can be evaluated in terms of how well they address purpose and need, but not so narrow that they pre-select a single alternative. Furthermore, a project's purpose and need must justify the impacts associated with a Proposed Project. EPA is aware that specific construction plans have been drawn up and that specific project elements (e.g., removal of the Dam, construction of a 20' floodplain bench in river reaches upstream of the Dam, etc.) have been communicated to the public and described in the Draft Design Report; this occurred before the NEPA process was conducted. At this point, USFWS appears to have skipped the important step of developing a range of alternatives (including a No Build alternative) to meet a specific project purpose and need. All reasonable alternatives should be identified and studied, regardless of whether or not they are within the jurisdiction of the lead Federal agency.

Based on the limited information provided, EPA offers the following comments for consideration when preparing the EA for the proposed project.

PURPOSE AND NEED / PROJECT ALTERNATIVES

Several project goals were identified on page 3 of the Draft Design Report. The forthcoming EA should identify and substantiate both the purpose of the project, and the need(s) for the proposed project, and identify the preferred alternative. The project purpose and the project need statements for the proposed action should be clear and concise for reviewers of the EA. After underlying problems have been identified and substantiated, the alternatives identified to solve the underlying problems should then be identified and explained. The no-action alternative and all action alternatives that would satisfy the substantiated purpose and need should be fully assessed in the EA. The EA should identify any alternatives considered but dismissed from further consideration (if applicable), and should provide elimination criteria and clear explanations for their early elimination.

CUMULATIVE IMPACTS

When analyzing the proposed project and alternatives, USFWS must consider actions that result as a direct or indirect consequence - that is, connected, similar, and cumulative actions.[1] Specifically, this would include indirect impacts to upstream wetlands. These connected, similar, and cumulative actions should be incorporated into the description of each alternative, and impacts assessed accordingly. Connected actions are those that are "closely related" to the proposal and alternatives. Connected actions automatically trigger other actions, they cannot or will not proceed unless other actions have been taken previously or simultaneously, or they are interdependent parts of a larger action and depend on the larger action for their justification. Specifically related to this project are the proposed reburying of two TransCanada natural gas pipelines (24" and a 22") that will be exposed post-restoration and the removal or plugging of an existing abandoned water line located 250 feet downstream of the Dam; work involving these pipelines would also be considered a connected action and should be analyzed under NEPA.

PROJECT DESCRIPTION AND DESIGN

Once the NEPA process has been completed and a preferred alternative selected, that alternative will need to be reflected in updated project plans. That preferred alternative will also require regulatory Federal Clean Water Act and state permits through MDEQ. EPA recommends that the forthcoming EA include the following:

- Describe how long the current Dam has been in place, information on location and type of prior (legacy) dams, the type of existing dam and its current condition, and the material of which it is constructed.
- The EA should discuss the potential for erosion due to project implementation. In particular, the EA should discuss if or how Dam removal will increase the possibility of bank scour or in-stream erosion. The EA should also discuss, for each alternative, whether bank erosion control or in-stream grade control measures are necessary and proposed, and if yes, where are they proposed and how were they designed.

[1] 40 CFR 1508.25

- The EA should provide information pertaining to construction access and how work will be done (e.g., construction staging from the river bank vs. in-stream river work). If cofferdams or other temporary dewatering measures are proposed, those measures, their impacts, and the lengths of time they will be installed, should be discussed.
- The EA should describe information on proposed construction sequencing, including the proposed timeline for this project and the specific proposed steps to accomplish the project.
- Discuss how USFWS plans to deal with non-sediment components if the Dam and appurtenant structures are removed. Include a discussion on where materials from concrete caps, paved roads, and abutments will be disposed.
- The EA should include a determination as to whether a legacy dam exists and whether the removal of a legacy dam will need to be incorporated into any of the action alternatives that propose removal of the Pucker St. Dam. When a new dam is constructed in the same or close location to an original dam (as this dam was reconstructed multiple times), it was historically common to submerge or built to submerge the older dam (or its remnants). A submerged older dam is referred to as a legacy dam. The need for removal of an upstream legacy dam as part of a downstream dam removal project is fairly common in the field of dam removal.

WATER QUALITY

The Dowagiac River is listed as impaired (i.e., not meeting water quality standards) on the MDEQ Clean Water Act Section 303(d) list of impaired waterbodies. The forthcoming EA should discuss existing water quality issues, the existing impairments, and how the proposed project may affect water quality in the Dowagiac River. Additionally, the EA should discuss expected effects of dam removal (both positive and negative) on water quality in the Dowagiac River. Specifically, the EA should discuss how the project will contribute to the overall water quality of the river.

WETLANDS

It is unclear if a wetland delineation has been completed or is planned to be completed. The EA should include a wetland delineation and robust analysis of wetland impacts associated with all project alternatives. Wetlands appear to be present adjacent to and in the vicinity of the Pucker Street Dam. Due to the groundwater-fed system, some of these wetlands may be high-quality groundwater seeps or fens. Project design and the alternatives analysis should incorporate a wetland delineation to ensure wetlands in the project vicinity are located and that wetland impacts are avoided, unavoidable impacts are minimized, and mitigation is provided for unavoidable, minimized impacts (as per the Clean Water Act Section 404(b)(1) guidelines).

Specifically, EPA recommends that a formal wetland delineation be undertaken to determine the potential for wetlands in all access/staging/clearing areas, and in areas of/adjacent to the river pool upstream that could be affected by Dam removal. An action alternative that involves either direct or indirect impacts to wetlands would not be "self-mitigating." Direct impacts to wetlands would be due to the placement of dredged or fill material. Indirect wetland impacts are attributed primarily to the loss of wetland hydrology associated with the drop in water level following Dam removal. In addition to wetland fill, the loss of (via indirect impacts to) wetlands, is of concern to EPA. Many wetland functions and values will be lost if existing wetlands revert to upland areas. While there is the potential for the development of new wetlands in areas currently inundated by areas of river channel, there is substantial uncertainty as to the quality, location, and acreage of wetlands that may actually develop post-Dam removal. Furthermore, the 1999 drawdown likely contributed to more wetland creation than the proposed project will, as that drawdown took the upstream reach from an impoundment to a channel.

Forthcoming NEPA documentation should include specific narrative information on proposed mitigation for direct wetland impacts. Additionally, EPA recommends that USFWS continue to work with MDEQ and/or EPA to develop an acceptable mitigation ratio and mitigation plan to compensate for indirect wetland impacts that meets requirements of the 2008 USACE Mitigation rule (40 CFR 230). Details on mitigation for indirect wetland impacts (including mitigation ratios, mitigation type, mitigation location(s), etc.), should be included in the EA.

EPA encourages additional coordination between USFWS and the wetland regulatory agencies to ensure that project implementation does not result in a net loss of wetland. The Draft EA should discuss how USFWS is in compliance with Executive Order 11990 (Protection of Wetlands).

The Draft EA should discuss the effects the proposed project will have on lowering the pool elevation behind the Dam, including the likelihood of instability over a period of many years as the river adjusts to a new, stable channel. In the interim period, the channel may headcut, which may induce incision, wasting of banks, and channel widening. Channel instability may also contribute to erosion of the many acres of exposed sediments upstream post-Dam-removal. The Draft EA should include additional information on fluvial geomorphology changes expected or possible in the new channel as it forms post-Dam removal, and the potential for these fluvial processes to affect the proposed restoration efforts.

SEDIMENT TESTING/DREDGING

The EA should include sediment analyses and discuss USFWS's plan for disposal of any contaminated or uncontaminated sediments. Project design may include full or partial removal of impounded materials. Materials reviewed by EPA indicate that sediments to be dredged from the Dowagiac River and/or Dam demolition materials are proposed to be utilized to fill the adjacent raceway channel, to build up a proposed floodplain shelf in the channel reaches above the Dam, and potentially to be placed at an adjacent park site. EPA was provided with recent (2014) sediment testing that has been undertaken for the project, including specific information on sediment testing locations or protocols undertaken for dredging. The forthcoming EA should include, at a minimum, the following information:

- A map/figure outlining the proposed dredging location(s);
- Narrative information on the type and quantity (cubic yards) of material proposed to be dredged, and a proposed dredging schedule;
- Information on prior sediment sampling (prior to 2016) and results of all prior sampling, including a robust discussion of prior arsenic issues in sediments;
- A summary of sediment analyses that clearly states whether sediment behind the Dam is suitable for beneficial re-use (i.e., land application, brownfield restoration, upland fill, landfill cover, etc.);

- A discussion of sediment dispersion expected during and post removal. EPA generally does not support flushing of sediments downstream. If the volume of sediment is sufficient, removal of the Dam may not immediately restore the upstream hydraulic gradient. In this case, remobilization of sediments may occur through head-cutting, with the cut progressing upstream. The period of time required for a head cut to reach equilibrium is determined by several factors including, but not limited to, sediment composition, channel-forming flow events, high-flow events, physical characteristics of the channel (e.g., ledge), presence of infrastructure (e.g., pipeline), and whether river channel aggradation has occurred upstream of the impoundment[2];
- Discussion of USFWS's plan for disposal of any contaminated sediments. Mitigation of deleterious impacts resulting from the remobilization of previously-impounded sediments may be required. Potential remedial measures may include full or partial removal of impounded materials, staged removal of a Dam to control sediment remobilization, and/or stabilizing sediment exposed through Dam removal. Based on sediment testing, EPA assumes that sediment analyses will inform how USFWS plans to deal with contaminated sediment (if present at the project site), in addition to removal of inert sediment;
- Information on the placement locations for all dredged sediment;
- Specific information on sediment testing (to include elutriate testing) regarding how dredged materials were or will be tested to ensure they are both suitable for open water disposal/shallow water placement, <u>and</u> also meet Michigan Water Quality Standards; and
- A discussion on how sediment, elutriate, biological, and bioaccumulation testing indicate that in-water placement of these dredged materials will not cause an adverse impact on biota or water quality.

<u>NON-NATIVE INVASIVE SPECIES</u>

The Draft Design Report states that the riverbanks upstream of the Dam will be sloped back from a vertical bank, and that a floodplain shelf will be constructed adjacent to each side of the River below the top of bank. Specifically, the Draft Design Report states on page 37, "*We are not proposing stabilizing the banks of the excavated channel with erosion control fabric or stone because the cost of running those treatments along the full length of the excavated river would be prohibitive.*" While we acknowledge stabilizing the banks will increase the overall cost of the project, we recommend the forthcoming EA discuss how this approach will control erosion and the spread of non-native, invasive plant species which will undoubtedly colonize bare soil. We recommend the EA identify the terrestrial noxious weeds/invasive species that are found within or near the preferred alternative project area[3]. Early recognition and control of new infestations is essential to stopping the spread of infestation and avoiding future widespread use of herbicides, which could correspondingly have more adverse impacts on biodiversity. We recommend the EA include an invasive management plan that addresses the identification and control of noxious weed/invasive species in and near the project area.

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[2] http://onlinepubs.trb.org/onlinepubs/archive/NotesDocs/25-25(14)_FR.pdf

[3] Michigan Department of Natural Resources (MDNR) Invasive Species Links at: http://www.michigan.gov/dnr/0,4570,7-153-10370_59996-270796--,00.html

AIR QUALITY

The forthcoming EA should discuss if Berrien County is in non-attainment or maintenance for any of the National Ambient Air Quality Standards (NAAQS). Because of their impact on human health, EPA has emphasized the need to address PM2.5 (and diesel emissions) through the National Clean Diesel Campaign[4], along with regional initiatives.

The forthcoming EA should identify and discuss existing air quality and air quality impacts at the project location, and those potentially associated with future construction and operations at site of the proposed project. The impacts of all action alternatives on air quality should be assessed by evaluating each alternative's impacts on the NAAQS. Each alternative's potential emissions should be discussed, and should include both direct and indirect emissions that are reasonably foreseeable. Be aware that there may be state and local air quality requirements to consider. These requirements can include, but are not limited to, provisions such as State indirect source regulations and State air quality standards.

GENERAL CONFORMITY

This project may need to address the General Conformity Rule[5] requirements. Under the General Conformity Rule, Federal agencies must work with State, Tribal and local governments in a nonattainment or maintenance area to ensure that Federal actions conform to the clean air quality goals as contained in the State Implementation Plan. General Conformity is required for all National Ambient Air Quality Standard nonattainment and maintenance areas.

CONSTRUCTION IMPACTS

EPA recommends that the forthcoming EA recommend specific measures and best management practices that will be undertaken to minimize construction impacts to air quality, water resources, soil, and other regulated resources. The EA should discuss proposed construction measures, including a discussion of staging areas and their locations, access to the worksite, and a discussion of any proposed in-stream construction. EPA recommends that equipment not work from the active river, and that dewatering measures such as temporary portable dams or cofferdams be installed to isolate river flow from any active work areas.

VEGETATION AND WILDLIFE HABITAT

It is likely that some tree removal and clearing will be required to access the project location. The forthcoming EA should include information on current vegetation. Regarding proposed tree trimming and removal, the EA should disclose the types and numbers (and acreage of shrubby areas or trees) that are proposed to be cleared for construction. The EA should also disclose whether these clearing areas are located in wetlands or stream as well as potential impacts to Indiana bat and northern long-eared bat, both species listed on the Endangered Species Act. Additionally, EPA recommends that discussion of tree clearing/removal (if located in wetland areas) specify whether trees will be mechanically cleared (bulldozed) or cut at their base (leaving

[4] http://epa.gov/diesel/

[5] 42 USC 7506(c), Section 176(c)

the trunks intact). This differentiation in tree removal is important with regard to regulatory requirements under Sections 404 and 401 of the Clean Water Act.

We recommend the EA describe the manner in which trees will be disposed of. EPA strongly recommends that any woody vegetation not be burned, as burning vegetation increases air impacts, but instead be mulched and the mulch offered to the community for use in yards, parks, commercial areas, etc.

Trees provide valuable habitat and protect water quality, in part, by stabilizing soils in a watershed. EPA also recommends the draft EA include the acreage of woody vegetation that will need to be removed. We urge avoidance of this resource to the extent feasible. EPA strongly recommends voluntary tree replacement for tree loss at a 1:1 ratio or covering the same acreage amount using native tree species. Mitigation might include, but is not limited to, replanting of native tree species adjacent to the river, or assisting local, county, or state agencies with any appropriate ongoing or planned reforestation plans. We recommend a possible species list and list and map of potential sites where trees can be planted be included with the forthcoming EA.

Lastly, EPA recommends removal of woody vegetation during winter months, to the extent feasible, to avoid damage to migratory birds protected under the Migratory Bird Treaty Act. We recommend this timeframe become a commitment in the decision document.

FEDERAL AND STATE ENDANGERED/THREATENED/RARE SPECIES AND CRITICAL HABITAT

The USFWS's website[6] lists the presence of eight Federally-endangered, threatened, or proposed as threatened species in Berrien County. Information reviewed by EPA was not clear on whether any mussels are present in the project reach of the Dowagiac River that may provide an important native mussel source population for nearby streams and marshes in the Lake Michigan Watershed. Additionally, it is not clear to EPA if USFWS has undertaken any coordination efforts with the Michigan Department of Natural Resources (MDNR), or the Michigan Natural Features Inventory (MNFI), regarding the potential for impacts to other state-listed species, or if USFWS has coordinated with MNFI to determine if state-listed species are present within any areas proposed to be disturbed via project construction.

The Draft EA should discuss how USFWS has worked with, or initiated a Rare Species Review with MNFI. A Rare Species Review involves a refined review of the rare species in the immediate vicinity of the project. The Rare Species Review corresponds to the Endangered Species Assessment previously provided by the Wildlife Division of MDNR, as MDNR ceased to accept review requests to the Environmental Review Program after September 16, 2011. These consultations are required to determine if any Federally- or state-listed endangered or threatened species are present within the project boundaries, and if project implementation would or could detrimentally affect any listed species or their critical habitat. As on-site surveys vary by species, and in certain instances must be completed during specific short seasonal timeframes, EPA strongly encourages swift and timely coordination with MNFI as soon as possible.

[6] http://www.fws.gov/midwest/endangered/lists/michigan-cty.html

Correspondence to and from the MNFI regarding required consultation efforts should be included in the forthcoming EA. State coordination with the MDNR - National Heritage Program may be required under Part 365 (Endangered Species) of the Michigan Natural Resources and Environmental Protection Act prior to commencement of construction activity. Additionally, the EA should include information on the requirement for consultation for both Federally- and state-threatened and endangered species, and information on the status and results of those consultation efforts.

<u>HISTORIC, ARCHITECTURAL, ARCHAEOLOGICAL, & CULTURAL RESOURCES</u>

The Draft EA should include information on USFWS's consultation with the Michigan State Historic Preservation Office (SHPO) under Section 106 of the National Historic Preservation Act regarding potential detrimental impacts to the Pucker Street Dam and/or any other sites within the project's Area of Potential Effect.

<u>PERMITS/PLANS</u>

The EA should also include a list of all Federal, state, and local permits that will be required to undertake the proposed actions. If construction plans for the action alternatives are available at the time, please include them with the EA. EPA understands that construction plans may be draft or at less than 100% design.

<u>MEASURES OF SUCCESS</u>

The EA should discuss the potential for restoration activities along the affected River stretches if the Dam and its appurtenant structures are removed. EPA recommends development of an Adaptive Management Plan (AMP) with a description of actions to be undertaken if it is determined that restoration is unsuccessful based on the measures of success selected. We recommend the AMP include action triggers based on monitoring. This should be included as an appendix to the EA.

<u>MONITORING/MAINTENANCE</u>

The EA should discuss duration of monitoring and rationale for selecting that time period. Key features of the monitoring plan should also be included (e.g., vegetation density, invasive species, observed wildlife, wildlife habitat, etc.). Monitoring plans should also discuss the intervals at which (after construction and restoration activities are complete) project performance will be measured. Monitoring plans should clearly state which entity(s) (e.g., USFWS, state resource agency, local government, non-governmental organization) will be responsible for monitoring and maintenance activities, and if an entity other than USFWS will be responsible for monitoring and maintenance activities, how USFWS will ensure project standards are met.

CORRESPONDENCE

For all environmental impact categories requiring coordination with other Federal or state agencies, EPA recommends that you provide copies of both your letters to those agencies, as well as the responses from those agencies, in the EA. Please include a complete copy of the wetland delineation/determination and MDEQ/USACE regulatory correspondence (e.g., jurisdictional determination) with the forthcoming EA.

Thank you for the early solicitation of EPA's comments regarding the proposal. We are available to discuss our comments with you in further detail if requested. If you have any questions about this letter, please contact the project lead, Ms. Liz Pelloso, PWS, at 312-886-7425 or via email at pelloso.elizabeth@epa.gov.

Sincerely,

Jennifer Blum
For

Kenneth A. Westlake, Chief
NEPA Implementation Section
Office of Enforcement and Compliance Assurance

cc (via email):
Marcy Hamilton, Southwest Michigan Planning Commission
Oscar Loveless, Wightman Associates
Brian Gunderman, MDNR-Fisheries
Luke Trumble, MDEQ-Dam Safety
Ben Zimont, MDEQ-Land/Water Interface Permitting
Dean Anderson, Michigan SHPO

Appendix B

Agency and Tribal Correspondence

Oscar R. Loveless

From:	jhermann@wightman-env.com
Sent:	Thursday, March 05, 2015 3:06 PM
To:	Oscar R. Loveless
Subject:	Re: TUESDAY'S Concept Design Team Meeting Agenda
Attachments:	image001.png; image002.png; SEDIMENT REGULATORY SUMMARY.pdf

Oscar, attached for your files are the following items regarding the regulatory approval for upland disposal for the sediments.

1. 12/23/14 request to Duane Roskoskey (OWMRP) and Joe Rathbun (WRD) to review attached sediment analytical results and map showing the sampling locations.
2. 12/26/14 response from Duane Roskoskey pointing out that different divisions of the MDEQ may have regulatory oversight of these sediments.
3. 1/7/15 correspondence from Jon Hermann to Duane Roskoskey summarizing their telephone conversation that OWMRP beleives the sediments are suitable for upland disposal based on statistical analysis of arsenic values that are below the new 10,000 ppb concentration of background for southwest Michigan per MDEQ Policy and Procedure #09-018.
4. 1/12/15 response from Joe Rathbun stating that the analytical results do not exceed WRD's Probable Effects Concentration Values, therefore WRD has no further questions.
5. 3/4/15 response from Frank Ballo (RRD) stating that RRD has no regulatory role under Part 201 for this project.
6. Copies of sediment analytical summary tables.
7. Copy of the sample location map.
8. Copy of statistical analysis calculations.

Based on this chain of correspondence, the dredged sediment can be used as unregulated fill material for any use that you may deem necessary. This does not alleviate the need for any further permits required for filliing wetlands or present water bodies.

Jon M. Hermann
Wightman Environmental, Inc.
4050 King Drive
Sodus, MI 49126
jhermann@wightman-env.com
269-934-7707 office
269-934-7414 fax
269-470-0438 cell

-----Original Message-----
From: Oscar R. Loveless [mailto:oloveless@wightman-assoc.com]
Sent: Thursday, March 5, 2015 11:55 AM
To: Jeff Dunlap (jdunlap@nilesmi.org), 'Jeff Krusinga', 'Jon Hermann', 'Marcy Colclough', 'Andy Selle', 'Beth Wentzel'
Subject: TUESDAY'S Concept Design Team Meeting Agenda

All, Attached is the proposed agenda for the team meeting. Please review and let me know if there is anything else we need to add. Thanks,

Oscar R. Loveless, PE
Wightman & Associates, Inc.
Engineering | Architecture | Surveying
O: 269.927.0100 | D: 269.201.2058 | C: 269.449.4919
2303 Pipestone Road, Benton Harbor, MI 49022 | www.wightman-assoc.com

From: jhermann@wightman-env.com <jhermann@wightman-env.com>

To: ROSKOSKEYD@michigan.gov, RATHBURNJ@michigan.gov
Cc: oloveless@wightman-assoc.com
Date: Tuesday, December 23, 2014 03:42 pm
Subject PUCKER STREET DAM REMOVAL PROJECT - SEDIMENT RESULTS

Gentlemen, the sediment quality results are attached along with a map showing the general location of the sediment samples. A total of 42 sediment samples were collected and analyzed for grain size and chemical parameters. A total of 14 transects were conducted, with sediment samples collected from the left, center and right side of the stream, as looking downstream. Sediment samples from transects 1 through 9 were collected by Great Lakes Environmental Center (GLEC) using vibracore methods. GLEC could not get their boat past, around, or over a large rock in the middle of the stream between transects 9 and 10. Wightman technicians in a small boat using a Russian Peat Borer with stainless steel auger collected the sediment samples from transects 10 through 14. The first transect was 25 feet upstream of the dam, with each successive transect 500 feet upstream.

The attached table summarizes the grain size and chemical parameters. I have not performed any leachate testing (SPLP) testing as of yet as I am afraid it will be of no use. We have total arsenic concentrations that range up to 27 ppm. Othe parameters exceed background levels, and we could perform leachate testing and (hopefully) show that they are not "contaminated" with respect to these other parameters, but I still have to deal with the arsenic. I do not know if it helps, but the MDEQ dealt with the arsenic levels previously in 1999-2000 when the MDEQ came in and lowered the dam to expose sediments at that time. The MDEQ performed a Health Consultation with the Department of Community Health. In that study of the Dowagiac River sediments at the same location, the arsenic concetrations ranged from 2 to 23 ppm. The health consultaion conclusion was that there was no apparent public health hazard associated with exposure to the arsenic detected.

Please review the attached information and I will call you after the holiday season (January 5/6) to review the results with you.

Have a safe and happy holiday season.

Jon M. Hermann
Wightman Environmental, Inc.
4050 King Drive
Sodus, MI 49126
jhermann@wightman-env.com
269-934-7707 office
269-934-7414 fax
269-470-0438 cell

Attachments: 0 SEDIMENT QUALITY RESULTS.pdf (2MB)
ii SEDIMENT SAMPLING LOCATION MAP.pdf (181KB)

United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
Green Bay Fish and Wildlife Conservation Office
6644 Turner Road
Elmira, Michigan 49730

August 2, 2016

The Honorable John Warren, Tribal Chairman
Pokagon Band of Potawatomi
58620 Sink Road
Box 180
Dowagiac, Michigan 49047

Re: Request for Information, Environmental Assessment of the Removal of Pucker Street Dam on the Dowagiac River

Dear Mr. Warren:

In accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA), the U.S. Fish and Wildlife Service (USFWS) as lead agency is preparing an Environmental Assessment (EA) to evaluate the effects of the proposed removal of the Pucker Street Dam on the Dowagiac River in Berrien County, Michigan. As part of the planning and evaluation process, the USFWS is requesting information and input from the Berrien Conservation District in order to evaluate potential impacts of the proposed action.

The Pucker Street Dam is located on the Dowagiac River, tributary to the St. Joseph River (third largest to Lake Michigan). The dam is located 3 miles from the confluence with the St. Joseph River at approximate coordinates: Latitude 41.865001 N and Longitude -86.241828 W. A project location map is provided as an attachment. The dam was built to supply electricity to the City of Niles, but has not produced power since 1992. In 1999, the City of Niles in cooperation with the Michigan Department of Natural Resources conducted a drawdown of the dam, eliminating the impoundment. Recent studies and investigations indicate that restoring the dam for hydro-electric power generation is not feasible. In 2013, Michigan Department of Environmental Quality (MDEQ) rated the dam as a significant hazard and is willing to hold off on requiring repairs if the City moves forward with removal efforts. In 2013, the City of Niles decided to remove Pucker Street Dam and restore the river.

The Pucker Street Dam not only presents a significant public safety hazard, but is also the only main stem barrier blocking all fish and aquatic species passage on the Dowagiac River. The dam disconnects about 84% of the Dowagiac Rive system (159 miles) from the St. Joseph River. It also inhibits downstream transport of sediment, nutrients, large wood, and host of other natural riverine functions. This project proposes to remove the Pucker Street Dam reconnecting over

159 miles of the Dowagiac River system and 11,000 acres of wetlands to the St. Joseph River. The project will also result in improved and safer access for fishing and paddling.

In order that potential environmental effects of the project may be fully evaluated and considered, the USFWS is hereby requesting that you provide input regarding issues or concerns relevant to your agency. We request that you respond in writing concerning any beneficial or adverse impacts relative to the interests of your agency. Please send your comments to me by September 12, 2016.

Thank you for your attention to this matter. If you have any questions, please do not hesitate to contact me at (231) 584-3553 or at rick_westerhof@fws.gov.

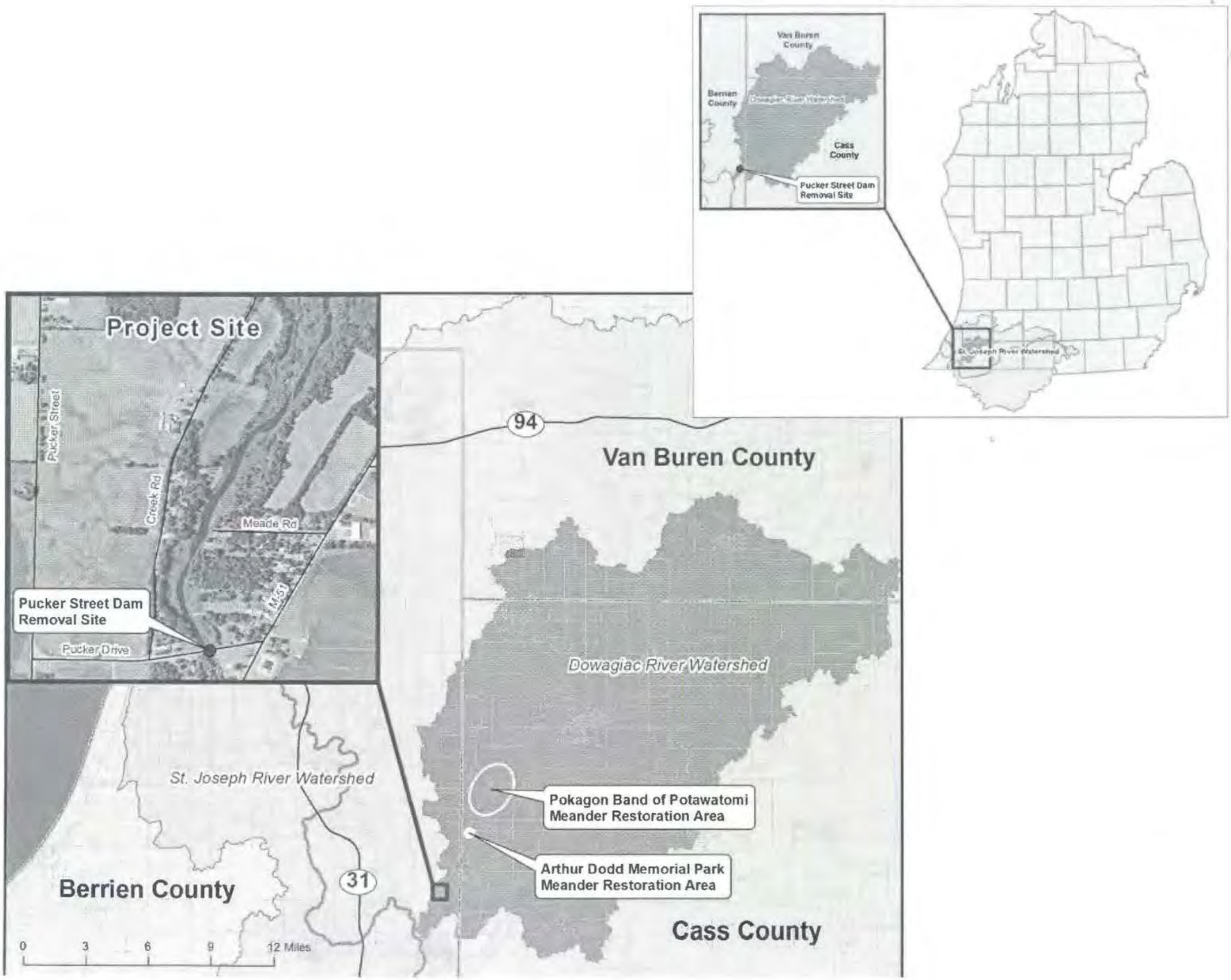
Sincerely,

Rick Westerhof
Fish Biologist

Attachments: Project Location Map

cc:

Jennifer Kanine, Pokagon Band of Potawatomi
Mark Holey, United States Fish and Wildlife Service


Project Site
Pucker Street
Creek Rd
Meade Rd
M-51
Pucker Street Dam
Removal Site
Pucker Drive
94
Van Buren County
Dowagiac River Watershed
St. Joseph River Watershed
Pokagon Band of Potawatomi
Meander Restoration Area
Arthur Dodd Memorial Park
Meander Restoration Area
31
Berrien County
Cass County
0
3
6
9
12 Miles
Van Buren
County
Berrien
County
Dowagiac River Watershed
Cass
County
Pucker Street Dam
Removal Site
St. Joseph River Watershed

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LANSING

RICK SNYDER
GOVERNOR

KEITH CREAGH
DIRECTOR

August 29, 2016

Mr. Rick Westerhof
United States Fish and Wildlife Service
Green Bay Fish and Wildlife Conservation Office
6644 Turner Road
Elmira, Michigan 49730

Dear Mr. Westerhof:

SUBJECT: Pucker Street Dam, Dowagiac River, Berrien County

Thank you for your letter regarding the proposed removal of the Pucker Street Dam on the Dowagiac River. This removal would provide several environmental and recreational benefits. One benefit would be upstream fish passage. Dam removal would reconnect the lower river with 28 miles of the main stem and 131 miles of tributary streams, including major coldwater tributaries such as McKinzie, Pokagon, and Peavine creeks. Forty-two fish species have been collected during Michigan Department of Natural Resources (MDNR) surveys on the Dowagiac River downstream of the Pucker Street Dam. This list includes 37 native species, four salmonid species, and one exotic species (common carp). The primary native species to benefit from the Pucker Street Dam removal would be smallmouth bass, walleyes, and suckers (white sucker, northern hog sucker, shorthead redhorse, and golden redhorse). Four salmonid species (rainbow trout [steelhead], Chinook salmon, coho salmon, and brown trout [mixture of resident and potamodromous fish]) also would be able to move upstream after the dam removal.

Steelhead, Chinook salmon, and coho salmon currently are restricted to the portion of the Dowagiac River that is downstream of the Pucker Street Dam. Dam removal would allow these popular game species to greatly expand their distribution within the river system, thus creating new fishing opportunities. Most native fish species are present upstream and downstream of the dam. However, the removal of the dam will allow these fish to move freely within the river system to access important spawning, nursery, foraging, and refuge areas.

Another environmental benefit of dam removal would be the rehabilitation of approximately two miles of high gradient stream habitat immediately upstream of the Pucker Street Dam. High gradient stream reaches typically have high habitat diversity (due to the diversity of water depths and current velocities with the stream channel) and coarse substrates (such as gravel and cobble). Such stream reaches provide suitable spawning habitat for many fish species and produce abundant and diverse macroinvertebrate communities.

The Pucker Street Dam creates a low gradient stream reach immediately upstream of the dam where sediment is deposited. Sediment-free water released below the dam has high erosive power, causing increased scour of the stream bed and banks downstream of the structure. The removal of the dam would restore natural transport of sediment, nutrients, and logs.

Canoeists and kayakers currently have to exit the stream and portage around the dam. Attempts to kayak over the dam could lead to serious injury or death. If the dam is removed, recreational users will be able to paddle through this stream reach without portaging.

Removal of the Pucker Street Dam would address several management options identified in MDNR's St. Joseph River Assessment (Wesley and Duffy 1999).

- Restore natural channel morphology in streams with high resource potential to enhance existing habitat diversity (e.g., **Dowagiac River – meander restoration**).
- Protect biological communities of the river by providing upstream and downstream passage at dams to mitigate for habitat fragmentation.
- Survey and develop an inventory of barriers to fish passage, such as culverts, and explore options to correct the problem.
- Rehabilitate free-flowing river conditions by removing dams, requiring dam owners to operate at run-of-the-river (e.g., Three Rivers Dam), modifying all possible dams to fixed-crest structures, or modifying the largest dams to incorporate a bottom draw system to mitigate warming effects on impoundments.
- Rehabilitate river navigability by constructing canoe portages and upstream and downstream access sites at dam locations on the mainstem and major tributaries.
- Rehabilitate rare, high-gradient areas and fragmented habitats by removal of unnecessary dams (e.g., Randall, Portage Plant, Pollack, Fox and Bears, Upper Constantine, and **Niles (Pucker Street)** dams).
- Rehabilitate populations of potamodromous fish by removal of unnecessary dams and installing upstream and downstream passage at other dams and barriers in the watershed. Passage facilities should allow the migration of salmonids as well as warm water species (smallmouth bass, walleye, flathead catfish, lake sturgeon, and redhorse suckers).
- Rehabilitate habitat continuity by removing unnecessary dams (e.g., Jonesville Dam on St. Joseph River, Upper Constantine on Fawn River, and **Niles Dam on Dowagiac River**). Require upstream and downstream fish passage as well as bottom draw release on those dams that remain (e.g., Sturgis, Three Rivers, Constantine, and Mottville dams).

Wesley (2008) reiterated MDNR's support for removal in his summary of the Pucker Street Dam drawdown.

- Develop a long-term strategy to address Pucker Street Dam removal as stated in the Management Options of the St. Joseph River Assessment (Wesley and Duffy 1999). The strategy should use a public process to consider the benefits and costs of full fish passage into the upper Dowagiac River and should consider the best option for sediment management. There is still 15 feet of head on the dam that is preventing fish passage and containing sediment.

Potential adverse effects of dam removal include colonization of upstream reaches by aquatic invasive fish species, competition of potamodromous species with resident fish species in upstream reaches, and sedimentation downstream of the dam. Colonization of upstream reaches by aquatic invasive fish species is not expected to occur as a result of the Pucker Street Dam removal. There are two dams on the St. Joseph River between Lake Michigan and Dowagiac River confluence. Fish ladders have been installed at both of these dams. Steelhead, salmon, and brown trout compose approximately 99% of the fish that move upstream through these ladders. Sea lampreys cannot move upstream past the first dam (Berrien Spring Dam) and do not have access to the Dowagiac River. Thus, removal of the Pucker Street Dam would not expand the distribution of sea lampreys. Common carp already are present upstream and downstream of the dam.

Dam removal will allow potamodromous steelhead, Chinook salmon, and coho salmon to move farther upstream on the main stem and into several tributary streams. Substantial natural reproduction of steelhead is expected to occur in coldwater tributaries to the Dowagiac River. Some of these tributaries (e.g., Pokagon and Peavine creeks) support naturalized populations of brown trout. Few studies however have examined the effects of steelhead introduction on resident brown trout populations. The most intensive study was completed by Nuhfer et al. (2014) on a small coldwater stream (Hunt Creek) in the northern Lower Peninsula of Michigan.

- Our case study clearly showed that interactions between juvenile steelhead and Brown Trout reduced the survival of young Brown Trout and lowered the abundance of older and larger Brown Trout in Hunt Creek. It is challenging to determine how these findings apply to individual streams within the diverse suite of trout streams found in the Great Lakes region; given our familiarity with data from other Michigan waters, we believe that our findings best represent the interactions among salmonid species in smaller trout streams where densities of age-0 trout are relatively high. During the years in which adult steelhead spawned in Hunt Creek, the late-summer density of all age-0 salmonids averaged about 4,000 fish/ha, resulting in lower survival rates for juvenile Brown Trout. We believe that lower survival of juvenile Brown Trout due to interactions with juvenile steelhead is less likely to occur in streams where densities of age-0 Brown Trout are lower. In addition, some larger Michigan streams, such as the Pere Marquette and Little Manistee rivers, have the capacity to produce and sustain some of the highest densities of large resident Brown Trout observed in the state, despite the presence of dense populations of juvenile steelhead (MDNR Fisheries Division, unpublished data). [Nuhfer et al. 2014]

The MDNR has conducted numerous surveys on Pokagon Creek during 2002-2015 as part of the Status and Trends Stream Monitoring Program. The estimated population density for age-0 brown trout in Pokagon Creek varied from 108 fish/ha in 2014 to 1,081 fish/ha in 2004. By comparison, the mean population density for age-0 brown trout in Hunt Creek prior to the introduction of steelhead was 1,252 fish/ha. Thus, densities of age-0 brown trout in Pokagon Creek are considerably lower than in Hunt Creek, and the potential for the introduction of steelhead to reduce brown trout survival likely is lower in Pokagon Creek. The existing brown trout fishery in the main stem Dowagiac River is supported primarily by annual stocking and is not likely to be affected by the introduction of steelhead.

Pokagon and Peavine creeks are surrounded by private land. No creel data are available for these streams. Anecdotal observations suggest that fishing pressure for brown trout is low. Fisheries Division has not received many complaints from anglers regarding conflicts with landowners, but public access is tenuous. Like most streams in Michigan, these creeks have never officially been declared navigable or non-navigable. The main stem Dowagiac River has multiple public access points. Removal of the Pucker Street Dam is expected to yield a net increase in fishing opportunities along the main stem through the expanded upstream movement of steelhead and salmon. However, fishing effort immediately downstream of the existing dam likely will decrease as potamodromous salmonids will no longer be concentrated in this stream reach by the presence of an impassible barrier.

One of the MNDR's chief concerns regarding the proposed dam removal is the potential downstream movement of sediment. The 1999 drawdown of the Pucker Street Dam impoundment resulted in the downstream release of large volumes of sediment. Sand released from the impoundment covered spawning gravel and filled in pools downstream of the dam. It took several years and major flood events to evacuate this sand from the river. Recent depth-of-refusal sampling upstream of the dam has revealed sediment deposits of up to 18 feet which could be mobilized by the dam removal.

In conclusion, the MDNR is supportive of the proposed removal of the Pucker Street Dam. However, the City of Niles and their consultants must develop a strategy for minimizing the downstream release of sediments during and after the dam removal.

Sincerely,

Keith Creagh
Director
517-284-6367

cc: Mr. Mark Holey, United States Fish and Wildlife Service
Dr. William E. Moritz, Natural Resources Deputy, DNR
Mr. Jim Dexter, DNR
Mr. Jay Wesley, DNR
Mr. Brian Gunderman, DNR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

C. HEIDI GRETHER
DIRECTOR

September 6, 2016

Mr. Rick Westerhof
United States Department of the Interior
United States Fish and Wildlife Service
Green Bay Fish and Wildlife Conservation Office
6644 Turner Road
Elmira, Michigan 49730

Dear Mr. Westerhof:

Thank you for your letter of August 2, 2016, to Director C. Heidi Grether, Department of Environmental Quality (DEQ), concerning your request for information regarding the Environmental Assessment of the removal of the Pucker Street Dam on the Dowagiac River. Director Grether has referred your letter to the DEQ's Water Resources Division (WRD) for response.

As you might be aware, WRD staff was engaged by the city of Niles and their project design team early in the planning phase of this project. The proposed dam removal and river restoration project will require a permit to be issued by the WRD prior to commencement of construction. Staff of the WRD will continue to provide input on state permitting requirements, but will not become involved in an official capacity until we receive a Joint Permit Application (JPA) from the project applicant.

Once we receive a JPA, we will begin our official review of the proposed project based on its merits, impacts, and compliance with several state statues that regulate construction activities within floodplains and below the Ordinary High Water Mark of regulated waterbodies, in regulated wetland areas, and on regulated dams. At the end of the application review period, the WRD will make a decision on whether or not to issue a permit for the proposed activities.

We are happy to coordinate our permitting process with the United States Fish and Wildlife Service's (USFWS) Environmental Assessment process and provide comments on any areas where the two overlap.

If you have any further questions regarding this matter, please contact Mr. Lucas Trumble, P.E., Environmental Engineer, Hydrologic Studies and Dam Safety Unit, WRD, at 517-420-8923; trumblel@michigan.gov; or DEQ, P.O. Box 30458, Lansing, Michigan 48909-7958; or you may contact me.

Sincerely,

Byron Lane, Chief
Hydrologic Studies and Dam Safety Unit
Water Resources Division
517-281-6821

cc: Mr. Mark Holey, USFWS
Ms. C. Heidi Grether, Director, DEQ
Mr. Robert Wagner, Program Deputy Director, DEQ
Ms. Teresa Seidel, DEQ
Ms. Kim Fish, DEQ
Mr. John Bayha, DEQ
Mr. Joe Rathbun, DEQ
Mr. Ben Zimont, DEQ
Mr. Luke Trumble, DEQ

Pokégnek Bodéwadmik · Pokagon Band of Potawatomi
Tribal Council

P.O. Box 180 • 58620 Sink Road • Dowagiac, MI 49047 • www.PokagonBand-nsn.gov
(269) 782-6323 • (888) 376-9988 toll free • (269) 782-9625 fax

September 12, 2016

Rick Westerhof, Fish Biologist
U.S. Fish and Wildlife Service
Green bay Fish and Wildlife Conservation Office
6644 Turner Road
Elmira, Michigan 49730

Re: Information re Environmental Assessment of the Removal of Pucker Street Dam on the Dowagiac River

Dear Mr. Westenhof:

The U.S. Fish and Wildlife Services ("USFWS") is preparing an Environmental Assessment to evaluate the effects of the proposed removal of the Pucker Street Dam on the Dowagiac River in Berrien County, Michigan. Through a letter dated August 2, 2016, you requested information and input from interested parties in order to evaluate potential impacts of the proposed action.

I am writing on behalf of the Pokagon Band of Potawatomi Indians ("Pokagon Band") to express support for removal of the Pucker Street Dam. The Pokagon Band continues to occupy its ancestral homeland in the St. Joseph River Valley in southwestern Michigan and northern Indiana, including near Dowagiac, Michigan.

The Pokagon Band is dedicated to reestablishing its land base. Consistent with this goal, the Pokagon Band currently has 1640 acres of trust and fee land in the vicinity of its Rodgers Lake land consolidation site ("Rodgers lake Site"). Importantly, the Rodgers, Lake Site is located just 5 miles north of the Pucker Street Dam, and four miles of the Dowagiac River are located within or adjacent to the Rodgers Lake Site.

Beginning in 2011, the Pokagon band launched an initiative to restore the meanders to the four-mile portion of the Dowagiac River located within or adjacent to the Rodgers lake Site. To date, progress on this initiative includes, completing a feasibility study, meeting with neighboring land owners, substantially completing engineering studies to locate the historic meanders, and restoring the Rodgers Lake outlet to the Dowagiac River from a pod to a meandering stream.

Removal of the Pucker Street Dam is consistent the Pokagon Band's restoration efforts and its overall goal of improving the aquatic wildlife habitat, hydrologic conditions and water quality of the Dowagiac River. Additionally, restoration of the Dowagiac River ecosystem will allow for connectivity throughout the Dowagiac River, thereby allowing fish passage to historic areas of the system, including the Rodgers Lake Site.

Thank you in advance for your work on this important project and consideration of the Pokagon Band's comments.

Sincerely,

John P. Warren

John P. Warren
Tribal Council Chairperson

BERRIEN

BERRIEN CONSERVATION DISTRICT

3334 Edgewood Road, Berrien Springs, MI 49103

(269) 471-9111 www.berriencd.org

Helping You Manage Your Natural Resources

October 20, 2016

Rick Westerhof, Fish Biologist
U.S. Fish and Wildlife Service
Green Bay Fish and Wildlife Conservation Office
6644 Turner Road
Elmira, MI 49730

Dear Mr. Westerhof,

Re: Request for Information, Environmental Assessment of the Removal of Pucker Street Dam on the Dowagiac River.

Berrien Conservation District supports the efforts to remove the Pucker Street Dam on the Dowagiac River in Berrien County, Michigan. It has been reported that the dam is potentially blocking fish and other aquatic species passage on the Dowagiac River.

The Dowagiac River Watershed lies within the St. Joseph River Basin in Berrien County. Berrien Conservation District's Resource Needs Assessment of 2012-2017 for the county lists loss of habitat and natural systems as a resource concern.

It is the Berrien Conservation Districts goal to support efforts to benefit native fish and their habitat, particularly projects that remove in-stream migration barriers and to restore natural systems resulting in habitat improvement. Dam removal will provide beneficial impacts to restoration of a natural stream system.

As part of your planning and evaluation process it is the Berrien Conservation District's recommendation to provide data to update the Dowagiac River Watershed Management Plan. Under the current 2002 revision there is not information or data regarding dam removals.

Thank you,

Nancy Carpenter

Nancy Carpenter, Manager
Berrien Conservation District
269-471-9111 x3

STATE OF MICHIGAN
MICHIGAN STATE HOUSING DEVELOPMENT AUTHORITY
STATE HISTORIC PRESERVATION OFFICE

RICK SNYDER
GOVERNOR

KEVIN ELSENHEIMER
EXECUTIVE DIRECTOR

November 30, 2016

RICK WESTERHOF
U S FISH AND WILDLIFE SERVICE
GREEN BAY NATIONAL FISH AND WILDLIFE CONSERVATION OFFICE
6644 TURNER ROAD
ELMIRA MI 49730

RE: ER17-26 Pucker Street Dam Removal, Sec. 11, 12 & 13, T7S, R17W, Niles Township, Berrien County (USFWS)

Dear Mr. Westerhof:

Under the authority of Section 106 of the National Historic Preservation Act of 1966, as amended, we have reviewed the above-cited undertaking at the location noted above. Based on the information provided for our review, it is the opinion of the State Historic Preservation Officer (SHPO) that no historic properties are affected within the area of potential effects of this undertaking.

This letter evidences the USFWS's compliance with 36 CFR § 800.4 "Identification of historic properties," and the fulfillment of the USFWS's responsibility to notify the SHPO, as a consulting party in the Section 106 process, under 36 CFR § 800.4(d)(1) "No historic properties affected." **If the scope of work changes in any way, or if artifacts or bones are discovered, please notify this office immediately.**

We remind you that federal agency officials or their delegated authorities are required to involve the public in a manner that reflects the nature and complexity of the undertaking and its effects on historic properties per 36 CFR § 800.2(d). The National Historic Preservation Act also requires that federal agencies consult with any Indian tribe and/or Tribal Historic Preservation Officer (THPO) that attach religious and cultural significance to historic properties that may be affected by the agency's undertakings per 36 CFR § 800.2(c)(2)(ii).

The State Historic Preservation Office is not the office of record for this undertaking. You are therefore asked to maintain a copy of this letter with your environmental review record for this undertaking.

If you have any questions, please contact Brian Grennell, Cultural Resource Management Specialist, at 517-335-2721 or by email at GrennellB@michigan.gov. **Please reference our project number in all communication with this office regarding this undertaking.** Thank you for this opportunity to review and comment, and for your cooperation.

Sincerely,

Brian G. Grennell
Cultural Resource Management Specialist

for Brian D. Conway
State Historic Preservation Officer

SAT:BGG

Copy: Jeff Dunlap, City of Niles
Marcy Hamilton, Southwest Michigan Planning Commission

REQUEST FOR MIDWEST RHPO NHPA CLEARANCE

For Undertakings that have the Potential to Cause Effects on Historic Properties

Project Background:

Project Name: **Pucker Street Dam Removal on the Dowagiac River in Berrien County, Michigan** County/State: **Berrien County, Michigan**__ On USFWS land?______**NO**__________

USFWS Program (NWR, WMD, NFH, PFW, FSH, ECS, Other (Name)):_**NFPP, GLFWRA,SOGL** _

Project Location: Township(s) _**7 S**_, Range _**17W**_, Section(s): _**13**_

Total Project Area Size (in Acres): **300 x 5600 x10 ft**__ If road/trail, (linear ft, L and W):__**320 x 300 x 5 ft**__

USFWS Project Leader/Station: __**Mark Holey, Green Bay FWCO**________ Phone #: _**920 866-1760**_ If there is a Governmental/NGO partner(s), please name: __**City of Niles, Michigan, MIDNR**__

Mandatory Attachments (on separate sheets):

1. USGS topographical map and aerial photo, ensuring that the project boundaries are exact.
2. Details of anticipated project activities, i.e. ground/building disturbance (add maps as necessary)
3. Only the relevant sections of design drawings showing soil disturbance boundaries (e.g. planviews)
4. Landuse history and environmental setting of the project area (add maps as necessary)

__x_**Check here if you have done any informal consultation(s) outside the USFWS** (if not, check here ____)
If so, did you talk with SHPO? Tribes? Did you consult any database with known surveys or sites?
Please attach any information you have regarding your outside informal consultation(s).

_X_**Check here if there has been a field survey done in the project area already** (if not, check here _____)
If so, who conducted it and when? April 2015 Did they find any buildings/sites? Please see the next section. **Please attach any information/report(s) you have regarding any previous field survey(s).**

_X_**Check here if there are known buildings/sites* in the project area** (if not, check here _____)
*Sites are such places as artifact scatters, mounds or earthworks, cemeteries, privy pits, old foundations, ruins, bridges, dams, water control structures, historic roads/trails/fences, and trash pits/piles.

Information needed to be furnished to RHPO if there are known buildings/sites in the project area:

1. Age of building(s)/site(s) or date(s) built: _1928__________ RPI # or State #(s)__________________
2. **Attach** ground level photographs of both inside and outside of buildings/sites.
3. **Attach** close-up aerial photo or a sketch map illustrating the placement of the buildings/sites in the project area, key the ground photos to the aerial photo/sketch map.
4. **Attach** detailed descriptions of the buildings/sites with emphasis on their size, floor plans and architectural elements. Individually, what kind of physical shape are they in (good, fair or poor)?

Submitted by: __**Rick Westerhof**____ Date:_**11-17-17**______ Phone #: _**231-584-3553**_

If applicable, submit this form with the Environmental Action Statement (EAS) or NEPA Checklist

RHPO Only **

Investigation

X No Field Survey Needed

__ Field Survey Done

__Phase I (ARPA# __________)

__Phase II (ARPA# __________)

__Phase III (ARPA# __________)

**Final Finding by Regional Director via RHPO*

__ No Potential Effect. __ No site/building(s) in APE. No Effect.

X Site/Building(s) present, but none are Historic Properties. No Effect.

__ Historic Property(ies) present, but No Effect/No Adverse Effect.

__ Historic Property(ies) present, Adverse Effect, Resolved with MOA.

Justify Finding: dam has been extensively remodeled
SHPO Concur

__ Stipulations ____

James E. Myster, USFWS Midwest RHPO — Date: 12/8/17 — RHPO Project # ______

*Although the project has been cleared, inadvertent discoveries are still possible. If so, please stop and contact the RHPO at 612-713-5439.

WIGHTMAN
it's all about people

July 11, 2018

MDEQ
4953 Adobe Road
Kalamazoo, MI 49009

Attention: Ben Zimont, Water Resources Division
Luke Trumble, Hydrologic Studies and Dam Safety Unit

RE: PUCKER STREET DAM REMOVAL – WETLAND ASSESSMENT

Dear Ben and Luke:

Additional information was requested regarding wetlands. This letter is intended to be used in coordination with the report prepared by Environmental Consulting & Technology, Inc. dated March 28, 2018.

Based on the information provided below, we request that wetland disturbance be exempt for this project along with all mitigation requirements.

Act No. 98 of 2013 Section 30311. (1) states *"A permit for an activity listed in section 30304 shall not be approved unless the department determines that the issuance of a permit is in the public interest, that the permit is necessary to realize the benefits derived from the activity, and that the activity is otherwise lawful."*

- Economic: Recent studies and investigations indicate that restoring the dam for hydro-electric power generation is not feasible. If the dam remains, major repairs, liability and management will continue to significantly burden the City with financial obligations, liability, and staff resources. A dam failure will result in downstream damage to properties, sediment discharge, and deterioration of animal habitat.
- Ecological: The Dowagiac River, because of the unique glacial geology and limited urban development in the watershed, is a large cold water river. In southern Michigan, there is no comparable cold water river system of this size with the potential for a high-quality cold water fishery. Removing Pucker Dam will benefit fish and other aquatic wildlife habitat and improve hydrologic conditions and water quality. The dam currently blocks the upstream migrations of fish species such as steelhead, Chinook salmon, coho salmon, brown trout, white suckers, and walleye to more than 159 miles of main stem and tributary habitat in the Dowagiac River. The proposed action will increase habitat continuity and restore the thermal and hydrologic regime of the Dowagiac River.
- Social: The Pucker Street Dam is a safety hazard for recreational users and its removal will improve safety for many users. The project will also help the City of Niles dismantle a structure that served a useful purpose at one time, but now has become an eyesore, liability, and a nuisance for management.

rwesterhof
2018-07-12 12:02:21
Street

Act No. 98 of 2013 Section 30311 (2) states *"In determining whether the activity is in the public interest, the benefit which reasonably may be expected to accrue from the proposal shall be balanced against the reasonably foreseeable detriments of the activity. The decision shall reflect the national and state concern for the protection of natural resources from pollution, impairment, and destruction. The following general criteria shall be considered: The probable effects on recognized historic, cultural, scenic, ecological, or recreational values and on the public health or fish or wildlife."*

(a) The relative extent of the public and private need for the proposed activity.
See the above: Economic, Ecological, and Social benefits of the project.

BENTON HARBOR
A 2303 PIPESTONE ROAD
BENTON HARBOR, MI 49022
O 269.927.0100

ALLEGAN
A 1670 LINCOLN ROAD (M-40)
ALLEGAN, MI 49010
O 269.673.8465

PORTAGE
A 9835 PORTAGE ROAD
PORTAGE, MI 49002
O 269.327.3532

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(b) *The availability of feasible and prudent alternative locations and methods to accomplish the expected benefits from the activity.*
For the dam removal project, there is no alternative location. Other alternative methods included repair and replacement of the dam. These alternatives were eliminated as feasible as they do not meet the project benefit of ~~an open river~~ and river restoration.

(c) *The extent and permanence of the beneficial or detrimental effects that the proposed activity may have on the public and private uses to which the area is suited, including the benefits the wetland provides.*
A dam failure will result in possible temporary but more likely permanent downstream damage to properties, sediment discharge, and deterioration of animal habitat. Within the last 20 yea[illegible] acres were established due to the drawdown.

rwesterhof
2018-07-12 12:19:32
providing fish passage

rwesterhof
2018-07-12 12:07:31
in 1999.

(d) *The probable effects of each proposal in relation to the cumulative effects crea[illegible] anticipated activities in the watershed.*
Removal of the dam will be very complementary to a large scale-restoration a[illegible] conducted by the Pokagon Band of Potawatomi Indians (PBPI) upstream. The[illegible] restore the Dowagiac River system. A significant channel restoration and flood[illegible] completed upstream at Dodd Park. Further, the PBPI are in the midst of final design for re-meandering and reconnecting an additional 5-6 miles of the Dowagiac River just upstream from the Pucker Street Dam and Dodd Park.

(e) *The probable effects on recognized historic, cultural, scenic, ecological, or recreational values and on the public health or fish or wildlife.*

- Historical: The removal of the dam will result in a pre-dam river channel condition and connect an additional 159 miles of recreation and fish passage. The project will also help the City of Niles dismantle a structure that served a useful purpose at one time, but now has become an eyesore, liability, and a nuisance for management. See the above responses for cultural, scenic, ecological, and recreational values.

(f) *The size of the wetland being considered.*
The Dowagiac River reach that will be affected by the project is 6,300 feet long. The estimated pre-dam, post-dam, post-drawdown, and post-construction open water and wetlands areas are as follows:

Year	Open Water (acres)	Wetland (acres)
1980	66.00	22.99
1996	63.73	26.36
2016	24.10	60.75
2020	11.65	14.42

(g) *The amount of remaining wetland in the general area.*
See above table.

(h) *Proximity to any waterway.*
Along both banks of the Dowagiac River for the 6,300 feet reach.

Act No. 98 of 2013 Section 30311. (3) states *"In considering a permit application, the department shall give serious consideration to findings of necessity for the proposed activity which have been made by other state agencies."*

- In 1999, the City of Niles with the MDNR, Fisheries Division determined that the best option for the dam was to open the gates and create river flow. At this timepoint, there were approximately 26.36 acres of wetland surrounding this reach of the river. Within the next 20 years, an additional 33.39 acres were established due to the drawdown.
- In 2013, the MDEQ, Dam Safety Program, sent a letter stating that if the dam was not repaired within five years, major repairs, replacement or removal should be implemented.

BENTON HARBOR
2303 PIPESTONE ROAD
BENTON HARBOR, MI 49022
269.927.0100

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PORTAGE, MI 49002
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- Since 2013, MDNR – Aquatic Habitat, US Fish & Wildlife Service – Fish Passage, National Fish & Wildlife Foundation, Great Lakes Fishery Trust, MDNR – Dam Management, Great Lakes Fish Habitat Partnership, Great Lakes Fish & Wildlife Restoration Act have approved grants for the dam removal project for fish passage and/or dam removal. The grant funding cannot be used for repair or replacement of the dam.

Act No. 98 of 2013 Section 30311. (8) states *"An alternative that entails higher costs, as described in R 281.922a(11) of the Michigan administrative code, is not feasible and prudent if those higher costs are unreasonable. In determining whether such costs are unreasonable, the department shall consider both of the following:(a) The relation of the increased cost to the overall scope and cost of the project. (b) Whether the projected cost is substantially greater than the costs normally associated with the particular type of project.*
The estimated cost for dam removal and river restoration is approximately $4,000,000. The estimated mitigation costs using a mitigation rate of 1.5:1 and mitigation bank costs of $30,000/acre will add an additional $2,000,000.

Your earliest consideration of the exemption of wetland disturbance and mitigation requirements is greatly appreciated. If you have any questions, please feel free to contact me.

Very truly yours,

Suzannah M Deneau

Suzannah Deneau, Project Engineer
sdeneau@gowightman.com

WIGHTMAN
it's all about people

July 23, 2018

MDEQ
4953 Adobe Road
Kalamazoo, MI 49009

Attention: Ben Zimont, Water Resources Division
Luke Trumble, Hydrologic Studies and Dam Safety Unit

RE: PUCKER STREET DAM REMOVAL – WETLAND ASSESSMENT

Dear Ben and Luke:

Following, please find the additional information you requested regarding the Pucker Street Dam removal and the potential impact on wetlands. This letter is intended to be used in coordination with the letter analysis prepared by Environmental Consulting & Technology, Inc. dated March 28, 2018.

Based on the information provided below, we request that the wetland disturbance be exempt for this project along with all requirements for compensatory mitigation.

Act No. 98 of 2013 Section 30311. (1) states *"A permit for an activity listed in section 30304 shall not be approved unless the department determines that the issuance of a permit is in the public interest, that the permit is necessary to realize the benefits derived from the activity, and that the activity is otherwise lawful."*
Following are breakdowns of Economic, Ecological, and Social benefits related to the dam removal.

- Economic: Recent studies and investigations indicate that restoring the dam for hydro-electric power generation is not feasible. If the dam remains, major repairs, liability and management will continue to significantly burden the City with financial obligations, liability, and staff resources. A dam failure represents a significant risk for downstream damage to properties, sediment discharge, and deterioration of animal habitat.
- Ecological: The Dowagiac River, because of the unique glacial geology and limited urban development in the watershed, is a large cold water river. In southern Michigan, there is no comparable cold water river system of this size with the potential for a high-quality cold water fishery. Removing Pucker Street Dam will benefit fish and other aquatic resources and associated wildlife habitats and improve hydrologic conditions and water quality. The dam currently blocks the upstream migrations of fish species such as steelhead, Chinook salmon, coho salmon, brown trout, white suckers, and walleye to more than 159 miles of main stem and tributary habitat in the Dowagiac River. The proposed action will increase habitat contiguity and restore the thermal and hydrologic regime of the Dowagiac River.
- Social: The Pucker Street Dam is a safety hazard for recreational users and its removal will improve safety for many users. The project will also help the City of Niles dismantle a structure that served a useful purpose at one time, but now has become an eyesore, liability, and a nuisance for management.

Act No. 98 of 2013 Section 30311 (2) states *"In determining whether the activity is in the public interest, the benefit which reasonably may be expected to accrue from the proposal shall be balanced against the reasonably foreseeable detriments of the activity. The decision shall reflect the national and state concern for the protection of natural resources from pollution, impairment, and destruction. The following general criteria shall be considered: The probable effects on recognized historic, cultural, scenic, ecological, or recreational values and on the public*

BENTON HARBOR
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O 269.927.0100

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PORTAGE
A 9835 PORTAGE ROAD
PORTAGE, MI 49002
O 269.327.3532

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health or fish or wildlife."

(a) *The relative extent of the public and private need for the proposed activity.*
See the above: Economic, Ecological, and Social benefits of the project.

(b) *The availability of feasible and prudent alternative locations and methods to accomplish the expected benefits from the activity.*
For the dam removal project, there is no alternative location. Other alternative methods included do nothing, repair and replacement of the dam. These alternatives were eliminated as not prudent since, they do not meet the project benefits of providing fish passage and river ecosystem restoration. Further the do nothing alternative could result in a catastrophic failure with significant environmental damage.

(c) *The extent and permanence of the beneficial or detrimental effects that the proposed activity may have on the public and private uses to which the area is suited, including the benefits the wetland provides.*
A dam failure will result in temporary and more likely permanent downstream damage to properties, sediment discharge, and deterioration of animal habitat. Since the 1999 ordered drawdown, an additional 33.39 acres of wetlands on the exposed impoundment sediments has occurred. The proposed project will result in the restoration of natural processes and wetland development that are not artificially supported by dam-related hydrology.

(d) *The probable effects of each proposal in relation to the cumulative effects created by other existing and anticipated activities in the watershed.*
Removal of the dam will be very complementary to a large scale-restoration and improvement effort being conducted by the Pokagon Band of Potawatomi Indians (PBPI) upstream. There is great momentum to restore the Dowagiac River system. A significant channel restoration and floodplain connection project was completed upstream at Dodd Park. Further, the PBPI are in the midst of final design for re-meandering and reconnecting an additional 5-6 miles of the Dowagiac River just upstream from the Pucker Street Dam and Dodd Park.

(e) *The probable effects on recognized historic, cultural, scenic, ecological, or recreational values and on the public health or fish or wildlife.*
- See the above responses for cultural, scenic, ecological, and recreational values.
- Historical: The removal of the dam will result in a pre-dam river channel condition and connect an additional 159 miles of recreation and fish passage. The project will also help the City of Niles dismantle a structure that served a useful purpose at one time, but now has become an eyesore, liability, and a nuisance for management.

(f) *The size of the wetland being considered.*
The Dowagiac River reach that will be affected by the project is 6,300 feet long. The estimated pre-dam, post-dam, post-drawdown, and post-construction open water and wetlands areas are as follows:

Year	Open Water (acres)	Wetland (acres)	Condition
1980	66.00	22.99	Full impoundment
1996	63.73	26.36	Full impoundment
2016	24.10	60.75	Partial Drawdown
2020	11.65	14.42	Dam Removal

(g) *The amount of remaining wetland in the general area.*
See above table.

(h) *Proximity to any waterway.*
Along both banks of the Dowagiac River for the 6,300 feet reach.

Act No. 98 of 2013 Section 30311. (3) states *"In considering a permit application, the department shall give serious consideration to findings of necessity for the proposed activity which have been made by other state agencies."*

- In 1999, the City of Niles with the MDNR, Fisheries Division determined that the best option for the dam was to open the gates and create river flow. At this timepoint, there were approximately 26.36 acres of wetland surrounding this reach of the river. Since the 1999 ordered drawdown, an additional 33.39 acres of wetlands were established on the exposed impoundment sediments which are artificially supported by dam-related hydrology.
- In 2013, the MDEQ, Dam Safety Program, sent a letter stating that if the dam was not repaired within five years, major repairs, replacement or removal should be implemented.
- Since 2013, MDNR – Aquatic Habitat, US Fish & Wildlife Service – National Fish Passage Program, National Fish & Wildlife Foundation, Great Lakes Fishery Trust, MDNR – Dam Management, Great Lakes Basin Fish Habitat Partnership, Great Lakes Fish and Wildlife Restoration Act have approved grants for the dam removal project for fish passage and/or dam removal. The grant funding cannot be used for repair or replacement of the dam.

Act No. 98 of 2013 Section 30311. (8) states *"An alternative that entails higher costs, as described in R 281.922a(11) of the Michigan administrative code, is not feasible and prudent if those higher costs are unreasonable. In determining whether such costs are unreasonable, the department shall consider both of the following:(a) The relation of the increased cost to the overall scope and cost of the project. (b) Whether the projected cost is substantially greater than the costs normally associated with the particular type of project.*
The estimated construction cost for dam removal and river restoration is approximately $5,500,000. The estimated mitigation costs using a mitigation rate of 1.5:1 and mitigation bank costs of $30,000/acre will add an additional $2,000,000.

Your earliest consideration of the exemption of wetland disturbance and mitigation requirements is greatly appreciated. If you have any questions, please feel free to contact me.

Very truly yours,

Suzannah M Deneau

Suzannah Deneau, Project Engineer
sdeneau@gowightman.com

Appendix C

City Response for Hydroelectric Option

CITY OF NILES

June 3, 2016

Mr. David R. Snyder
Falling Waters LLC
1657 Commerce Drive
Suite 15-B
South Bend, IN 46628

RE: Intent to Own, Restore, Operate and Maintain the Pucker Street Dam for Purposes of Hydropower Production, Niles, Michigan.

Submitted: Certified Mail

Dear Mr. Snyder:

As you may be aware, the City of Niles, in coordination with the United States Fish and Wildlife Service (USFWS), has retained the Southwest Michigan Planning Commission (SWMPC), to prepare an Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) for the proposed action for the removal of the Pucker Street Dam and proposed Dowagiac River restoration activities. As part of the NEPA process, the environmental consequences of all reasonable alternatives are considered in the analysis in support of federal decision-making. This analysis is extensive and thoroughly assesses the effect on a full range of environmental factors that include water resources, water quality, terrestrial and aquatic ecology, sensitive species receptors, recreation, land use, social factors, wetlands and public safety.

As part of the NEPA process, a public scoping meeting was held on April 14th 2016 at the Law Enforcement Complex located at 1600 Silverbrook Avenue in Niles, Michigan from 6:00 PM to 8:00 PM to solicit input regarding the proposed removal of the Pucker Street Dam and proposed river restoration activities. The meeting was held in an open house format and included a PowerPoint Presentation prepared and presented by, the USFWS and the SWMPC. Comment forms were provided at the meeting and all participants were encouraged to provide written comments either at the meeting or subsequently via email, mail, or drop-off to the Niles City Hall at 333 N. 2nd Street, Niles, Michigan.

Although no written comments were received from yourself or your company, Falling Waters LLC, you did verbally indicate that rural development grants were available from the United

States Department of Agriculture (USDA), Rural Energy for America Program (REAP), to restore hydropower capabilities to the Pucker Street Dam. It is assumed that your comments were specific to the proposal submitted by Falling Waters to the City of Niles, dated November 18, 2011 for the development of hydrokinetic energy.

The purpose of this letter is to obtain a written response from you based upon your statements made at the public scoping meeting on April 14th, and in order to assess the viability of generating hydro, and/or hydrokinetic power, from the Pucker Street Dam as an alternative to the other possible actions. The City of Niles is requesting in writing (via certified mail), verification of your interest to own, restore, operate, permit (as applicable), and maintain (including all financial assurances/financial liabilities associated with the Pucker Street Dam) at no expense to the City of Niles, within 10 business days of receipt of this letter. All written communication on this matter should be directed to Richard Huff, City Administrator, City of Niles, 333 N. 2nd Street, Niles, Michigan 49120. If we do not receive written notification within 10 business days, we will assume that you are either not interested or capable of meeting the City's requirements for a credible entity for ownership and operation of the dam for hydro or hydrokinetic power, at no expense to the City of Niles.

If you confirm to the City of Niles in writing that you have interest in purchasing the dam for purposes of generating hydro and/or hydrokinetic power, please provide a detailed plan on the steps to be taken to bring the dam into compliance with all applicable federal, state and local regulations and associated costs. Proof of financial assurance must also be provided as well as proposed schedules. The City of Niles would recommend that as the proposed owner and operator of the dam, that you would perform an independent engineering and operation and maintenance evaluation in order to adequately evaluate the required financial assurances in ownership and operation of the Pucker Street Dam for hydro and/or hydrokinetic power, including costs associated with future repairs, modifications, future removal, if required, etc. The City of Niles would require this information, via certified mail as noted above, within 30 days of the receipt of this letter for its review and evaluation.

If you have any questions regarding this request, please feel free to contact me at 269-683-4700 or via email at rhuff@nilesmi.org.

Respectfully Submitted,

Richard A. Huff
City Administrator
City of Niles, Michigan

Cc: Rick Westerhof, USFWS
Marcy Hamilton, SWMPC
Jeff Dunlap, City of Niles Utilities Mngr.

Appendix D

Sediment Sampling Results

Table 1
Sediment Sample Quality Results
Pucker Street Dam Removal Project
Niles, MI

SAMPLE ID:	T-1-L		T-1-C		T-1-R		T-2-L		T-2-C		T-2-R		Statewide Default Background Level	Residential Drinking Water Protection Criteria	Direct Contact Criteria	Probable Effects Concentration
SAMPLE DATE:	11/10/2014		11/10/2014		11/10/2014		11/10/2014		11/10/2014		11/10/2014					
DATE ANALYZED:	11/16/2014		11/16/2014		11/16/2014		11/16/2014		11/16/2014		11/16/2014					
SAMPLE TYPE:	Sediment		Sediment		Sediment		Sediment		Sediment		Sediment					
	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL				
METALS																
Arsenic	4,100	1,000	6,300	1,000	**14,000**	1,000	8,600	1,000	6,700	1,000	6,600	1,000	5,800/10,000*	4,600	7,600	33,000
Cadmium	<200	200	<200	200	490	200	300	200	<200	200	200	200	1,200	6,000	550,000	4,980
Copper	2,300	500	1,100	500	12,000	500	7,200	500	3,400	500	5,600	500	32,000	5,800,000	20,000,000	149,000
Lead	3,000	1,000	2,500	1,000	14,000	1,000	8,800	1,000	4,200	1,000	5,700	1,000	21,000	700,000	400,000	128,000
Mercury	<50	50	<50	50	<50	50	<50	50	<50	50	<50	50	130	1,700	160,000	1,060
Nickel	3,200	500	2,700	500	7,300	500	5,300	500	3,500	500	5,600	500	20,000	100,000	40,000,000	48,600
Selenium	280	200	<200	200	**850**	200	**520**	200	**420**	200	320	200	410	4,000	2,600,000	NA
Zinc	18,000	500	16,000	500	**57,000**	500	34,000	500	20,000	500	26,000	500	47,000	2,400,000	170,000,000	459,000
PNAs																
Anthracene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	41,000	230,000,000	845
Benzo[a]anthracene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	20,000	1,050
Benzo[a]pyrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	2,000	1,450
Chrysene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	2,000,000	1,290
Fluoranthene	<330	330	<330	330	350	330	360	330	<330	330	<330	330	NA	730,000	46,000,000	2,230
Indeno[1,2,3-cd]pyrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	20,000	NA
Phenanthrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	56,000	1,600,000	1,170
Pyrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	480,000	29,000,000	1,520
Total PNAs	<330	330	<330	330	350	330	360	330	<330	330	<330	330	NA	NA	NA	22,800
PCBs																
Total PCBs	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	(T)	676
SIEVE ANALYSIS (P/F?)	Pass	NA	Pass	NA	Fail	NA	Fail	NA	Fail	NA	Fail	NA	NA	NA	NA	NA

NOTES
* Background Default Level for Arsenic per MDEQ Policy & Procedure #09-018, March 19, 2013.
- Bolded/shaded cell indicates exceedance of one or more MDEQ Part 201 Residential Generic Cleanup Criteria and/or Michigan's Sediment Quality Guideline Values.
- Only detected parameters are listed.
- All concentrations shown in parts per billion (ppb).
- NA=means a criterion or value is not available or not applicable.
- NLL=means hazardous substance is not likely to leach under most soil conditions.
- NLV=means hazardous substance is not likely to volatilize under most conditions.
- (T)=Refer to the federal Toxic Substances Control Act (TSCA), 40 C.F.R. §761, Subpart D and 40 C.F.R. §761, Subpart G, to determine the applicability of TSCA cleanup standards.

Table 1
Sediment Sample Quality Results
Pucker Street Dam Removal Project
Niles, MI

SAMPLE ID:	T-3-L		T-3-C		T-3-R		T-4-L		T-4-C		T-4-R		Statewide Default Background Level	Residential Drinking Water Protection Criteria	Direct Contact Criteria	Probable Effects Concentration
SAMPLE DATE:	11/10/2014		11/10/2014		11/10/2014		11/11/2014		11/11/2014		11/11/2014					
DATE ANALYZED:	11/16/2014		11/16/2014		11/16/2014		11/16/2014		11/16/2014		11/16/2014					
SAMPLE TYPE:	Sediment		Sediment		Sediment		Sediment		Sediment		Sediment					
	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL				
METALS																
Arsenic	1,400	1,000	**17,000**	1,000	6,100	1,000	5,900	1,000	8,600	1,000	**12,000**	1,000	5,800/10,000*	4,600	7,600	33,000
Cadmium	<200	200	480	200	<200	200	210	200	380	200	330	200	1,200	6,000	550,000	4,980
Copper	3,500	500	8,700	500	3,900	500	7,500	500	8,200	500	7,000	500	32,000	5,800,000	20,000,000	149,000
Lead	3,300	1,000	13,000	1,000	6,000	1,000	6,100	1,000	9,100	1,000	12,000	1,000	21,000	700,000	400,000	128,000
Mercury	<50	50	110	50	96	50	73	50	110	50	81	50	130	1,700	160,000	1,060
Nickel	6,500	500	14,000	500	3,900	500	3,600	500	6,200	500	6,900	500	20,000	100,000	40,000,000	48,600
Selenium	<200	200	**1,100**	200	**410**	200	400	200	**610**	200	**780**	200	410	4,000	2,600,000	NA
Zinc	17,000	500	**54,000**	500	25,000	500	24,000	500	37,000	500	43,000	500	47,000	2,400,000	170,000,000	459,000
PNAs																
Anthracene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	41,000	230,000,000	845
Benzo[a]anthracene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	20,000	1,050
Benzo[a]pyrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	2,000	1,450
Chrysene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	2,000,000	1,290
Fluoranthene	<330	330	550	330	510	330	<330	330	<330	330	400	330	NA	730,000	46,000,000	2,230
Indeno[1,2,3-cd]pyrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	20,000	NA
Phenanthrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	56,000	1,600,000	1,170
Pyrene	<330	330	470	330	410	330	<330	330	<330	330	330	330	NA	480,000	29,000,000	1,520
Total PNAs	<330	330	1,020	330	920	330	<330	330	<330	330	730	330	NA	NA	NA	22,800
PCBs																
Total PCBs	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	(T)	676
SIEVE ANALYSIS (P/F?)	Fail	NA	Fail	NA	Fail	NA	Fail	NA	Fail	NA	Fail	NA	NA	NA	NA	NA

NOTES
* Background Default Level for Arsenic per MDEQ Policy & Procedure #09-018, March 19, 2013.
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Table 1
Sediment Sample Quality Results
Pucker Street Dam Removal Project
Niles, MI

SAMPLE ID:	T-5-L		T-5-C		T-5-R		T-6-L		T-6-C		T-6-R		Statewide Default Background Level	Residential Drinking Water Protection Criteria	Direct Contact Criteria	Probable Effects Concentration
SAMPLE DATE:	11/11/2014		11/11/2014		11/11/2014		11/11/2014		11/11/2014		11/11/2014					
DATE ANALYZED:	11/20/2014		11/20/2014		11/20/2014		11/20/2014		11/20/2014		11/20/2014					
SAMPLE TYPE:	Sediment		Sediment		Sediment		Sediment		Sediment		Sediment					
	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL				
METALS																
Arsenic	3,900	1,000	2,600	1,000	7,500	1,000	7,800	1,000	<1,000	1,000	5,900	1,000	5,800/10,000*	4,600	7,600	33,000
Cadmium	<200	200	<200	200	350	200	230	200	<200	200	<200	200	1,200	6,000	550,000	4,980
Copper	4,100	500	2,300	500	13,000	500	7,100	500	2,400	500	4,900	500	32,000	5,800,000	20,000,000	149,000
Lead	5,900	1,000	2,900	1,000	12,000	1,000	9,800	1,000	1,500	1,000	2,400	1,000	21,000	700,000	400,000	128,000
Mercury	57	50	<50	50	<50	50	84	50	<50	50	<50	50	130	1,700	160,000	1,060
Nickel	5,500	500	3,400	500	6,700	500	8,400	500	2,800	500	6,500	500	20,000	100,000	40,000,000	48,600
Selenium	**520**	200	**490**	200	**780**	200	**950**	200	<200	200	<200	200	410	4,000	2,600,000	NA
Zinc	24,000	500	13,000	500	44,000	500	40,000	500	11,000	500	24,000	500	47,000	2,400,000	170,000,000	459,000
PNAs																
Anthracene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	41,000	230,000,000	845
Benzo[a]anthracene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	20,000	1,050
Benzo[a]pyrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	2,000	1,450
Chrysene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	2,000,000	1,290
Fluoranthene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	730,000	46,000,000	2,230
Indeno[1,2,3-cd]pyrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	20,000	NA
Phenanthrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	56,000	1,600,000	1,170
Pyrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	480,000	29,000,000	1,520
Total PNAs	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NA	NA	22,800
PCBs																
Total PCBs	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	(T)	676
SIEVE ANALYSIS (P/F?)	Fail	NA	Fail	NA	Fail	NA	Fail	NA	Pass	NA	Pass	NA	NA	NA	NA	NA

NOTES

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Table 1
Sediment Sample Quality Results
Pucker Street Dam Removal Project
Niles, MI

SAMPLE ID:	T-7-L		T-7-C		T-7-R		T-8-L		T-8-C		T-8-R		Statewide Default Background Level	Residential Drinking Water Protection Criteria	Direct Contact Criteria	Probable Effects Concentration
SAMPLE DATE:	11/11/2014		11/11/2014		11/11/2014		11/11/2014		11/11/2014		11/11/2014					
DATE ANALYZED:	11/20/2014		11/20/2014		11/20/2014		11/20/2014		11/20/2014		11/20/2014					
SAMPLE TYPE:	Sediment		Sediment		Sediment		Sediment		Sediment		Sediment					
	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL				
METALS																
Arsenic	4,300	1,000	4,100	1,000	5,500	1,000	3,400	1,000	1,900	1,000	1,400	1,000	5,800/10,000*	4,600	7,600	33,000
Cadmium	<200	200	<200	200	<200	200	<200	200	<200	200	<200	200	1,200	6,000	550,000	4,980
Copper	2,500	500	3,700	500	6,100	500	2,400	500	2,800	500	1,800	500	32,000	5,800,000	20,000,000	149,000
Lead	3,300	1,000	4,200	1,000	6,500	1,000	3,700	1,000	2,200	1,000	1,800	1,000	21,000	700,000	400,000	128,000
Mercury	<50	50	<50	50	<50	50	<50	50	<50	50	<50	50	130	1,700	160,000	1,060
Nickel	2,900	500	3,800	500	4,700	500	4,300	500	7,000	500	2,600	500	20,000	100,000	40,000,000	48,600
Selenium	230	200	<200	200	290	200	270	200	<200	200	<200	200	410	4,000	2,600,000	NA
Zinc	16,000	500	21,000	500	25,000	500	19,000	500	19,000	500	9,400	500	47,000	2,400,000	170,000,000	459,000
PNAs																
Anthracene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	41,000	230,000,000	845
Benzo[a]anthracene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	20,000	1,050
Benzo[a]pyrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	2,000	1,450
Chrysene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	2,000,000	1,290
Fluoranthene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	730,000	46,000,000	2,230
Indeno[1,2,3-cd]pyrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	20,000	NA
Phenanthrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	56,000	1,600,000	1,170
Pyrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	480,000	29,000,000	1,520
Total PNAs	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NA	NA	22,800
PCBs																
Total PCBs	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	(T)	676
SIEVE ANALYSIS (P/F?)	Pass	NA	Fail	NA	Fail	NA	Pass	NA	Pass	NA	Pass	NA	NA	NA	NA	NA

NOTES

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- NLV=means hazardous substance is not likely to volatilize under most conditions.
- (T)=Refer to the federal Toxic Substances Control Act (TSCA), 40 C.F.R. §761, Subpart D and 40 C.F.R. §761, Subpart G, to determine the applicability of TSCA cleanup standards.

Table 1
Sediment Sample Quality Results
Pucker Street Dam Removal Project
Niles, MI

SAMPLE ID:	T-9-L		T-9-C		T-9-R		T-10-L		T-10-C		T-10-R		Statewide Default Background Level	Residential Drinking Water Protection Criteria	Direct Contact Criteria	Probable Effects Concentration
SAMPLE DATE:	12/9/2014		12/9/2014		12/9/2014		12/9/2014		12/9/2014		12/9/2014					
DATE ANALYZED:	12/17/2014		12/17/2014		12/17/2014		12/17/2014		12/17/2014		12/17/2014					
SAMPLE TYPE:	Sediment		Sediment		Sediment		Sediment		Sediment		Sediment					
	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL				
METALS																
Arsenic	**14,000**	1,000	3,100	1,000	**15,000**	1,000	**27,000**	1,000	**11,000**	1,000	7,800	1,000	5,800/10,000*	4,600	7,600	33,000
Cadmium	250	200	<200	200	640	200	280	200	230	200	<200	200	1,200	6,000	550,000	4,980
Copper	6,400	500	620	500	23,000	500	8,500	500	4,300	500	4,000	500	32,000	5,800,000	20,000,000	149,000
Lead	13,000	1,000	1,800	1,000	**25,000**	1,000	8,700	1,000	13,000	1,000	8,300	1,000	21,000	700,000	400,000	128,000
Mercury	**160**	50	<50	50	97	50	53	50	61	50	<50	50	130	1,700	160,000	1,060
Nickel	9,800	500	2,600	500	10,000	500	8,100	500	10,000	500	6,200	500	20,000	100,000	40,000,000	48,600
Selenium	**610**	200	<200	200	**810**	200	300	200	**490**	200	400	200	410	4,000	2,600,000	NA
Zinc	46,000	500	11,000	500	**81,000**	500	41,000	500	32,000	500	31,000	500	47,000	2,400,000	170,000,000	459,000
PNAs																
Anthracene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	41,000	230,000,000	845
Benzo[a]anthracene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	20,000	1,050
Benzo[a]pyrene	<330	330	<330	330	<330	330	<330	330	<330	330	460	330	NA	NLL	2,000	
Chrysene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	2,000,000	1,290
Fluoranthene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	730,000	46,000,000	2,230
Indeno[1,2,3-cd]pyrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	20,000	NA
Phenanthrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	56,000	1,600,000	1,170
Pyrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	480,000	29,000,000	1,520
Total PNAs	<330	330	<330	330	<330	330	<330	330	<330	330	460	330	NA	NA	NA	22,800
PCBs																
Total PCBs	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	(T)	676
SIEVE ANALYSIS (P/F?)	Fail	NA	Pass	NA	Fail	NA	Fail	NA	Fail	NA	Fail	NA	NA	NA	NA	NA

NOTES

* Background Default Level for Arsenic per MDEQ Policy & Procedure #09-018, March 19, 2013.

- Bolded/shaded cell indicates exceedance of one or more MDEQ Part 201 Residential Generic Cleanup Criteria and/or Michigan's Sediment Quality Guideline Values.
- Only detected parameters are listed.
- All concentrations shown in parts per billion (ppb).
- NA=means a criterion or value is not available or not applicable.
- NLL=means hazardous substance is not likely to leach under most soil conditions.
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- (T)=Refer to the federal Toxic Substances Control Act (TSCA), 40 C.F.R. §761, Subpart D and 40 C.F.R. §761, Subpart G, to determine the applicability of TSCA cleanup standards.

Table 1
Sediment Sample Quality Results
Pucker Street Dam Removal Project
Niles, MI

SAMPLE ID:	T-11-L		T-11-C		T-11-R		T-12-L		T-12-C		T-12-R		Statewide Default Background Level	Residential Drinking Water Protection Criteria	Direct Contact Criteria	Probable Effects Concentration
SAMPLE DATE:	12/9/2014		12/9/2014		12/9/2014		12/9/2014		12/9/2014		12/9/2014					
DATE ANALYZED:	12/17/2014		12/17/2014		12/17/2014		12/17/2014		12/17/2014		12/17/2014					
SAMPLE TYPE:	Sediment		Sediment		Sediment		Sediment		Sediment		Sediment					
	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL				
METALS																
Arsenic	5,000	1,000	3,000	1,000	2,800	1,000	<1,000	1,000	5,900	1,000	**13,000**	1,000	5,800/10,000*	4,600	7,600	33,000
Cadmium	<200	200	<200	200	<200	200	<200	200	<200	200	240	200	1,200	6,000	550,000	4,980
Copper	6,100	500	2,900	500	1,200	500	1,100	500	3,500	500	6,500	500	32,000	5,800,000	20,000,000	149,000
Lead	5,700	1,000	6,100	1,000	2,500	1,000	2,000	1,000	6,900	1,000	10,000	1,000	21,000	700,000	400,000	128,000
Mercury	58	50	<50	50	<50	50	<50	50	60	50	90	50	130	1,700	160,000	1,060
Nickel	10,000	500	5,500	500	2,200	500	3,000	500	10,000	500	8,500	500	20,000	100,000	40,000,000	48,600
Selenium	250	200	**430**	200	<200	200	<200	200	400	200	**490**	200	410	4,000	2,600,000	NA
Zinc	29,000	500	20,000	500	13,000	500	14,000	500	26,000	500	41,000	500	47,000	2,400,000	170,000,000	459,000
PNAs																
Anthracene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	41,000	230,000,000	
Benzo[a]anthracene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	20,000	1,050
Benzo[a]pyrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	2,000	
Chrysene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	2,000,000	1,290
Fluoranthene	<330	330	<330	330	<330	330	<330	330	<330	330	650	330	NA	730,000	46,000,000	2,230
Indeno[1,2,3-cd]pyrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	20,000	NA
Phenanthrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	56,000	1,600,000	
Pyrene	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	480,000	29,000,000	1,520
Total PNAs	<330	330	<330	330	<330	330	<330	330	<330	330	650	330	NA	NA	NA	22,800
PCBs																
Total PCBs	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	(T)	676
SIEVE ANALYSIS (P/F?)	Fail	NA	Pass	NA	Pass	NA	Pass	NA	Pass	NA	Fail	NA	NA	NA	NA	NA

NOTES
* Background Default Level for Arsenic per MDEQ Policy & Procedure #09-018, March 19, 2013.
• Bolded/shaded cell indicates exceedance of one or more MDEQ Part 201 Residential Generic Cleanup Criteria and/or Michigan's Sediment Quality Guideline Values.
• Only detected parameters are listed.
• All concentrations shown in parts per billion (ppb).
• NA=means a criterion or value is not available or not applicable.
• NLL=means hazardous substance is not likely to leach under most soil conditions.
• NLV=means hazardous substance is not likely to volatilize under most conditions.
• (T)=Refer to the federal Toxic Substances Control Act (TSCA), 40 C.F.R. §761, Subpart D and 40 C.F.R. §761, Subpart G, to determine the applicability of TSCA cleanup standards.

Table 1

Sediment Sample Quality Results
Pucker Street Dam Removal Project
Niles, MI

SAMPLE ID:	T-13-L		T-13-C		T-13-R		T-14-L		T-14-C		T-14-R		Statewide Default Background Level	Residential Drinking Water Protection Criteria	Direct Contact Criteria	Probable Effects Concentration
SAMPLE DATE:	12/9/2014		12/9/2014		12/9/2014		12/9/2014		12/9/2014		12/9/2014					
DATE ANALYZED:	12/17/2014		12/17/2014		12/17/2014		12/17/2014		12/17/2014		12/17/2014					
SAMPLE TYPE:	Sediment		Sediment		Sediment		Sediment		Sediment		Sediment					
	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL	Conc.	MDL				
METALS																
Arsenic	2,300	1,000	3,200	1,000	2,200	1,000	**11,000**	1,000	**18,000**	1,000	7,200	1,000	5,800/10,000*	4,600	7,600	33,000
Cadmium	<200	200	<200	200	<200	200	220	200	530	200	<200	200	1,200	6,000	550,000	4,980
Copper	1,400	500	6,400	500	2,000	500	9,400	500	10,000	500	4,200	500	32,000	5,800,000	20,000,000	149,000
Lead	3,000	1,000	1,600	1,000	2,400	1,000	15,000	1,000	**21,000**	1,000	5,400	1,000	21,000	700,000	400,000	128,000
Mercury	<50	50	<50	50	<50	50	**190**	50	**200**	50	90	50	130	1,700	160,000	1,060
Nickel	3,000	500	6,900	500	3,500	500	6,700	500	**23,000**	500	5,000	500	20,000	100,000	40,000,000	48,600
Selenium	<200	200	<200	200	<200	200	390	200	**930**	200	310	200	410	4,000	2,600,000	NA
Zinc	13,000	500	20,000	500	13,000	500	**50,000**	500	**72,000**	500	27,000	500	47,000	2,400,000	170,000,000	459,000
PNAs																
Anthracene	650	330	<330	330	<330	330	<330	330	<330	330	330	330	NA	41,000	230,000,000	845
Benzo[a]anthracene	630	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	20,000	1,050
Benzo[a]pyrene	560	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	2,000	1,450
Chrysene	620	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	2,000,000	1,290
Fluoranthene	1,900	330	<330	330	<330	330	600	330	460	330	500	330	NA	730,000	46,000,000	2,230
Indeno[1,2,3-cd]pyrene	410	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	20,000	NA
Phenanthrene	740	330	<330	330	<330	330	<330	330	<330	330	370	330	NA	56,000	1,600,000	1,170
Pyrene	<330	330	<330	330	<330	330	860	330	380	330	400	330	NA	480,000	29,000,000	1,520
Total PNAs	5,510	330	<330	330	<330	330	1,460	330	840	330	1,600	330	NA	NA	NA	22,800
PCBs																
Total PCBs	<330	330	<330	330	<330	330	<330	330	<330	330	<330	330	NA	NLL	(T)	676
SIEVE ANALYSIS (P/F?)	Pass	NA	Pass	NA	Pass	NA	Fail	NA	Fail	NA	Fail	NA	NA	NA	NA	NA

NOTES

* Background Default Level for Arsenic per MDEQ Policy & Procedure #09-018, March 19, 2013.
- Bolded/shaded cell indicates exceedance of one or more MDEQ Part 201 Residential Generic Cleanup Criteria and/or Michigan's Sediment Quality Guideline Values.
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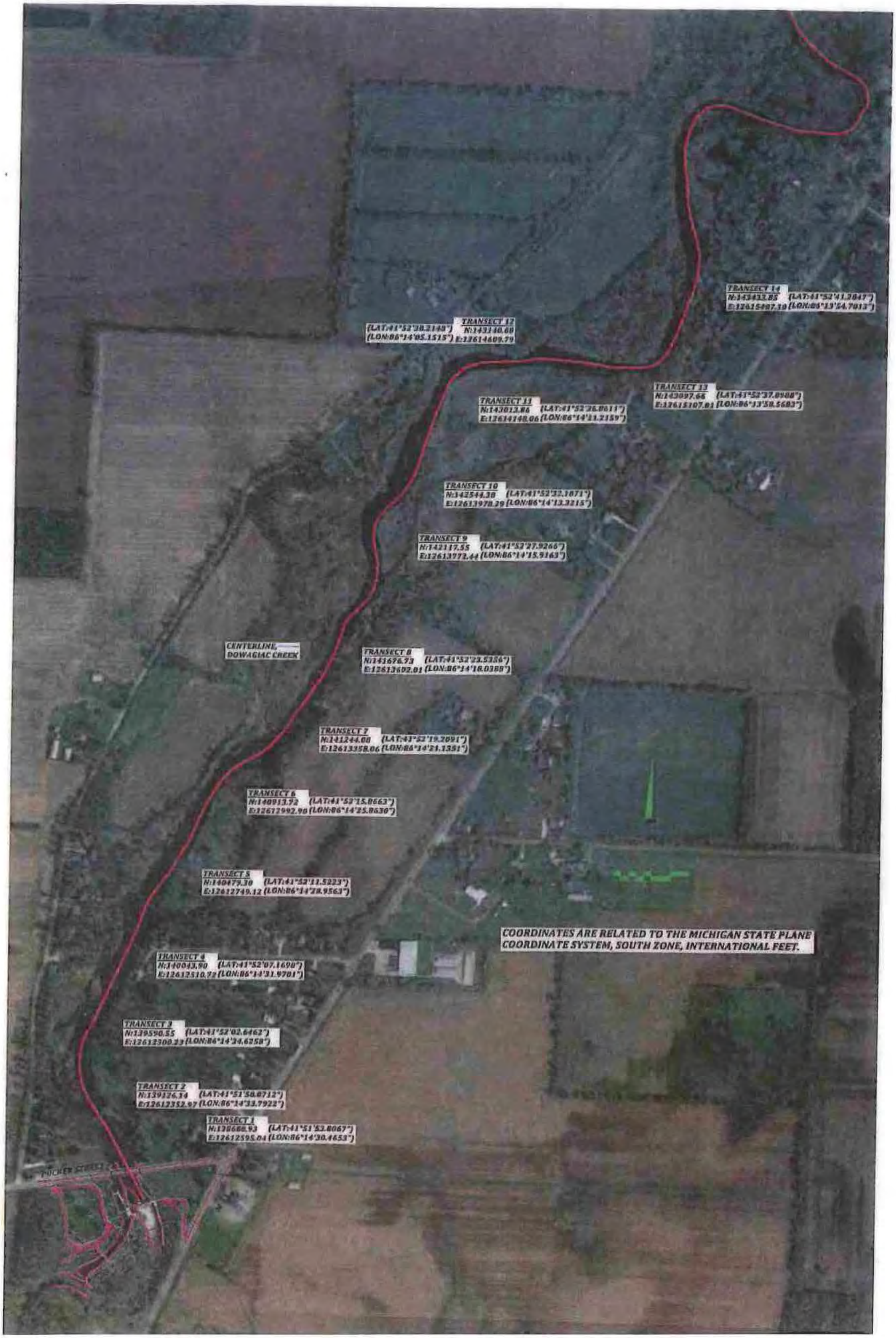

TRANSECT 14
N:143432.85 (LAT:41°52'41.2847")
E:12615407.10 (LON:86°13'54.7013")
TRANSECT 12
(LAT:41°52'38.2149") N:143340.69
(LON:86°14'05.1515") E:12614609.79
TRANSECT 13
N:143097.66 (LAT:41°52'37.0908")
E:12615107.01 (LON:86°13'58.5683")
TRANSECT 11
N:143013.86 (LAT:41°52'36.0611")
E:12614148.06 (LON:86°14'11.2159")
TRANSECT 10
N:142544.38 (LAT:41°52'32.1871")
E:12613978.29 (LON:86°14'13.3215")
TRANSECT 9
N:142117.55 (LAT:41°52'27.9266")
E:12613772.44 (LON:86°14'15.9163")
CENTERLINE,
DOWAGIAC CREEK
TRANSECT 8
N:141676.73 (LAT:41°52'23.5386")
E:12613602.01 (LON:86°14'18.0388")
TRANSECT 7
N:141244.08 (LAT:41°52'19.2091")
E:12613358.06 (LON:86°14'21.1351")
TRANSECT 6
N:140913.72 (LAT:41°52'15.8663")
E:12612992.90 (LON:86°14'25.8630")
TRANSECT 5
N:140479.30 (LAT:41°52'11.5223")
E:12612749.12 (LON:86°14'28.9563")
COORDINATES ARE RELATED TO THE MICHIGAN STATE PLANE
COORDINATE SYSTEM, SOUTH ZONE, INTERNATIONAL FEET.
TRANSECT 4
N:140043.90 (LAT:41°52'07.1690")
E:12612510.72 (LON:86°14'31.9701")
TRANSECT 3
N:139590.55 (LAT:41°52'02.6462")
E:12612300.23 (LON:86°14'34.6258")
TRANSECT 2
N:139126.34 (LAT:41°51'58.0712")
E:12612352.97 (LON:86°14'33.7922")
TRANSECT 1
N:138688.93 (LAT:41°51'53.8067")
E:12612595.04 (LON:86°14'30.4653")

Appendix E

Pucker Street Dam Removal and River Restoration
Draft Design Report
April 7, 2016

Pucker Street Dam Removal and River Restoration

DRAFT Design Report

April 7, 2016

Prepared for:

City of Niles
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Table of Contents

INTRODUCTION

The city of Niles, Michigan, is working with partners, including the Michigan Department of Natural Resources, Pokagon Band of Potawatomi, Southwest Michigan Planning Commission, and others, to restore the Dowagiac River to a free flowing channel by removing the aged Pucker Street Dam. The existing hydroelectric dam was constructed in 1928, but it no longer produces power due to maintenance costs, sedimentation in the reservoir, and damage to its turbines. Structural issues also create safety concerns at the dam and downstream, which prompted the initial investigations into removal. In addition to eliminating Pucker Street Dam's integrity problems, removing the dam will also have important ecological benefits. The dam blocks almost the entire Dowagiac River watershed and all of its tributaries (159 miles of stream) to fish passage from the St. Joseph River and Lake Michigan. Removing the dam would eliminate that barrier and allow for restoration of two miles of high gradient cold water habitat, which is a rare commodity in the region. Overall, restoring the Dowagiac River to free-flowing conditions will elevate the potential of an important regional asset- socially, economically, and environmentally.

The removal of Pucker Street Dam and restoration of the Dowagiac River within the existing impoundment has several goals:

- Eliminate safety issues by removing the dam and surrounding structures.
- Reconnect the upstream and downstream waters.
- Provide a stable channel form that can pass the flow and sediment delivered to it from upstream.
- Minimize impacts downstream of the dam, especially with respect to sediment.
- Provide fish passage through the reconnected and restored reach, including adequate habitat, to the extent that budget allows.
- Minimize impacts to adjacent landowners.
- Create an amenity by improving recreational access

The impounded area has captured sediment since a log dam was built just upstream of the existing structure in 1828, and today approximately 1,000,000 CY of material has filled the impoundment. The volume of stored sands and silts and the length of the impoundment pose some unique restoration challenges. If left to adjust on its own after dam removal, channel recovery could take decades and large volumes of sediment would be evacuated from the impoundment to the detriment of the functioning downstream fishery and adjacent landowners. Actively removing and managing sediment will be costly, especially if habitat improvements are implemented along the excavated channel. The final design will balance budget limitations and the benefits of certain restoration elements.

This document includes descriptions of the existing geomorphic and hydrologic conditions of the study area, and justification of a design that will meet the goals of the project. Due to high cost of sediment removal, the design presented does not incorporate return of the river to the pre-dam channel meanders. Instead, the proposed alignment follows the straighter existing alignment through the impoundment. We expect that over time, the river will continue to evolve within the corridor through processes of erosion and deposition and ultimately reclaim a meandering pattern with deep pools in bends and riffles between the bends. Excavation of floodplain benches is included as an option at this point, depending on final budget, for both safety and to provide ecological benefits associated with floodplain corridors.

GEOMORPHIC PROCESS

Rivers and streams evolve and adjust to efficiently pass the sediment and water delivered to them from upstream. When the energy associated with the flow and channel slope balance the sediment load and bed material size, the channel is considered stable and in equilibrium (Figure 1). Although most natural rivers are resilient, large or consistent changes in flood flows related to climate or management (e.g., dam operations) will likely result in a change in channel dimensions to accommodate the new conditions. Increases in flow or flow energy will lead to erosion and a larger channel, and diminished flows or flow energy will result in deposition and a smaller channel. Similarly, increases in sediment delivery will usually result in sediment deposition within the channel, and a decrease in sediment delivery often results in erosion along the bed and banks (Figure 1).

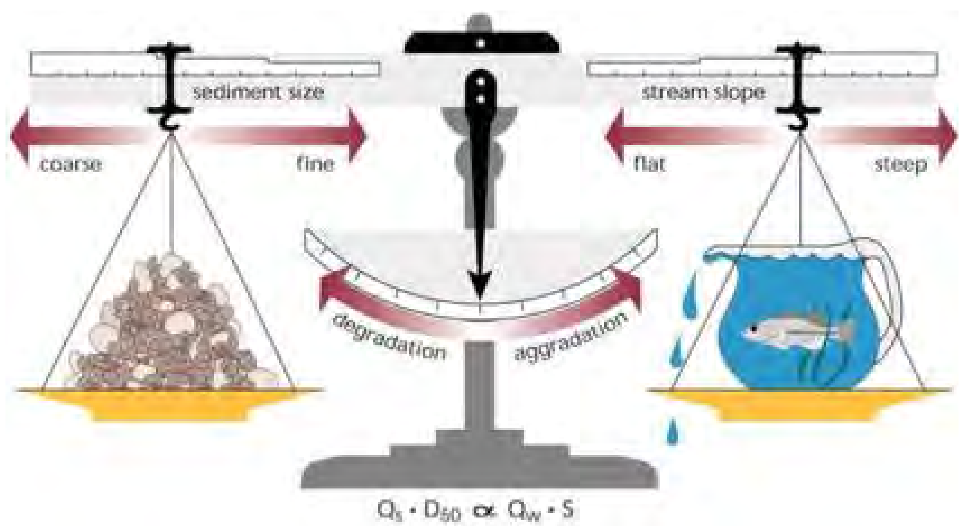

Figure 1. **Lane's Balance – Channels in equilibrium balance slope and flow capacity with sediment load and sediment size (from Rosgen, 1996; Lane, 1955).**

Dam removal represents a large and fast change compared to natural rates and scales of normal river change. The reservoir, and potentially the upstream main stem channel and tributaries, will respond to the rapid increase in slope at the dam site via channel incision to decrease the slope and attain a new stable position (Schumm *et al.*, 1984; Simon and Rinaldi, 2000; Doyle, et al, 2002). Incising channels follow a general pattern of adjustments through time (Simon and Rinaldi, 2000; Figure 2 and Figure 3), which permits prediction of spatial and temporal trends associated with dam removal (Doyle et al. 2002). Typically, flow released over the sediment stored at the dam face will begin cutting a notch, or nickpoint, as the channel initiates adjusting towards a lower channel gradient (*Stage 1*).

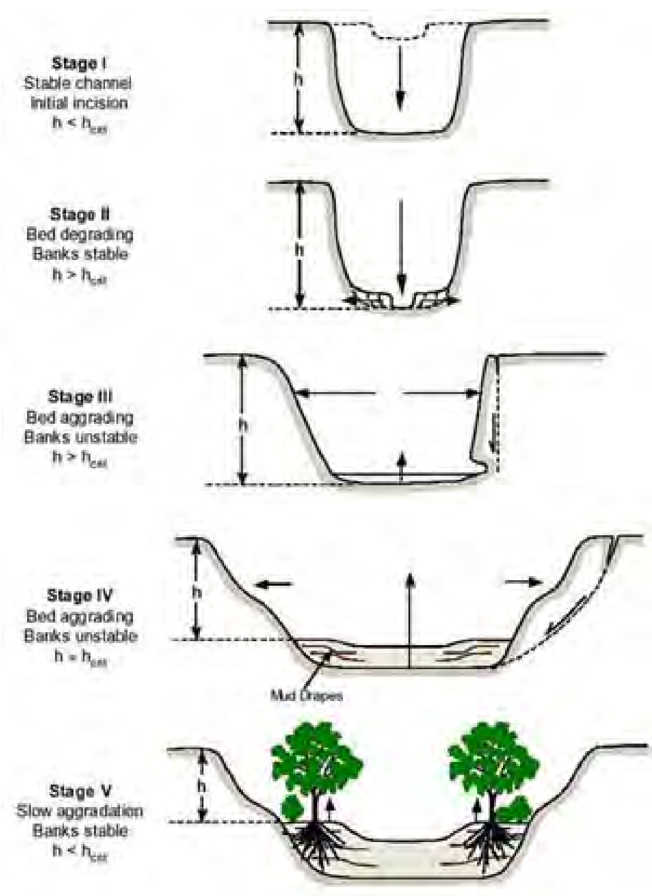

Figure 2. General pattern or stages of channel cross section adjustment over time following a change in downstream base level (Schumm,1984).

Rapid down cutting (i.e., degradation or incision) through the impounded sediment follows as nickpoints migrate upstream, the local gradient flattens, and sediment is evacuated along the incised channel (*Stage 2*). As it progresses downward, incision also frequently results in unstable channel bank heights and slopes, resulting in channel widening as the banks collapse and fall into the river (*Stage 3*). Meanwhile, newly evacuated upstream sediment begins to deposit along the downstream reaches where incision has already occurred (*Stage 4*). The deposition raises (i.e., aggrades) the channel, which reduces bank heights. Channel widening and erosion become limited to localized areas, such as at the outside of bends and where bar deposits force flow against the banks. Finally, deposition and erosion normalize, vegetation establishes on newly deposited sediment, and a more stable channel form results (*Stage 5*).

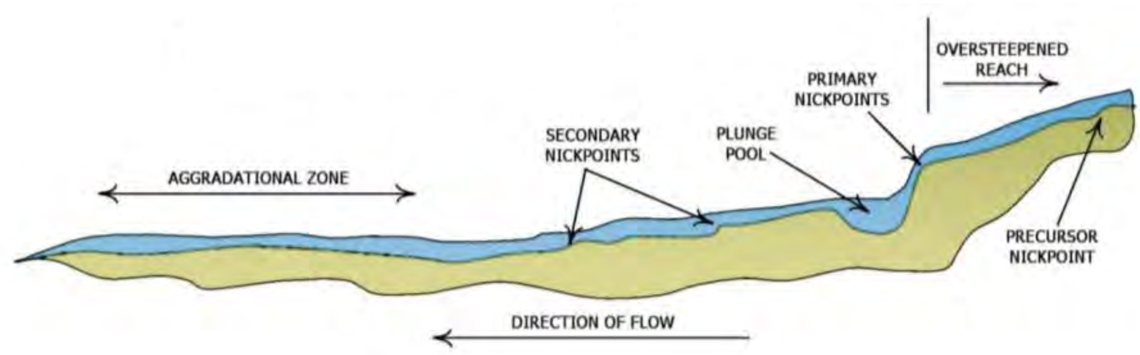

Figure 3. Longitudinal pattern of channel adjustment over time, showing upstream nickpoint migration, which leaves a lower gradient channel downstream level (Schumm, 1984).

WATERSHED CONTEXT

The Dowagiac River drains approximately 285 mi^2 of the southwest corner of Michigan's Lower Peninsula. It originates in Decatur Township, Van Buren County, and terminates approximately 31 miles downstream at its confluence with the St. Joseph River in Berrien County, near the town of Niles, MI. The watershed drains glacial deposits consisting of outwash sand and gravel, coarse-textured till, and finer glacial lake deposits (Kirby and Hampton 1998). The coarse textured materials allow substantial groundwater contributions to the Dowagiac River system. The Dowagiac River and most of its tributaries support a popular coldwater fishery (Wesley and Duffy 2003).

CLIMATE

Berrien County's climate is significantly moderated by westerly winds that are cooled in summer and warmed in winter as they pass over Lake Michigan. Monthly average temperatures vary from 73 degrees F in July to 23 degrees F in January, and a mean annual temperature of 49 degrees F. Mean annual precipitation is approximately 35 inches, which is distributed evenly throughout the year, and generally decreases with distance from the lake.

Total annual precipitation at Dowagiac, MI, is 22 inches. The region gets approximately 70 inches of snow per year. Most of the rainfall and snowmelt water drains to the Dowagiac River and its tributaries as groundwater.

GEOLOGY

Glacial Geology

Michigan was covered by glaciers around 10,000 years ago, and the current landforms, soils, and surface geology are the result of the advance and retreat of the most recent glaciation. The surface geology within the Dowagiac Watershed consists almost entirely of thick glacial sands, silts, and gravels, along with limited post-glacial stream deposits (Figure 4; Kincare, 2010), which have buried the shale bedrock by hundreds of feet. The Michigan Lobe of the Wisconsin Glaciation advanced south, along what is now Lake Michigan, into Illinois and Indiana. The Kalamazoo Moraine and the Valparaiso Moraine, which are large piles of river and delta sand deposited along the edge of the Michigan Lobe during ice retreat, demarcate the east and west side of the watershed near Niles. The moraines mark periods of glacial equilibrium, before melting withdraws the ice front to the next moraine position (Stone et al., 2003; Kincare, 2010; Figure 4).

The Dowagiac River runs along the former Glacial Lake Dowagiac bed between the Kalamazoo and Valparaiso Moraines (Figure 5). The lake formed when ice and sediment blocked spillway outlets to the south (Figure 4). The flat lake bed is expressed in the low gradients of the upper Dowagiac River and the river's associated wetlands upstream of Sumnerville, MI (Figure 6). The glacial lake spillway is largely filled with gravelly, sandy delta deposits from upstream (north) and from the adjacent moraines. These sands and gravels are now the dominant material in the modern channel and floodplain (Stone et al., 2003; Kincare, 2010). They also make up the sandy and loamy soils found in the region (e.g. Ockley/Kalamazoo Loams, Oshtemo Sandy Loam, Cohoctah Sandy Loam). The sands and silts stored behind Pucker Street Dam are derived from these materials.

The glacial materials associated with the outwash plains and moraines are relatively permeable, allowing precipitation to infiltrate and travel in subsurface pathways through the deposits. The coarse glacial material of the watershed is responsible for storing tremendous volumes of cold groundwater which maintain the Dowagiac River, even in the heat of summer, as a cold water river. Within the study reach, floodplain wetlands have formed along the valley walls where groundwater seeps into the valley. Infiltration also reduces surface runoff in the system, thereby limiting flow fluctuations.

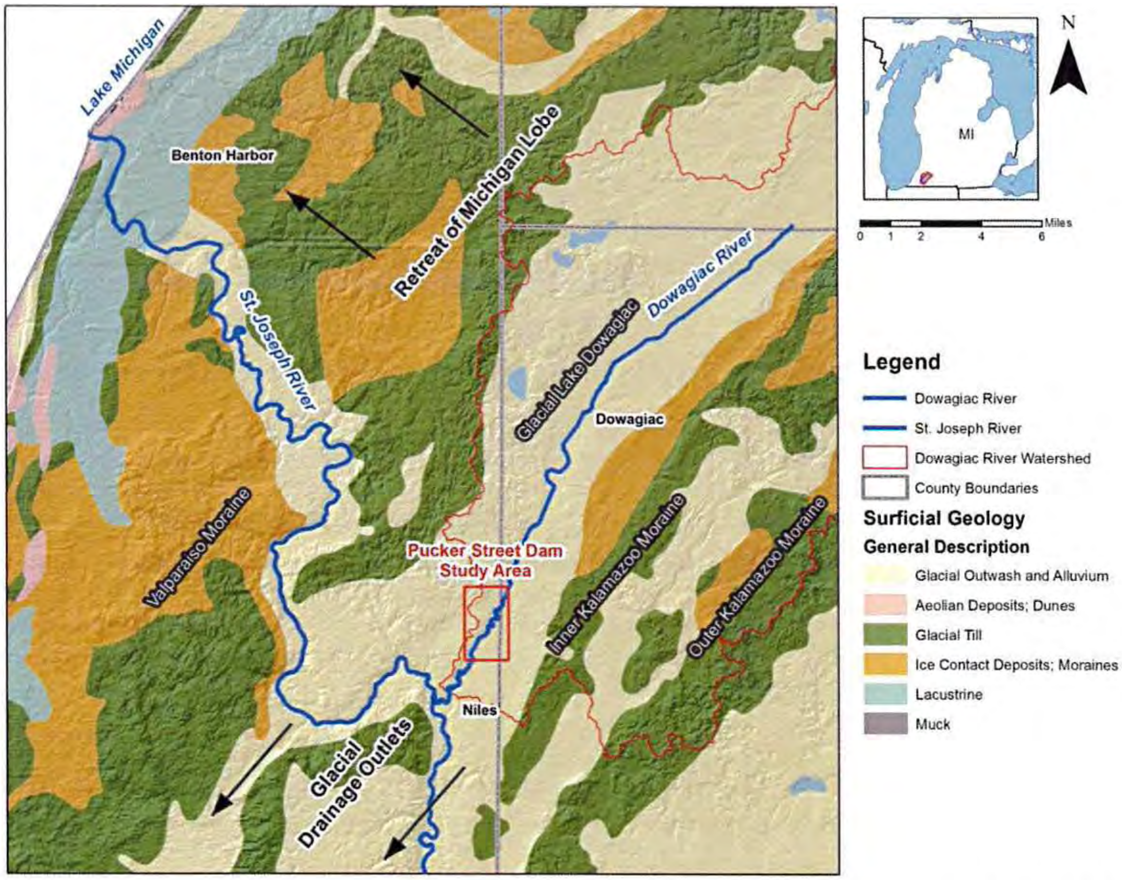

Figure 4. Glacial geology of the region surrounding the Pucker Street Dam project area (red box). The river flows between two end moraines associated with the Michigan Lobe of the Wisconsin continental glaciation. Glacial retreat from the Kalamazoo Moraine system to the Valparaiso Moraine system established a southwest trending meltwater spillway dominated by Glacial Lake Dowagiac. The spillway is largely filled with gravelly, sandy delta deposits from upstream (north) and from the Valparaiso Moraine.

Figure 5. Generalized cross section of the Dowagiac River valley at the upstream end of the project reach. The overall valley is defined by the Valparaiso Moraine to the west (left) and the Kalamazoo Moraine to the east (right).

Before retreating west, ice and sediment along the Valparaiso Moraine directed flow in the St. Joseph River away from its current route to Lake Michigan, sending the water south to the Kankakee River system.. However, once the Michigan Lobe melted back to the west, potholes and kettles (i.e., small ice melt lakes) left behind coalesced and "captured" the St. Joseph River. The flow spilled off to the west, cutting a new route to present day Benton Harbor (Figure 4). Since then, downward shifts in the surface water elevation in Lake Michigan have forced multiple episodes of incision along the lower section of the St. Joseph River. The downstream end of the Dowagiac River also steepened in response to lowered Lake Michigan and St. Joseph River elevations, creating a slope break approximately where Pucker Street Dam sits today – the channel is generally steeper downstream of the dam and less steep upstream of the dam (Figure 6). Survey data suggests the steeper slope extends under the Pucker Street impoundment sediments to near Kinzie Road (See Data Collection Section).

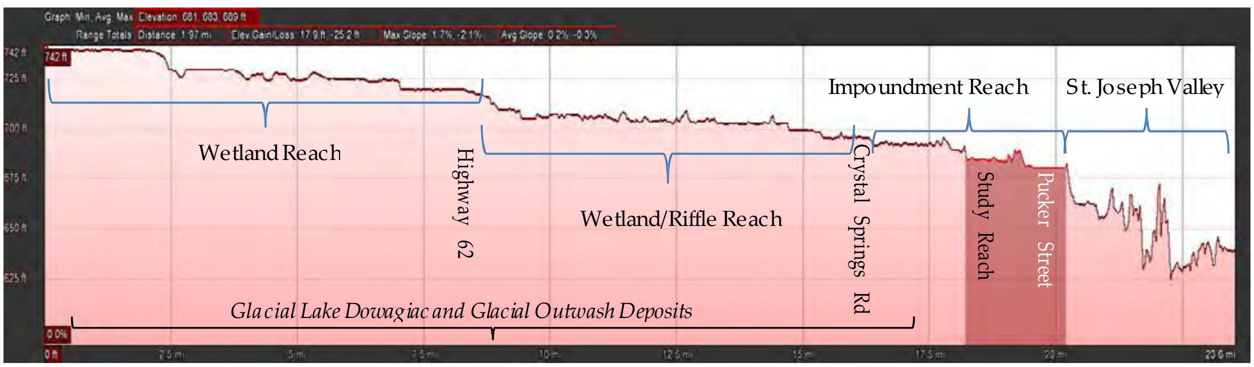

Figure 6. A generalized longitudinal profile of the Dowagiac River.- The project area is highlighted in the profile. Pucker Street Dam sits at a transition from flatter upstream gradient (i.e., lower energy) to steeper gradients (i.e., higher energy) leading into the St. Joseph River Valley.

RIVER PROFILE

The longitudinal profile of the Dowagiac River presented in Figure 6 is a helpful tool in understanding the energy of the river system, and thus, movement of sediment and water along the channel. The profile provides channel bed elevations from a river's headwaters to its mouth, and the slope of the lines gives a general idea of the relative energy in the system. The steepness of the slope dictates the type of river patterns at various locations along the 31 mile length, with the wetland sections formed in Lake Dowagiac deposits at the headwaters of the river, transitional reaches between wetland and pool/riffle sections in the middle, and finally a steeper channel with coarse cobbles and gravels and riffles characterizing the transition into the St. Joseph River Valley. Beginning in the Dowagiac River headwaters, the flat wetland swamp section is apparent, separated by a few short steeper transitions down to additional flat reaches downstream to Highway 62. As water leaves the upstream wetland area the slope increases slightly and the channel picks up energy. However, the river's slope remains relatively gradual until Crystal Springs Road, where the river steepens again until it hits a series of impoundment deposits. The first impoundment section is just upstream of Kinzie Road, where a former dam blocked the river. This upper impoundment area is followed by the long flat section representing the study reach upstream of the Pucker Street Dam. The steepest section of the Dowagiac River is downstream of Pucker Street Dam, where the channel falls into the St. Joseph River Valley. The channel was steeper through the dam and impoundment prior to construction, and the dam was likely sited to take advantage of the high energy of the river in the section (Figure 6).

SEDIMENT TRANSPORT

Based on observations in the upper watershed, the Dowagiac gains sand and finer material from tributaries within the upland wetland reaches, but the sands cannot be transported easily due to the reach's low gradient (i.e., low energy). Once the landscape slope increases, sediment is delivered to the river from tributaries, and to a lesser extent, from erosion along the channel margins. Bed material begins to include more gravels and small cobbles, which form occasional riffles along the channel; however, sand appears to be the dominant bed material along most of the river. Sand moves nearly continuously within the Dowagiac system and is eventually delivered to the impoundment behind the dam. Some gravel is also transported through the system, but currently appears to settle at the upstream end of the study reach, downstream of Kinzie Road, while the smaller sand and fine particles can be carried further downstream into the impoundment.

FLORA AND FAUNA

Vegetation

An interpretation of the General Land Office surveys conducted in the 1800s (Comer and Albert 1997) indicate the historically dominant vegetation type along the Pucker Street section of the Dowagiac River is Beech/Sugar Maple forest with some wet hardwood forests and other wetland types within the floodplain. Today, agriculture dominates the watershed, comprising 55% of the total acreage. The uplands are primarily used for crops, especially corn, but hogs and other livestock are also raised in portions of the watershed. Suburban development also occupies land adjacent to the river and closer to Niles, downstream.

Aquatic Ecology

Aquatic organism sampling has been conducted by the MDEQ and MDNR (2012) within the watershed and tributaries. The following general observations are consistent within the mainstem. Habitat is degraded throughout the Dowagiac River system largely due to historical channelization, dam operations, and land use impacts.

Fish – Fish species above the Pucker Street Dam are consistent with a cold water fishery. Assessments in the mainstem (Wesley and Duffy, 2003) included a total of 37 species, with brown trout, which are stocked by MDNR, being the most numerous species. Although Wesley and Duffy (2003) reported an ample number of species along the river, the authors noted that habitat was lacking. The dam at Pucker Street blocks passage of several fish species including steelhead, chinook salmon, coho salmon, brown trout, white suckers, and walleye to more than 159 miles of main stem and tributary habitat in the Dowagiac River system. Lake Sturgeon ascended the river historically and lake trout were noted to spawn upstream of Niles, MI (Ballard, 1948). The dam also blocks passage of non-native salmon species that are an important component of the regional recreational sport fishery.

Macroinvertebrates – A 2012 survey included documentation of between 22 and 37 macroinvertebrate taxa. Assemblages of mayflies, stoneflies, and caddisflies were present, which is consistent with a cold water system and indicative of good water quality. The Dodd Park site had a river wide high of 37 taxa. The higher values may be a result of recent restoration work completed to expose coarse substrate in an old meander. Given the results from the Dodd Park site, located in the lower part of the river, habitat would appear to be more limiting than water quality in the development of a healthy macroinvertebrate community in Dowagiac River.

WATERSHED HISTORY

Other than the St. Joseph de Miami Missionary, established in 1691, and Fort Saint Joseph, established in 1697, settlement near Niles and within the Dowagiac River watershed began in the late 1820s and rapid settlement followed in the 1830s (Rogers, 1875). The main industry was agriculture and large areas were deforested in the following decades to make way for farms. Clearing the forest and plowing the soil likely increased both the runoff and sediment available for transport through the Dowagiac System.

The Dowagiac River was straightened, lowered, and channelized from Decatur to Sumnerville between 1901 and 1928 to drain the surrounding floodplain swamps and free more land for agriculture. Straightening the river increased the channel slope and the disturbance increased the sediment available for transport. The combination led to an increase in the volume of sediment delivered downstream, where bedload (i.e., sand and gravel) and some finer sediments were trapped behind Pucker Street Dam. The straightened, leveed channel also provides little habitat for fish and other aquatic and riparian fauna.

PROJECT SITE

The project site includes the Dowagiac River Valley from about 300 feet downstream of Pucker Street Dam to the Kinzie Road Bridge, approximately 11,000 ft upstream of the dam. Within that reach, the focus is on Pucker Street Dam and its 5,900 ft long impoundment. The Dowagiac Valley width ranges from about 200 feet to 700 feet wide. The wider sections are included in the impoundment area. Suburban homes line the edge of the valley, some within 50 ft of the channel (Figure 7) and, landowners adjacent to the channel often utilize the surface exposed following the 1999 reservoir drawdown. Most of the upland areas, away from the river, are farmed (Figure 11). Except where Pucker Street and the dam cross the river at the downstream end of the reach, all of the floodplain is undeveloped (Figure 11). Three pipes are buried across the channel: an abandoned water line 250 feet downstream of the dam, and two gas lines at Station 4200. The water line is exposed at low flows. The gas line is buried below the existing channel with 3-4 ft of cover when it was located by the TransCanada Pipelines Mid America on 08/25/2015.

Below Kinzie Road, the valley along the *upstream reach* (i.e., upstream of the former impoundment; Figure 11) includes more woodland and narrower valley widths relative to the lower two-thirds of the study area (Figure 8). The channel is relatively sinuous, steep, and gravelly, and large wood is present in the stream. At the downstream end of this section, the channel turns to the west and transitions to the lower gradient, formerly impounded section of the channel.

Figure 7. Houses and yards set within 50 feet of the Dowagiac River impoundment.

Figure 8. Upstream section of Dowagiac River, below Kinzie Road.

The *downstream*, impoundment section (Stations 1150 – 7200) is inset into glacial material, leaving high, steep, wooded, valley walls demarcating the flat floodplain of the former reservoir (Figure 12 and Figure 9). In this lower section, the channel is straighter than upstream, despite the wide flat valley. Cross section surveys along the channel show variable channel widths, ranging from around 70 feet to 100 feet wide at estimated bankfull conditions within the impounded section (Figure 12), and channel depths (i.e., impounded sediment surface to channel bed) varied from around 4 feet to around 8 feet, with an average of approximately 6 feet (see Data Collection section of this report). Wetlands and small side channels are common where groundwater seeps from the adjacent slopes and where side channels were abandoned after the dam was opened in 1999 (Figure 10). Much of the floodplain remains vegetated in native and non-native plants, with occasional thick copses of willows and small stands of cottonwood, ash, and alder (Figure 9 and Figure 10).

Figure 9. Downstream section of Dowagiac River, within the impoundment.

Figure 10. Floodplain wetland along the valley wall within the impoundment reach.

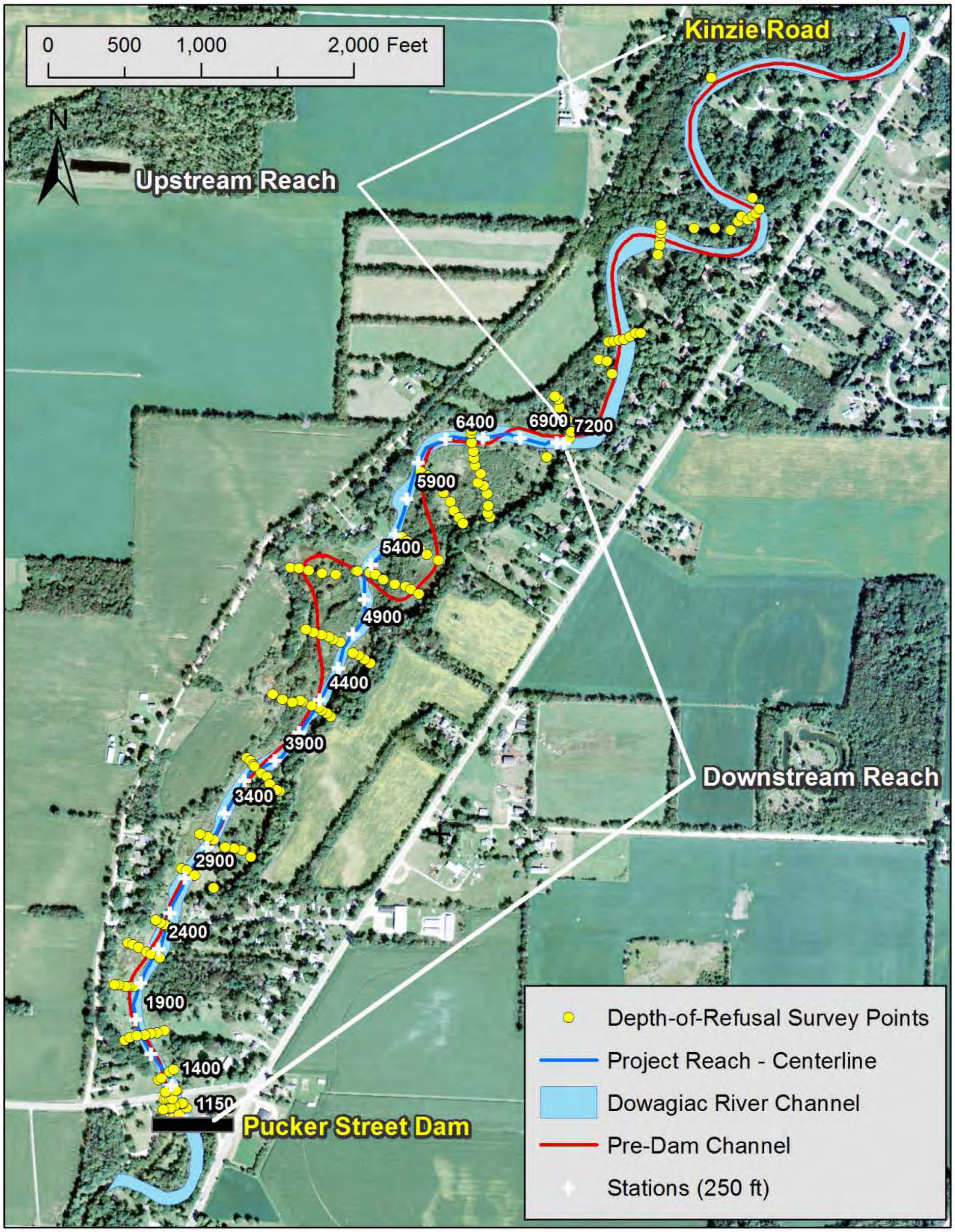

Figure 11. Existing Conditions and Depth of Refusal (DOR) survey points along the study reach of the Dowagiac River.

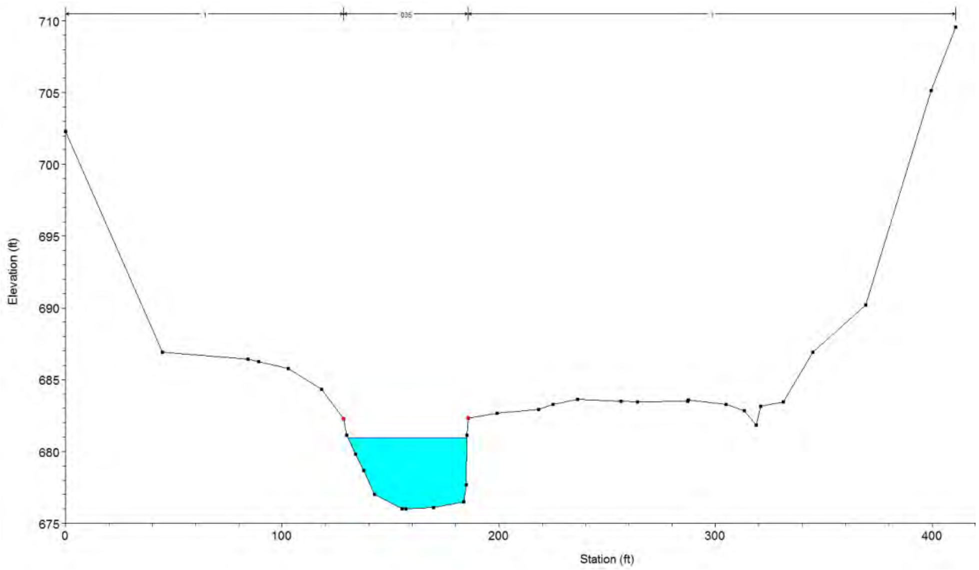

Figure 12. Typical cross-section through the Dowagiac River valley through the impounded reach. The valley generally has a wide flat floodplain between high terrace valley walls. The Dowagiac River is inset into the former impoundment sediments that now form the floodplain.

DAM HISTORY

Pucker Street Dam is located three miles upstream of the Dowagiac River - St. Joseph River confluence. The dam was originally built as a log dam in 1828. The existing, larger concrete hydroelectric structure was constructed 100 feet downstream of the original dam in 1928. Pucker Street Dam is the only mainstem channel barrier that traps sediment within the Dowagiac River system, and by 1940, enough sediment settled behind the dam that the impoundment was dredged (Wesley, 2008). The river likely delivered much of this new sediment after most of its length above the dam was straightened in the 1910s and 1920s. By the 1990s, sediment had filled the impoundment again and suspended silts and sands had damaged the turbines, forcing the city to open the gates and allow run-of-river flow.

The 1938 aerial photographs of the dam impoundment (Figure 13) depict delta formation at the upstream end of the impoundment, indicating continued filling through that time. By 1999, a significant delta had formed over the upper third of the reservoir, leaving low lying vegetated islands and bars of fine material (Figure 13). The wedge of sediment formed despite at least one dredging event (1940) and multiple accidental and maintenance related sediment releases (Wesley, 2008). The reservoir was drawn down in 1999, and the corresponding air photos (Figure 14) show exposed deposition throughout the former pond. Currently, the dam is dormant with three gates permanently left open.

Bedload transport sampling conducted up- and downstream of the dam provided estimates of background base flow transport rates between 3 tons/day and 1 ton/day (Wesley, 2008). An empirical equation produced by the US Army Corps of Engineers (2012) that relates sediment yields to drainage area predicts an average annual rate of transport of 26,300 CY/year (42,600 tons/year) for the Dowagiac River at Pucker Street. The sandy bed load material along the Dowagiac River mobilizes relatively easily, especially if the channel is disturbed, and high flows likely carry large loads of material. Although much of the sediment carried by the river formerly deposited upstream of Pucker Street Dam, now that the reservoir is mostly filled, more sediment likely passes downstream, especially finer material that remains suspended in the flow.

Figure 133. Comparison of the 1999 air photo and 1938 air photo at the Pucker Street Dam impoundment. A sizeable delta formed over the northern (top of 1999 photo) third of the reach.

Figure 144. Sediment exposed within Pucker Street Dam impoundment after the 5 foot draw down event in 1999. Light colored areas adjacent to the channel are exposed reservoir sediment.

DATA COLLECTION

Geomorphic Survey

Initial field reconnaissance along the Dowagiac River occurred in May and July, 2013. Field work included noting general geomorphic characteristics and collecting topographic and depth-of-refusal surveys at transects across the river and along the existing channel alignment. The assessment extended from 2,200 feet downstream of the dam to the Kinzie Road crossing, upstream (Figure 15). Topographic surveying was conducted using rtkGPS (real time kinematic global positioning system), primarily to obtain elevations at 35 cross sections and along the channel for developing a one-dimensional hydraulic model (HECRAS) and a longitudinal profile.

The depth of refusal (DOR) survey was conducted by pushing a rod through accumulated impoundment sediment until a firm layer (e.g., clay or gravel) "refuses" further penetration. DOR surveys allow an initial interpretation of former vertical and horizontal channel position and depth of sediment. Along the Dowagiac River study reach, the DOR survey was difficult due to the fine sediments and large depth of material stored in the impoundment. It was not always clear whether "refusal" occurred in former channel bed deposits, or in former floodplain. Additionally, in some of the wider floodplain areas of the impoundment, such as Station 4500 to 6500, field limitations made it difficult to complete a thorough survey of the reach.

Data collected as part of the DOR and longitudinal profile surveys are plotted in Figure 15. The survey data confirm existing average channel depths (i.e., from bed to impounded sediment surface) of around 6 feet throughout the study reach. Existing channel gradient is 0.0008 ft/ft. The DOR data, however, suggest the valley is filled with sediment up to 18 feet deep at the dam site, and that the channel gradient prior to dam construction was approximately 0.0019 ft/ft, more than double the existing gradient. The DOR rod probed through layers of silt and sand deposited behind the dam. Refusal was often forced by gravel or clay, suggesting that, prior to dam construction, sand was generally passed through the reach or stored in bars and floodplain material, and the channel bed was likely gravel with some sand and clay.

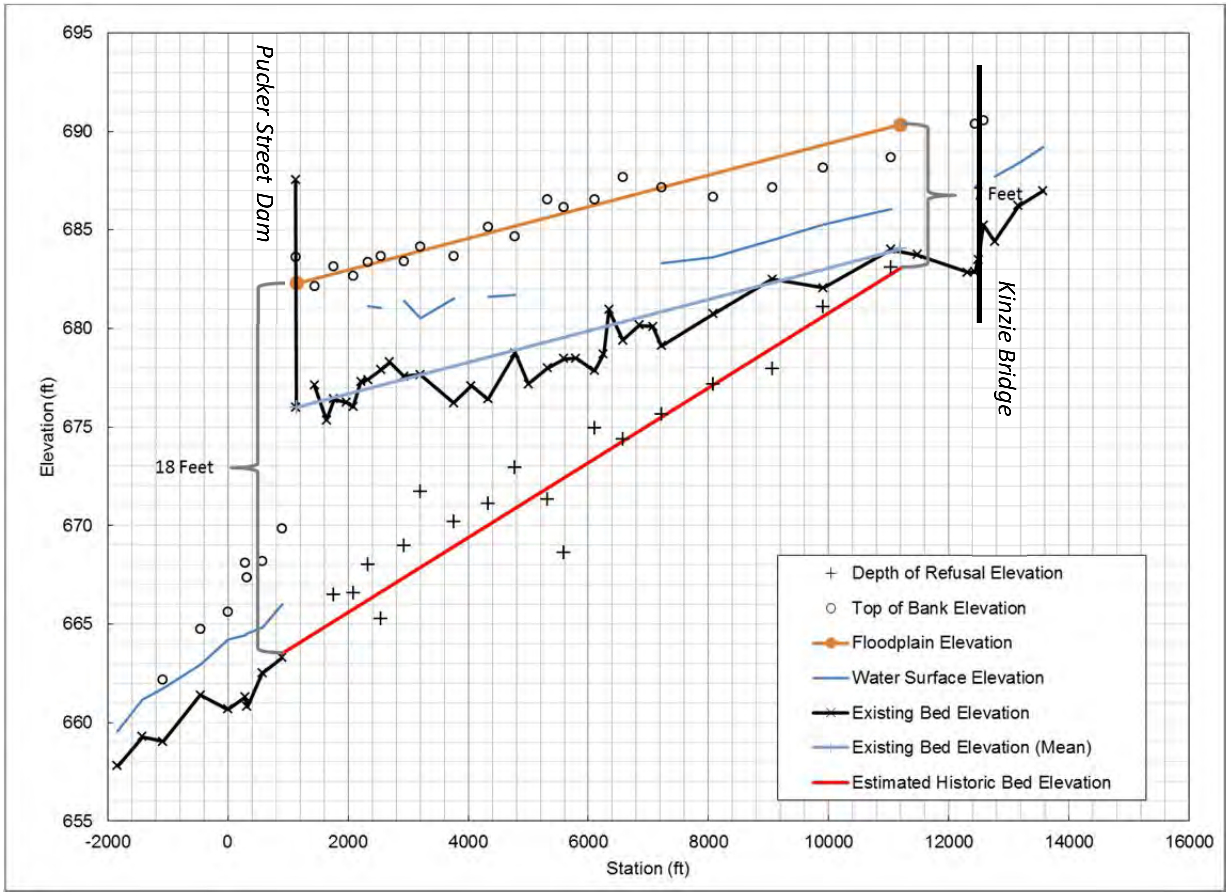

Figure 15. Longitudinal profile of the Dowagiac River from Kinzie Road to Pucker Street Dam (STA 1150). The profile includes expected historical bed elevations based on the DOR survey data, as well as existing bed and floodplain elevations.

SEDIMENT SAMPLING

A total of 42 sediment samples were collected and analyzed for grain size and chemical parameters (PCB's, PNA's, arsenic, cadmium, copper, lead, mercury, nickel, selenium and zinc). A total of 14 transects were conducted, with sediment samples collected from the left, center and right side of the stream when looking downstream. Sediment samples from transects 1 through 9 were collected by Great Lakes Environmental Center (GLEC) using vibracore methods. GLEC could not get their boat past, around or over a large rock in the middle of the stream between transects 9 and 10. Wightman technicians in a small boat using a Russian Peat Borer with stainless steel auger collected the sediment samples from transects 10 through 14. The first transect was 25 feet upstream of the dam, with each successive transect 500 feet upstream.

Results (see appendix for full summary submittal) were submitted to the MDEQ for review and concurrence with our findings. Based on this review it was determined that the dredged sediment is considered clean (inert and suitable for unrestricted upland disposal) and can be used as unrestricted fill material. This material will still need to be permitted for placement in streams or wetlands just like any other fill materials.

HAZARDOUS MATERIAL

Sample collection and analysis were performed for three of four hazardous materials investigated within the power house. Investigations were conducted for Asbestos, Lead based paint, PCB's and Mercury. The results of these investigations are that asbestos and lead based paints were detected and will need to be mitigated as part of the power house demolition process. Oils were sampled and tested for PCB's but no PCB's were detected. No items were found that would have contained Mercury so nothing was tested and no report generated.

Asbestos (see full report in the appendix)

Wightman Environmental, Inc. (WEI) conducted a National Emissions Standard for Hazardous Air Pollutant inspection of the power house and dam on 3/18/14 & 4/4/14. The purpose of the inspection was to determine if the referenced structure contained any asbestos containing materials. The dam structure consists of a two-story brick and concrete block structure with associated dam spillways.

During the inspection, bulk samples were randomly collected from any suspected asbestos containing building materials. Category II non-friable asbestos was discovered in electric wire insulation and category I non-friable asbestos in the roofing tar. Since these are non-friable sources of asbestos a licensed asbestos abatement contractor is not required but special procedures and handling per regulations are required.

Lead Based Paint (see full report in the appendix)

Wightman Environmental, Inc. (WEI) performed a lead-based paint inspection for the structure known as the Pucker Street Dam in Niles, Michigan on 3/18/14. Based on that inspection WEI concluded that there is non-intact lead-based paint at the property and lead hazard activities will be required.

The inspection was performed by a Michigan Department of Community Health Certified Lead Inspector and consisted of collecting and testing paint chip samples from 16 painted surfaces within the structure. In conjunction with the paint chip samples a visual surface by surface inspection was also performed. The painted surfaces within the structure were observed to be non-intact at the time of the inspection. Please note not all painted surfaces could be accessed for testing

Polychlorinated Biphenyl (PCB's) (see full report in the appendix)

Wightman Environmental, Inc. (WEI) performed an inspection on 3/18/14 looking for sources of oil to sample for PCBs. Two sources of oil were identified: the large generator and a hydraulic pump. Samples were collected from each source and sent to an independent laboratory for analysis. Both samples were found to be non-detect for PCB's.

ANALYSIS

HYDROLOGY

Base Flows

Base flow is the portion of the river discharge that is groundwater. Surface water runoff when added to base flow, induces flow increases of various magnitudes, including floods. Base flow, although relatively constant, varies in magnitude with precipitation and snow melt within and between years. Groundwater contribution is important to the Dowagiac River, providing a stable source of cold water that provides suitable habitat for cold water species, such as trout. The persistence of vegetation along the banks and the habitat available to different fauna is governed by base low and its seasonal variations.

To investigate base flow in the Dowagiac, a plot of the average daily discharge can be useful. Average daily discharge indicates the average flow on any day of the year in the Dowagiac over the period of record. A plot of this average daily discharge at the Dowagiac River gaging station at Sumnerville (USGS 04101800). is displayed in Figure 16. The seasonality of flow on the Dowagiac River is apparent, with higher flows in the spring, gradually trending lower into summer then increasing in late fall and winter with rainfall and lake effect snow events.

To understand the changes between wet years and dry years in the magnitude of base flow, it is useful to consider the exceedance probability, which is expressed as the percentage of time that a giving flow rate is exceeded. The driest day would have a 100% exceedance flow value, indicating flow has never dropped below this value during the period of record. Base flow during wet years is difficult to interpret as the exceedance values begin to incorporate elements of the flood signature. We used the 10% exceedance value to estimate typical low flows in extremely wet years. The results for the Sumnerville gate were multiplied by the ratio of watershed area at Pucker Street to the watershed at the gage (~1.11) to estimate typical low flow in the study reach (Table 1).

Flood Magnitudes

To estimate flood magnitudes, a Log-Pearson Type III (LP3) probability distribution was fit to the Dowagiac River at Sumnerville, MI, flow gaging station data (USGS gage 04101800; IACWD, 1983). This gage is located 4.5 miles upstream of the project site and has a drainage area of 255 mi^2 compared with 282 mi^2 at the downstream end of the project area. The Sumnerville gage recorded larger floods (>1250 cfs) in 1968, 1985, 1986, 1990, 1993, 1997, 2008, and 2009. The smallest annual peak flow was 629 cfs in 2000 and the largest annual peak was 2300 cfs in 2008 (Figure 17). An additional flow gaging station at State Highway 51 (USGS gage 04101535, installed in 2012) was not utilized for flood magnitude analysis given its short period of record. In general, the high infiltration rates throughout the watershed and subsequent high groundwater supply to the Dowagiac River results in a relatively stable flood hydrology. The range of flood flows is relatively small, with the difference between a frequently occurring peak flow (< 2 year return interval) and an infrequent peak flow (>50 year return interval) less than a factor of 2.

Table 1. Low flow statistics at the Sumnerville gage and at Pucker Street Dam.

% Time Exceeded	Discharge (cfs)	
	Sumnerville Gage	Pucker Street Dam
1	777	859
5	541	598
10	458	506
50	276	305
75	205	227
90	162	179

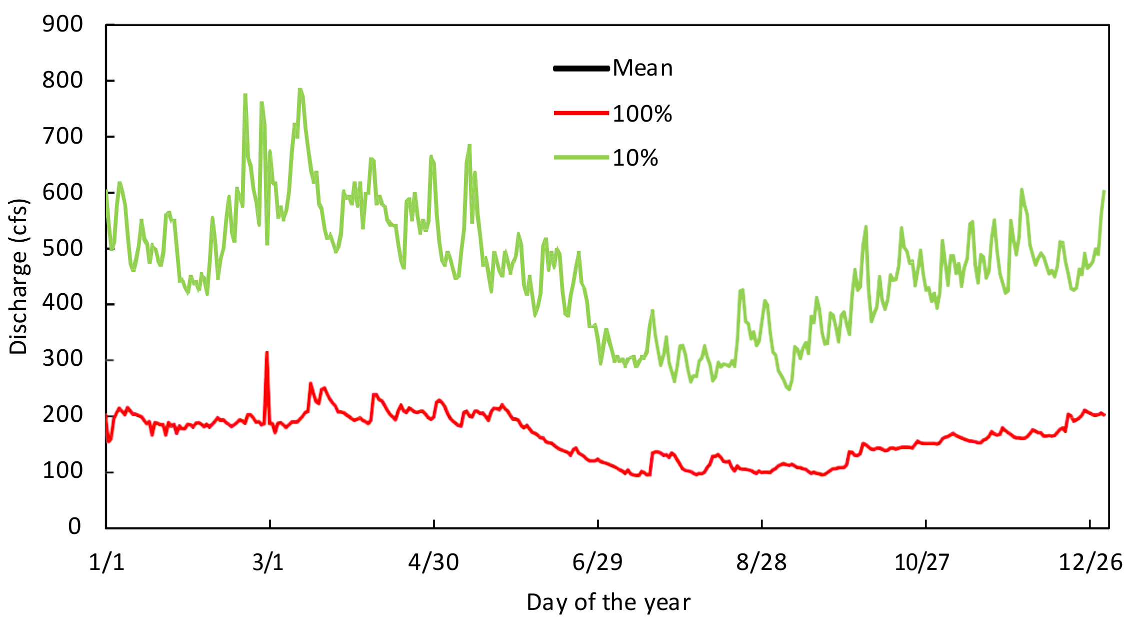

Figure 16. Probability of flows exceeded for each day of the year at the Sumnerville gage. The black line is the average flow magnitude for each day averaged for the gage record since 1980, while the green and red lines relate to flows exceeded 10% and 100% of the time, respectively, for each day of the year.

The gage record at Sumnerville included 52 years of data. Analysis of the annual peak flood plot (Figure 17) suggests peak flood magnitudes have increased over the period of record. Given the importance of flood hydrology to the project, the data was parsed to examine the potential effect of this trend on predicted discharge. Three component sets were analyzed. First, the 1983 through 2013 data set was investigated because it includes inter-decadal climate cycles shown to persist within the Lake Michigan region (Thompson and Baedke, 1997; Hanrahan, 2009; Wang et al., 2012). The second period of analysis focused the data record over the last 11 years. Both study periods included one outlier (2008) which was excluded from the analyses. The IACWD (1983) recommends at least 10 years of data to complete the LP3 analysis.

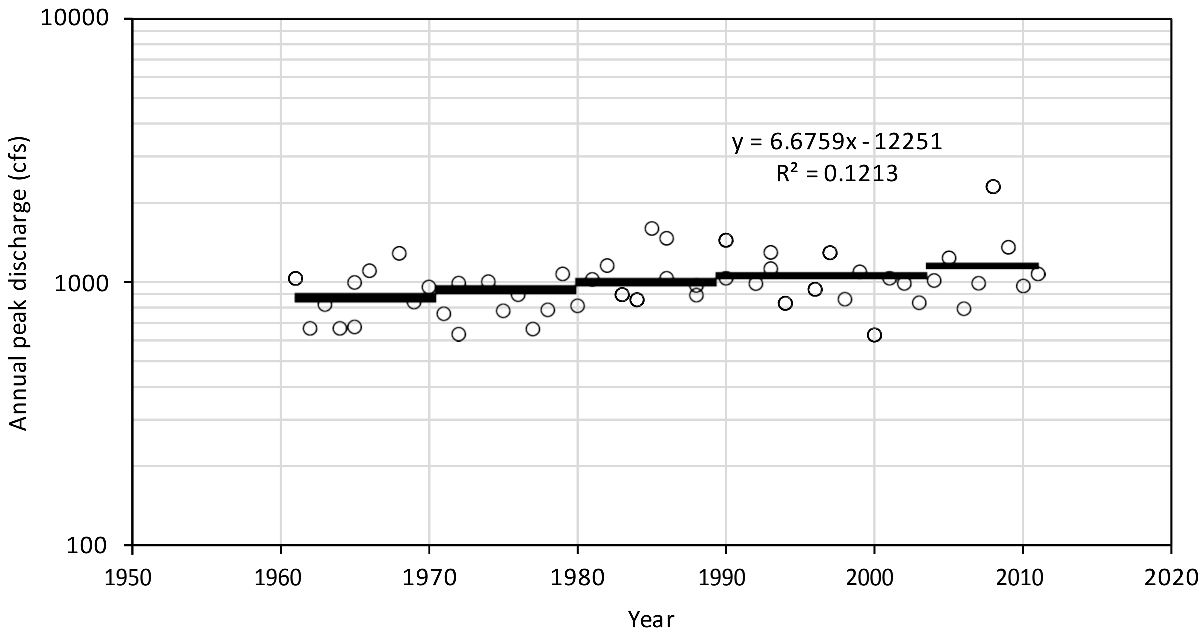

Figure 17. Annual instantaneous peak discharges for the Dowagiac River gaging station at Sumnerville (USGS 04101800). One high outlier was detected in 2008 and removed from the flood quantile estimation procedure. There is a general increase in annual peak flood magnitude.

The application of the LP3 method for determining flood magnitudes required calculating first, second and third moments of logarithms of the annual maximum peak discharges at the USGS Dowagiac River gaging station at Sumnerville (04101800). For the third moment (i.e., skew coefficient), we used a generalized value that combined the gaging record with a regional average value as flood quantiles are relatively sensitive to the value (IACWD, 1983). With the entire gage record data, the skew was 0.085 while the regional average skew was 0.081 (Croskey and Holtschlag, 1983). The similarity between the two values confirms that the Sumnerville gage reflects regional climate and runoff regimes. Combining the two values resulted in a generalized value of 0.083. For the parsed data, the sample skew coefficient was 0.17 and 0.28 for the 30- and 10-year gaging records, respectively. The higher skews indicate larger magnitude floods in recent years.

The flood magnitudes for the 30-year gage record resulted in the largest estimates while the full record had the second highest estimates and the 10-year record had the lowest estimates. We applied the 30-year gaging data for project site as it provided more conservative results by producing higher estimated water surface elevations and larger shear stresses. The final peak discharge values for Pucker Street (Table 3) were derived by multiplying the gage measurements by the ratio of watershed area at Pucker Street to the watershed area at Sumnerville (~1.11).

Table 2. Peak flood magnitude estimates at the USGS gage (04101800) using the full, 30-year, and 10-year data records. The 30-year record predicted the highest discharges and was used to provide a more conservative approach for hydraulic modeling.

Recurrence Interval (years)	Discharge (cfs) for various gaging record lengths		
	Full record	30-year	10-year
1.43	901	911	897
1.5	908	920	914
2	952	1017	991
5	1149	1218	1166
10	1269	1341	1271
25	1314	1488	1394
50	1517	1593	1480
100	1617	1695	1562

Table 3. Predicted flood magnitudes at Pucker Street based on the 30-year Sumnerville Gage data record and the watershed area ratio transformation.

Recurrence Interval (years)	Discharge (cfs) Pucker Street Dam
1.43	1008
1.5	1017
2	1125
5	1347
10	1483
25	1646
50	1762
100	1874

CHANNEL FORM AND HYDRAULICS

Channel Planform Alternatives

Figure 18 displays the estimate of the historical planform alignment for initial design purposes. The historical ("pre-dam") alignment includes the channel from just downstream of the dam to the transition point from the upstream section of the study reach to the downstream section where the impoundment began (Station 7200). The historical alignment generally follows the minimum elevations (i.e., deepest points) measured during the DOR survey (Figure 15), especially along the lower end of the reach, from the dam to station 4300. Within this subreach, the inset design channel and the additional slope from the existing surface down to the channel bed will occupy most of the existing valley floor.

At Stations 4400 to 6100, the historical alignment deviates from the existing alignment and features a set of bends that abut the opposing valley walls and traverse the entire valley floor. The similar bends depicted in the 1868 general land survey office (GLO) map offer additional evidence that this is likely the pre-dam alignment (Figure 19). A change in channel planform in this section may have accompanied a possible shift to a lower slope observed at station 3200 in the DOR data (Figure 15), or the bends may have developed due to differences in valley morphology and sediment storage prior to dam construction. Taking advantage of this meandering form would maximize channel length through the reach, increasing the length by approximately 1000 feet. The additional length and sinuosity would provide opportunities for scour hole development and wood recruitment or placement, which would promote habitat improvement. Additionally, the meander bends would reduce overall channel gradient and provide temporary sediment storage on point bars. If these processes are reinstated, they would likely provide more heterogeneous velocities and diverse bathymetry and topography along the meander sequences, thereby creating more complex habitats.

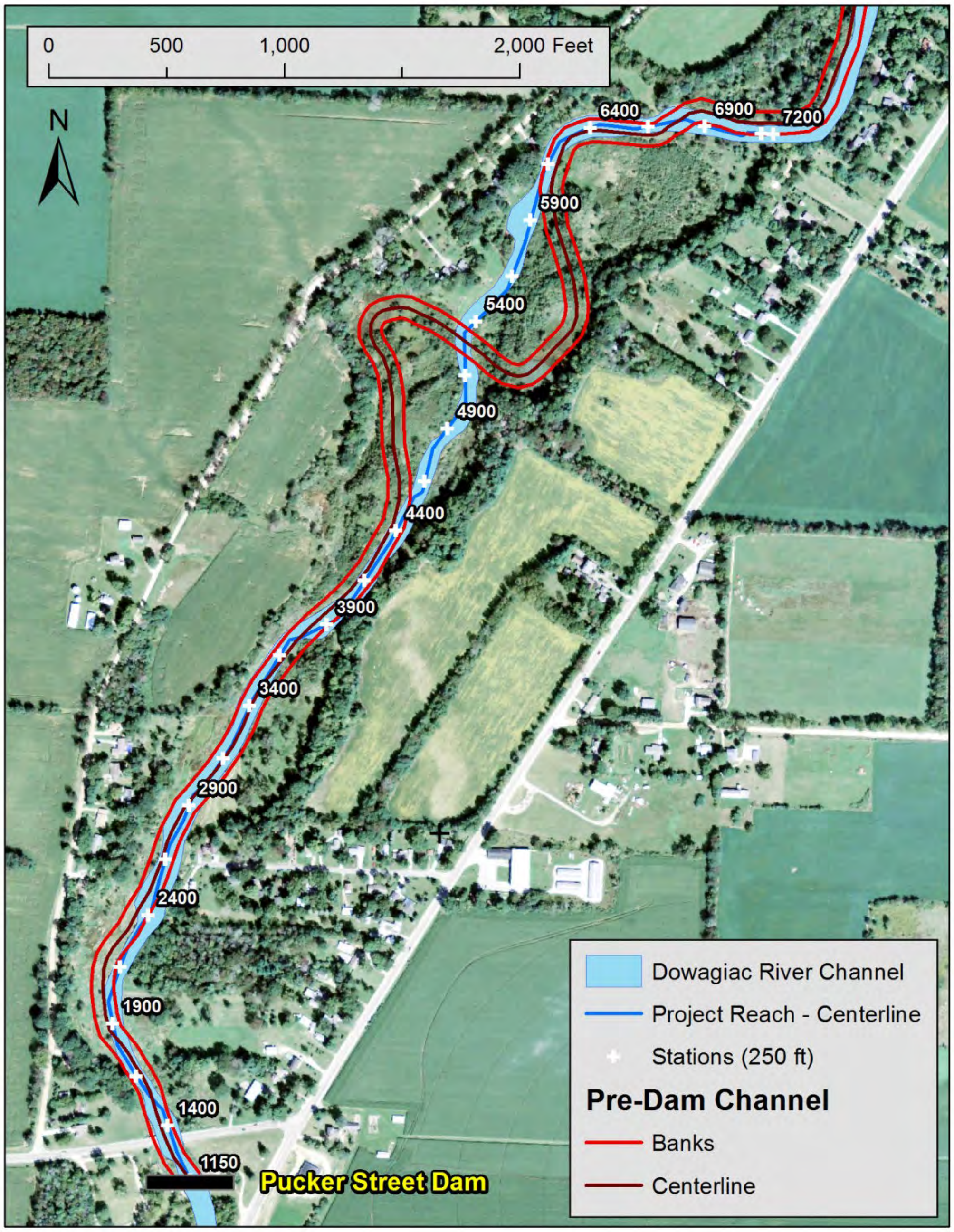

Figure 18. The Dowagiac River pre-dam planform alignment.

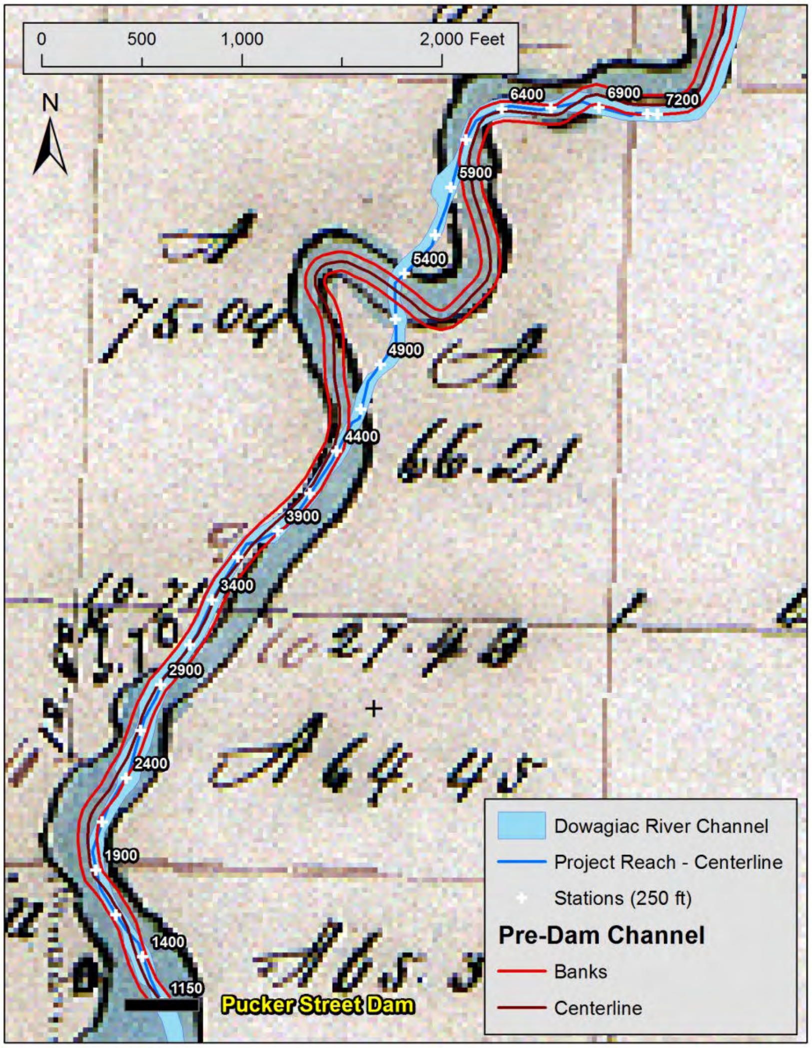

Figure 19. GLO map of the Dowagiac River channel alignment in 1868.

The remaining pre-dam channel alignment, above the bends, extends to Station 7200 where the channel transitions from the formerly ponded area to the upstream reach characterized by a narrower, forested floodplain and more gravelly bed. No work is anticipated in this subreach. The river at this location was likely impacted by Pucker Street Dam, and has adjusted since the 1999 drawdown. Following dam removal, continued adjustments will likely be smaller in comparison and limited to coarsening bed material and a slight decrease in water surface elevation.

A second option considered for the project channel alignment is to leave the river in its existing configuration. After dam removal, the channel along both the historical and existing alignments will be similar between the dam and Station 4500. Upstream of Station 4500, the existing channel planform does not follow the DOR elevations and mapped meander bends, leaving a straighter and steeper channel than the proposed historical alignment. Using the existing channel alignment reduces opportunities to improve overall channel and riparian habitat and limits the dam removal's impact on ecological restoration, at least in the short term; however, it also reduces costs, both in excavation and sediment management. Because we anticipate a budget that will not be sufficient to fully excavate the pre-dam meanders, leaving the river in the existing alignment is the project partners' preferred option.

Proposed Channel Cross Section

A number of methods were applied to estimate stable cross-sectional geometry for the Dowagiac River through the project reach, including using reference reaches as guides to channel sizing, estimating widths and depths based on regional hydraulic geometry studies, and using bankfull flow estimates to refine the final dimensions.

Hydraulic geometry equations for Michigan streams (Rachol and Borley-Morse, 2009) provide estimates of channel dimensions using drainage area as the only independent variable. The drainage area at the dam is 282 square miles and at the upstream end of the project area, Kinzie Road, the drainage area is 281 square miles. The equations were used to develop values for several channel geometry variables (Table 5).

Table 5. Channel geometry predicted by empirical equations from Rachol and Borley-Morse (2009).

Channel Parameter	*Predicted by geometry equations*
Width	98.0 ft
Depth	3.1 ft
Width/Depth ratio	31.9
Bankfull discharge	861 cfs

Channel dimensions were further defined by observing channel reaches downstream from the dam and just upstream from the impounded area. The downstream reach is steeper and has been impacted by a lack of sediment supply below the dam; therefore, below the dam, the channel has larger grain sizes, greater channel width, and shallower channel depth. The channel upstream of the historic impounded area likely provides a slightly better reference reach as sediment is still being supplied from upstream. Results from the reference reach analysis are provided in Table 6.

Table 6. Channel dimensions observed at reference reaches along the Dowagiac River upstream and downstream of the project reach.

Downstream Reference Reach	
Average Width	110 ft
Average Depth	3.7 ft
Average Width:Depth	30
Upstream Reference Reach	
Average Width Average	88 ft
Depth	4.2 ft
Average Width:Depth	21

To refine the proposed cross-section geometry, the channel was designed to pass an estimated bankfull flow. The bankfull discharge was predicted using the estimated annual flood quantiles at the Sumnerville stream gage and then transferring the data downstream by the ratio of drainage area. The 1.5 year annual recurrence interval flood, approximately 1015 cfs, was used as a first prediction of bankfull discharge (see Hydrology Section). The bankfull discharge was then routed through a trapezoidal channel using Manning's equation.

$Q = (1.49AR^{2/3}S^{1/2})/n$

Where A = channel area

R = hydraulic radius (A/Wetted Perimeter)

S = slope = 0.0024 ft/ft based on DOR data representing historic bed elevations but existing channel alignment

N = roughness = 0.038 based on existing bed material and Strickler's equation.

A range of potential channel geometries were calculated based on fitting depths and bottom widths to the estimated bankfull flow of 1015 cfs (Table 7).

Based on the channel geometry analyses summarized previously, a channel top width between 90 and 100 ft appears appropriate as it is narrower than the sediment starved downstream reach and wider than the upstream reach that has a slightly lower slope. Further, a width to depth ratio (W:D) of 31 was chosen as it was close to the downstream reach and the hydraulic geometry results. The upstream reference reach did not factor into the W:D decision as some legacy effects from the dam likely elevate bankfull depths relative to "natural" conditions.. Applying 2:1 side slopes and the W:D ratio and bankfull channel width requirements to the suite of bankfull channel dimensions results in an 82 ft wide channel bed width, a 94 ft top width, and a depth of 3.0 ft.

Table 7. Range of channel dimensions based on fitting depths and bottom widths to the estimated bankfull flow.

Bottom Width Feet	*Top Width Feet*	*Depth feet*	*Area ft^2*	*Wetted Perimeter feet*	*Hydraulic Radius feet*	*W/D*	*Shear Stress lbs/ft^2*
70	83.3	3.32	254.2	84.8	3.00	25.1	0.45
72	85.1	3.26	256.3	86.6	2.96	26.1	0.44
74	86.9	3.21	258.4	88.4	2.92	27.0	0.44
76	88.7	3.16	260.5	90.1	2.89	28.0	0.43
78	90.5	3.12	262.5	91.9	2.86	29.0	0.43
80	92.3	3.07	264.6	93.7	2.82	30.0	0.42
82	94.1	3.03	266.6	95.5	2.79	31.1	0.42
84	95.9	2.99	268.6	97.4	2.76	32.1	0.41
86	97.8	2.94	270.6	99.2	2.73	33.2	0.41
88	99.6	2.91	272.6	101.0	2.70	34.3	0.40
90	101.5	2.87	274.5	102.8	2.67	35.4	0.40

Floodplain Width Analysis

The proposed *bankfull* dimensions described above only define a channel that passes the 1.5 year recurrence interval flood, not the entire channel that will be excavated through the existing impoundment materials, either naturally or mechanically. Figure 15 indicates that bank heights, when extended from the proposed bed elevation to the existing sediment surface, will range from 18 feet at the dam to around 10 feet at the upstream end of the proposed alignment. With 2H:1V bank slopes and large bank heights, the resulting channel will hold flows well over the 100 year return interval flow (Figure 20). The channel may seem somewhat canyon-like, and the existing floodplain surface will be abandoned and revert to an upland condition in most areas. This situation makes establishing riparian vegetation and in-channel habitat difficult. Additionally, flood flows confined by the high banks will likely force widening within the narrow channel area, ultimately leading to natural development of an inset floodplain as sediment erodes laterally in the reach. This additional eroded sediment will be delivered downstream in the process. The excavation volume for this channel configuration along the existing alignment, with no floodplain bench construction, is about 203,000 CY. A similar amount, at least, would be expected to evacuate naturally over time if no channel excavation is conducted.

In situations where channels are actively cut into relatively deep sediments, floodplain benches provide a number of advantages. Spreading flood water laterally over the bench decreases energy within the channel, and during floods, the wider overall channel will store more water, attenuating downstream flooding and increasing groundwater-surface water interactions. The bench also presents an area for vegetation recruitment and establishment. The vegetation cover provides natural resistance to the erosive forces of water along the bench surface and along the banks. The floodplain bench can also be used to create off-channel habitat and flood refugia. For instance, where groundwater elevations are high, pocket wetlands can be fostered by excavating low spots (i.e., scrapes) in the bench.

In the case of a 20 foot bench, the lower surface would extend 20 feet from the top of the design channel before starting up the slope to the top of the impounded sediment (Figure 21). Benches should not be constructed where they will impact adjacent structures, or where the channel abuts the valley wall. Finally, the benches are often wider on the inside of bends to replicate point bars. Excavating 20 foot benches along the entire existing alignment will add about 102,000 CY to the excavation quantity, bringing the total excavation to approximately 305,000 CY of sediment. Depending on final budget, the project partners may elect to excavate a floodplain along only a portion of the channel to reduce sediment volumes. Excavation volumes would increase to 115,000 CY and 430,000 CY for floodplain and total excavation, respectively, if project partners chose to pursue restoration of the pre-dam alignment.

During the concept phase analysis, general channel and floodplain geometries were combined with flow duration and peak flow statistics to develop a, steady-state hydraulic model using the U.S. Army Corps of Engineers' HEC-RAS program. The analysis was based on restoring the channel to the pre-dam alignment, therefore the slope is slightly flatter (0.0019) than the proposed condition slope of 0.0024. However, the general patterns are expected to be similar so the analysis conducted is presented here.

The program is one-dimensional; therefore, there is no direct modeling of multi-dimensional hydraulic effects of cross section shape changes, bends, and other two- and three-dimensional aspects of flow. The hydraulic model calculates channel and floodplain water velocities, depths, and shear stresses for various input flows (developed above in Table 3). Models were set up for general existing conditions, and proposed trapezoidal channel conditions to begin understanding post removal hydraulics of the channel. The proposed conditions included a "no floodplain" scenario, in which the channel geometry continued at a 2H:1V slope from the channel bottom up to the existing impoundment surface (Figure 20), a 20 ft floodplain bench width (40 ft total floodplain width; Figure 21), and a 50 ft floodplain bench width (100 ft total floodplain width). The model was constructed only for this evaluation and has not been developed within the calibrated model of the river.

The model allowed comparison of water surface depths, velocities and shear stresses for multiple floods (Table 4), for the three described floodplain scenarios. At the 10YR return interval flood, channel depth decreases by 0.1 ft when adding 20 ft floodplain or 50 ft benches to the cross section. At the 100 yr return interval flood, the depth decreases by 0.2 ft for 20 ft benches and 0.3 ft for 50 ft benches. This translates into small differences in energy dissipation, as seen in the change in shear stress. Comparing the shear stress in the project site during a 100-yr return period flood to the "no floodplain" condition, the addition of 20 ft floodplain benches offers insignificant relief of 0.02 lbs/ft^2, and 50 ft benches lower shear stress by just 0.03 lbs/ft^2.

Based on this analysis, floodplain benches in the project would appear to function largely for ecological value and safety, rather than as a conveyance for flood energy. However, the need to develop vegetation as a resisting element to channel migration is a critical stabilization component along the river corridor that will be limited without a bench. Given these findings, we propose including a 20 ft (average) bench on each side of the river wherever possible given budget limitations. If budget precludes incorporation of benches for the entire length of the river, we propose including them at the downstream end and continuing up as far as budget allows.

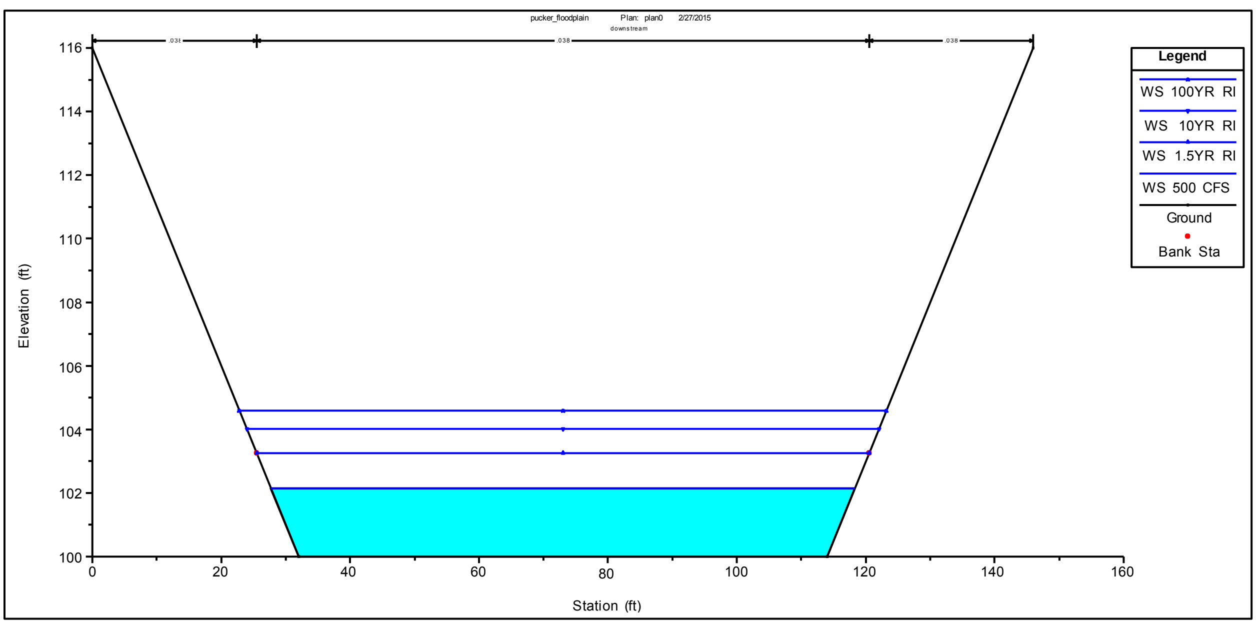

Figure 20. Floodplain cross section based on a 16 foot excavation depth and 2:1 slopes and no floodplain bench. 500 cfs represents an average flow for the study reach.

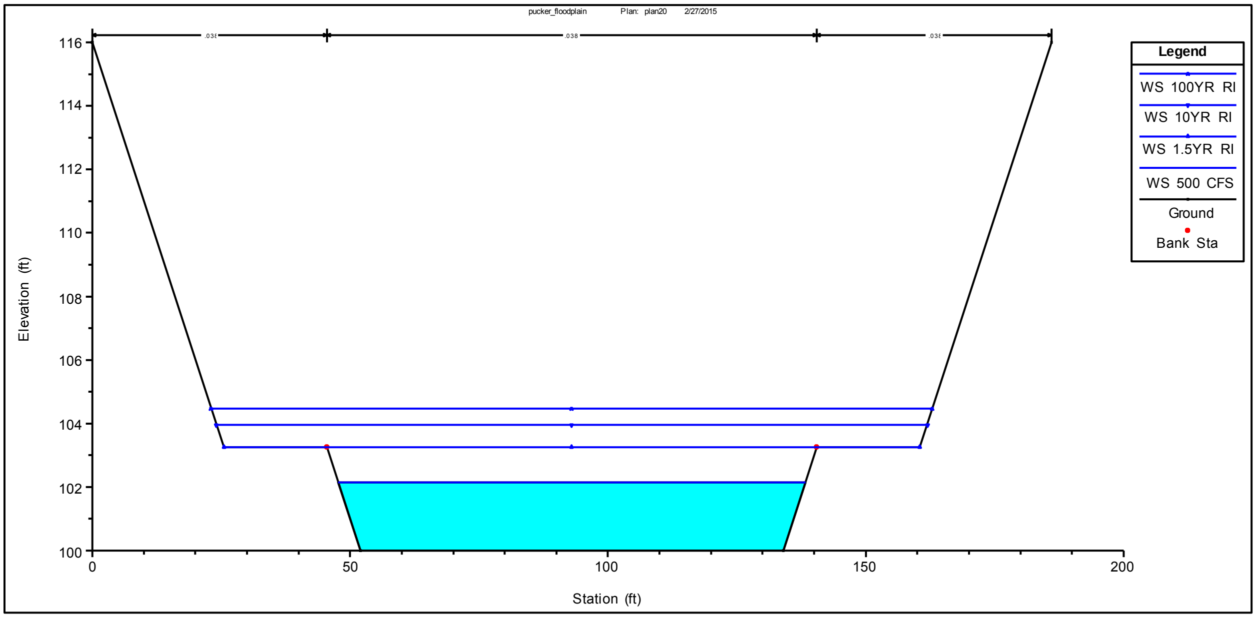

Figure 21. Floodplain cross section based on a 16 foot excavation depth and 2:1 slopes, and 20 foot floodplain benches. 500 cfs represents an average flow for the study reach.

Table 4. Changes in channel dimensions with varying flows and floodplain bench widths. 500 cfs represents an average flow for the study reach.

Flood	*Discharge (cfs)*	*Floodplain Width (ft)*	*Flow Area (sq ft)*	*Top Width (ft)*	*Max Depth (ft)*	*Shear Channel (lb/sq ft)*	*Shear Floodplain (lb/sq ft)*	*Velocity (ft/s)*	*Slope (ft/ft)*
500 CFS	505	50	185.3	90.6	2.2	0.24	0.00	2.7	0.0019
500 CFS	505	20	185.3	90.6	2.2	0.24	0.00	2.7	0.0019
500 CFS	505	0	185.3	90.6	2.2	0.24	0.00	2.7	0.0019
1.5YR RI	1015	50	287.9	195.0	3.3	0.35	0.00	3.5	0.0019
1.5YR RI	1015	20	287.7	135.0	3.3	0.35	0.00	3.5	0.0019
1.5YR RI	1015	0	287.6	95.0	3.3	0.35	0.00	3.5	0.0019
10YR RI	1483	50	414.4	197.6	3.9	0.43	0.08	4.0	0.0019
10YR RI	1483	20	384.9	137.9	4.0	0.44	0.08	4.1	0.0019
10YR RI	1483	0	362.2	98.1	4.0	0.44	0.04	4.1	0.0019
100YR RI	1874	50	499.0	199.3	4.3	0.48	0.12	4.3	0.0019
100YR RI	1874	20	454.2	139.9	4.5	0.50	0.13	4.4	0.0019
100YR RI	1874	0	418.5	100.4	4.6	0.51	0.07	4.5	0.0019

SEDIMENT MANAGEMENT

1999 Drawdown

An initial drawdown and passive sediment release occurred at Pucker Street Dam in May 1999 when the gates were permanently opened (Wesley, 2008). Water levels were dropped 5 feet and a slug of sediment was released into the river below the dam. A week after the drawdown, turbidity increased and remained high for about three weeks while the river cut downward to a new, lower channel elevation through the impoundment. Formerly flooded sediments in the impoundment were exposed after the first week of the draw down. By August 1999, the turbidity within and downstream of the impoundment was the same and appeared to be back to normal levels for the river. A wave of sandy bedload material was noted in the downstream channel in June following the drawdown. The sand moved as a coherent slug, increasing in thickness, by up to 18 inches, and then decreasing again at subsequent downstream monitoring stations as it spread and progressed towards the St. Joseph River. By July 21, 1999, sand was clearing from steeper sections (e.g., riffles) in the reach downstream of the dam but persisted in the lower velocity runs and pools. A year after the drawdown, sand had mostly evacuated in areas immediately below the dam, and continued to progress downstream (Wesley, 2008).

After the initial sediment slug was released, a sediment trap was constructed between the dam and Pucker Street to capture material prior to entering the reach below the dam. Approximately 35 tons/day of sand was caught by the 110 ft long, 70 ft wide and 12 ft deep sediment trap over the first few months after installation. The trap required monthly dredging, but it is not clear if dredging was scheduled, or if the trap filled on a monthly basis. If the trap filled before scheduled dredging, additional material would have passed downstream. Sediment delivery from above Pucker Street Bridge remained high through the fall of 1999, but decreased to about 5 tons/day in spring, 2000. The trap was maintained until September 2002 when bedload estimates at the dam were equivalent to background estimates (about 1 ton/day). Overall, the sediment trap was cleaned 14 times, removing approximately 48,000 cubic yards of sand at a total cost of approximately $50,000. Three years after the draw down the river channel had stabilized considerably in the former impoundment. Continued bank erosion during high flows periodically added sediment to the system. The river below the dam recovered to near pre-draw down conditions. Riffle and run substrates returned to gravel and cobble, and the pools deepened. However, sand that was not there prior to draw down persisted along the margins of the river. Based on the channel dimensions established after the drawdown (Wesley, 2008), roughly 100,000 CY of sediment was estimated as the release from the impoundment between 1999 and 2002. Although no measurements were made, up to half of the material could have passed downstream of the dam (Wesley, personal communication).

Active versus Passive Sediment Management

Passive restoration of a stream entails removing the major impediment to natural river function, in this case a dam, to natural river function and allowing the river to restore itself over time. The advantage to this approach is the low cost, as it requires little work in the impoundment to control sediment or foster more natural channel characteristics. Low cost comes at the expense of time, as the river will evolve through a lengthy process of erosion and migration that may require decades to centuries to arrive at the restored condition. It can also have a negative short term impact on downstream reaches as large volumes of sediment may be delivered below the dam.

Active restoration entails not only removing the impediment to natural function, but also using mechanical means to create a stable channel form with higher ecological function. The advantage to this approach is that the time scale for recovery is shortened, and short term impacts are reduced, particularly those impacts associated with transport of sediment below the impoundment. This advantage is offset by the significant capital expense of the project.

Passive Sediment Management

Under a passive sediment management scenario, the dam is breached or removed with little or no sediment management. The channel within the impoundment is allowed to freely adjust its slope and form via incision, widening, and meandering (Figure 2 and Figure 3); and the resulting eroded sediment is allowed to flush downstream unimpeded. These adjustments will continue until the channel develops a form consistent with the flows and sediment regime imposed on it.

If passive management is utilized and the Dowagiac River follows general post-dam removal patterns of incision within the impoundment (Figure 2), adjustment through the reservoir materials will likely generate steep, unvegetated slopes left behind as the channel cuts away sediment to return to a more natural bed level. The river bed occupied after incision will likely have elevations similar to the bed prior to building the dam. These elevations are estimated by the DOR data along the channel (Figure 15). The banks will be roughly 10 to 18 feet high within the former impoundment (Figure 15), and will likely be too steep and unstable to establish vegetation. With no vegetation for long term stabilization, the channel will likely widen over time and form a new floodplain inset into the impoundment sediments. The exact nature of sediment transport and downstream depositional patterns associated with this sediment evacuation is difficult to predict accurately. The speed at which this process progresses will be governed by the magnitude and frequency of high flows that act on the channel following dam removal.

Active Sediment Management

The anticipated general pattern of channel evolution after a dam removal can be used to organize sediment stabilization efforts within the former impoundment. The evolutionary process (Figure 2) can be accelerated, and downstream sediment impacts can be reduced. Under an active sediment management scenario, sands and silts in the impoundment would be mechanically removed down to the pre-dam channel bed elevation and channel width. This represents the volume of material most likely to mobilize downstream following removal of the dam.

Because the 1999 drawdown produced a significant sediment slug, and because there are fishery, recreational, and infrastructure considerations downstream, active sediment management is desired for the Pucker Street Dam project. The initial incision that would be expected under a passive management scenario can be mimicked by excavating the channel to the proposed bed elevations, which are based on the DOR survey (Figure 15). The bank slopes from the channel bed to the existing sediment surface should not be steeper than 2H:1V. The excavation allows reaching a relatively stable endpoint quickly while controlling the release of sediment. In this alternative, the channel will be aligned to match the historical channel location. Due to the depth and extent of the sediment stored behind Pucker Street Dam, active sediment removal will require large scale cut and fill.

Sediment Volumes

The Pucker Street Dam impoundment stores roughly 1,026,000 CY of sand and silt. This value does not include coarser gravel material stored along the channel upstream of the impoundment to Kinzie Road, which could amount to an additional 43,300 CY. This coarser material is best left in the river as substrate. Only sediment associated with establishing a new river channel and floodplain must be managed. Sediment outside of this corridor can be left in place. An estimated 203,000 CY of sediment will need to be excavated to achieve the “no floodplain” scenario along the existing alignment. If moved to the historic alignment, approximately 315,000 CY would need to be excavated for the “no floodplain” scenario. Similar amounts of material would be expected to evacuate from the impoundment if the channel only progressed to *Stage 3* (Figure 2) under a passive sediment management scenario (i.e., no floodplain development). Adding an average 20 foot bench to both sides of the channel (i.e., 40 foot floodplain) increases the amount of required digging by 102,000 CY for the proposed alignment and 115,000 CY for the existing alignment.

It is important to understand that the channel will continue to evolve over time. Particularly during the first few years after dam removal, before vegetation becomes well established, channel banks will be susceptible to erosion. We are not proposing stabilizing the banks of the excavated channel with erosion control fabric or stone because the cost of running those treatments along the full length of the excavated river would be prohibitive. Leaving a sediment trap in the lower impoundment may help reduce the amount of eroded material from traveling downstream.

Contamination

Results (see appendix for full summary submittal) were submitted to the MDEQ for review and concurrence with our findings. Based on this review it was determined that the dredged sediment is considered clean (inert and suitable for unrestricted upland disposal) and can be used as unrestricted fill material.

The results show that only concentrations of arsenic, selenium and zinc in some samples exceed the statewide default background levels however the Upper Confidence Limits (UCL) for arsenic and zinc are below the accepted state background levels for this area. Although the UCL for selenium at 480 parts per billion (ppb) exceeded the default background limit of 410 ppb this is still a low enough concentration to not exceed the part 201 (environmental remediation) criteria.

Pipeline Crossing

Two Transcanada/ANR natural gas pipelines cross the Dowagiac River at Station 4200. The pipes consist of a 24 inch diameter line and a 22 inch diameter line running parallel to each other. Both are buried below the channel, and a 2015 inspection indicated a minimum cover of 3.9 ft over the 22 inch pipe and 3.1 ft over the 24 inch pipe. Depth-of-refusal probing in this section of river suggests the pre-dam channel bed is likely 5 to 7 feet below the existing bed (Figure 15), which indicates the pipes were buried in post-dam reservoir sediment. If the channel is allowed to passively achieve its pre-dam bed elevations, the pipes will eventually be exposed and elevated above the bed. This would be an unacceptable condition that risks both the integrity of the pipes, particularly given the likelihood of debris accumulating on them to an unpredictable degree, and risks the safety of recreational users. The pipes will be relocated at a sufficient depth below the expected grade of the pre-dam channel. Project partners are currently planning to proceed with pipeline reconfiguration and are discussing solutions with Transcanada/ANR.

Access / Locations for Spoils

Due to the confined valley within the project area, access and excavated sediment disposal requires careful consideration. Access can be achieved at the dam site, at the city-owned parcel near station 6400, and with the necessary permission, might be possible at some of the privately owned properties along the valley.

A number of opportunities exist for disposing the excavated sands from the valley. Spoils from the sediment trap during the 1999 drawdown were placed next to the dam site, and there appears to be additional room for storage within the city-owned park. Material could also be placed in the existing floodplain area not impacted by the proposed in-channel work. The most inexpensive approach is to keep material on-site. Based on analysis of sediment volumes and available area for disposal within the existing impoundment, former raceway, and city park, we anticipate keeping all material on site.

We are working with project partners to finalize access locations.

Habitat Restoration

Habitat potential for the project lies largely within two realms, the in-channel habitat and the floodplain habitat. The overall goal for any habitat project is to increase the complexity of depths, flow velocities, vegetation, and other elements, which in turn increases the type and abundance of species that utilize such areas.

Floodplain Habitat

The existing floodplain has developed on the impounded sediment surface exposed after the 1999 drawdown. It includes floodplain wetlands, remnant side channels, and microtopography, although it may be somewhat disconnected from the channel in some sections. Following removal, this surface will dry considerably and vegetation may shift to comprise more upland species. Constructing inset floodplains during excavation (i.e., 20 ft bench) will allow for the addition of planned topographic variation such as shallow wetland scrapes and shallow deposits of fill to augment the existing topographic variation. Excavation of a floodplain bench will also foster vegetation development, which is important for habitat and erosion resistance. Under a "no floodplain bench" scenario, floodplain benches will develop over time as sediment is eroded and deposited along the channel margins and vegetation naturally proliferates. In general, channel banks will be self-forming through the project area, but development of stable banks may be slower and will result in sediment migration to the downstream reach under a passive or "no floodplain bench" scenario.

In-Channel Habitat

Wood

Habitat within the newly excavated channel will be augmented by the construction of wood complexes and single log pieces. Analogs of these exist within the current channel, both upstream and downstream of the project reach (Figure 22). A complex of large wood provides important habitat for adult and young of the year fish. In-channel wood also induces scour and deposition within the channel, creating bed variability and habitat heterogeneity. Installation of large wood remains an option in the proposed design and will be dependent on the final budget and contractor bid prices. If installation of large wood is completed as part of this project, wood will not span the channel, and will be compatible with paddler use of the river. Placed wood may require periodic maintenance to ensure captured debris from upstream does not completely block the channel.

Figure 22. Examples of single log and wood accumulations along the Dowagiac River.

Pool and Riffle Habitat

Bed forms (e.g., pools, riffles, runs, etc.) associated with the pre-dam channel are currently buried by fine sediment trapped by the dam. Dam removal will uncover many of these features, thus, reestablishing a more heterogeneous channel form. The DOR survey indicated the historic bed in the project reach contained gravels as well as sand. These gravels, and possibly coarser material, will be exposed along the project reach following removal, and will also be delivered to the project reach from upstream. Reactivating the natural transport of these materials will maintain the exhumed bed features, and reestablish river function and process.

Pools will develop in two places within the project reach: 1) on the outside of meander bends and 2) in association with local scour from obstructions (e.g., wood) encountered in the channel. Pools on meander bends often develop in concert with point bar sediment deposited on the inside of a bend. Point bars are not common above the dam along the Dowagiac River largely because the channel was straightened. Field observations of point bar development upstream of the project site (Figure 23) provide examples of this process. Given that we are not reestablishing the pre-dam meanders, bend scour will be initially limited. However, as the stream evolves and creates new meander bends, we expect these features to develop.

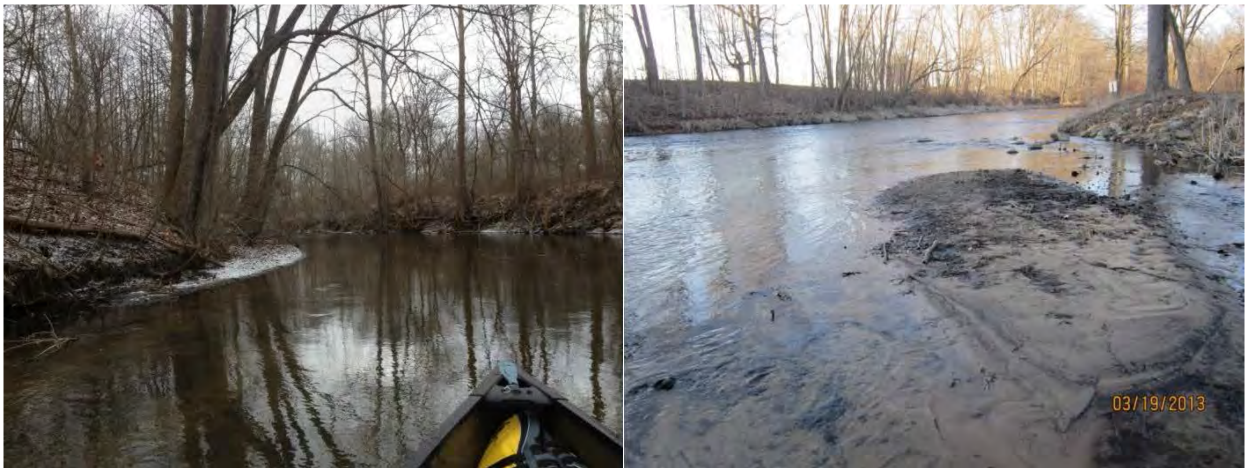

Figure 23: Bends in the Dowagiac River upstream of the study area exhibit weak point bar formation with a coincident deeper pool on the outside of the bend.

PROPOSED CHANGES AT PUCKER STREET DAM

The dam and the area around it pose additional constraints and opportunities for the project. First, channel position will be maintained under the Pucker Street Bridge and through the dam site. The concrete wall along the east bank at the dam (Figure 24) will likely be left in place, but it will be hidden and the vertical drop will be eliminated by creating a stone toe with fabric encapsulated lifts on top. The upper portion of the slope will be vegetated with native plants that will not require mowing. On the west side of the river, the bank will be shifted to the east enough to accommodate the material placed along the eastern wall while maintaining the conveyance capacity of the upstream reach. The bank will slope up to the existing ground surface at the island to create a natural bank that allows for access to the water by both people and wildlife. Both banks will tie into the existing topography within a few hundred feet downstream of the dam.

Some of the material excavated from the impoundment will be used to fill the upstream raceway adjacent to the dam. The raceway is currently spanned by a foot bridge which will be replaced by a wider land bridge created from fill material. The lower end of the raceway may be left open for additional backwater habitat or perhaps to accommodate recreational access.

Figure 24. Concrete wall along the east bank below Pucker Street Dam.

DEMOLITION AND DEWATERING

Prior to the start of demolition, dredging of the area behind the dam will be performed to create a sediment basin during the drawdown of the river. Demolition will start with the powerhouse and the removal of the hazardous materials and equipment followed by the structure above the main floor elevation. To accommodate a possible flood flow during construction the overflow spillway will be removed to the current water level.

Once this is complete a sheeting and king pile cofferdam will be installed to isolate the west portion of the spillway consisting of the first three bays including the one that has been sealed that the office room sits above. The upstream portion will be isolated first and then the downstream portion. The cofferdam will then be partially dewatered to allow bracing and rakers to be added as the hydraulic pressure increases. Once the bracing is in place the cofferdam will be fully dewatered and the spillway demolished down to the concrete apron elevation of approximately 663.41 feet. Simultaneously split bulkhead style gates will be installed in the cofferdam.

When everything is ready the sheeting in front of the gates will be removed and the gates gradually opened drawing down the river in a controlled manner to the approximate tailwater elevation of 666 feet. The intent is to use a split bulkhead where the upper bulkhead can be gradually lifted to allow the water surface to fall to the elevation of the lower bulkhead. After the top bulkhead is removed, the bottom bulkhead will be gradually lifted until water surfaces reach the final drawdown level. Once the new river level is established, the cofferdam structure shall be removed, the bridge pier support work will occur, and the concrete apron removed. The remaining spillway will then be isolated and removed.

The final portion of the demolition will be to remove the remaining portion of the powerhouse structure and any additional structural removal needed to reshape and restore the channel from the bridge to the downstream end of the project.

Concept Level Costs

The concept level engineer's opinion of probable construction costs indicates the project will cost approximately $3.4M, including alternative items aimed at improving in-channel habitat. Just under half of the estimated costs are associated with excavating and disposing of the impoundment sediment. Powerhouse demolition and dam disposal accounts for $1M of the estimate.

60% - Engineer's Opinion of Probable Construction Costs				
BASE BID				
Description	**Unit**	**Quantity**	**Unit Price**	**Subtotal**
Mobilization and Controls	LS	1	$118,000	$118,000
DAM REMOVAL	**Unit**	**Quantity**	**Unit Price**	**Subtotal**
Powerhouse Demolition and Dam Disposal	LS	1	$956,000	$956,000
Bridge Stabilization	LS	1	$100,000	$100,000
BANK STABILIZATION	**Unit**	**Quantity**	**Unit Price**	**Subtotal**
Bank Stabilization (East Wall) - Rock	CY	240	$75	$18,000
Bank Stabilization (East Wall) - FES Lifts	FF	750	$40	$30,000
Channel Excavation (West Bank)	CY	1200	$6	$7,200
Steep Slope Hydroseed	AC	2.0	$2,500	$5,000
SEDIMENT MANAGEMENT AND RESTORATION	**Unit**	**Quantity**	**Unit Price**	**Subtotal**
Excavate Sediment within Channel (reuse within former impoundment area)	CY	203000	$6	$1,218,000
Install and Maintain Sediment Traps	EA	4	$5,000	$20,000
ALTERNATE BID ITEMS (PENDING FINAL BUDGET)	**Unit**	**Quantity**	**Unit Price**	**Subtotal**
Floodplain Excavation (up to 102,000)	CY	30000	$6	$180,000
Large Wood for In-Channel Habitat (up to 300)	EA	100	$450	$45,000
In- Channel Dig and Pitch (Operator and Excavator) (upto 15)	DAY	0	$2,000	$0
Seed (floodplain mix) Floodplain Corridor (upto 15)	AC	8.0	$2,000	$16,000
			Sub Total base bid items	**$2,472,200.00**
			Sub Total IFI alternate items	**$241,000.00**
			Contingency (15%)	**$406,980.00**
			Construction Oversight	**$300,000.00**
			Total	**$3,420,180.00**

SUMMARY

The removal of Pucker Street Dam presents significant opportunities and challenges. Challenges include the size of the Dowagiac River, the interaction with the Pucker Street Bridge, and the volume and depth of material stored within the impoundment. Removing the dam provides an opportunity for restoring a unique high gradient, cold water habitat for both the Dowagiac River system, and all of southern Michigan.

Construction funding will dictate the extent of active restoration elements that can be included within the project. At a minimum, removal of the dams and proper management of sediment will be priorities. Other desired elements of the project can be enacted later if and when funds are available. Budget constraints, short term sediment management concerns, and other factors limit the project partners' ability to fully restore the pre-dam river. A compromise solution that allows fish passage, habitat enhancement within the channel, partial floodplain excavation, at a significantly lower cost, is proposed. This proposed solution entails excavating a channel along the existing alignment that has partially cut through the impoundment sediment. In the long term, natural processes will allow the river to fully re-establish geomorphic and biologic health.

A primary goal of the project is to limit the impact of downstream sediment transport, a concern developed from stakeholder experience with the 1999 drawdown. Active sediment management represents the best means to accomplish this goal. Sediment will be managed using active approaches to the greatest extent practical, although minor incidental sediment release should be expected. Significant turbidity will persist while active construction in the channel is occurring, but will be limited following conclusion of construction. Excavation and sediment management will include construction and operation of at least one sediment trap. Excavated material will be reused within the existing impoundment footprint.

A floodplain will be excavated to the extent that budget allows beginning in the lower impoundment near the existing dam site. In areas of active excavation, seeding is expected to promote quick establishment of vegetation. Woody species such as trees and shrubs are not included but may be added if final budget allows.

REFERENCES

Cass County Conservation District. 2002. Dowagiac River Watershed Plan. 46p.

Cass County Conservation District. 2007. Dowagiac River MEANDR Restoration II: Evaluation Report. Appendix 1.

Chow, V.T., D.R. Maidment, and L.W. Mays. 1988. Applied Hydrology. McGraw-Hill.

Clarke, G.P.A., J.R. Batres-Marroquin, B.L. Braden, H. Kato, A.M. Perot, Jr. 1998. Feasibility assessment for rehabilitating the Dowagiac River System in Southwestern Michigan: A Watershed Analysis of Potential Changes to the Ecology and Community. The University of Michigan, School of Natural Resources and Environment.

Comer, P. J., Albert, D. A., Wells H. A., Hart B. L., Raab J. B., Price D. L., Kashian D. M., Corner, R. A., and D. W. Schuen. 1995. Michigan's presettlement vegetation, as interpreted from the General Land Office Surveys 1816–1856. Michigan Natural Feature Inventory, Lansing, Mich.

Croskey, H.M., and D.J. Holtschlag. 1983. Estimating generalized flood skew coefficients for Michigan. U.S. Geological Survey Water-Resources Investigations Report 83-4194, Lansing, Mi.

Dudley, S.J., J.C. Fischenich, and S.R. Abt. 1998. Effect of woody debris entrapment on flow resistance. Journal of the American Water Resources Association, 34(5): 1189-97.

Dorr, J.A. and D.F. Eschman. 2001. *Geology of Michigan*. University of Michigan Press, Ann Arbor, MI. 476p.

Holtschlag, D.J., and H.M. Croskey. 1984. Statistical models for estimating flow characteristics of Michigan streams. U.S. Geological Survey Water-Resources Investigations Report 84-4207, Lansing, Mi.

Interagency Advisory Committee on Water Data [IACWD]. 1982. Guidelines for determining flood flow frequency: Bulletin 17B of the Hydrology Subcomittee. U.S. Geological Survey, Office of Water Data Coordination, Reston, Va.

Kincare, K.A. 2010. The late Wisconsin and Holocene development of the St. Joseph River. Dissertation for PhD, Michigan State University, Dept of Geology. ProQuest Dissertations and Theses; 2010. 179p.

Kirby, M.J. and D.R. Hampton. 1997. The Hydrology and Hydrogeology of the Dowagiac River Watershed - Southwest Michigan. Western Michigan University, Department of Geology, Institute of Water Sciences.

Leverett, F. and F.B. Taylor. 1915. Pleistocene of Michigan and Indiana and the history of the Great Lakes. US Geologoical Survey, Monograph 53.

Powell, G.E., D. Mecklenburg, and A. Ward. 2006. Evaluating channel-forming discharges: a study of large rivers in Ohio. Transactions of the ASABE, 49(1): 35-46.

Rachol, C.M., and K. Boley-Morse. 2009. Estimated bankfull discharge for selected Michigan rivers and regional hydraulic geometry curves for estimating bankfull characteristics in southern Michigan rivers. U.S. Geological Survey Scientific Investigations Report 2009-5133, 300 pp.

Rieck, R.L., and H.A. Winters, 1993. Drift volume in the southern peninsula of Michigan – a prodigious Pleistocene endowment. Physical Geography 14: 478-93.

Rogers, H.S. 1875. *History of Cass County, Michigan from 1825-1875*.Cassopolis, MI: WH Mansfield Vigilant Book and Job Printing (1875).

Rosgen, D.L. *Applied fluvial geomorphology*. Wildland Hydrology Consultants, Pagosa Springs, CO.

Schumm, S.A. 1977. *The Fluvial System.* Wiley-Interscience.

Shields Jr., F.D., C.J. Gippel. 1995. Prediction of the effects of woody debris removal on flow resistance. Journal of Hydraulic Engineering, 121(4): 341-54.

Stone, B.D., Kincare, K.A., OLeary, D.W., Lundstrom, S.C., Taylor, E.M., and S.E. Brown. 2003. Glacial and postglacial geology of the Berrien County region of Michigan. 49th Midwest

Wesley, J.K. 2008. Dowagiac River - Pucker Street Dam Draw Down Experience. Michigan Department of Natural Resources Status of the Fishery Resource Report 2008-58.

Williams, G.P. 1978. Bank-full discharge of rivers. Water Resources Research, 14(6): 1141-54.k

APPENDIX

Wightman Environmental, Inc. Sediment Regulatory Summary

Wightman Environmental, Inc. Asbestos Inspection Report

Wightman Environmental, Inc. Lead Base Paint Report

Wightman Environmental, Inc. PCB Report

Appendix F

Public and Agency Comments Received on Draft EA and USFWS's Response to Comments

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Public and Agency Comments Received on Draft EA and USFWS's Response to Comments

1 RESPONSE TO COMMENTS ON DRAFT EA

As required by the National Environmental Policy Act (NEPA) and implementing regulations, USFWS made available to the public and stakeholders the Pucker Street Dam Removal and Dowagiac River Restoration Draft EA on the Pucker Street Dam Project website (www.swmpc.org/puckerstdam.asp) on December 7, 2018. The News Release of the availability of the Draft EA for public comment was published on the USFWS website on December 7, 2018, opening the 30-day comment period which closed on January 7, 2019.

The availability of the Draft EA was announced by issuance of a press release. News releases were issued in four newspapers (Niles Daily Star, South Bend Tribune, Herald Palladium, and Chicago Tribune) and two websites (MLive and City of Niles). Printed copies were available at eleven locations, including local agency offices, libraries and the USFWS office. In addition, electronic versions of the document were available on the project website or by request. Comments were accepted by mail or email.

During that time, five comments were received, four from public citizens and one from the Pokagon Band of Potawatomi. Due to the partial government shutdown during the comment period, the USFWS granted USEPA's request for an extension to provide comments, which were received on February 11, 2019. All comments received on the Draft EA and USFWS response are provided below.

2 GENERAL RESPONSES

2.1 Logjams in the Dowagiac River

Summary of Comments: USFWS received four comments from two people on the Draft EA which referenced lack of angling and paddling/canoeing access throughout the Dowagiac River due to log jams. Below is a general response to each of the key points raised by the commenters. *(Commenters: D. Harley and A. Marton)*

General Response: Removal of other obstructions including log jams is out of scope for this project. However, in conjunction with other planned projects in the region, the proposed project would cumulatively improve Dowagiac River conditions including removal of log jams. Despite being out of scope, the EA does acknowledge that management actions are needed to improve overall river access for recreational users. In Section 3.11.2.2.2 Recreation, the EA states "it is expected that dam removal may result in an increase in paddler use of the river due to dam removal. However, this increase is dependent upon management measures to remove obstructions that may pose a safety hazard in the river upstream of Kinzie Road" (Section 3.11.2.2.2 Recreation). Other management activities are in the preliminary planning stages, including the Cass County Drain Commissioner and Parks Director maintaining a clear pathway for paddling the Dowagiac River. Further, as stated in the City of Niles Recreation Plan, the City supports the development and maintenance of water trails on the Dowagiac and St. Joseph rivers (http://www.nilesmi.org/document_center/community/Park%20recreation/RecreationPlanBinder2016.pdf). Additionally, the Pokagon Band of Potawatomi is working on the first phase of a stream restoration project that would restore up to 5 miles of the Dowagiac River upstream of the project area (Section 3.16.1 Identification of "Other Actions").

After these larger projects are complete to remove the existing logjams, local cooperative management could be used to maintain a reasonable navigational width on the river. For example, on other rivers in the area, the Southwest Michigan Planning Commission follows MDNR's woody debris management guidelines and maintains up to 5 feet for recreational users to pass through. This type of wood debris management has been successful on other rivers after dam removal, such as the Boardman River. The removal of the three Boardman River dams brought statewide and national attention to the Boardman River. Given how fragile the newly reclaimed river banks are and how the Boardman River is already heavily used by locals and visitors alike for not only paddling but trout fishing as well, it was suggested that a recreation plan be developed to help balance recreational uses. The Grand Traverse Conservation District works with MDNR Fisheries Division and the local paddle club to manage the river for "reasonable" navigation. When a tree falls or a new log jam occurs blocking navigation, Conservation District staff only cut away enough of the tree or log jam to allow for two kayaks or canoes to pass side-by-side (Steve Largent, personal communication).

3 SPECIFIC RESPONSES

3.1 Full Economic Impact Study

Comment: You are misrepresenting the negative economic impact on the City of Niles and surrounding area. My clients, on a daily basis, visit the stores and gas stations in the area. Among the establishments that will be negatively impacted are Rusty Hook, The Nugget, Wal Mart, Holiday Inn Express, Duncan's Kozy Kitchen, Riverside Food and Liquor Store, Wings Etc. among others. I truly think you should complete a full economic impact study before you negatively impact a town that is already struggling. *(Commenter: D. Harley)*

Response: With the removal of the dam, the recreational fishing will change from a concentrated location below the dam to a wider area when fish passage is restored. The opportunity to fish will not be diminished by the project. Any changes to an individual store income may be offset by increased use of this section of the river by boaters. Since there would be minor impacts to recreational use of the river, a broader economic impact study is not warranted.

3.2 Adverse Economic Impacts

Comment: Adverse economic impacts associated with a potential reduction in anglers would effect a variety of area businesses that currently are being patronized by lower Dowagiac River anglers. *(Commenter: A. Marton)*

Response: Impacts to fish populations would be minor in the short-term and positive in the long-term (see Section 3.5 Aquatic Ecology). Any loss to recreational fishing use of the river in the short-term would be offset by long-term improvements to the fishery and increased use of the Dowagiac River by other recreational users (e.g., paddlers). Therefore, a broader economic impact study is not warranted as economic impacts are anticipated to be beneficial in the long-term.

3.3 Economic Impact Study

Comment: An actual economic impact study should be completed to support no adverse impact from potential reduction of anglers being offset by paddlers. *(Commenter: A. Marton)*

Response: Comment acknowledged. See Specific Response 3.2 "Adverse Economic Impacts".

3.4 Resource Utilization Data

Comment: The EA contains no factual resource utilization data to demonstrate the value of the resource to its users today and beyond. *(Commenter: A. Marton)*

Response: MDNR has about 14 years (1992 to 2004 and 2006) of creel survey data available for the section of the Dowagiac River downstream of Pucker Street Dam. The survey data includes recreational fishing usage and was referenced in EA Section 3.6 Aquatic Ecology. The data is publicly available at https://www.michigan.gov/documents/dnr/FR16_551843_7.pdf.

3.5 Dowagiac as a Fishing Resource

Comment: The EA contains no mention of the value (non-economic) of the Dowagiac River downstream of the dam as a world-class recreational fishing resource. *(Commenter: A. Marton)*

Response: Recreational fishing in the Dowagiac River is addressed as a beneficial use in EA Sections 3.5 Aquatic Ecology and 3.11 Parks and Recreation.

3.6 Fishing on the Lower Dowagiac River

Comment: Fishing on the lower Dowagiac River is one of the facets that currently draws tourists to both the City of Niles and Berrien County and should be leveraged for further economic development in the area. *(Commenter: A. Marton)*

Response: Fishing opportunities in the Dowagiac River are anticipated to improve due to increased access for salmonids to suitable spawning and feeding habitat in this cold-water system (see Section 3.5 Aquatic Ecology). Removal of the Pucker Street Dam has been a priority management action for MDNR specifically because of the anticipated positive effects to the fishery, among other benefits. Improvements to the fishery coupled with potential benefits for other recreational users (e.g., paddlers) are anticipated to have long-term economic benefits for the City of Niles and Berrien County.

3.7 Trout Fishery Above the Dam

Comment: The lack of mention of the wonderful trout fishery above the dam is an obvious omission. The trout fishing upstream of the dam will be negatively impacted with the removal of the dam. The dam is the upstream barrier that keeps smallmouth, pike, and walleye from foraging on the brown trout above the dam. This is a large reason why the fishing for brown trout below the dam is poor at best. There are very few fish left after the warm water species spend the summer eating them. On the other side of the dam the trout fishing is excellent because they are free of the large predators below the dam. I typically catch more trout in a day above the dam than I do in an entire year below the dam. See, this project will hurt not one, but two sides of the dam. *(Commenter: D. Harley)*

Response: EA Section 3.5 Aquatic Ecology describes the Dowagiac River as a quality coldwater system with naturally occurring and stocked brown trout. Brown trout are likely to remain an important game fish in the Dowagiac River system after removal of the Pucker Street Dam. Any negative effects to brown trout due to competition from other salmonids would be offset by continued stocking by MDNR. Based on the comment received, this information has been added to EA Section 1.4 Purpose and Need. In addition, as Table 3-4 indicates, smallmouth bass are already present above the Pucker Street Dam.

3.8 Stocking Steelhead

Comment: No plan for stocking steelhead to replace fish impacted from removal and to populate new fishery upstream. *(Commenter: A. Marton)*

Response: The existing steelhead population in the lower Dowagiac River is sustained by natural reproduction and migrants from the St. Joseph River stocking. MDNR plans to continue to stock steelhead in the St. Joseph River. After Pucker Street Dam removal, natural reproduction of steelhead is expected to increase due to the increased access to spawning habitat upstream of the project. In the future, if natural reproduction does not appear to be sufficient to support the steelhead fishery, MDNR would consider implementing a specific stocking program in the Dowagiac River.

3.9 Repair or Restore any Downstream Habitat

Comment: The EA contains no mention of a plan to repair or restore any downstream habitat damaged as a result of dam removal. *(Commenter: A. Marton)*

Response: EA Section 2.2.4.2.3 Restoration and Sediment Management Measures, states dam removal activities will include various sediment management practices that would help reduce downstream sedimentation. While there may be a small increase in sediment that is deposited downstream, this would be temporary while the natural flow of the river is restored to pre-dam conditions (see EA Section 3.4 Water Quality). The MDEQ permit will require turbidity monitoring during construction and require immediate action if unacceptable levels are reached.

3.10 Aquatic Resources

Comment: The Environmental Consequences Section regarding macroinvertebrates discusses baseline information on mussels found within the river (affected environment). However, the expected environmental effects (consequences) to mussels were not discussed. (*Commenter: USEPA)*

Response: Text was added to Section 3.5.2.2 to discuss impacts to mussels.

3.11 Aquatic Resources

Comment: Amend the Final EA to discuss the October 2017 mussel surveys, including who did them and what the results were. Discuss any mussel salvage operations to be undertaken during or before project implementation. (*Commenter: USEPA)*

Response: Text has been added to the Final EA as requested.

3.12 Aquatic Resources

Comment: MDEQ will likely require turbidity monitoring and a control plan, and that monitoring of dissolved oxygen may also be required. In-water work restrictions to protect fish windows will also likely be required, as further discussions with Michigan Department of Natural Resources (MDNR) staff are ongoing. The Final EA should discuss turbidity monitoring, including any progress made on a turbidity monitoring and control plan as per ongoing discussions with MDEQ. (*Commenter: USEPA)*

Response: The proposed project will comply with all of the terms and conditions of the permits acquired from local, state, and federal agencies, including turbidity monitoring.

3.13 Natural Salmon or Steelhead Reproduction

Comment: There is no mention in the EA of natural salmon or steelhead reproduction in the lower Dowagiac River. Their reproduction areas should be protected in the both the short and long term and the project plan should be amended to include a plan to protect and/or clean up any sedimentation that occurs as a result of the dam removal. *(Commenter: A. Marton)*

Response: EA Section 2.2.4.2.3 Restoration and Sediment Management Measures includes sediment management activities during the dam removal process to prevent large amounts of sediment from moving downstream. Lesser amounts of sedimentation are likely downstream of the project but would be temporary while the natural flow of the river is restored. Any loss of spawning habitat would be compensated by the increased access for salmonids to additional spawning habitat upstream of the project (see EA Section 3.5 Aquatic Ecology). Other management activities such as the Pokagon Band of Potawatomi stream restoration project would also likely increase available spawning habitat in the Dowagiac River (Section 3.16.1 Identification of "Other Actions").

3.14 In Favor of Removal

Comment: Following stream improvement project for a long time; positive project. *(Commenter: F. Hodge)*

Response: Comment acknowledged. Thank you for your interest in the project.

3.15 Log Jams

Comment: There are log jams larger than houses just above Kinzie Road and plenty of smaller ones above that. There is no plan mentioned in opening up this section of water, but you speak about paddlers making an economic impact. Paddlers will not come in droves to a river that is as clogged with log jams. Paddling this section of river is not only a lot of work, but also dangerous. *(Commenter: D. Harley)*

Response: Removal of other obstructions including log jams is out of scope for this project. However, in conjunction with other planned projects in the region, the proposed project would cumulatively improve Dowagiac River conditions including removal of log jams. Despite being out of scope, the EA does acknowledge that management actions are needed to improve overall river access for recreational users. In Section 3.11.2.2.2 Recreation, the EA states "it is expected that dam removal may result in an increase in paddler use of the river due to dam removal. However, this increase is dependent upon management measures to remove obstructions in the river upstream of Kinzie Road" (Section 3.12.1.2 Recreation). Other management activities include the Cass County Drain Commissioner and Parks Director maintaining a clear pathway for paddling the Dowagiac River. Additionally, the Pokagon Band of Potawatomi is working on the first phase of a stream restoration project that would restore up to 5 miles of the Dowagiac River upstream of the project area (Section 3.16.1 Identification of "Other Actions").

3.16 Log Jams

Comment: The EA contains no plan for cleaning up the many impassable log-jams upstream of the dam. *(Commenter: A. Marton)*

Response: Comment acknowledged. See Specific Response 2.1 "Log Jams".

3.17 Log Jams

Comment: The river miles between Arthur Dodd Memorial park and The Pucker Street dam are clogged with huge logjams, very challenging to navigate in even a kayak. *(Commenter: A. Marton)*

Response: Comment acknowledged. See Specific Response 2.1 "Log Jams".

3.18 Log Jams

Comment: No current management plan is in place to remove the major log jams which prevents angler and paddler use of the Dowagiac River upstream of Kinzie Road access. *(Commenter: A. Marton)*

Response: Comment acknowledged. See Specific Response 2.1 “Log Jams”.

3.19 Signatory to the 1836 Treaty

Comment: The Pokagon Band of Potawatomi is not a signatory to the 1836 Treaty and the 1836 Treaty does not cover the project area. Please remove the language on treaty rights. *(Commenter: K. Boone)*

Response: Text in the EA has been changed as suggested.

3.20 Lower Dowagiac River Users

Comment: The EA contains no mention that currently a vast majority of the Dowagiac River users are summer tubers, paddlers and year-round anglers that use the river below the Pucker Street Dam. *(Commenter: A. Marton)*

Response: Recreational uses of the river are listed in Section 3.11.1.2 of the EA. Text in the EA has been added to include not only canoeing and kayaking, but also tubing as popular activities.

3.21 Water Trail

Comment: The EA contains no plan for creation of a water trail upstream of dam. *(Commenter: A. Marton)*

Response: Specific project goals for a water trail are outside the scope of this EA. However, other management activities referenced in EA Section 3.11.2.2.2 address improvements to the existing water trail in the Dowagiac River. For example, Pokagon Band of Potawatomi is working on restoring stretches of the river upstream of the project area. Additionally, the Cass County Drain Commissioner and Parks Director are in the planning stages of working on the water trail with SWMPC (EA Section 3.16.1 Identification of “Other Actions”). Therefore, in conjunction with other planned management activities, the proposed project would cumulatively improve river conditions for a water trail.

3.22 Description

Comment: Why may ‘dam removal result in an increase in paddler use of the river’? There does not seem to be a factual basis for this claim. *(Commenter: A. Marton)*

Response: Currently, the Pucker Street Dam is a barrier for recreational users paddling or tubing down the Dowagiac River and discourages use of the Dowagiac River trail network (EA Section 3.12.1.2 Recreation). Removal would eliminate the need for portage around the dam.

See Specific Response 3.21 “Water Trail” for more information about cumulative actions to improve the Dowagiac River trail network.

3.23 Project Descriptions

Comment: Throughout the Draft EA, descriptions of the action alternative and elements of the proposed action (as described in various locations) fail to include narrative descriptions of all actions necessary or proposed for project implementation, including their associated environmental consequences. *(Commenter: USEPA)*

Response: Additional text was added to the Final EA to address comments provided to fully describe all proposed activities and impacts.

3.24 Sediment Testing

Comment: Only minimal information was included in the Draft EA on sediment testing undertaken for the project, including specific information on sediment testing locations, protocols undertaken for dredging, and the results of the testing (as well as confirmation from regulatory agencies). *(Commenter: USEPA)*

Response: Text was added to Section 3.3.1.2 of the Final EA to direct readers to Appendix D for information on the sediment testing. In addition, correspondence with MDEQ regarding the test results was added to Appendix B.

3.25 Vegetation and Wildlife Habitat

Comment: The Final EA should be updated to include specific information on tree removal, including numbers and acreages, as we recommended in our scoping comment letter. The Final EA should also describe how trees will be disposed of. EPA strongly recommends that any woody vegetation not be burned, as burning vegetation increases air impacts, but instead be mulched and the mulch offered to the community for use in yards, parks, commercial areas, etc. Trees to be removed for access roads should be replaced, and EPA reiterates our prior recommendation that USFWS and the local sponsors plant tree replacements for tree loss at a 1: 1 ratio or covering the same acreage amount using native tree species. Mitigation might include, but is not limited to, replanting of native tree species adjacent to the River, or assisting local, county, or state agencies with any appropriate ongoing or planned reforestation plans. We recommend a possible species list and list and map of potential sites where trees can be planted be included with the Final EA. *(Commenter: USEPA)*

Response: Additional information regarding the location and sizes of the trees to be removed have been added to the Final EA. Cut trees will be disposed of properly and not burned. Tree removal areas are located on private property, therefore any mitigation within the project area would have to be done in accordance with individual easement agreements.

3.26 Sensitive Species

Comment: In the Final EA, add USFWS's determination on specific species that may be affected within the project area. If the project may have a potential effect on a listed species, such as the Indiana bat, describe what measures will be taken to ensure an adverse effect will not occur. *(Commenter: USEPA)*

Response: Effects determinations for listed species have been added to the Final EA.

3.27 Sensitive Species

Comment: In the forthcoming decision document, assumed to be a Finding of No Significant Impact (FONSI), EPA reiterates our prior recommendations that such date restrictions (for both tree removal and/or in-water work) become commitments in the decision document *(Commenter: USEPA)*.

Response: Tree harvest restrictions dates (October 1 to March 31) will be added to the FONSI. In water activity restrictions will be included in the MDEQ permit and the project will comply with all permit requirements.

3.28 Wetlands

Comment: The Draft EA refers to wetlands adjacent to the river within the upstream pool of the dam as "artificial wetlands." In the Draft EA, the term "artificial wetlands" was utilized by USFWS to specifically describe wetlands that developed adjacent to the River after the 1999 drawdown of the dam pool. Use of this term is confusing and technically erroneous, as wetlands in the project area are regulated at both the state and federal level by MDEQ. *(Commenter: USEPA)*

Response: The term has been removed as requested to avoid confusion.

3.29 Wetlands

Comment: The Draft EA also stated that the proposed placement of dredged materials in the specified wetland locations upstream of the dam (Areas A, B, C, and D) were selected specifically because it is believed those are areas where future wetlands are NOT expected to form post drawdown once the dam is removed (however, these areas are currently wetland). The methodology used to determine where wetlands will remain, or where future wetlands will form post-drawdown, was not discussed in the Draft EA. *(Commenter: USEPA)*

Response: Correspondence with MDEQ regarding wetland impacts and mitigation have been added to Appendix B. Other information regarding mitigation requirements are being determined through on-going consultation with MDEQ, and therefore will be included in the MDEQ permit.

3.30 Wetlands

Comment: The Final EA should clarify, explain, and quantify wetland impacts, both permanent and temporary, across the document. Access roads should be modified to avoid wetland impacts (to the extent feasible). Restoration of temporary wetland impacts should be proposed and explained. The Final EA should explain how the project will comply with the Clean Water Act regulations that call first for avoidance of impacts, then minimization of impacts, and finally mitigation of impacts. *(Commenter: USEPA)*

Response: Additional text and tables have been added to the Final EA to clarify the impacts to wetlands.

3.31 Less Fishable Water

Comment: As you add miles that the fish could spread out you do not add more fishable water for local anglers. The water above the dam is not only difficult, at best, to wade, but there is very little access as well. The water is too deep to wade and the tributaries are not navigable. You will lose thousands of angling hours spent on the Dowagiac River. *(Commenter: D. Harley)*

Response: Recreational fishing access is provided at Dodd Park and Sink Road above the Pucker Street Dam and will be available at the former dam site upon completion of the project. Fishermen can wade into the Dowagiac River at Dodd Park and can continue to do so at the dam site following dam removal along with some additional wading waters immediately above the dam removal site. MDNR has closed the Sink Road access site and is in the process of developing a more user-friendly site on Peavine Road that will include parking—increasing access for recreational users. After the Pokagon Band of Potawatomi planned river restoration project in this stretch, there will more wadable waters and more habitat for spawning.

Downstream access is still provided at the M-139 access site and also at the City's Marmont Street Boat Ramp (http://www.nilesmi.org/document_center/community/Park%20recreation/RecreationPlanBinder2016.pdf).

3.32 Public Access During Construction

Comment: The EA contains no specific plan for public river access, parking or services during the duration of the dam removal project. All of which are currently available at the dam site today (parking, non-improved launch, public access, picnic benches etc.). *(Commenter: A. Marton)*

Response: Due to the short-term nature of the disturbance during construction (up to seven months) and safety concerns, the construction of a temporary access location is not warranted.

See Specific Response 3.31 "Less Fishable Water" for more information about river access during and after construction.

3.33 Public Facilities

Comment: The EA contains no mention of a post dam removal plan for public facilities and services at the former dam site and associated park (parking, launch, public access, ADA access, etc.). *(Commenter: A. Marton)*

Response: These elements are outside the scope of the proposed project, but are addressed in City of Niles Recreation Plan. As stated in their current recreation plan, a project objective of the dam removal project is to "ensure public access for fishing and paddling/boating is improved."

3.34 Additional Public Access Upstream

Comment: The EA contains no plan for acquiring additional public access upstream of the current dam site. *(Commenter: A. Marton)*

Response: The acquisition of additional lands, including privately held property, is outside the scope of the proposed project.

See Specific Response 3.31 "Less Fishable Water" for more information about upstream river access.

3.35 Other Regional Destinations

Comment: Without a plan in place to create new public access and open up the upper river to navigation, there are no other regional recreational salmon and steelhead destinations of the quality the Dowagiac River for anglers to be transferred to. This is the main reason the resource is so very unique. *(Commenter: A. Marton)*

Response: While the Dowagiac River is popular for anglers, the St. Joseph River also runs through the City of Niles and attracts many anglers.

See Specific Response 3.31 "Less Fishable Water" for more information about upstream river access and Specific Response 2.1 "Log Jams" for more information about upstream river navigation.

3.36 Distance to Arthur Dodd Memorial Park

Comment: The EA states that "Arthur Dodd Park Memorial Park is located approximately 1.6 miles upstream of the project area." By road, Arthur Dodd Park Memorial Park is more than 4 miles from the Pucker Street Dam. *(Commenter: A. Marton)*

Response: The sentence in the EA refers to the distance from the northern most extent of the project area, the Kinzie Road crossing. Text has been added to the EA to clarify the distance between the park and the dam.

3.37 Limited Angler Access Upstream

Comment: Dispersal of anglers upstream of the dam is limited by little public access above dam and log jams. *(Commenter: A. Marton)*

Response: Comment acknowledged. See Specific Response 3.31 “Less Fishable Water” for more information about upstream river access and Specific Response 3.1 “Log Jams” for more information about upstream river navigation.

3.38 Rock Structures/Whitewater Park

Comment: If natural river design is used it would not increase costs, increase rock structures in stream, decrease fish passage nor reduce opportunity to fish from small boats. It also would lessen impact on landowners upstream and downstream of dam. MDNR white paper is not relevant/timely. *(Commenter: J. Tharp)*

Response: Sediment cannot be left in place at the project site under natural river channel design methods. Adding rock to create water features would increase project costs. Fish passage could be impacted at normal water levels because of the large rock obstacles and higher water velocities through artificially created rapids. Large, rocky rapids could also act as a barrier to other recreational users such as tubers. Ultimately, natural water features such as riffles are expected to be exposed as the Dowagiac River returns to its natural grade and flow regime following dam removal. Additional reasons for not constructing a whitewater park are addressed in the EA in section 2.2.3.1 Dam Removal with Whitewater Park Construction.

3.39 Monitoring

Comment: EPA recommends that a monitoring and adaptive management plan be developed. In the Final EA, include the most up to date Monitoring and Maintenance Plan as an appendix to the document. (*Commenter: USEPA)*

Response: As required by other permits and approvals for this project, a monitoring and maintenance plan will be developed that will detail monitoring and reporting performed during construction and restoration activities to ensure that they are done in accordance with the design plans and permits.

3.40 Project Plans

Comment: Include the most recent construction plans as an appendix to the Final EA. (*Commenter: USEPA)*

Response: Text has been added to the Final EA that the final plans are available upon request.

Ripple Guide Service

52801 Hastings Street
South Bend, IN 46637

574-993-7453
www.rippleguides.com

January 6, 2019

To Whom it May Concern,

I am writing in response the environmental assessment dealing with the removal of the Pucker Street dam on the Dowagiac River. I have a number of points I would like to address as they are missing completely or misrepresented in the EA.

First, the lack of mention of the wonderful trout fishery above the dam is an obvious omission. The trout fishing upstream of the dam will be negatively impacted with the removal of the dam. The dam is the upstream barrier that keeps smallmouth, pike, and walleye from foraging on the brown trout above the dam. This is a large reason why the fishing for brown trout below the dam is poor at best. There are very few fish left after the warm water species spend the summer eating them. On the other side of the dam the trout fishing is excellent because they are free of the large predators below the dam. I typically catch more trout in a day above the dam than I do in an entire year below the dam. See, this project will hurt not one, but two sides of the dam.

The EA, and the new sign at Pucker Street, talks numerous times about a new open river. This is very inaccurate. If you think this river is open then your ignorance is glaring on the subject. There are log jams larger than houses just above Kinzie Road and plenty of smaller ones above that. There is no plan mentioned in opening up this section of water, but you speak about paddlers making an economic impact. Paddlers will not come in droves to a river that is as clogged with log jams. Paddling this section of river is not only a lot of work, but also dangerous.

There is also talk about more river to fish for steelhead and salmon. As you add miles that the fish could spread out you do not add more fishable water for local anglers. The water above the dam is not only difficult, at best, to wade, but there is very little access as well. The water is too deep to wade and the tributaries are not navigable. You will lose thousands of angling hours spent on the Dowagiac River. What a shame for an area that needs the tourism dollars and what a shame that many people will never visit the city of Niles again. Without the top notch fishing they won’t have a reason to visit.

Lastly, I think you are misrepresenting the negative economic impact on the city of Niles and surrounding area. My clients, on a daily basis, visit the stores and gas stations in the area. Among the establishments that will be negatively impacted are Rusty Hook, The Nugget, Wal Mart, Holiday Inn Express, Duncan’s Kozy Kitchen, Riverside Food and Liquor Store, Wings Etc. among others. I truly think you should complete a full economic impact study before you negatively impact a town that is already struggling.

If you have any questions or comments please contact me as I would love to fill you in more completely. Thank you for reading my comments and I trust you will take them to heart.

Sincerely,

Dustan Harley

Miller, Stephanie

From: Marcy Hamilton <hamiltonm@swmpc.org>
Sent: Monday, January 07, 2019 4:43 AM
To: Miller, Stephanie; Westerhof, Rick
Subject: Fwd: Responding to document Pucker Street Dam Removal

Marcy Hamilton
Southwest Michigan Planning Commission
hamiltonm@swmpc.org
269-925-1137 x1525

From: FREDERICK N HODGE
Sent: Sunday, 6 January, 5:19 pm
Subject: Responding to document Pucker Street Dam Removal
To: Marcy Hamilton
Cc: FRED

Marcy, I respond positively to the document. I support this effort. Reviewed the document placed at the Oak Brook IL. Library. Many Thanks for all this effort. Frederick N. Hodge 3 Oak Brook Club Dr. E 108 Oak Brook, IL 60523

Mr. Adam Marton
5985 Trail End Road
Three Oaks, MI 49128

Ms. Marcy Hamilton January 7, 2019
Southwest Michigan Planning Commission
376 West Main Street, Suite 103
Benton Harbor, MI 49022
hamiltonm@swmcpc.org

Mr. Rick Westerhof
U.S. Fish and Wildlife Service Midwest Region
6623 Turner Road, Elmira, MI 49730
Rick_westerhof@fws.gov

Dear Mr. Westerhof and Ms. Hamilton,

Below please find my comments regarding the draft Environmental Assessment (EA) for the proposed Pucker Street Dam Removal and Dowagiac River Restoration Project.

My understanding is that the EA has been prepared to inform USFWS decision makers and the public about the environmental consequences of the proposal to remove the Pucker Street Dam. I think in areas this EA is incomplete, inaccurate, omits supporting factual data points and includes anecdotal opinions which are offered as facts. Furthermore, I think this EA omits several key "future-state" details that should be included so that they may be considered by the decision-making parties.

As a result, I believe this draft EA to be incomplete, inaccurate and unsuitable to be used to inform USFWS decision makers and the public about the environmental consequences of the proposal to remove the Pucker Street Dam.

I agree dam removal puts an end to the city of Niles' on-going management of an aging structure issue while offering fish passage. As outlined in this EA, "the plan" from a user's perspective offers no benefit to the majority of the river's users or inhabitants.

My comments are on the following areas within the document.

1. The EA contains no factual resource utilization data to demonstrate the value of the resource to it's users today and beyond.
    a. I.E. How many actual river utilization hours are spent annually on the Dowagiac River.
        i. Where are people spending time

                1. Above the dam
                2. Below the dam
                3. Arthur Dodd Memorial Park
                4. Tributaries of the Dowagiac River
        ii. What Activities are people currently participating in while using the resource
                1. Tubing
                2. Fishing (Conventional Fishing or Fly Fishing)
                3. Kayaking, Canoeing
                4. Birding

2. The EA contains no specific plan for public river access, parking or services during the duration of the dam removal project. All of which are currently available at the dam site today (parking, non-improved launch, public access, picnic benches etc.)
    a. Page 93, Chapter 3, Section 11.2.2.2 Recreation
        i. Mentions "…the project area would be restricted during the construction phase. The carry-in boat launch on the city owned property adjacent to Pucker Street Dam would be inaccessible during demolition activities. However, additional boat launch and use of the river by canoers and kayakers would be restored following demolition activities. Therefore, impacts to recreational users and the boat launch would be considered temporary and minor"
            1. Shouldn't an auxiliary boat launch and associated parking area be secured for usage during the demolition as part of the project plan?
            2. The M139 boat launch does not provide access to the water upstream of highway 139 only downstream.
3. The EA contains no mention of a new plan to stock steelhead in the Dowagiac river that will:
    a. Replace those fish that;
        i. Were unable to successfully reproduce as a result of spawning gravel being covered by sediment
        ii. Suffered mortality as a result of habitat degradation as a result of dam removal.
    b. Populate a new fishable watershed
4. The EA contains no mention of a post dam removal plan for public facilities and services at the former dam site and associated park (parking, launch, public access, ADA access, etc.).
5. The EA contains no mention that currently a vast majority of the Dowagiac River users are summer tubers, paddlers and year-round anglers that use the river below the Pucker Street Dam.
6. The EA contains no mention of a contingency plan for downstream sediment clean up should this be necessary.
7. The EA states on page 59, Chapter 3, Section 4.2.2 Environmental Consequences. "…short term effects to water quality are anticipated. Removal of the dam would mobilize accumulated sediments behind the dam and increase downstream turbidity… Sediment removals would reduce adverse effects to water quality, but increased turbidity

and sediment deposition would nonetheless occur." The EA contains no mention of a plan to repair or restore any downstream habitat damaged as a result of dam removal and resulting in immediate;

   a. Overall aquatic habitat degradation (short or long term)
   b. Submersion of current and/or legacy spawning habitat
      i. That contains fertilized steelhead eggs from the spring spawning activity
   c. Submersion of aquatic vegetation
   d. Submersion of fish habitat
   e. Displacement of fish and other aquatic wildlife

8. There is no mention in the EA of natural salmon or steelhead reproduction in the lower Dowagiac River. Nor of protecting these important spawning areas. Nor is there mention of a self-sustaining population of salmon or steelhead. However, the EA states on page 62 no salmon or steelhead are stocked in the Dowagiac River. In the right time of the year anyone on the river has observed the annual salmon and steelhead spawning in the lower Dowagiac River and the subsequent clouds of juvenile salmon and steelhead par. These observations illustrate that in fact there most likely is significant successful reproduction of salmon and steelhead in the lower Dowagiac River. These reproduction areas should be protected in the both the short and long term and the project plan should be amended to include a plan to protect and/or clean up any sedimentation that occurs as a result of the dam removal.
9. The EA contains no plan for acquiring additional public access upstream of the current dam site.
   a. Seemingly, a key component in utilizing a newly "opened up" river resource
10. The EA contains no plan for creation of a water trail upstream of the dam
    a. Seemingly, another key component in utilizing a newly "opened up" river resource
11. The EA contains no plan for cleaning up the many impassable log-jams upstream of the dam
    a. Seemingly, yet one more key component in utilizing at newly "opened up" river resource
12. The EA contains no comprehensive historical resource utilization report to offer decision makers an accurate picture of how, when, and for what people are using the resource.
13. The EA contains no mention of the value (non-economic) of the Dowagiac River downstream of the dam as a world-class recreational fishing resource.
    a. My opinion is the lower Dowagiac River is unique to this region of the USA. It offers a broad range of opportunities that include excellent year-round steelheading with seasonal salmon, brown trout, bass and rough fish fishing. There is particularly good access and anglers can fish from shore, by boat and on foot. Steelhead are a highly coveted fish by anglers because of their size, beauty, challenge and strength. In comparison to other rivers in the region, the lower Dowagiac valley appears to be wild, forested and scenic. All of these reasons make it a very desirable destination to anglers. Unlike many of the northern Michigan "steelhead" rivers (Pere Marquette, Au Sable, Muskegon, Manistee) it's proximity to Chicago, South Bend, Indianapolis (2 hours, give or take) offers day trip opportunities to the thousands of people in the region who covet high-quality

cold-water fishing. Annually the lower Dowagiac draws hundreds of people a year locally, from all over the country and some from other parts of the world.

14. Page # 64, Chapter 3.5.2.2 Environmental Consequences
    a. Alternative B…
        i. "Short-Term Effects would include some sediment deposition within downstream habitats."…
        ii. "Such deposition may occur and adversely affect spawning and feeding habits below the dam and may result in direct mortality of less mobile organisms."

15. Page # 90, Chapter 3.10.2.2.2 Environmental Consequences, Economic Impacts
    a. The EA states "While the concentrated angler usage of the lower Dowagiac River for steelhead and salmon may be transferred to other regional destinations under this alternative, angler use of the Dowagiac River for brown trout is expected to remain stable. In addition, removal of the Pucker Street Dam is expected to increase paddler use of the Dowagiac River, therefore adverse economic impacts associated with a potential reduction in angler use are expected to be offset by an increase in paddlers and would be minor overall"
        i. As stated point #12-A above, without a plan in place to create new public access and open up the upper river to navigation, there are no other regional recreational salmon and steelhead destinations of the quality the Dowagiac River for anglers to be transferred to. This is the main reason the resource is so very unique.
        ii. Angler use of the Dowagiac River for brown trout is very, very limited.
            1. This type of usage might represent 5% of the total Dowagiac River annual angling hours and does not represent an equitable comparison to angling hours spent steelhead and salmon fishing.
        iii. With the exception of the public access water at Arthur Dodd Memorial Park and the Kinzie Street River crossing, by and large, there is no other public access to brown trout fishing in the Dowagiac River.
        iv. The river miles between Arthur Dodd Memorial park and The Pucker Street dam are clogged with huge logjams, very challenging to navigate in even a kayak and are described on the "Michigan Water Trails" website as "The river downstream of this access point has several MAJOR log jams. Advanced paddling skills are needed to navigate and there may also be a significant portage."
            1. http://www.michiganwatertrails.org/location.asp?ait=av&aid=1319
        v. Adverse economic impacts associated with a potential reduction in anglers would effect the following area businesses that currently are being patronized by lower Dowagiac River anglers:
            1. Rusty Hook, 209 E Main St, Niles, MI 49120
            2. Duncan's Kozy Kitchen, 1100 Front Street Niles, MI 49120
            3. Riverside Food and Liquor Store, 1206 Front Street, Niles MI 49120

4. Wheatberry Tavern & Restaurant, 15212 Red Bud Trail N. Buchanan, MI 49102
5. Wings Etc. 2008 S 11th Street, Niles, MI 49120
6. Old Country Bakeshop, 51318 IN-933, South Bend, IN 46637
7. Holiday Inn Express & Suites Niles 1000 Moore Drive, Niles, MI 49120
8. Comfort Suites, 52939 US Hwy 933 North, South Bend, IN 46637
9. Nugget Downtown Grill, 202 E. Main Street, Niles MI 49120
10. Marathon Gas Station, 2323 North, 5th Street, Niles, MI 49120
11. Riverfront Park Campground, 1701 Pucker St, Niles, MI 49120
12. Wallmart Supercenter, 2107 11th Street, Niles, MI 49120
13. Ripple Guide Service, 52801 Hasting St. South Bend, MI 46637
14. On Point Guide Service, 51556 Forrestbrook Avenue, South Bend, IN 46637
15. Anglin Outdoors Guide Service, 409 Fox Street, La Porte, IN 48350
16. Fiddler's Hearth 127 N. Main Street, South Bend, IN 46601
17. Greenbush Brewing Co. 5885 Sawyer Road, Sawyer, MI
18. Harding's Friendly Market, 4710 Niles Buchanan Rd. Buchanan, MI 49107
19. BP Gas Station 301 River St. Buchanan, MI 49107
20. McDonald's 813 Front Street, Buchanan, MI 49107

vi. "adverse economic impacts associated with a potential reduction in angler use are expected to be offset by an increase in paddlers and would be minor overall"
   1. An actual economic study should be completed to verify this unfounded claim in the EA.
   2. Comparative examples of Midwest U.S. paddling destinations that generate economic value for their communities would go a long way in supporting this economic claim in the EA.

16. Page # 44, Section # 2-26 & 27 "impacts" Notes that…
   a. Recreation "Potential impacts below dam, but increases in tourism and recreational expenditures associated with paddling and fishing within a broader watershed."
   b. Economic "Positive economic increase due to increase uses associated with fishing and paddling within broader watershed"
      i. How could there be a positive economic impact associated with;
         1. The same amount of anglers
         2. Paddlers struggling to navigate in…."The river downstream of this access point has several MAJOR log jams. Advanced paddling skills are needed to navigate and there may also be a significant portage."

17. Page 88, Chapter 3, Section 10.1.2 – Economic Setting
    a. Describes the project area being in a rural portion of Berrien County. It goes on to say… "Berrien County has a diverse economic base, including manufacturing, agricultural products, healthcare and tourism."
        i. Fishing on the lower Dowagiac River is one of the facets that currently draws tourists to both the City of Niles and Berrien County.
            1. The empty store fronts on Main Street in Niles clearly demonstrate there is an opportunity for economic development in town. It seems building on something that people are already seeking out in Berrien County and Niles, Michigan is smarter than starting from scratch.
            2. Many other communities around the world have leveraged recreational resources to provide a basis for economic growth. Smithers, Terrace and Houston all small towns in Canada's province of British Columbia have used Steelhead fishing as the basis for amazing growth. Check out steelhead paradise for an example of what is possible.
                a. http://www.steelheadparadise.com

18. Page 91, Chapter 3, Section 12.1.1 Parks
    a. States, "Arthur Dodd Park Memorial Park… is located approximately 1.6 miles upstream of the project area".
        i. By road, Arthur Dodd Park Memorial Park is more than 4 miles from the Pucker Street Dam.
19. Page 93, Chapter 3, Section 11.2.2.2 Recreation
    a. States. "With the removal of the Pucker Street Dam, steelhead, walleye and salmon that previously aggregated below Pucker Street Dam would disperse to the upper reaches of the watershed. Consequently, the concentrated angler use of the lower Dowagiac may therefore be expected to be similarly dispersed or transferred to other productive angling destinations.
        i. Note there is very little public access upstream of Pucker Street
        ii. Note the significant log jams the prevent ease of usage and access
    b. States. "In summary, Alternative B would result in some short-term direct effects to the Pucker Street Dam site…. Additionally, some of the angler use that is driven by steelhead and salmon fishing may be expected to shift to other accessible reaches of the watershed or to other regional destinations… Finally, it is expected that dam removal may result in an increase in paddler use of the river due to dam removal. However, this is dependent upon management measures to remove obstructions in the river upstream of Kinzie Road (treefalls, etc.). Therefore, impacts to recreational use by anglers may be adverse but offset by expanded use by paddlers and would be minor overall.
        i. No current management plan is in place to remove the major log jams which prevents angler and paddler use of the Dowagiac River upstream of Kinzie Road access.

1. Why “may dam removal result in an increase in paddler use of the river”? There does not seem to be a factual basis for this claim
2. The above statement that “increase in paddler use of the river due to dam removal. However, this is dependent upon management measures to remove obstructions in the river upstream of Kinzie Road (treefalls, etc.). is in direct conflict with economic impact claims. On page # 90, Chapter 3.10.2.2.2 Environmental Consequences, Economic Impacts. Where, the EA states “While the concentrated angler usage of the lower Dowagiac River for steelhead and salmon may be transferred to other regional destinations under this alternative, angler use of the Dowagiac River for brown trout is expected to remain stable. In addition, removal of the Pucker Street Dam is expected to increase paddler use of the Dowagiac River, therefor adverse economic impacts associated with a potential reduction in angler use are expected to be offset by an increase in paddlers and would be minor overall”

As stated above, I think in areas this EA is incomplete, inaccurate, omits supporting factual data points and includes anecdotal opinions offered as facts. Furthermore, I think this EA omits several key “future-state” details that should be included so that they may be considered by the decision-making parties. As a result, I believe this draft EA to be incomplete, inaccurate and unsuitable to be used to inform USFWS decision makers and the public about the environmental consequences of the proposal to remove the Pucker Street Dam.

The decisions related to the Pucker Street Dam will leave a legacy for future citizens of our country. I am hopeful those making the decisions about how this project will move forward are looking at things just this way. It is very easy to think all dam removal is a good thing. But in fact, each watershed is unique and has a multitude of factors that should be taken deeply into consideration. There is no doubt this is a complex issue. Miles and miles of the upper Dowagiac River were channelized decades ago, they are no longer in a natural state. The upper river has very little public access, it is log jam choked and runs through mostly private property. There are no plans in place for the state or any other entity to acquire public access sites, improve existing facilities or clear the massive log jams that impede the general public’s use. The lower river is currently in stunning shape, perhaps more healthy and beautiful than it has been in the memories of anyone alive today. Clean cold water that runs fast through sand, gravel, stones, trees and boulders before it joins the St. Joe. This part of the river has become one of the region’s most prolific light tackle sport fisheries for steelhead. The majestic Dowagiac river bottom is home to untold numbers of plants, wildlife and undersea creatures that all thrive in spite of everything we hear in “today’s world”.

Thank you for taking my comments into consideration.

Sincerely,

Adam Marton

Miller, Stephanie

From: Marcy Hamilton <hamiltonm@swmpc.org>
Sent: Monday, January 07, 2019 4:43 AM
To: Miller, Stephanie; Westerhof, Rick
Subject: Fwd: Pucker Street Dam Environmental Assessment Comment

Marcy Hamilton
Southwest Michigan Planning Commission
hamiltonm@swmpc.org
269-925-1137 x1525

---------- Forwarded message ----------
From: "**jason tharp**" <jastharp@yahoo.com>
Date: Mon, Jan 7, 2019 at 12:17 AM -0500
Subject: Pucker Street Dam Environmental Assessment Comment
To: "Marcy Hamilton" <hamiltonm@swmpc.org>

Dam removal with Whitewater Park Construction should be reconsidered due to several flaws in point 2.2.3.1 of the Environmental Assessment. The Whitewater Park option using natural river design was eliminated before it was truly considered.

The first point for eliminating was “increased project costs”. The current project has increased project cost to as much as $7 million. Building a whitewater park using natural river design would allow for a significant cost savings from the current plan by leaving much of the sediment in place. At the time this draft was written the project cost was only $3.5 million. The current plans cost has doubled.

The second point can also be disputed even if true. “increased rock structures in stream”. Increased rock structures have been used in several dam removals in Michigan with success and with approval of permitting agencies. Some of these projects include the Coldwater River at Freeport, the Thornapple River at Nashvile, the Red Cedar River at Williamston, Mill Creak at Dexter, the Cass River in Frankenmuth, the Shiawassee River in Chesaning, the Chippewa River in Mt. Pleasant, the Grand River in both Dimondadle and Eaton Rapids, and several dam removals on the Raisin River in Monroe. Also on the lower reaches of the Kalamazoo River a rock riffle was added by the MDNR for fish habitat. The amount of rock added to this river absent a dam removal was equal in area to half a football field. This just proves that adding rock structures have been approved in Michigan and that fish passage could not be affected if done correctly. It also shows that adding rock structures can improve fish habitat.

The next point “decreased fish passage”. A whitewater park using natural river design would allow acceptable fish passage. Frankenmuth dam removal is an example. This dam of 13 feet was stepped down in just 300 feet of distance with a rock ramp. Post removal fish assessment was showing positive fish passage. This just shows in an extreme case fish passage is possible at acceptable levels.

The next point is highly questionable “landowner opposition” The landowner of the dam being Niles would be open a design for removal that costs less. Landowners upstream would see less impact on their personal land properties with a whitewater park using natural river design. Landowners downstream would also face less risk. Leaving more sediment in place leaves less chance for downstream impact.

Another point that is questionable is “jeopardizing grant funding because grants were based on natural channel restoration design concepts”. All whitewater park designs at Pucker Street dam would use natural river design. The Coldwater River at show that the same grants were used to create a rapid in the river. Prior dam removals listed also show improved fish habitat with fish passage.

Another point that can be disputed is “potentially reducing other recreational opportunities such as fishing from a small boat”. Boats currently used downstream of the dam mainly consist of drift boats or similar. These boats are capable in rapids. Any whitewater park design would be limited to class 2 and would allow all craft that currently use the river to continue to do so.
The last issue is the use of the whitepaper shared by the MDNR Fisheries division. The first point of this paper that is an issue is use of the whitewater park on the Bear River in Petoskey as an example. The whitewater park in Petoskey was designed not to pass fish because of demands by MDNR Fisheries division. This was done to prevent passage of sea lamprey which isn’t and issue here. One dam was left in place on the Bear River to prvent sea lamprey passage but also stopped all fish. Another example was the Canoe Chute in Ann Arbor on the Huron. This design was not in the main river channel and did not use natural river design. The dam in the main channel was left in place. Lastly the whitepaper was written in 2012 in response to Grand Rapids Whitewater. The MDNR is now a partner and supporter of this project with the first stages of construction starting within the next 2 years. The knowledge learned from Grand Rapids Whitewater is showing what is possible with whitewater parks.

With all this information a whitewater park should be considered as part of Pucker Street Dams removal.

Thanks
Jason Tharp
jastharp@yahoo.com

Miller, Stephanie

From: Marcy Hamilton <hamiltonm@swmpc.org>
Sent: Tuesday, January 22, 2019 2:33 PM
To: Miller, Stephanie
Subject: FW: Corrections Needed in EA for Pucker Street Dam Removal
Attachments: TCU_map_183629_7.pdf

Hi Stephanie. I received this message from the Pokagon Band about removing language.

Thanks!
Marcy

Marcy Hamilton, Senior Planner
Southwest Michigan Planning Commission
376 W Main St, Ste 130, Benton Harbor, MI 49022
269-925-1137 x1525
hamiltonm@swmpc.org www.swmpc.org

From: Kyle Boone <Kyle.Boone@pokagonband-nsn.gov>
Sent: Tuesday, January 22, 2019 12:03 PM
To: Marcy Hamilton <hamiltonm@swmpc.org>
Cc: Jennifer Kanine <Jennifer.Kanine@pokagonband-nsn.gov>; Grant Poole <Grant.Poole@pokagonband-nsn.gov>
Subject: Corrections Needed in EA for Pucker Street Dam Removal

Hey Marcy,

I was reading through the EA for the Pucker Street Dam Removal and noticed an error when referring to the Pokagon Band.

Section 1.8, page 1-10 states:
"The Pokagon Band…and is one of the five federally recognized 1836 Treaty tribes with adjudicated treaty rights in the project area."

The Pokagon Band of Potawatomi is not a signatory to the 1836 Treaty and the 1836 Treaty does not cover the project area (see attached map for treaty boundaries.) After speaking with Jennifer, I think we would be most comfortable with the language on treaty rights being removed entirely.

Please let myself, Grant, or Jennifer know if you have any questions or concerns.

Thanks,
Kyle

Kyle Boone
Environmental Specialist, Department of Natural Resources

Pokégnek Bodéwadmik
Pokagon Band of Potawatomi

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

FEB 1 1 2019

REPLY TO THE ATTENTION OF:

Rick Westerhof
U.S. Fish and Wildlife Service
Midwest Region Office Fisheries
6644 Turner Road
Elmira, Michigan 49730

RE: EPA Comments: Draft Environmental Assessment –Proposed Removal of the Existing Pucker Street Dam (aka Niles Dam) on the Dowagiac River; City of Niles, Berrien County, Michigan

Dear Mr. Westerhof:

The U.S. Environmental Protection Agency has reviewed a Draft Environmental Assessment (Draft EA) prepared by the U.S. Fish and Wildlife Service (USFWS) for the proposed removal of the existing Pucker Street Dam (also known as the Niles Dam) on the Dowagiac River (River) in Niles, Michigan. This letter provides EPA's comments on the Draft EA, pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality's NEPA Implementing Regulations (40 CFR 1500-1508), and Section 309 of the Clean Air Act. We previously provided scoping comments to you regarding this project on May 3, 2016.

The Pucker Street Dam (Dam) is located on the Dowagiac River approximately three miles upstream of its confluence with the St. Joseph River. The existing concrete Dam, wingwalls, and powerhouse were built in 1928. The Dam has not produced power in many years due to maintenance costs, sedimentation in the upstream impoundment, and damaged turbines. Before the construction of the current Dam, a log dam was built just upstream of the existing structure in 1828 and was in place for many years (legacy dam). Structural issues that have created safety concerns both at the Dam and downstream have led to the current proposal to remove it.

In addition to safety concerns, the Dam also impedes fish migration within the River, blocking almost the entire River watershed and its tributaries (159 miles of mainstem and tributary habitat) to fish passage from the St. Joseph River and Lake Michigan. Removing the existing Dam would eliminate that barrier and allow for restoration of two miles of high-gradient cold-water aquatic habitat, which is a rare resource in this region. The project purpose is to promote and enhance fish passage, increase habitat continuity, restore the hydrologic regime of the River, and address stability and safety issues associated with the Dam. The project area includes approximately 11,000 feet of river upstream of the Dam and 300' downstream of the Dam.

The Draft EA discussed five alternatives: four action alternatives and the No Action Alternative. While dam removal was common to all action alternatives, ecosystem restoration approaches proposed were varied. Three of the action alternatives (Concept 1, Concept 3, and Concept 4) were eliminated from detailed consideration due to issues including the absence of sediment management measures and unreasonableness due to funding constraints. **Design Concept 2 – Blended Active/Passive Restoration Using Existing Channel Alignment** was selected as the Preferred Alternative. Design Concept 2 was selected as it integrates active restoration with a sufficient level of sediment management to minimize off-site (downstream) impacts.

EPA's comments on the Draft EA are enclosed with this letter. We recommend that the Final EA address these comments and our recommendations, which generally relate to project descriptions, sediment testing, impacts to aquatic resources and wetlands, mitigation and monitoring commitments, and information to include in the Final EA. We appreciate having had the opportunity to discuss this project with you and the project team via conference call on February 6, 2019.

Thank you for the opportunity to review and provide comments on this Draft EA. We are available to discuss our comments with you in further detail if requested. When the Final EA is released, please send a copy to our office. If you have any questions about this letter, please contact the lead NEPA Reviewer, Liz Pelloso, PWS, at 312-886-7425 or via email at pelloso.elizabeth@epa.gov.

Sincerely,

Kenneth A. Westlake, Chief
NEPA Implementation Section
Office of Enforcement and Compliance Assurance

Enclosure: *EPA's Detailed Comments: Pucker Street Dam Removal*

<u>cc with enclosure (via email):</u>
Marcy Hamilton, Southwest Michigan Planning Commission
Oscar Loveless, Wightman Associates
Brian Gunderman, MDNR-Fisheries
Jay Wesley, MDNR-Fisheries
Luke Trumble, MDEQ-Dam Safety
Ben Zimont, MDEQ-Land/Water Interface Permitting

EPA's Detailed Comments: Pucker Street Dam Removal
Draft Environmental Assessment
Niles, Michigan

February 11, 2019

PROJECT DESCRIPTIONS

- Throughout the Draft Environmental Assessment (Draft EA), descriptions of the action alternative and elements of the proposed action (as described in various locations) fail to include narrative descriptions of all actions necessary or proposed for project implementation, including their associated environmental consequences.

  Examples include:
  - The Project Element "Construction Staging" (Table 2-2, page 2-11) does not include construction access. The table states that construction operations will occur at the dam and powerhouse as well as "upstream for 6,000 linear feet." However, at least five temporary access roads are proposed to implement the project. The need for construction access and associated haul roads, as well as the specific work to be undertaken upstream, is not clearly depicted in this table or in narrative format in the Draft EA.
  - Other impacts associated with the preferred alternative that were not clearly discussed in the Draft EA include the proposed disposal of dredged materials into Spoil Area A, B, C, and D, as noted in draft construction documents[1]. These Spoil Areas were also not referred to by name (A, B, C, D) in the narrative text of the Draft EA (Figure 2-2), even though that is how they are referred to in the EA figures (such as Figure 3-8).
  - Figure 2-2 does not show all five proposed access roads. Figure 2-6 does, however.
  - The Wetlands and Spoils Plan, along with Figure 2-6, depicted an offsite access road near the north end of the project. This proposed access road would impact offsite wetlands. The purpose for this access, and the impacts to wetlands associated with this proposed access road, were not discussed in the Draft EA.
  - The Draft EA vacillates on the future of the existing raceway. Most references in the Draft EA state the raceway will be filled, but page 2-14 states, "*The lower end of the raceway may be left open for additional backwater habitat or perhaps to accommodate recreational access.*"
  - Table 2-3 lists the sequence of events to implement the preferred alternative, but no subsequent text narrative in the Draft EA explains these proposals. The use of a cofferdam is noted but not explained, and many of these descriptions are not explained in text within the Draft EA in "plain language[2]."

  Recommendation: Revise the project descriptions throughout the Final EA, to describe and analyze all actions and impacts associated with the preferred alternative. Additional

[1] Wetlands and Spoils Plan - not included in the Draft EA but provided electronically to EPA on February 5, 2019

[2] For information about the plain language initiative and its application to governmental documents, see www.plainlanguage.gov and https://plainlanguage.gov/media/FederalPLGuidelines.pdf.

narrative text should be added to fully describe all proposed activities and impacts. Narrative text additions should be written in plain language.

SEDIMENT TESTING/DREDGING

- In our scoping comments to USFWS, EPA recommended that the Draft EA include sediment analyses and discuss USFWS's plan for disposal of any contaminated or uncontaminated sediments. The Draft EA states that sediments to be dredged from the Dowagiac River and/or Dam demolition materials are proposed to be utilized to fill the adjacent raceway channel, to build up a proposed floodplain shelf in the channel reaches above the Dam, and to be placed at an adjacent park site. During scoping, EPA was provided with recent (2014) sediment testing information for testing undertaken in 2014. Only minimal information was included in the Draft EA on sediment testing undertaken for the project, including specific information on sediment testing locations, protocols undertaken for dredging, and the results of the testing (as well as confirmation from regulatory agencies).

  Page 3-10 of the Draft EA states, "*Results of the sediment analysis were submitted to the MDEQ [Michigan Department of Environmental Quality] for review and concurrence. Based on this review it was determined that the dredged sediment is considered inert and suitable for unrestricted upland disposal and can be used as unrestricted fill material. The appropriate federal and state permits from U.S. Army Corps of Engineers and MDEQ would still need to be acquired to place this material in streams and wetlands.*" Correspondence to and from MDEQ regarding sediments were provide electronically to EPA on February 5, 2019, before our project conference call; however, the written correspondence to and from MDEQ, as well as their concurrence from MDEQ that dredged sediment is considered inert and can be utilized as unrestricted fill, was not included in the Draft EA.

  Recommendation: Add the following information to the Final EA:
  - A section specifically on Sediment Testing (or, rename Section 3.3.1.2), to include additional information on discussions undertaken with MDEQ and notation to see further information (copies of correspondence to/from MDEQ) in Appendix B; and
  - Written concurrence from MDEQ that the dredged material is suitable for unrestricted land disposal and/or beneficial reuse (should be added to Appendix B).

WETLANDS

- In our scoping comments, EPA recommended that a wetland delineation be completed, and that the Draft EA should include a copy of the delineation and a robust analysis of wetland impacts associated with all project alternatives. A wetland delineation was undertaken in 2018, but was not included in the Draft EA. A copy of the wetland delineation was provided to EPA electronically on February 5, 2019.

  The Draft EA refers to wetlands adjacent to the river within the upstream pool of the dam as "artificial wetlands." In the Draft EA, the term "artificial wetlands" was utilized by USFWS to specifically describe wetlands that developed adjacent to the River after the 1999 drawdown of the dam pool. Use of this term is confusing and technically erroneous, as wetlands in the project area are regulated at both the state and federal level by MDEQ.

Recommendations: Remove references to the term "artificial wetlands" from the Final EA. These wetlands are regulated by MDEQ.

- All disposal material is proposed to be placed in existing, delineated wetland areas adjacent to the River, and this placement will constitute "direct impacts" to regulated wetlands. An action alternative that involves either direct or indirect impacts to wetlands would not be "self-mitigating." As is expected with dam removal projects, while the development of new wetlands in areas currently inundated in the existing dam pool is expected, there is substantial uncertainty as to the quality, location, and acreage of wetlands that may actually develop post-Dam removal. Furthermore, the Draft EA notes that the current proposal will result in more filling of regulated wetland acreage than is expected to be created post dam-removal. During the February 6, 2019, project conference call, the project team stated that 8.74 acres of wetland will be filled, and 4.10 acres of wetland are expected to form post-drawdown.

EPA acknowledges that discussions with MDEQ regarding a potential waiver of wetland mitigation requirements for the proposed wetland fill are ongoing. Specifically, the USFWS and the project sponsor have requested of MDEQ that wetland fill proposed with dam removal activities be exempted from mitigation requirements as per Section 30311. (1) of Michigan 2013 Public Act 98[3] which states "*A permit for an activity listed in section 30304 shall not be approved unless the department determines that the issuance of a permit is in the public interest, that the permit is necessary to realize the benefits derived from the activity, and that the activity is otherwise lawful.*" In correspondence sent to MDEQ in July 2018, the project team provided MDEQ with information and written justifications of why such a waiver is being requested. This. correspondence to MDEQ, verification of such conversations, any other correspondence sent to MDEQ on this subject, or confirmation of a waiver of mitigation from MDEQ, was not provided in the Draft EA in Appendix B (Agency and Tribal Correspondence)

The Draft EA also stated that the proposed placement of dredged materials in the specified wetland locations upstream of the dam (Areas A, B, C, and D) were selected specifically because it is believed those are areas where future wetlands are NOT expected to form post-drawdown once the dam is removed (however, these areas are currently wetland). The methodology used to determine where wetlands will remain, or where future wetlands will form post-drawdown, was not discussed in the Draft EA.

Recommendations: In the Final EA, add all correspondence to/from MDEQ to Appendix B. This should discussions that were/are ongoing regarding the need for, or waiver of, mitigation requirements for wetland fill proposed with project implementation. Additionally, add a discussion to the Final EA of the methodology used to determine where wetlands will remain, or where future wetlands will form post-drawdown. Plans should be added to the Final EA that show areas expected to form as wetlands post-

[3] https://www.legislature.mi.gov/documents/2013-2014/publicact/pdf/2013-PA-0098.pdf

drawdown and showing where dredged materials are proposed to be placed (to show that spoils are not going to fill future wetland restoration areas).

- Figure 2-8 does not include an accurate summary or quantification of wetland impacts associated with the proposed project. During the February 6, 2019, project conference call, the project team estimated there will be 8.7 acres of wetland impact associated with the disposal of dredged materials into existing wetlands. There will also be a temporary impact to existing (off-site) wetlands associated with the northern-most access road that was also not discussed, quantified, or explained in narrative format in the Draft EA. Section 3.9.2.2 states that staging areas and temporary access roads will be sited to avoid the placement of fill in existing wetlands. However, this is at odds with the drawings that show impacts to offsite wetlands associated with the northern-most proposed access road.

  Recommendations: The Final EA should clarify, explain, and quantify wetland impacts, both permanent and temporary, across the document. Access roads should be modified to avoid wetland impacts (to the extent feasible). Restoration of temporary wetland impacts should be proposed and explained. The Final EA should explain how the project will comply with the Clean Water Act regulations that call first for avoidance of impacts, then minimization of impacts, and finally mitigation of impacts.

AQUATIC RESOURCES

- The Environmental Consequences Section regarding macroinvertebrates discusses baseline information on mussels found within the river (affected environment). However, the expected environmental effects (consequences) to mussels were not discussed.

  Recommendations: The Final EA should discuss the potential for adverse (or beneficial) effects, if any, to mussels from both the No Action Alternative and the preferred alternative.

- The Draft EA discussed generic protections to reduce turbidity during construction, including site isolation from active flow, use of turbidity curtains, and use of silt curtains. However, there was no discussion of active in-River turbidity monitoring during dam deconstruction and dredging. During the February 6, 2019, conference call, MDEQ staff noted that there is agency concern over turbidity during in-water work and ensuring that turbidity levels do not exceed levels that will be protective of fish and macroinvertebrates. MDEQ will likely require turbidity monitoring and a control plan, and that monitoring of dissolved oxygen may also be required. In-water work restrictions to protect fish windows will also likely be required, as further discussions with Michigan Department of Natural Resources (MDNR) staff are ongoing.

  Recommendations: The Final EA should discuss turbidity monitoring, including any progress made on a turbidity monitoring and control plan as per ongoing discussions with MDEQ. Include correspondence with agency staff regarding turbidity protections in Appendix B.

- The Draft EA references historic mussel surveys undertaken below the Pucker Street dam. During the February 6, 2019, project conference call, USFWS staff noted that additional mussel surveys were undertaken in 2017 both upstream and downstream of the dam. These 2017 surveys were not discussed in the Draft EA. The Draft EA also did not discuss if any mussel salvage operations would be undertaken before or during dam deconstruction. During the February 6 conference call, USFWS noted that during drawdown there is the potential to incorporate mussel salvage activities.

  Recommendations: Amend the Final EA to discuss the October 2017 mussel surveys, including who did them and what the results were. Discuss any mussel salvage operations to be undertaken during or before project implementation.

VEGETATION AND WILDLIFE HABITAT

- In our 2016 scoping comments, EPA requested that the Draft EA disclose the types and numbers (and acreage of shrubby areas or trees) that are proposed to be cleared for project implementation. We also requested the Draft EA disclose whether forested areas to be cleared are located in wetlands or streams as well as potential impacts to the Indiana bat and northern long-eared bat, both species listed on the Endangered Species Act. We also requested that the Draft EA describe how trees will be disposed of.

  Specific information was not provided in the Draft EA, but during our conference call on February 6, 2019, the project team stated that 705 trees will be removed to implement the project, and several specific large trees have been identified and may not be removed, or may be harvested for the landowner as per their requests.

  Recommendations: The Final EA should be updated to include specific information on tree removal, including numbers and acreages, as we recommended in our scoping comment letter. The Final EA should also describe how trees will be disposed of. EPA strongly recommends that any woody vegetation not be burned, as burning vegetation increases air impacts, but instead be mulched and the mulch offered to the community for use in yards, parks, commercial areas, etc.

  Trees to be removed for access roads should be replaced, and EPA reiterates our prior recommendation that USFWS and the local sponsors plant tree replacements for tree loss at a 1:1 ratio or covering the same acreage amount using native tree species. Mitigation might include, but is not limited to, replanting of native tree species adjacent to the River, or assisting local, county, or state agencies with any appropriate ongoing or planned reforestation plans. We recommend a possible species list and list and map of potential sites where trees can be planted be included with the Final EA.

MITIGATION COMMITMENTS

- Page 3-30 states, "*Tree removal activities would be required for the project and would be limited to the October to March timeframe to avoid the bat roosting season.*"

  Recommendation: In the forthcoming decision document, assumed to be a Finding of No Significant Impact (FONSI), EPA reiterates our prior recommendations that such date restrictions (for both tree removal and/or in-water work) become commitments in the decision document.

FEDERAL AND STATE ENDANGERED/THREATENED/RARE SPECIES

- The Draft EA did not explicitly state a determination of "*no effect*" or "*may affect, but is not likely to adversely affect*" any Federally listed or threatened or candidate species within the project area. During the February 9, 2019, project conference call, USFWS discussed their internal protocols required for such determinations and noted that the only species with which a potential issue may occur is the Indiana bat. If trees cannot be removed before the start of tree removal restriction dates, emergence surveys will be required.

  Recommendation: In the Final EA, add USFWS's determination on specific species that may be affected within the project area. If the project may have a potential effect on a listed species, such as the Indiana bat, describe what measures will be taken to ensure an adverse effect will not occur.

MONITORING/MAINTENANCE/MEASURES OF SUCCESS

- In our scoping comments, EPA previously recommended that USFWS develop an Adaptive Management Plan (AMP) for the project. Such a plan would discuss the duration of monitoring and rationale for selecting that time period(s) and include key features of the monitoring plan (e.g., vegetation density, invasive species, observed wildlife, wildlife habitat, etc.). A robust monitoring plan should discuss the intervals at which (after construction and restoration activities are complete) project performance will be measured. Monitoring plans should clearly state which entity(s) (e.g., USFWS, state resource agency, local government, non-governmental organization) will be responsible for monitoring and maintenance activities, and if an entity other than USFWS will be responsible for monitoring and maintenance activities, how USFWS will ensure project standards are met.

  The development of adaptive management criteria was also recommended, to include a description of actions to be undertaken if it is determined that restoration is unsuccessful (based on the measures of success selected), and the selection of action triggers based on monitoring. We also recommended that the AMP be included with the Draft EA as an appendix. The Draft EA did not include a Monitoring or Adaptive Management Plan. However, a Monitoring and Maintenance Plan – November 2018 was provided electronically to EPA on February 5, 2019.

  Recommendation: EPA continues to recommend that a monitoring and adaptive management plan be developed that includes the elements noted above, and that the current plan be modified to include them. In the Final EA, include the most up to date Monitoring and Maintenance Plan as an appendix to the document.

PROJECT PLANS

- EPA has reviewed the construction plans submitted to MDEQ under the MDEQ/USACE Joint Permit Application. These plans detail many aspects of the proposed project; however, they were not included with the Draft EA.

  Recommendation: Include the most recent construction plans as an appendix to the Final EA.