ENVIRONMENTAL ASSESSMENT (EA)

for

MAPLE RIVER DAM REMOVAL AND ROAD CROSSING IMPROVEMENTS
– MAPLE RIVER, PELLSTON, MI

PREPARED FOR:

U.S. FISH & WILDLIFE SERVICE

DEPARTMENT OF THE INTERIOR

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1.0 INTRODUCTION

1.1 Project Authority
In 2012, Conservation Resource Alliance (CRA) began the process of working with a conservation-minded landowner, the late Paxson Offield, to determine the fate of the Maple River Dam. Over these past years, CRA has met with project partners, acquired funding and developed a working relationship with a new landowner, to fulfill Mr. Offield’s vision of restoring the free-flowing condition of the Maple River for the first time in over 80 years. The proposed project involves three primary components: Removal of the Maple River Dam; Replacement of the Woodland Road culverts with a free-span bridge and; Replacement of the “Two-Track” culverts with a free-span bridge.

The National Environmental Policy Act (42 U.S.C. §4321 et seq. (1969)) was one of the first laws written that establishes the broad national framework for protecting our environment. NEPA requires federal agencies to assess the environmental effects of their proposed actions prior to making decisions. Environmental Assessments (EAs) are valuations of the environmental and related social and economic effects, to determine the likelihood of impacts from alternative courses of action.

The purpose of this EA is to analyze the potential environmental impacts of the proposed project, and to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

1.2 Project Background and Location
The Maple River is a high-quality coldwater stream that drains a watershed of approximately 159 square miles and outlets to Burt Lake in Cheboygan County, Michigan. The West Branch of the Maple River drains extensive swamps while the East Branch of the Maple River begins as the outlet of Douglas Lake. At the confluence of the East and West Branches of the Maple River, the Maple River Dam forms 42-acre Lake Kathleen. Maple River Dam is located in Maple River Township (T36 N, R4W, Section 10), Emmet County, immediately north of Woodland Road and approximately one-third of a mile east of US-31.
1.3 Site Description
1.3.1 Dam and Embankments

The Maple River Dam is an aging structure that no longer serves its intended purpose, but does create an impoundment and sea lamprey barrier. Historically, the first dam was built on the site in 1884, to power a sawmill (Eby, 2014). In 1901, a hydroelectric dam was built and operated for about 40 years. On November 8, 1951, the dam breached and washed out a portion of the dam embankment and Woodland Road. The road was rebuilt to the south following the wash-out. It is believed that the dam was reconstructed in 1966(7) (Godby et al., 2015). At that time, the purpose of the dam was changed from hydroelectric production to recreational usage. Today, the dam and impoundment are under the ownership of one private entity and still serve a private recreational purpose, on a limited basis.

The dam consists, in part, of an earthen embankment that measures approximately 1,200 feet long with a structural height of about 15 feet. The face of the embankment is at a maximum 4H:1V slope. The downstream slope of the dam south of Woodland Road varies, but is closer to a 1 1/2H: 1V slope.

A 2004 Dam Safety Inspection Report (Owens, 2004) indicated that the earthen embankment was in good condition overall, but noted evidence of seepage on the downstream face. By 2014, the earthen embankment had degraded to fair overall condition (SGI, 2015). Slopes were stable, but seepage was present along the majority of the downstream toe of the dam and trees were present along the embankment. According to SGI, there is a sinkhole present near the principal spillway that needs to be repaired and seepage is also present along the downstream toe. However, the width of the embankment is significant, typically over 100 feet, allowing for a higher factor of safety.

Spicer (2015) found the principal spillway concrete outfall structure to be in poor condition. Significant concrete deterioration is occurring along the raceway, concrete beams, etc. The historical concrete outlet structure, though out of service, is also in poor to unsatisfactory condition. Though the structure is not thought to be an immediate hazard to the safety of the dam, it was noted that it could be a potential safety hazard to people trespassing on the structure.

The hazard potential classification of the Maple River Dam is currently listed as “low.” Based on the potential for loss of life and economic loss downstream of the dam, Spicer recommended that the current hazard potential classification remain in place. The hazard potential classification is only an indication of
the potential for loss of life and economic loss due to failure of the dam. The hazard potential classification is not an indication of the stability or integrity of the dam.

1.3.2 Spillway

The concrete spillway is currently in fair condition structurally, but the concrete is significantly deteriorated and, as it continues to degrade, will have an impact on the structural stability of the spillway. The principal spillway consists of four stop log bays constructed with steel H-Beam stop log guides and wooden stop logs. These stop logs are stored in a permanent up position resulting in the normal lake level being controlled by the stop log bay sill elevation throughout the entire year. Essentially, the dam operates as a run-of-the-river facility; the same volume of water entering the impoundment from the East and West Branches of the Maple River is simultaneously leaving the impoundment over the top of the spillway. The overall opening of the stop log bays is approximately 26 feet including the H-Beam stop log guides. Two concrete fixed crest weirs are located immediately east and west of the stop log bays and are approximately 13 feet long each. The crests of these weirs are approximately three feet higher than the sill of the stop log bays. Downstream of the stop logs is a concrete raceway, with embedded rocks for energy dissipation. A concrete walk and concrete cross beams are also part of this structure. Immediately downstream of the principal spillway are three, six-foot (72") diameter CMP culverts under the jurisdiction of the Emmet County Road Commission that discharge to the Maple River.

1.3.3 Powerhouse

An inactive/abandoned hydroelectric structure is present approximately 500 feet east of the principal spillway on the south side of Woodland Road. The only remaining portion of the facility is the concrete structure.
1.3.4 Reservoir
The impoundment, “Lake Kathleen”, is 42-acres in surface area, with an average depth of 4.2 feet and a maximum depth of 12.9 feet. The lake does stratify, and has cold temperatures (maximum of 64.1°F on August 22, 2007) and good oxygen levels (6.79 ppm), at 11.1 ft. depth (MDNR, 2010).

1.3.5 Woodland Road Crossing
The Woodland Road crossing of the Maple River consists of three, six foot diameter (72”) CMP culverts located just downstream of the dam and spillway. The array of culverts is undersized, as evidenced by a large scour hole downstream of the structures and significant historic bank erosion that has been stabilized with large boulders. All three culverts are in poor to fair condition and are perched well above the streambed.
1.3.6 Two-Track Crossing
The Two-Track crossing is on the East Branch of the Maple River and consists of a battery of six randomly sized culverts that are in poor condition. Most of the culverts are plugged, to various degrees, by sediment. The entire crossing is failing due to erosion, sink holes and piping around the culverts.

1.4 Purpose and Need
Several factors contribute to the need for removal of the Maple River Dam and replacement of the Woodland Road and Two-Track crossings. The dam and its embankments are aging and require continual inspection and maintenance (the embankment has failed in the past) and the dam creates the Lake Kathleen impoundment, which has altered the natural ecology and function of the Maple River. Negative impacts of dams on ecology and natural processes are well-documented in the literature and the Maple River Dam is no exception. The dam fragments the Maple River system by blocking upstream migration of fish and other aquatic organisms, interrupts natural transport of sediment and organic debris, and alters water chemistry including water temperature. The current owner of the dam has no interest in maintaining or improving the structure and would like to see the river returned to its natural, free-flowing condition.

Habitat fragmentation has detrimental impacts on resident fish and wildlife that move up and down a river to find suitable spawning, rearing, and feeding habitat. Dams can also have a number of negative impacts on mussel populations, including decreased water quality and sediment deposition in the reservoir, channel incision downstream of the dam, and inhibition of host fish dispersal.

Stable river systems depend on consistent transport of sediment and woody debris. Disruptions in these transport patterns can lead to erosion of streambanks and bed and altered morphology. Ultimately, the ecology of the river is impacted through degraded instream and riparian habitat. Impacts to the Maple River are readily apparent. Upstream of the impoundment, excessive deposition has led to widening and shallowing, and habitat homogeneity, of the stream channel. The formation of deltas at the mouths of the East and West Branches of the Maple River are indicative of the extent of sedimentation. Spicer (2014) estimated that construction of the dam has resulted in accumulation of over 100,000 tons of sediment since 1938. This estimate equates to an annual load of 1,400 tons of sediment that is prevented from passing to downstream reaches. Downstream of the dam, sediment “starvation” has led to erosion of the banks and bed.

A shift from free-flowing (lotic) to still (lentic) water conditions has altered the habitat and associated aquatic community. Impounded waters typically have increased water temperatures, and trap fine sediments.
sediment and nutrients such as nitrogen and phosphate that promote excessive plant growth. In the case of Lake Kathleen, the average depth of the impoundment is 4.2 feet, with a maximum depth of 12.9 feet. The lake does stratify, and has cold temperatures (maximum of 64.1°F on August 22, 2007) and good oxygen levels (6.79 ppm), at 11.1 ft. depth. However, the Michigan Department of Natural Resources (MDNR) has found that the mean July water temperature is 5 to 5.4°F higher in the impoundment than in the upstream river (MDNR, 2010). An example of the shift in aquatic communities is illustrated by a fisheries survey conducted by the University of Michigan, which found a mix of coldwater and warmwater species typical of an impoundment on a coldwater river (Curless 1973).

The Woodland Road crossing is, in itself, a barrier for upstreaming migrating aquatic species during most flow conditions due to its perched elevation above the streambed. In addition, the three culverts have limited hydraulic capacity. During large design storm events, Woodland Road will experience overtopping, which could result in erosion of the embankment and failure of the crossing. In recent history, high flows have been observed in which these culverts were running near their full capacity.

The Two-Track crossing appears to have been originally constructed of random culverts and fill, with little thought for stream processes or hydraulic capacity. The crossing consists of six pipes of various sizes and all are in a state of disrepair. The crossing is likely a barrier to aquatic species at high flows. Most of the erosion originally caused by this crossing has healed and the sideslopes and streambanks are now well-vegetated. All of the culverts are prone to becoming sediment laden during low flow conditions, thus limiting their capacity during high flow conditions.
2.0 ALTERNATIVE ANALYSIS

The formulation of alternatives, consistent with project goals and objectives and the requirements of NEPA, 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

Design alternatives were developed based on comments from the landowner, community leaders and potential grant funders, survey data, field verification, modeling results, previous dam removal projects, comments from community stakeholders, and other recommendations. The method for determining alternatives was based on the following considerations:

1. Restore aquatic connectivity and natural stream processes
2. Effects on sea lamprey migration (Appendix 1).
3. Managing sediment transport caused by removal of the dam by one of three methods:
   a. Let all eroded sediment migrate downstream with no reduction in sediment transport;
   b. Trap eroding sediment in natural low areas in Lake Kathleen. No future maintenance would be necessary;
   c. Construct a sediment sump upstream of the dam to trap sediments. Ongoing dredging and maintenance of the sump would be necessary until head-cutting of the river ceases;
4. Maintain downstream peak flow to not cause negative impacts to adjacent landowners
5. Determine extent of maintaining upstream impoundment
6. Protect new stream section to minimize erosion potential
7. Project cost and availability of grant funding
8. Operation and maintenance
9. Project construction and dewatering methods and means using best engineering judgment and industry practices.

Several design alternatives were considered and evaluated in the process of determining the best design to cost effectively allow free fish passage, improve the recreational benefits of the dam, and maintain historical benefits at the site. The following is a list of alternatives considered; all of these alternatives were analyzed on an individual basis for comparative purposes:

Alternative 1: No Action

Alternative 2: Maintain lake and provide fish passable system (e.g. fish ladder); replacement of road crossings.

Alternative 3: Partial removal of dam with the purpose of maintaining the impoundment- removal of four feet to maintain partial pool and provide fish passable system; replacement of road crossings.

Alternative 4: Full removal of dam with the purpose of using in-lake storage for sediment transport control; replacement of road crossings.
Alternative 5:  Full removal of dam and construction of a sediment sump directly upstream of the dam for sediment transport control; replacement of road crossings. Utilize natural river sediment transport to convey sediment from impoundment to a sediment sump.

2.1  Alternatives Developed and Considered

2.1.1  Alternative 1 – No Action
The No Action alternative would leave the dam and all appurtenances in place. Impacts to the natural environment would continue to occur, in terms of fragmented habitats, degraded water quality and altered stream processes. The property owner would be responsible for continued maintenance on deteriorating structure that is not providing any personal benefit.

2.1.2  Alternative 2 - Maintain lake and provide fish passable system (e.g. fish ladder)
The main factors preventing fish passage are the high flow velocities and the excessive height of the spillway crest found in the concrete spillway. This alternative would leave the existing structure in place, but construct a meandering, fish passable, natural channel fish ladder along the northwesterly side of the spillway. The fish ladder would be constructed in a way to maintain the existing lake elevation and still achieve low velocities for fish passage and enhance the natural aesthetics of the adjacent area to the spillway. This alternative also proposes the removal of the Woodland Road and Two-Track crossings and replacement of the culverts with clear span timber bridges.

2.1.3  Alternative 3 - Partial removal of dam with the purpose of maintaining the impoundment-removal of four feet to maintain partial pool and provide fish passable system
This alternative would involve the partial removal of the existing spillway but would keep a fixed spillway crest to maintain a wetland/lake complex. This removal could be done during one construction season or spread over multiple construction seasons to incrementally lower the lake. The existing dam crest would be lowered four feet and the downstream spillway would be modified with riffle and pool sections to enhance fish passage. A much smaller lake would be maintained and the lake fringes would likely revert to wetlands. This alternative also proposes the removal of the Woodland Road and Two-Track crossings and replacement of the culverts with clear span timber bridges.

2.1.4  Alternative 4 - Full removal of dam with the purpose of using in-lake storage for sediment transport control
This alternative would involve the partial to full removal of the existing dam and the replacement of the structure with stepped rock weirs extending from the spillway crest to the Woodland Road crossing. This option would include adding natural stone to enhance the aesthetics of the banks adjacent to the dam. Natural stone and boulders would be placed within the removed dam area to mitigate any loss of stream habitat or pools and provide resting areas for migrating fish. Constructing a riffle and pool section would help to maintain the aesthetic looks of a fast moving section of the river including the sounds produced by this rushing water. The lake level would be lowered and the previously inundated area would revert to a riverine channel with extended flood shelves.

This alternative provides discussion of lowering the dam crest between five to nine feet to provide flexibility in managing sediment erosion. The purpose of partial removal would be to use existing storage capacity in Lake Kathleen to trap sediments that will be eroded when the river headcuts to its natural flow line. Sediment not trapped in the upstream, in-lake storage would be allowed to migrate downstream. The potential sediment storage is dependent upon the desired crest elevation. This alternative also proposes the removal of the Woodland Road and Two-Track crossings and replacement of the culverts
with clear span timber bridges. Effects of this alternative on sea lamprey management are discussed in Appendix 1.

2.1.5 Alternative 5 - Full removal of dam and construction of a sediment sump directly upstream of the dam for sediment transport control; Replacement of Woodland Road and Two-Track Crossings
This alternative would involve the complete removal of the existing dam from the spillway crest to Woodland Road crossing. This option would include adding natural stone to enhance the aesthetics of the banks adjacent to the new stream section. Natural stone and boulders would be placed within the new stream area to mitigate any loss of stream habitat or pools and provide resting areas for migrating fish. Maintaining a riffle and pool section would help to maintain the aesthetic looks of a fast moving section of the river including the sounds produced by this rushing water. The lake level would be lowered approximately 13 feet and the previously inundated area would revert to a riverine channel with extended flood shelves. This alternative also proposes the removal of the Woodland Road and Two-Track crossings and replacement of the culverts with clear span timber bridges. Effects of this alternative on sea lamprey management are discussed in Appendix 1.

2.2 Alternatives Eliminated from Consideration
CRA and project partners conducted an analysis of all project alternatives to identify and recommend those that warrant further consideration as part of this EA. This analysis considered all appropriate elements of each alternative including their effectiveness in meeting the project purpose, need, goals and objectives; engineering factors; cost and environmental impact (hydrology, water quality, sediment, aquatic and terrestrial ecology, wetlands, sensitive species, etc.).

Considering the environmental, economic, legal and social issues associated with the dam, a recommendation was made for Alternative 5 - Full Removal, and it was determined that the following three alternatives should be eliminated from further consideration. Essentially, the landowner was the decision maker and chose Alternative 5 to restore the free-flowing condition of the riverine system and to remove all liabilities and associated maintenance with dam ownership and/or fish passage systems.

2.2.1 Alternative 2 - Maintain lake and provide fish passable system (e.g. fish ladder)
- This alternative was eliminated because it does not provide natural free flow of the Maple River, does not remove dam risk, does not remove dam operation and maintenance, and it does not remove source of temperature impacts.

2.2.2 Alternative 3 - Partial removal of dam with the purpose of maintaining the impoundment-removal of four feet to maintain partial pool and provide fish passable system
- This alternative was eliminated because it does not provide natural free flow of the Maple River, does not fully remove dam risk, does not fully remove dam operation and maintenance, and it does not fully remove source of temperature impacts.
2.2.3 Alternative 4 - Full removal of dam with the purpose of using in-lake storage for sediment transport control
   o This alternative was eliminated because it does not provide natural free flow of the Maple River, does not fully remove dam risk, does not fully remove dam operation and maintenance, and it does not fully remove source of temperature impacts.

2.3 Alternatives Retained for Detailed Consideration

2.3.1 Alternative 1 – No Action
The No Action alternative would leave the dam and all appurtenances in place, as well as the existing crossings at Woodland and the Two-Track Roads. Impacts to the natural environment would continue to occur, in terms of fragmented habitats, degraded water quality and altered stream processes. The property owner would be responsible for continued maintenance on a deteriorating structure. The risk of dam failure, and associated impacts, would increase if the dam continues to deteriorate. The reason for not eliminating this alternative would be due to the inability to pay for any of the other alternatives, or lack of landowner cooperation, therefore leaving this as the only option.

2.3.2 Alternative 5 - Full removal of dam and construction of a sediment sump directly upstream of the dam for sediment transport control; Replacement of Woodland Road and Two-Track Crossings
This alternative would involve the complete removal of the existing dam from the spillway crest to Woodland Road crossing. The lake level would be lowered approximately 13 feet. The previously inundated area would revert to a riverine channel with extended flood shelves. This alternative also proposes the removal of the Woodland Road and Two-Track crossings and replacement of the culverts with clear span timber bridges.

This removal and reconstruction could be done during one construction season or spread over multiple construction seasons. The following approach would be followed for removal:

- Install diversion piping or other dewatering means via one of the following methods:
  o Gravity flow: A 30-48 inch pipe installed 5-10 feet below the existing lake level with a smaller coffer dam that would be incrementally lowered to decrease the lake level. For estimating purposes, a 48 inch pipe was assumed.
  o Pump: The contractor may install pumps to divert water from Lake Kathleen to the downstream river. The total pump capacity would need to exceed base flow of 45,000 gallons per minute (gpm) (100 cubic feet per second (cfs)). It would likely require 10 8-inch pumps, though a more detailed determination of pumping requirements is necessary.
  o Siphon: The contractor may use a siphon using primer pumps, with number and size of pipes to be determined after performing hydraulic analysis.
- Install steel sheetpile coffer dam immediately upstream of the existing dam crest, the estimated steel sheet pile length is 30 feet.
- Spillway demolition and lake lowering may occur in one of two ways:
  o Demolish and remove concrete spillway to design elevation and leave crest of sheetpile structure in place. Lowering of lake level would occur post-demolition. This alternative will require full removal of concrete spillway and appurtenances.
Demolish and remove concrete spillway and appurtenances and lower lake level simultaneously. The process would require alternating lowering of the dam crest and lowering of the sheet pile crest to minimize the pressure difference up and downstream of the sheetpile. This method would potentially reduce the required length of steel sheetpile, though may present increased construction costs and risk.

- Excavate sediment basin upstream of existing structure to capture headcut sediment.
- Spoils from sediment basin to be levelled in upland areas adjacent to impoundment on the property.
- Remove sediment from basin as determined necessary. Sediment removal will be based upon the rate of sediment transport into the basin and based upon allowable sediment loading downstream. Excavated sediments will be levelled in upland areas adjacent to impoundment on the property.
- Excavate and grade soil beneath the former spillway to proposed elevations and slopes.
- Remove existing CMP culverts and replace with 80-ft free span timber bridge.
- Incrementally remove dewatering piping and structures as necessary to ensure base flow is maintained in the river.
- Backfill and restore as necessary.
- Stabilize upstream exposed impoundment bottom lands with vegetative cover using seed and mulch. Construct berms and grade as necessary to maintain or maximize isolated pool areas.
- Seed and restore as necessary any disturbed areas, including spoil deposition areas.

The Woodland Road crossing, which consists of three culverts, would be replaced with a timber bridge. At this location, the Maple River has a bankfull width of about 30 feet. Following dam removal and site restoration, the new bridge will span about 80 feet. The culverts and bridge construction will need to be coordinated with the Lake Kathleen dewatering and dam removal project. The culvert and road embankment removal will be completed by the dam removal contractor at or near the same time as the dam spillway is removed. After removal, the bridge contractor will install the bridge sub-structure (pilings) and complete any armoring of the banks. On completion of the sub-structure and river armoring, the timber bridge super structure and road approaches will be completed by the Emmet County Road Commission.

The Two-Track crossing will be replaced with a smaller, lighter duty timber bridge capable of handling off-road vehicles, such as all-terrain vehicles, snowmobiles, hobby-type tractors, and the occasional passenger vehicle. The East Branch of the Maple has a bankfull width of 24 feet that will be spanned. The selected contractor will remove and properly dispose of the existing culverts. The proposed bridge substructure (abutments) will be installed and then the timber bridge super structure and approaches will be constructed at or near the location of the existing culverts. Two large existing gas transmission mains are located near the existing culverts. The final location of the proposed crossing will depend on discussion and approval from the gas company.

**2.3.2.1 Presumed Benefits of Alternative 5**

- Improves upstream passage for fish under most flow conditions
- Improves downstream passage for all fish and other aquatic organisms
- Restores natural stream processes, including transport of sediment, woody and other organic debris through the system
- Eliminates maintenance and responsibility associated with the failing dam structure
- Reduces sediment erosion at Woodland Road crossing
- Increases habitat for Hungerford's crawling water beetle
- Sea lamprey control will be managed through the sterile male release program and adaptive management (Appendix 1)
- Manages sediment transport by construction of sediment sump within lake
- Removes MDEQ dam safety regulation
- Grants available for dam removal
- Aesthetically pleasing
- Eliminates unattractive nuisance and safety hazard

Woodland Road and Two-Track Crossings
- Removes fish passage obstruction
- Increases habitat for Hungerford's crawling water beetle
- Removes a hydraulic/flow obstruction
- Increases fish habitat by providing natural river bottom
- Reduces scour due to undersized culverts
- Reduces localized soil erosion due to steep embankments
- Provides more aesthetically appealing crossings

2.3.2.2 Presumed Detriments of Alternative 5
- Removes recreational and natural aesthetic benefits of an impounded lake
- Possible range of expansion of invasive species
- Will require ongoing monitoring and dredging of sediment sump until system has stabilized
- Removes infrastructure that has been part of the community for a long period of time
- High construction costs

Woodland Road and Two-Track Crossings
- Construction cost
- Traffic impacts due to road closures for construction

2.4 Environmentally Preferred Alternative
The environmentally preferred alternative is determined by applying the six criteria in the NEPA (1969), which guides the Council on Environmental Quality (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. The six criteria include:
- 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.

Alternative 1, No Action, minimally meets the above six evaluation factors because it retains the existing facilities, but does not address the components of the project Purpose and Need, does not resolve the existing dam safety issue and does not provide a solution to the issues of environmental degradation.

Alternative 5, Full Removal, 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 not significant. Because it meets the Purpose and Need for the project, the project objectives, is the environmentally preferred alternative and the preferred sea lamprey control alternative, full dam removal is recommended.
3.0 Affected Environment and Consequences

The proposed actions considered in this Environmental Assessment (EA) are Alternative 1: No Action and Alternative 5: Full removal of the Maple River Dam, its spillway and appurtenances, replacement of the downstream culvert and restoration of the Maple River and its riparian lands; Replacement of the Woodland Road and Two-Track Crossings (Full Removal). This section discusses the implications associated with each of these two alternatives.

3.1 Physical Environment

3.1.1 Geology, Soils and Sediments

The headwaters of the Maple River originate in coarse-textured glacial till, glacial outwash sand and gravel, and postglacial alluvium (West Branch Maple River) and coarse-textured glacial till and lacustrine sand and gravel (East Branch Maple River) (Godby et al., 2015). The Maple River is comprised almost entirely of lacustrine sand and gravel (82.1%).

3.1.1.1 Alternative 1: No Action

Under this alternative, no construction would occur and there would be no impact to geology, seismicity, or soils. Sandy sediment will continue to build up within Lake Kathleen. There is currently a sediment delta that primarily exists along the northern edges of Lake Kathleen, where the West and East Branches of the Maple River enter the impoundment. Sediment transported by the river will continue to expand the delta, eventually filling Lake Kathleen. Downstream of the dam, the channel will continue to be starved of sediment which may cause additional bank erosion and channel instability issues.
3.1.1.2 Alternative 5: Full Removal

Under this alternative, impacts to geology would be minimal as bed rock depth is significantly below the surface soils and disturbance will be limited to locations that are previously disturbed. No geologic or seismic impacts are expected from the construction activities.

Dam removal will include partial removal of the existing embankment, which will be re-graded to facilitate the river channel. Impacts to soils would be limited in location to the disturbed areas and mitigated by using site specific Soil and Sedimentation Control (SESC) measures. Any disturbed topsoil will be stockpiled onsite and replaced following excavation to allow vegetation to be established at the site following construction.

Full removal of the structure will cause localized sediment build-up to be transported downstream during drawdown and subsequent to dam removal. Headcutting upstream of the previously inundated lake will occur up both the East and West Branches; in the West Branch, headcutting is anticipated to stop about 2,000 feet below US-31 and, in the East Branch, headcutting may approach the Two-Track Crossings. The total eroded sediment volume is approximately 70,000 cubic yards, of which 40,000 cubic yards will cut from Lake Kathleen and the West Branch and 30,000 cubic yards will cut from the East Branch.

Sediment transport could be managed in a number of ways, but the preferred method is to create a large sump immediately upstream of the dam spillway and monitor the progress of erosion and acceptable sediment transport downstream. The sediment sump will be dredged, as necessary. The size of the sediment sump and frequency of maintenance will be determined by the construction sequence and acceptable sediment transport downstream; the volume of sediment to be allowed to pass downstream is unknown at this time. If full removal occurs in one construction season, the sediment sump will likely need to be larger or maintained more frequently than if the removal were spread over several construction seasons.

The exposed bottomland and stream channel will be allowed to naturally vegetate and stabilize through the erosion and sedimentation process. Sediment travelling downstream will continue to be managed at the sediment sump. There is no anticipated increase in sedimentation of the downstream river channel; however, permanent loss of the impoundment means that natural sediment transport will be restored.

3.1.2 Water Resources and Water Quality

The Maple River is shown on United States Geological Survey (USGS) quad maps and is regulated by the Michigan Department of Environmental Quality (MDEQ). There are no listings for water quality impairments, no established Total Maximum Daily Loads (TMDLs), and the Maple River is not listed on the Federal Clean Water Act Section 303d list for water quality impairments. Godby et al. (2015) suggests that, based upon several studies, all designated uses of the Maple River are being met.

Though little background data exists to describe the geochemical conditions of Lake Kathleen, it is known that the impoundment increases water temperatures and is serving as a sink for sediment, woody debris and other organic material transported from upstream reaches. Water quality upstream and downstream of the dam is generally considered good to excellent and supports an excellent brook trout fishery (Godby et al., 2015). If the dam is removed, the river channel through the former impoundment is expected to, over time, mimic upstream conditions.
3.1.2.1 Alternative 1: No Action
Under this alternative there would be no impact to water resources or water quality. The existing, site specific issues associated with ponding of a river, including increase water temperature and sediment accumulation, would remain.

3.1.2.2 Alternative 5: Full Removal
The potentially affected environment is considered to be the Lake Kathleen impoundment and the flowing sections of river up and downstream of the Maple River Dam. The area upstream includes the section of the river to where water velocities diminish in response to the impoundment, and mobile sediment begins to settle out in the still water environment. The area downstream of the dam includes the extent of the river where water quality (primarily temperature and sedimentation) has been affected by release of water and storage of sediment behind the dam.

Both the East and West Branches, immediately upstream of the impoundment, are impacted by excessive sedimentation associated with decreased sediment transport capacity and competency as the rivers near the still waters of the impoundment. Generally, the area of impact extends several hundred feet upstream into both river channels, where channel widening and loss of stream facets (i.e. riffle, run, pool) are obvious. The wide, shallow stream channels are prone to warming and decreased water quality.

Downstream of the dam, the river is affected by increased water temperature due to the effects of solar heating of the impoundment.

3.1.3 Floodplain Management (Executive Order 11988)
This project area has not been surveyed by Federal Emergency Management Agency (FEMA) and thus, is not included in Flood Insurance Rate Mapping. However, since more than two square miles of watershed contribute to the Lake Kathleen impoundment, it is regulated by the MDEQ under Part 31 of NREPA. As part of the MDEQ permitting process, the project will need to certify there is no impact (harmful interference) to downstream property owners. Due to the small size of the impoundment (42 acres) versus the overall contributing watershed (over 120 square miles), the impoundment is very limited in attenuating peak flows. Therefore, the removal of the dam will not result in any significant increases in peak discharges downstream during large storm events.

3.1.3.1 Alternative 1: No Action
Under the No Action alternative, there would be no changes to the existing conditions. The potential for another dam failure, and associated downstream flooding and degradation, would remain.

3.1.3.2 Alternative 5: Full Removal
The impoundment provides very limited attenuation during the 100-year flood and, therefore, dam removal will not have any measurable impact on the downstream floodplain. Removal of the dam will result in a significant lowering of the 100-year floodplain upstream of the dam.

3.1.4 Air Quality
The Clean Air Act (CAA) requires the United States Environmental Protection Agency (USEPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The CAA established two types of national air quality standards: primary standards set limits to protect public health, including the health of “sensitive” populations such as asthmatics, children,
and the elderly; along with secondary standards that set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation and buildings. Current criteria pollutants are: Carbon Monoxide (CO), Nitrogen Dioxide (NO2), Ozone (O3), Lead (Pb), Particulate Matter (PM10), and Sulfur Dioxide (SO2). Because of their impact on human health, EPA has also emphasized the need to address PM2.5 (and diesel emissions).

The USEPA designates areas as either NAAQS attainment or non-attainment areas. An area is considered a non-attainment area if it does not meet the national primary or secondary air quality standards for a pollutant. Based on information obtained from the USEPA website, Emmet County, Michigan is considered within attainment status for all pollutants (USEPA website).

3.1.4.1 Alternative 1: No Action
No changes in air quality would be expected.

3.1.4.2 Alternative 5: Full Removal
Construction activities may result in temporary, short-term impacts to air quality. Impacts may result from the operation of diesel and gasoline engines associated with excavation, grading, and other equipment during the construction phase. Also, during the construction phase, exposed soil could temporarily increase airborne particulate matter in the local area. The proposed project would not create any long-term increases in pollutants that adversely impact air quality.

To reduce the temporary impacts to air quality, measures will be undertaken during the construction to reduce the emission of criteria pollutants and fuel-burning equipment running times would be kept to a minimum. To minimize the impact of airborne particulates, open construction areas will be minimized, and construction site practices will follow standard SESC measures.

3.1.5 Aesthetics and Recreation
The area surrounding the Maple River Dam is rural and remains in a somewhat natural state. Lake Kathleen is attractive and offers nice views from several vantage points. Because the property surrounding the dam, impoundment and upstream river channels has been privately owned, few public recreational opportunities have existed. Private recreational opportunities have included fishing, hunting, canoeing/kayaking and trail use for walking and all-terrain vehicles. No public recreation is known to occur on the property, though it appears possible for an individual to wade or paddle downstream from the US-31 crossing and into Lake Kathleen.

3.1.5.1 Alternative 1: No Action
If the Maple River Dam remains in place, aesthetics and recreational activities will remain unchanged.

3.1.5.2 Alternative 5: Full Removal
Removal of the dam and replacement of the Woodland Road crossing will have implications on aesthetics and recreational activities. The obvious change would be the replacement of the impoundment (lake) with a stream channel that will, eventually, be surrounded by dense vegetation. A new timber bridge will add rural character to the scene, which will, in time, blend in with the surroundings and fit the idyllic image of a northern Michigan trout stream. If the dam were to be removed, the private “lake” fishery will be
eliminated in favor of additional high quality stream angling for trout. While there is discussion of public access, there should be no expectation for public recreational opportunities at this time.

Douglas Lake is located approximately eight river miles upstream of the dam, with many road crossings, culverts, beaver dams and other grade controls present that will prevent unintended hydrologic impacts to the lake.

3.2 Biological Environment

3.2.1 Terrestrial Environment

As part of a wetland and terrestrial assessment of the project area, SES (2017) described the lands surrounding Lake Kathleen to consist of upland field, deciduous hardwood forests, northern dry pine forest, and coniferous hardwoods over sands and loamy sands that, along much of the adjacent shoreline, slope steeply to the lake and fringe wetlands (Appendix 2). Habitats for a variety of terrestrial species is present within the project area and the river and riparian corridor provide excellent food, cover, and travel or migration routes.

The majority of animals seen, heard, or noted from signs such as tracks and scat were primarily associated with Lake Kathleen and adjacent wetlands (Table 1). While the list is short, the habitat present throughout and adjacent to Lake Kathleen is likely to support additional animals including numerous species of small mammals and furbearers, reptiles and amphibians, birds of prey, songbirds and Neotropical migrants. For example, 121 breeding birds Doepker et al. (2001), nine species of frogs and toads and seven species of salamanders (Harding and Holman 1992), eleven species of snakes and one lizard (five-lined skink) (Harding and Holman 1990) and five species of turtles are known to occur in the habitats of the Cheboygan River watershed. As well, black bear, bobcat and other game or recreationally important species are found in the region.

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anas discors</td>
<td>Blue-winged teal</td>
</tr>
<tr>
<td>Anas platyrhynchos</td>
<td>Mallard</td>
</tr>
<tr>
<td>Anas rubripes</td>
<td>American black duck</td>
</tr>
<tr>
<td>Branta canadensis</td>
<td>Canada goose</td>
</tr>
<tr>
<td>Castor canadensis</td>
<td>American beaver</td>
</tr>
<tr>
<td>Haliaeetus leucocephalus</td>
<td>Bald eagle</td>
</tr>
<tr>
<td>Lophodytes cucullatus</td>
<td>Hooded merganser</td>
</tr>
<tr>
<td>Odocoileus virginianus</td>
<td>Whitetail deer</td>
</tr>
<tr>
<td>Ondatra zibethicus</td>
<td>Muskrat</td>
</tr>
<tr>
<td>Procyon lotor</td>
<td>Raccoon</td>
</tr>
</tbody>
</table>

3.2.1.1 Alternative 1: No Action

The No Action alternative would ensure that the project site remains in its existing condition. Typical of an earthen embankment of a dam, much of the southern shoreline of Lake Kathleen is relatively open, maintained, barren of vegetation and does not provide ideal conditions for wildlife travel or inhabitation.
3.2.1.2 Alternative 5: Full Removal

Removal of the Maple River Dam would result in loss of the Lake Kathleen impoundment. There would be no impact to surrounding upland habitats, but a dramatic increase in river edge habitat and travel corridor. Habitats of the northern project area would be linked to those south of the Woodland Road crossing.

3.2.2 Aquatic Environment

According to Godby et al. (2015), the West Branch Maple River is classified as warm in its headwaters due to its surface drainage origins, but quickly accrues groundwater and cools rapidly. From the confluence of Cold Creek to Lake Kathleen, it is considered a coldwater stream and is dominated by brook trout, with lesser numbers of brown and rainbow trout. The density of brook trout at Robinson Road was found to be higher than any other Stream Status and Trends fixed site in the Northern Lake Huron Management Unit (NLHMU). Brook trout standing crop is second only to the North Branch of the Au Sable River, and is more than twice the statewide average of other high quality trout streams. This reach had an average of 1,415 trout per acre (5,156 trout per mile) and 51 pounds of trout per acre from 2002-04 (Godby et al., 2015).

Godby et al. (2015) describes the East Branch as being a warm-transitional stream originating at the outlet of Douglas Lake. The fish community is comprised primarily of warm and coolwater fish species, although it does have some coldwater habitat as it accrues groundwater in the lower portion of the river. The stream has good habitat for trout, but temperatures get high enough during the summer to make it thermally marginal for these species. Therefore, trout only use the stream on a seasonal basis. In 2002, bowfin, mudminnows, four cyprinid (minnow) species, grass pickerel, largemouth bass, mottled sculpin, pumpkinseed, white sucker, and yellow perch were collected by MDNR at the Robinson Road crossing. This mix of coolwater species is typical of a marginal trout stream, with dace and sculpin alongside perch and centrarchids.

Despite originating below the Maple River Dam, the Mainstem is considered to be cold-transitional due to the significant groundwater inputs. In 2002, MDNR collected brook, brown, and rainbow trout, in addition to ten other species of fish representing both warm and coldwater preferences (Godby et al., 2015). This mix of fish types within the community reflects the still water origins of the Mainstem. Brown trout were the most abundant game fish encountered and growth determined to be above the state average. Gravel was the predominant substrate throughout the reach, and there was a good variety of pool, riffle, and run habitat. Strong, self-sustaining populations of rainbow trout live in Burt Lake and use the Mainstem for spawning. Young rainbow trout are known to migrate back to Burt Lake to take advantage of the large forage base in the lake, and can grow to impressive sizes.

Little is known about the fish population of Lake Kathleen proper, but it can be assumed that there is a wide-ranging mix of species based on seasonal water temperatures and diversity of fish within the East and West Branches. Anecdotal evidence from anglers suggests that there is a population of sunfish, including bluegill and largemouth bass, as well as yellow perch.
3.2.2.1 Alternative 1: No Action
There would be no change to the aquatic environment under this alternative. The impoundment would continue to have impacts on the river system and the dam and road crossings would continue to sever migratory routes for aquatic species.

3.2.2.2 Alternative 5: Full Removal
Removal of the dam and replacement of road crossings, and the associated loss of the impoundment, will uncover approximately one-mile of coldwater stream habitat that has been inundated for at least 80 years. As well, the critical link between Burt Lake and the headwaters and tributaries of the Maple River will be restored for myriad aquatic species. Removal of the dam will likely decrease the overall temperature in the Maple River near the structure. This will further benefit native coldwater species, along with trout.

The movement of sediment from draining of the lake, and subsequent downstream deposition, could impact the downstream natural habitats if not managed properly.

The removal of the dam will ecologically connect 43 miles of Maple River and its tributaries. This will certainly benefit native and desirable fish species but may also provide additional spawning locations for sea lamprey. USFWS, Sea Lamprey Control, has not yet made a decision on support for full removal but a decision is forthcoming. As well, they have provided an alternatives analysis directed toward long-term sea lamprey control options for the Maple River (Appendix 1).

When the dam is removed and the lake reduces in area and depth, there will be a loss of habitat for lake-dwelling species such as warmwater fish. These fish that prefer lentic environments will not thrive in a free-flowing system, and will be replaced with riverine species. Species of the lotic impoundment will attempt to find new areas to live, spawn, and feed, possibly moving downstream to Burt Lake.

3.2.3 Wetlands (Executive Order 11990)
Executive Order 11990, Protection of Wetlands, requires federal agencies to take action to minimize the loss of wetlands. The NEPA compliance process requires federal agencies to consider direct and indirect impacts to wetlands, which may result from federally funded actions.

In 2017, SES completed an assessment of wetland and terrestrial environments on the project site. The National Wetland Inventory Map and the Michigan Resource Inventory Map do not identify the presence of wetlands within or adjacent to the existing impoundment; however, hydric (wetland) soils are present based on the State’s final wetland inventory, and the Emmet County Soil Survey. Inspection of the area showed a narrow band (1 to 10 feet) of emergent and scrub-shrub wetland along portions of the Lake Kathleen shoreline. Slightly larger wetland areas were identified at the upstream influence of the impoundment along the East and West Branches of the Maple River.
The wetlands along the East Branch, close to where the influence of the impoundment ends, contains a mixture of scrub-shrub and wet meadow wetland, but is primarily dominated by shrubs adjacent to the river (Table 2). Soils at the surface are organic. On the West Branch is a scrub-shrub wetland with a high density of reed canary grass in the herbaceous layer. Areas of open water are also present. Soils consist of organics over sandy loans, with evidence of past sediment deposits from river flooding.
Table 2. Plant species documented within the project area, SES (2017).

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Wetland Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acer saccharum</td>
<td>sugar maple</td>
<td>FACU</td>
</tr>
<tr>
<td>Alnus rugosa</td>
<td>alder</td>
<td>OBL</td>
</tr>
<tr>
<td>Asclepias syriaca</td>
<td>common milkweed</td>
<td>FACU</td>
</tr>
<tr>
<td>Betula papyrifera</td>
<td>paper birch</td>
<td>FACU</td>
</tr>
<tr>
<td>Carex sp.</td>
<td>Sedge</td>
<td>----</td>
</tr>
<tr>
<td>Carex stricta</td>
<td>upright sedge</td>
<td>OBL</td>
</tr>
<tr>
<td>Centaurea solstitialis</td>
<td>starthistle</td>
<td>[UPL]</td>
</tr>
<tr>
<td>Cornus amomum</td>
<td>silky dogwood</td>
<td>FACW</td>
</tr>
<tr>
<td>Dactylis glomerata</td>
<td>orchardgrass</td>
<td>FACU</td>
</tr>
<tr>
<td>Eupatorium maculatum</td>
<td>joe pye weed</td>
<td>FAC</td>
</tr>
<tr>
<td>Lonicera sp.</td>
<td>honeysuckle</td>
<td>----</td>
</tr>
<tr>
<td>Ostrya virginiana</td>
<td>hophornbeam</td>
<td>FACU</td>
</tr>
<tr>
<td>Phalaris arundinacea</td>
<td>reed canarygrass</td>
<td>FACW</td>
</tr>
<tr>
<td>Pinus strobus</td>
<td>eastern white pine</td>
<td>FACU</td>
</tr>
<tr>
<td>Populus tremuloides</td>
<td>quaking aspen</td>
<td>FAC</td>
</tr>
<tr>
<td>Prunus serotina</td>
<td>black cherry</td>
<td>FACU</td>
</tr>
<tr>
<td>Pteridium aquilinum</td>
<td>western brackenfern</td>
<td>FACU</td>
</tr>
<tr>
<td>Quercus rubra</td>
<td>northern red oak</td>
<td>FAC</td>
</tr>
<tr>
<td>Rubus allegheniensis</td>
<td>blackberry</td>
<td>FACU</td>
</tr>
<tr>
<td>Salix amygdaloides</td>
<td>peachleaf willow</td>
<td>FACW</td>
</tr>
<tr>
<td>Salix exigua (S. interior)</td>
<td>sandbar willow</td>
<td>OBL</td>
</tr>
<tr>
<td>Schoenoplectus tabernaemontani</td>
<td>softstem bullrush</td>
<td>OBL</td>
</tr>
<tr>
<td>Solidago altissima</td>
<td>Canada goldenrod</td>
<td>FACU</td>
</tr>
<tr>
<td>Solidago gigantea</td>
<td>giant goldenrod</td>
<td>FACW</td>
</tr>
<tr>
<td>Thuja occidentalis</td>
<td>northern white cedar</td>
<td>FACW</td>
</tr>
<tr>
<td>Tilia americana</td>
<td>American basswood</td>
<td>FACU</td>
</tr>
<tr>
<td>Ulmus americana</td>
<td>American elm</td>
<td>FACW</td>
</tr>
<tr>
<td>Verbascum thapsus</td>
<td>common mullein</td>
<td>UPL</td>
</tr>
<tr>
<td>Viburnum lentago</td>
<td>nannyberry</td>
<td>FAC</td>
</tr>
</tbody>
</table>

The lake bed nearshore consisted mostly of sandy soils with sparse or no vegetation. Organics and silt deposits were noted further upstream on the East Branch of the Maple River. Slow moving water areas contained scattered white water lily (*Nymphaea odorata*) and *Potamogeton* species.

### 3.2.3.1 Alternative 1: No Action
The No Action alternative would ensure that the project site remains in its existing condition.

### 3.2.3.2 Alternative 5: Full Removal
SES (2017) suggested that all wetlands within the project area would be considered regulated under Part 303 of NREPA, and have values and functions, especially considering that they are directly contiguous to Lake Kathleen and/or the Maple River. Wetland functions include, but are not limited to, fish and wildlife habitat, water quality and water storage.

If the dam were to be removed and Lake Kathleen were to disappear, there would be an obvious impact to the hydrology associated with the existing wetlands. Due to the topography of the area and the narrow fringe of wetland adjacent the lake (approximately 3.3 acres total), the potential for negative impacts to wetlands is small. In addition, a larger quantity of wetlands is expected to develop adjacent to the new
(restored) river channel after removal of the dam. A reduced lake pool is expected to result in more wetland growth in the low, shallow areas that were previously inundated. Much of the 42 acres currently inundated will likely revert to wetland. Small, offline ponds could be created to mitigate the overall loss of open water habitat for waterfowl.

Wetlands associated with the East and West Branches are not expected to be impacted under this alternative. The hydrology of these wetlands is largely regulated by the riverine environment, rather than the impoundment, which is not expected to change due to the significant distance upstream of the dam.

Downstream of the dam, wetlands are expected to remain in their existing condition, since no work is proposed and sediment passing downstream will be managed to ensure that the stream channel is stable. Importantly, there are no long-term negative wetland impacts anticipated under this alternative.

3.2.4 Rare Species
In accordance with Section 7 of the Endangered Species Act (ESA) of 1973, the project area was evaluated for the potential occurrences of federally listed threatened and endangered species. The ESA requires any federal agency that funds, authorizes, or carries out an action to ensure that their action is not likely to jeopardize the continued existence of any endangered or threatened species (including plant species) or result in the destruction or adverse modification of designated critical habitats.

The following federally listed and candidate species are found in Emmet County, Michigan (USFWS, 2015):

- Michigan monkey-flower (*Mimulus michiganensis*)
- Hungerford's crawling water beetle (*Brychius hungerfordi*)
- Northern long-eared bat (*Myotis septentrionalis*)
- Piping plover (*Charadrius melodus*)
- Rufa Red knot (*Calidris canutus rufa*)
- Eastern Massasauga (*Sistrurus catenatus*)
- Michigan dwarf lake iris (*Iris lacustris*)
- Houghton's goldenrod (*Solidago houghtonii*)
- Pitcher's thistle (*Cirsium pitcheri*)

Of the listed species, both the Michigan monkey-flower and the Hungerford's crawling water beetle have been previously documented in the project area and are of specific concern.

**Michigan monkey-flower**
Michigan monkey-flower is an aquatic to semiaquatic, perennial forb of marl springs, cold streams and seeps (Penskar 2012). This globally imperiled species is known only from Michigan, where it is endemic to the Straits of Mackinac and Grand Traverse regions, including outlying colonies documented on Beaver Island in northern Lake Michigan.

A population of Michigan monkey-flower is known to occur along Woodland Road near the Maple River Dam and is well-known for its uniquely high level of sexual reproduction compared to other populations, which exhibit primarily vegetative reproduction (Bliss, 1986). In anticipation of possible dam removal, Slaughter (2015) surveyed colonies of Michigan monkeyflower at this location, and mapped colonies on the south side of Woodland Road, both west and east of the Maple River. Similar to previous observations
at this location, all specimens appeared to be fertile and contained fully developed fruits (capsules) with seeds.

Slaughter (2015) found that locations of colonies were restricted to, but abundant, in the large, spring-fed, mucky wetlands below the Woodland Road embankment. The area was dominated by the non-native *Myosotis scirpoides* (forget-me-not).

**Hungerford’s crawling water beetle**

The Hungerford’s crawling water beetle (HCWB) was listed as endangered on March 7, 1994, under the provisions of the U.S. Endangered Species Act. The species has been found in five streams in the United States and one stream in Canada (USFWS, 2006a). Of these occupied streams, only the East Branch of the Maple River has historically contained consistently large numbers of beetles.

The beetle is known to inhabit relatively cool (15-25 degrees C), fast flowing alkaline streams with sand and gravel substrates, often just below beaver dams, culverts or similar human-made structures (USFWS, 2006a). Adults seem to prefer gravel and cobble riffles, but larvae occupy areas with slower current and dense growth of microalgae, especially *Chara*. However, the habitat requirements of the species are not fully understood and it is uncertain what habitat characteristics are important for all life stages of this species. Because the habitat in which they have often been found does not appear to be rare, it has also been suggested that their distribution may be limited by dispersal or another factor (e.g., appropriate food, pupation sites), or, the species may be a glacial relict that has been rare since the last glaciation (USFWS, 2006a).

The East Branch of the Maple River represents the best-studied and largest known population of this species. The beetle is found in several areas of the East Branch, from the Douglas Lake Road crossing downstream for approximately two and a half miles to the project site, including at least a dozen occupied sites (USFWS, 2006a). The HCWB was first collected from the East Branch of the Maple River in 1952 (Spangler 1954). Most recently, Great Lakes Ecosystems (GLE) (2013) completed thorough searches for the HCWB at several sites in the Maple River watershed. The HCWB was absent from locations at Ely Bridge Road (farthest upstream search location on the West Branch), at the Robinson Road crossing (West Branch of the Maple River, downstream from Ely Bridge Road) and at the Brutus Road crossing (Main Branch). However, after an intense search, GLE found a single adult HCWB immediately below the dam outfall (downstream of Woodland Road), in a large pool near the westerly bank. This HCWB was found in location where a small amount of cooler groundwater entered the pool, presumably providing more favorable conditions than warmer portions of the pool.

Because that single adult beetle was discovered, representing the first recorded occurrence of HCWB within the Main Branch of the Maple River, GLE was asked to revisit the area to conduct a more thorough investigation. The follow-up work included re-surveying the entire spillway pool area, Lake Kathleen proper, upstream of Lake Kathleen on the East Branch, and downstream of the dam at Maple River Road. Despite intensive search efforts and timing the effort during the season of peak abundance, no HCWB were found at any of the sites except for the East Branch site. Here, seven adult beetles were captured over 3.75 hours, in 700 feet of stream below the Two-Track crossing.

Based upon survey results, GLE opined that the original observation below the dam was probably incidental. The one adult HCWB could have washed down from an upstream population or traveled upstream and became trapped below the spillway culverts. It was also speculated that the beetle simply
flew from a nearby population and landed in the pool. In any case, GLE does not believe that there is a population occurring in the outfall pool or at any of the survey sites on the Main or West Branch.

Stream modification, including culvert removal or bridge construction, could be a threat to the HCWB. However, in most cases, the overall positive benefits of these projects outweigh any short-term adverse impacts. For example, based upon an increase in the HCWB population after replacement of twin culverts with a timber bridge on the Carp Lake, USFWS (2006b) suggested that projects that improve environmental conditions at road crossings are likely to have overall benefits to this species (Appendix 3). Though, at sites where large numbers of beetles occur, the overall habitat benefits of stream-crossing improvement projects may not outweigh the negative impacts to HCWB and their habitat. Each project must be evaluated on a case-by-case basis to evaluate the potential risks and benefits.

**Northern long-eared bat**

The USFWS describes the summer habitat for the Northern long-eared bat as follows:

>“During the summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags (dead trees). Males and non-reproductive females may also roost in cooler places, like caves and mines. Northern long-eared bats seem to be flexible in selecting roosts, choosing roost trees based on suitability to retain bark or provide cavities or crevices. This bat has also been found rarely roosting in structures, like barns and sheds” (USFWS).

On April 2, 2015, the USFWS proposed, in the Federal Register Vol. 80 No. 63, the Northern long-eared bat as “Threatened status with interim 4(d) rule for incidental take of Northern Long-eared Bats.” Under the interim 4(d) rule, take incidental to certain activities conducted in accordance with the following habitat conservation measures, as applicable, will not be prohibited (i.e., will be excepted from the prohibitions). For such take to be excepted, the activity must:

- Occur more than 0.25 mile from a known, occupied hibernacula
- Avoid cutting or destroying known, occupied roost trees during the pup season (June 1–July 31).
- Avoid clearcuts (and similar harvest methods, e.g., seed tree, shelterwood, and coppice) within 0.25 mile of known, occupied roost trees during the pup season (June 1–July 31).
- Be less than one acre in size of contiguous habitat or one acre in total within a larger tract, whether that larger tract is entirely forested or a mixture of forested and non-forested cover types.

According to USFWS data, there are no known hibernacula or roosts within or near Lake Kathleen. Very few, if any, roosting trees are expected to be cut and as such, the project “May affect, not likely to adversely affect” the bat.

**Piping plover**

Piping plover habitat is restricted to beaches along the Great Lakes shoreline (MNFI website, 2016). The project area does not have the necessary habitat requirements for the plover and has not been found near the project area (MNFI website, 2016). Neither the Piping plover, nor its habitat, will not be impacted by the proposed project. Therefore, the project will have “No effect” on the Piping plover (Ania, Undated).
**Rufa Red Knot**
The rufa red knot (knots) breeds in the tundra of the central Canadian Arctic from northern Hudson Bay to the southern Queen Elizabeth Islands (USFWS website, 2016). The bird winters at the tip of South America in Tierra del Fuego, in northern Brazil, throughout the Caribbean, and along the U.S. coasts from Texas to North Carolina. However, the migrating rufa red knot requires stopover habitats (May 1 to September 30) in the Great Lakes. Their habitat is found along the coastal areas of the Great Lakes where the knots find easily digested foods – with thin or no shells – in order to gain enough weight to fuel the next flight. As such, the proposed project will have “No Effect” on the rufa red knot (Ania, Undated).

**Eastern massasauga**
The Eastern Massasauga lives in wet areas including wet prairies, marshes and low areas along rivers and lakes. In many areas the snakes also use adjacent uplands during part of the year (MNFI website, 2016). They often hibernate in crayfish burrows but they may also be found under logs and tree roots or in small mammal burrows. There will be little to no change in existing habitat for the Eastern Massasauga as a result of Alternative 5; preferred habitat would actually be increased by removal of the impoundment. The Eastern Massasauga has not been reported from the project area (MNFI, 2016); however, the project area was recently identified as Tier 2 habitat, with high potential for harboring the snake. The project “May affect, not likely to adversely affect” the Eastern Massasauga.

**Michigan dwarf lake iris**
The Dwarf Lake Iris’s habitat is partially shaded, sandy-gravely soils on lakeshores (MNFI website, 2016). There is no iris habitat in the project area and Alternative 5 will have “No Effect” on the dwarf lake iris or its habitat (Ania, Undated).

**Houghton’s goldenrod**
The Houghton’s Goldenrod requires sandy flats along Great Lakes shores (MNFI website, 2016). Therefore, Alternative 5 will have “No Effect” on Houghton’s Goldenrod (Ania, Undated).

**Pitcher’s thistle**
The Pitcher’s thistle’s habitat is restricted to stabilized dunes and blowout areas, which are not found in the project area. Alternative 5 will have “No Effect” on the Pitcher’s thistle (Ania, Undated).

3.2.4.1 **Alternative 1: No Action**
The No Action alternative will not impact any rare species. However, continued neglect of the infrastructure could result in failure of the dam, embankments or road crossings, causing negative impacts to the HCWB in the East Branch and Michigan monkey-flower downstream of Woodland Road.

3.2.4.2 **Alternative 5: Full Removal**
USFWS (2006b) opined that restoration activities that result in overall benefits to the watershed, after ensuring benefits to HCWB, outweigh risks. Projects that occur in or immediately upstream of occupied habitat may result in adverse impacts during project activities. In some cases, the disturbance may be temporary and the adverse impacts may be short-term, while providing long-term overall benefits to the species. Because the East Branch of the Maple River harbors the largest known population of HCWB in the world and the Two-Track crossing would be replaced, causing temporary disturbance, this alternative is “likely to adversely affect” the HCWB. As such, all BMPs will be strictly enforced and special care will be taken to ensure protection of the species during construction activities. Prior to replacement of the
culverts at the Two-Track crossing, GLE, under permit and oversight from USFWS, will capture all HCWB from the site and move them to a suitable upstream location. It is anticipated that the free-span timber bridge slated for the site will result in long-term habitat improvement. The existing array of culverts is in danger of complete failure, which would result in complete disruption of downstream habitats.

Regarding Michigan monkey-flower, MNFI suggested that this is perhaps the single most important colony and that dam removal and any work associated with Woodland Road may impact this occurrence. Further evaluation was recommended. While the plant does not grow in the construction area and there will be no direct impact to the plant, construction activities will be planned and coordinated with MNFI to avoid or minimize indirect impact to the plant or its habitat. This alternative “May affect, likely to adversely affect” the Michigan monkey-flower. Conservation measures may include removal of forget-me-not, hydrologic monitoring or relocation of plants.

Likewise, this alternative “May affect, not likely to adversely affect” the Eastern Massasauga rattlesnake since the habitat has been identified as “Tier 2”, with high potential for hosting the species. And, Alternative 5 “May affect, not likely to adversely affect” the Northern long-eared bat because very few, if any trees will be removed, and the removal of trees would occur from November 1 and March 31, which is outside of the pup season June 1 –July 31, and is during the season the bats do not inhabit northern Michigan.

Alternative 5 will have “No effect” on the Piping plover, Rufa red knot, Michigan dwarf lake iris, Houghton’s goldenrod or Pitcher’s thistle.

3.2.5 Noxious or Invasive Species

Invasive species, as defined by Executive Order 13112, includes alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. According to Executive Order 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.

Six non-native and/or adventive plants were identified in the areas surrounding Lake Kathleen. These include forget-me-not (*Myosotis scirpoides*), yellow starthistle (*Centaurea solstitialis*), orchard grass (*Dactylis glomerata*), honeysuckle (*Lonicera* sp.), Canada thistle (*Cirsium arvense*), common mullein (*Verbascum thapsus*), and reed canary grass (*Phalaris arundinacea*). Of these plant, reed canary grass has the highest potential to spread and out-compete native wetland plant communities and forget-me-not has been identified by MNFI as a threat to the Michigan monkey-flower.

A number of aquatic invasive species, including round gobies and rusty crayfish, are known to occur in Burt Lake; however, none of these species has been documented in the Maple River. The most concerning aquatic species, relative to this project, is the sea lamprey (*Petromyzon marinus*).

Sea lamprey are an invasive fish that are parasitic on other fish species. Sea lamprey are born in rivers where they live most of their life in the larval stage before, typically, migrating to the Great Lakes to feed as an adult. Adult sea lamprey and can kill up to 40 pounds of fish per year and are responsible for massive depredation of lake trout and other important sport fish (Coscarelli and Bankard, 1999). Adult sea lamprey
return to the rivers to spawn a new generation. The USFWS is tasked with controlling sea lamprey populations and have deployed several methods to do so.

According to the USFWS, the Maple River is infested with sea lamprey below the Maple River Dam. Spawning-phase assessment has been conducted by USFWS annually on the mainstream Cheboygan River since 1977. The average spawning-phase population estimate during this time period has been 24,816 sea lampreys; however, the inland population of sea lamprey found above the lock-and-dam of the Cheboygan River is significantly smaller. Following a previous failure of the Maple River Dam, sea lamprey were found in both branches of the upper Maple River. Currently, native lampreys are regularly found upstream of the dam, suggesting that suitable spawning and rearing habitat is still available. For these reasons, USFWS will consider deploying the sterile male release program beyond the current experimental protocol, and will monitor the sea lamprey population into the future to determine if additional control efforts are necessary.

The round goby is known to be common in the lower Cheboygan River and in Mullet Lake (Godby et al., 2015), as well as in Burt Lake. An exotic fish, the round goby can reduce native fish populations through predation on eggs and larvae or through direct competition for forage and habitat. No round gobies are known to occur in the Maple River or the project area.

Zebra mussels are a small exotic mollusk that attach to hard surfaces underwater and filter microscopic algae and zooplankton from the water (Godby et al., 2015). Zooplankton are an important food source for young fish such as walleye, yellow perch, and bass. These mussels can have detrimental effects upon Michigan’s lakes and rivers by killing native clams and filtering out essential nutrients from the water column which fish rely upon for survival. They can also outcompete macroinvertebrates for food and habitat. It is reported that zebra mussels are found throughout Burt Lake and in Douglas Lake, the source water for the East Branch Maple River.

Rusty crayfish are a nonnative invertebrate from the Ohio River valley. They can grow large and often out-compete native species of crayfish. Rusty crayfish are also known to remove or shred large amounts of aquatic vegetation that is essential for lake productivity and fish shelter. Reports of this species exist through parts of the inland waterway including Pickerel, Crooked, Burt, and Mullett Lakes (Godby et al., 2015). Due to their reliance on aquatic vegetation, the habitat of the Maple River is unlikely to support a population of this species.

3.2.5.1 Alternative 1: No Action
The No Action alternative will have no direct impact on the spread of invasive species. Presence of the Maple River Dam eliminates upstream migration of aquatic species into the upper Maple River Watershed. Zebra mussels have already been documented upstream of the dam and, like rusty crayfish and round gobies, are easily spread via bait buckets, etc. and eventual introduction to Lake Kathleen is probable.

3.2.5.2 Alternative 5: Full Removal
The USFWS remains hopeful that a solution to the sea lamprey issue is forthcoming and is supportive of dam removal. Following dam removal, USFWS will consider deploying the sterile male release program beyond the current experimental protocol, and will continue an adaptive management strategy. Further discussion is provided in Appendix 1.
MDNR – Fisheries Division is supportive of dam removal and believes that “The long term benefits of removing the Maple River Dam and restoring connectivity to this watershed far outweigh the potential short term benefit of delaying the spread of invasive species. The threat of additional invasive species colonization to the Maple River from the Great Lakes is attenuated by a downstream barrier in the Cheboygan River watershed, specifically the Cheboygan Dam” (Neal Godby, personal communication).

The likelihood of the spread of reed canary grass, once full removal is complete, is high. This plant is commonly found along the shore of Lake Kathleen, and upstream of the lake in both the East and West Branches of the Maple River. Its presence will be restricted to the riparian corridor of the restored channel where soil saturation is sufficient for its establishment and regeneration. However, abundance, in the long run, will likely be reduced through plant succession and the establishment of alder and willow species. In addition, native plantings could be proposed to initiate establishment of desired species. A regiment of routine assessments and plant treatments could also be incorporated to control reed canary grass (and other species noted) and provide an initial basis for native vegetation to establish.

Abundance of the non-native upland species is generally small and isolated. While their presence may provide a seed source for spread, it is not likely a significant concern, especially considering the presence of existing seed sources in the native soils and the high abundance of adjacent native upland plant species.

3.3 Hazardous Materials
MDEQ developed a Policy and Procedure (09-018) to identify when proposed dredging requires testing, when processing applications for permit under authority of Part 301, Inland Lakes and Streams; Part 325, Great Lakes Submerged Lands; and Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), and proposed placement of dredge spoils is upland.

The Policy and Procedure states, in part, “For all sieve grain analysis testing of dredging projects of less than 10,000 cubic yards, applicant shall sample sediments from six (6) discrete locations within the proposed dredge area. If more than 10,000 cubic yards of dredging are proposed, at least one additional sample shall be obtained and analyzed for each 10,000 cubic yards of additional material proposed for dredging. Typically, each sample will consist of a composited subset of a core taken to full project depth. DEQ field staff may mandate specific sampling criteria, locations, and/or depth intervals, based on their site specific knowledge. Applicant conducts a sieve grain size analysis on the sediments using U.S. Standard Sieve Number 200 sieve. Applicant reports the results for each of the six (or more) discrete sample locations as a mass percentage of retained sediments. If the average mass percentage retained on the Number 200 sieve is 90 percent sand or greater, no additional sediment testing is required…”

MET (2016) collected sediment samples from six discrete locations within Lake Kathleen. The samples were analyzed and compared to generic MDEQ Part 201 Cleanup Criteria (12/30/2013). All results were reported at levels below laboratory method detection limits (non-detectable), or below Part 201 Criteria. MET (2016b) also completed a Phase I assessment of the project area and found no evidence of recognized environmental conditions in connection with the property or surrounding area.

Soils and Materials Engineers, Inc. followed up with sediment sampling from 12 locations within Lake Kathleen in 2017 (SME, 2017). All 12 samples were found to contain greater than 90% coarse sediment (No. 200 sieve). As such, no further testing is necessary.
The contractor will be responsible for the disposal of inorganic materials, such as concrete, asphalt, rebar, etc. The contractor will be required to remove these materials from the site and properly dispose of them.

3.4 Socioeconomics

3.4.1 Economic Setting
The project area is located in a rural portion of Emmet County that is characterized by low density residential development and mostly private recreational uses. Emmet County is primarily known for tourism that is attributable to the attractiveness of the Lake Michigan coastline and the lakefront communities of Petoskey and Harbor Springs, but also inland areas, including several large lakes and forests. The Village of Pellston, which prides itself on being one of the coldest places in the nation, is the community nearest the Maple River Dam. The Pellston Regional Airport offers daily flights to and from Detroit Metro, and also services and facilities for private flights.

The Dam Site Inn is a restaurant located to the west of, and overlooking, Lake Kathleen. The business was established in 1953 and currently operates as a seasonal restaurant boasting views of Lake Kathleen.

3.4.1.1 Alternative 1: No Action
If no action is taken, the physical and economic environment of Lake Kathleen will remain unchanged.

3.4.1.2 Alternative 5: Full Removal
Removal of the Maple River Dam would result in loss of the impoundment. The lake would transform into a river channel surrounded by floodplain, wetlands and a naturally vegetated environment. Relative to the local economy, no significant changes are anticipated, though impacts to the Dam Site Inn are possible, but unknown.

3.4.2 Noise
Sound is most commonly measured in decibels (dB) on the A-weighted scale, which is the scale most similar to the range of sounds that the human ear can hear. During any construction, the decibels will increase above average levels. These construction noises will be contained to certain hours of the day.

3.4.2.1 Alternative 1: No Action
Presently, noise in the vicinity of Maple River Dam is limited to mostly natural sounds of birds, wind, etc. Road noise, from Woodland Road is infrequent and, for the most part, subtle. Road noise associated with traffic on US-31 is more substantial, especially during west winds and at night. The noise of water rushing over the dam is perpetual.

3.4.2.2 Alternative 5: Full Removal
Removal of Maple River Dam and associated activities will result in the short-term increases in noise from heavy equipment and construction activities. Duration of increased noise levels would likely take place from 7 a.m. to 7 p.m. for a period of up to four months. As few as four residences and one commercial building would be within “noise distance” of construction activities. Following dam removal, noise levels are expected to return to those levels currently evident in the project vicinity. Impacts of noise emissions will be short-term and small.
3.4.3 Public Services and Utilities
Community services, such as water and wastewater treatment, law enforcement, and fire and emergency medical treatment (EMT) services, are not currently impacted by the Maple River Dam or impoundment.

3.4.3.1 Alternative 1: No Action
There are currently no environmental consequences related to community facilities or services, but certainly would be if the dam were to fail again. Law enforcement and fire and emergency services would not be able to use Woodland Road if any portions of the dam were to fail and wash out the road.

3.4.3.2 Alternative 5: Full Removal
Dam removal would ensure continued use of Woodland Road and emergency access across the river.

3.4.4 Traffic and Circulation
The local transportation network consists primarily of US-31, the main north-south route linking Pellston with Petoskey to the south and I-75/Mackinaw City to the north. Woodland Road is a lightly used county route serving rural residential areas southeast of Pellston.

3.4.4.1 Alternative 1: No Action
Under this alternative there would be no change to the current traffic and circulation conditions.

3.4.4.2 Alternative 5: Full Removal
Impacts would include reduced traffic circulation and road closure for removal and replacement of the culvert below Woodland Road. The road layout proximate the dam site would allow for relative ease of detour around Woodland Road. During construction, there would be an increase in construction equipment and worker vehicles on Woodland Road near the construction site. The contractor will be required to comply with the Emmet County Road Commission (EMRC) traffic control guidelines. The ECRC has already been contacted and has approved a four month closure of Woodland Road.

No long-term traffic or circulation impacts would result from this project. The project would result in reduced potential for wash-out of Woodland Road. Thus, a long-term benefit would be expected.

3.4.5 Environmental Justice (Executive Order 12898)
On February 11, 1994, President Clinton signed Executive Order (EO) 12898: “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.” The EO directs federal agencies, to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States.

The US Census Bureau estimated the Emmet County population to be 33,161 in 2015, a 1.4% increase from the previous estimate in 2010 (USCB website). Caucasians represent about 93% of the populations, while American Indians are the second most represented group of origin, at 3.7%. The total number of housing units to support this population is 21,382, with a median home value of $163,100. Median household income was $51,018 with approximately 11 percent of the population below poverty level.
3.4.5.1 Alternative 1: No Action
No changes to the population, income, or ethnic makeup of Emmet County would occur if the dam remains in place.

3.4.5.2 Alternative 5: Full Removal
No changes to the population, income, or ethnic makeup of Emmet County would occur if the dam is removed. There would be no impact related to environmental pollution and no minority or low income populations would be displaced or negatively affected in any other way. Consequently, no environmental justice impacts would occur with dam removal.

A small labor force (less than 10 workers) would be required to remove the Maple River Dam. The required labor is expected to be available from the local area and no changes to residential populations are expected. As such, no changes in demographics, in terms of additional housing needs, median household incomes or poverty levels are anticipated.

3.4.6 Safety and Security
Safety and security issues that have been considered in this analysis include the health and safety of the area residents, and the protection of personnel involved in activities related to the construction of the action alternatives. All safety and security standards as established by the federal Occupational Safety and Health Administration (OSHA) would be implemented and followed for the duration of the construction. Dam safety in Michigan is regulated by the MDEQ under Part 307.

3.4.6.1 Alternative 1: No Action
If no project is undertaken, the risk of dam failure and wash-out of Woodland Road would remain in the area downstream of the proposed project site. Without construction, the potential for impacts to safety and security due to flooding would remain and be greater than either of the other alternatives.

The No Action Alternative would not include construction; therefore, there would be no safety risks stemming from construction activities. However, continued inspection and maintenance would be necessary, putting contractors at potential risk.

3.4.6.2 Alternative 5: Full Removal
During the construction project, a safety risk would exist for those working on the site. To minimize the risks to safety and human health, all construction activities would be performed using qualified personnel trained in the proper use of the appropriate equipment including all appropriate safety precautions; additionally, all activities would be conducted in a safe manner in accordance with the standards specified in the OSHA regulations.

Removal of the dam will permanently alleviate safety issues surrounding the existing structure, including slip and fall type of hazards and the possibility of dam failure.

3.5 Historic and Cultural Resources
In addition to review under NEPA, consideration of effects to historic properties is mandated under Section 106 of the National Historic Preservation Act (NHPA), as amended, and implemented by 36 CFR Part 800. Requirements include identification of significant historic properties that may be affected by the
proposed action. Historic properties are defined as archaeological sites, standing structures, or other historic resources listed in or eligible for listing in the National Register of Historic Places (NRHP) (36 CFR 60.4).

As defined in 36 CFR Part 800.16(d), the Area of Potential Effect (APE), “is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist.”

In addition to identifying historic properties that may exist in the proposed project’s APE, FEMA must also determine, in consultation with the appropriate State Historic Preservation Officer (SHPO)/Tribal Historic Preservation Officer (THPO), what effect, if any, the action will have on historic properties. Moreover, if the project would have an adverse effect on these properties, FEMA must consult with SHPO/THPO on ways to avoid, minimize, or mitigate the adverse effect.

### 3.5.1 Historic Structures

MET (2016) reported that available historical information suggests that the areas adjacent the project area, in each direction, have consisted of undeveloped woodlands since at least 1938.

On February 15, 2017, the USFWS sent a letter to the State of Michigan (SHPO) indicating that, due to past extensive renovations and its rapidly deteriorating condition, the Maple River Dam is ineligible for listing by the National Register of Historic Places. The Regional Historic Preservation Office (RHPO) also indicated that no historic properties are present. All communication regarding the review of historic structures is included in Appendix 4.

#### 3.5.1.1 Alternative 1: No Action

This alternative would not impact any historic structures.

#### 3.5.1.2 Alternative 5: Full Removal

This alternative would not impact any historic structures.

### 3.5.2 Tribal Coordination and Religious Sites

No religious or tribal sites were identified as being within the project area.

#### 3.5.2.1 Alternative 1: No Action

This alternative would not impact any religious or tribal sites.

#### 3.5.2.2 Alternative 5: Full Removal

This alternative would not impact any religious or tribal sites.

### 3.6 Comparison of Alternatives

Removal of the Maple River Dam and replacement of the Woodland Road and Two-Track crossings meet the objectives established for this project. The No Action Alternative, clearly, does not address project objectives.
4.0 Cumulative Impacts

A cumulative impact analysis must consider the potential impact on the environment that may result from the incremental impact of the project when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). Cumulative impacts may result from individually minor actions, which when added together result in greater impacts over a period of time. Cumulative impacts were assessed within the project area, inclusive of three actions described in this document: Removal of the Maple River Dam and replacement of the Woodland Road and Two-Track crossings. The methodology for performing such analyses is set forth in “Considering Cumulative Effects under the NEPA” and includes the following:

1. Identification of the geographic area in which effects of the project may be felt;
2. Assessment of the impacts that are expected in that area from the project;
3. Identification of other actions (past, present, and reasonably foreseeable) that have had or are expected to have impacts in the same geographic area;
4. Assessment of the impacts or expected impacts from these other actions, and
5. Assessment of the overall impact that can be expected if the individual impacts are allowed to accumulate.

4.1 Water-Related Effects

4.1.1 Geographic Area of Analysis

The area in which water quality-related effects of the project may be evident was determined to include:

- Mainstem of the Maple River, for a distance of approximately one mile downstream of the Maple River Dam. Because the Maple River Dam is no longer adjustable, is not used for flood control, etc., changes in the hydrology and hydraulics of the Mainstem are negligible. Sediment transport processes will be restored to convey sediments to downstream reaches of the Maple River. Because sediments associated with dam removal will be intensively managed, downstream impacts will be limited to a normalized sediment transport pattern that is similar to existing transport patterns of natural reaches of the Maple River. The thermal regime of the Mainstem, for a limited distance downstream of the dam, will be impacted since warmer waters of Lake Kathleen will be eliminated.
- Lake Kathleen and immediately surrounding lands - This area contains a proposed action (dam removal) and is the area of direct effect.
- The East and West Branches of the Maple River from the confluence of Lake Kathleen upstream for approximately one quarter of a mile. Both branches are influenced by backwater and altered sediment transport patterns of Lake Kathleen. Because of excessive sediment accumulation, morphology of these reaches is also impacted. The East Branch contains a proposed action (replacement of the Two-Track crossing).

4.1.2 Identification of “Other Actions”

Past, present, and reasonably foreseeable future actions within the geographic area of analyses were reviewed to identify potential cumulative impacts. Project partners and local agencies and municipalities were contacted to identify potential actions that could, in combination with the proposed actions, result in significant adverse impacts. In addition, any future projects would, similarly, be required to comply with local, state, and federal rules and regulations. These regulations help assure that cumulative impacts to
4.1.3 Analysis of Cumulative Effects
All long-term impacts associated with the proposed actions have been determined to be positive. No negative cumulative impacts to wetlands or streams are anticipated. Any direct or indirect water-related effects of the proposed actions will be mitigated. These mitigative measures include management of mobilized sediment within the impoundment and use of Best Management Practices, including SESC measures to minimize erosion and sedimentation to receiving waters.

4.2 Aquatic Ecosystem-Related Effects
4.2.1 Geographic Area of Analysis
The area in which aquatic ecosystem-related effects of the project may be evident was determined to include the project area and the Maple River from the headwaters downstream to Burt Lake. The entire Maple River and its tributaries will be impacted by removal of the Maple River Dam, in terms of fish passage and ecosystem connectivity.

4.2.2 Identification of “Other Actions”
Past, present, and reasonably foreseeable future actions within the geographic area of analyses were reviewed to identify potential cumulative impacts. Project partners and local agencies and municipalities were contacted to identify potential actions that could, in combination with the proposed actions, result in significant adverse impacts. In addition, any future projects would, similarly, be required to comply with local, state, and federal rules and regulations. These regulations help assure that cumulative impacts to the environment will be avoided. No present or on-going actions were identified that are relevant to this analysis.

4.2.3 Analysis of Cumulative Effects
All long-term impacts associated with the proposed actions have been determined to be positive. No negative cumulative impacts to aquatic ecosystems are anticipated. Any direct or indirect water-related effects of the proposed actions will be mitigated. These mitigative measures include management of mobilized sediment within the impoundment and use of Best Management Practices, including SESC measures to minimize erosion and sedimentation to receiving waters.
5.0 Public Participation

As part of the planning process, CRA has met with a variety of project partners including personnel from MDNR - Fisheries, MDEQ and USFWS - Sea Lamprey Division, Michigan Natural Features Inventory (MNFI), multiple landowners, the Carp and Maple River Task Force, Little Traverse Conservancy, University of Michigan Biological Station (UMBS) at Douglas Lake and Emmet County Parks and Recreation. Issues of significance that arose from these meetings is summarized below.

The MDNR – Fisheries Division has been an active participant in the discussion and planning, and is in full support, of the proposed action. The proposed project aligns with the policy and goals of MDNR. Specifically, the Cheboygan River Assessment (Godby et al., 2015) includes the management options of restoring “free flowing river conditions by removing dams no longer used for their original purpose” and indicates that “removal of the...Maple River Dam would open a significant amount of spawning and nursery habitat to migratory fish species...”. Fisheries Division Policy on Dams and Barriers (Policy Number 02.01.002; April 2005) states that “dam removal will be considered where the dam serves little or no purpose and there is a reasonable expectation that dam removal will benefit the environment or aquatic resources. If the dam is likely to cause significant damage to public health, safety, welfare, property, natural resources, or the public trust in those natural resources, Fisheries Division will recommend that MDEQ order its removal.”

The USFWS will soon make a decision on support of full dam removal, as well as deployment of the sterile male release program beyond the current experimental protocol. As well, USFWS will continue monitoring and will use an adaptive management strategy for long-term control of sea lamprey.

The UMBS held a public meeting to solicit feedback on the dam removal. Primary issues of concern for the 200 attendees were an increase in the sediment delta at the mouth of the Maple River in Burt Lake, possible lowering of the lake level at Douglas Lake, impacts on brook trout, and distribution of project information to landowners along the river.
6.0 Mitigation Measures and Permits

The following permits will be required for the implementation of the proposed detention basin project:

The CRA will follow all local, state, and federal rules and regulations that pertain to the proposed project, and will obtain all applicable permits prior to commencing work at the proposed site. Permits would be required pursuant to Part 301, Inland Lakes and Streams; Part 303, Wetlands Protection; Part 315, Dam Safety and; Part 31, Floodplains, of the Natural Resources and Environmental Protection Act (NREPA), 1994 P.A. 451, as amended. The permitting of this alternative, if selected, may require further investigations and studies to satisfy MDEQ permitting requirements.

These mitigation measures will be followed for the implementation of the proposed action:

1. Appropriate construction site best management practices will be implemented to minimize soil erosion. The measures will be implemented, installed, and maintained as required by the soil erosion permit. The measures may include, but are not limited to, minimizing the disturbed area, maintaining vegetative cover, inlet protection, stabilized construction access, silt fence, and erosion mat.

2. Measures will be taken to reduce the potential for temporary air quality impacts during construction including, keeping fuel-burning equipment running time to a minimum, minimizing open construction areas, and watering open construction areas to control dust when necessary.

3. Decontamination procedures will be set forth and monitored to control the spread if invasive species.

4. If hazardous materials are encountered during construction, materials will be handled and disposed of in accordance with all applicable rules and regulations.

5. The proposed project will maintain a specifications which define allowable hours of construction and noise levels at property boundaries.

6. To minimize the risks to safety and human health, all construction activities will be performed using qualified personnel trained in the proper use of the appropriate equipment including all appropriate safety precautions; additionally, all activities would be conducted in a safe manner in accordance with the standards specified in the OSHA regulations.

7. Equipment will be maintained in good working order to minimize noise and pollution.

8. If any human or archeological remains are encountered during construction, work at the site would be stopped immediately and FEMA, Michigan State Police, and Emmet County Health Department would be contacted immediately.

9. If deviations from the proposed scope of work result in substantial design changes, the need for additional ground disturbance, additional removal of vegetation, or in any other unanticipated changes to the physical environment, the Grantee must contact FEMA, and a re-evaluation under NEPA and other applicable environmental laws will be conducted by FEMA.

10. All required local, State and Federal permits and approvals will be obtained prior to implementing the project.

11. No spoil material removed from detention basin may be stored or disposed of in a regulated floodplain or wetland area.
7.0 Consultations and References

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8.0 List of Preparers

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Streamside Ecological Services, Inc.
mnurse@streamsideeco.com
APPENDICES
APPENDIX 1

USFWS – SEA LAMPREY CONTROL, ALTERNATIVES ANALYSIS
Lake Kathleen Dam Removal Sea Lamprey Barrier Alternatives

Draft 11/21/17

Need for Sea Lamprey Control on Maple River

The Cheboygan Dam and Lock complex represents the first impediment to sea lamprey migration in the Cheboygan River Watershed. This structure blocks a significant portion, but not 100% of adult sea lamprey migrating from Lake Huron. Additionally, a small population of adult sea lamprey likely complete their life cycle above the dam utilizing Burt and Mullet Lakes to feed (inland population). Successful spawning of adult sea lamprey in the upper Cheboygan Watershed can lead to both escapement into Lake Huron and maintaining the inland population. The combination of these two sources of adult lamprey into the upper Cheboygan watershed has resulted in the need to chemically treat the system including the lower Maple River with TFM on a 3-4 year cycle. It is assumed that unrestricted access to the upper Maple River following the removal of Lake Kathleen dam without the implementation of any sea lamprey control measures would lead to increased treatments costing an extra $115,000 per cycle. Additionally, if TFM treatments were required in the East Branch Maple River (upstream of dam) it would lead to adverse impacts to the federally endangered Hungerford’s crawling water beetle (HWCB) that occur in the East Branch Maple River. Therefore, maintaining sea lamprey control measures in the Maple River has been deemed a priority for this restoration project and overall sea lamprey control efforts in the Lake Huron basin. Federal funding for the removal of Lake Kathleen Dam is contingent on the concurrence of sea lamprey control (USFWS and GLFC) to the preferred alternative replacement of a sea lamprey barrier.

Additional control measures in Cheboygan Watershed

In 2017 a sterile male release technique (SMRT) study was initiated to address the upper Cheboygan watershed sea lamprey population. The program will be implemented from 2017-2019 and involves releasing sterilized adult male lamprey (at a high ratio of sterile to normal males, >100:1) in the Maple, Pigeon, and Sturgeon Rivers in order to prevent successful spawning leading to the delay or elimination of TFM treatments. The assessment of the program includes adult trapping, nest, and larval assessments. If the SMRT program demonstrates success then efforts will begin to modify the Cheboygan lock in order to completely prevent sea lamprey passage (block 100%). If modifications are successful then aggressive efforts could begin to eradicate the isolated inland sea lamprey population. Eradication efforts are not guaranteed, but there is a definite possibility that a sea lamprey barrier on the Maple River will not be necessary in the future. Conversely, increased sea lamprey distribution into the East and West Branch Maple Rivers following the removal of Lake Kathleen dam would complicate inland population eradication efforts.

Alternative A - No barrier

Alternative A consists of the complete removal of Lake Kathleen dam with no replacement of a sea lamprey control barrier or implementation of any additional control measures. This option would permanently draw down the impoundment leaving no impediments to natural channel development. Fish passage upstream and downstream of former dam would be restored throughout the year for all species including sea lamprey. The small population of sea lamprey adults would likely expand their range into East and West Branch Maple Rivers. The expanded distribution would require similar TFM treatments as the lower Maple River (3-4 year cycle) including HWCB habitat in the East Branch.
Alternative B - Fixed Crest barrier

Alternative B consists of placing a fixed crest barrier in the vicinity of the current dam at a sufficient height to block sea lamprey. The conceptual design of this option would utilize sheet piling from the coffer dam to create a minimum vertical drop of 18 inches during all flow conditions. An 18 inch vertical drop would allow jumping fish species to pass upstream while blocking sea lamprey and non-jumping species. However, results from the HEC-RAS model show the barrier would need to be between 7 to 8 feet in height to maintain the required drop during spring-time flows. At this height the fixed crest barrier would prevent passage for all species, including jumping fish through a majority of the flow conditions throughout the year. Additionally, a fixed crest barrier at the 6+ foot required height would maintain a significant impoundment and continue to inhibit natural channel development and sediment transport.

Alternative C – Adjustable Physical Barrier

Alternative C consists of the placement of an adjustable physical barrier in the vicinity of the current dam. This structure could be raised to maintain the 18 inch minimum required vertical drop through all potential flows during the sea lamprey migration season (~March through June) and lowered to at or near streambed elevation the remainder of the year. Several design options are available for this alternative including a stop log structure and a hinged steel sheet weir plate. Conceptual designs for these options would utilize high velocities as an additional barrier resulting in a structure 5.5 feet tall with the adjustable spillway a maximum width of 20 feet (bankfull width ~40feet). These structures would have a significant footprint requiring abutment walls and constrict the channel throughout the year. Initial construction costs of an adjustable physical barrier are estimated to be from $110,000-$250,000. Additional significant costs would also be incurred during removal if and when sea lamprey eradication efforts are achieved. During sea lamprey migration season, maintaining an 18 inch barrier would create surface elevations ranging from 643 feet to as high as 650 feet during a 100 year flood. The resulting impoundment would range from 0.6 acres to 96 acres. Seasonal inundation and channel constriction would inhibit natural channel development including impacts to sediment transport, stream stability, and riparian development. Operation of the barrier could be done through two maintenance options: First, would be to raise the spillway to maximum height at the beginning of the season and lowered at the end (annual option). Second, would be more labor intensive and require raising and lowering the spillway in correspondence to natural flow events (continual). Fish passage would be achieved for all species outside of sea lamprey spawning season through both maintenance options, unless the channel constriction to 20 foot creates a velocity barrier during some flow conditions. During operation fish passage for jumping species would be achieved through the continual maintenance option, but restricted to high flow events through the annual maintenance option. Additionally, the continual maintenance option would increase the risk of sea lamprey passage during an unexpected flow event.

Alternative D - Electric Barrier

Alternative D consists of the placement of a portable electrical barrier in the Maple River during sea lamprey migration season. This alternative offers flexibility for placement of the barrier location to include sites outside of the immediate vicinity of the existing dam and Woodland Road crossing. Downstream placement would restrict sea lamprey access to less habitat in the Maple River than currently available. However, stream conditions (gradient, width, ect.) need to be ideal in order to successfully block sea lamprey passage. Potential locations that have been identified include the road crossings at
Brutus Rd, Maple River Rd, and Woodland Rd. An electric barrier may not block 100% of sea lamprey and is susceptible to outages due to electrical failure. In order to reduce the risk of sea lamprey infestation upstream multiple lines of electrical barriers can be placed either in succession or spaced out at strategically ideal locations. Additional control measures including trapping and sterile male release technique (SMRT) could be implemented in coordination with the electrical barriers to further reduce the risk. This alternative would require a minimal footprint to secure the electrical barrier during the season and could be completely removed the remainder of the year. No additional costs for permanent removal will be incurred if and when eradication efforts are successful. The Electrical barrier will not restrict flow while blocking sea lamprey passage through electrical current allowing for natural channel development following dam removal. Fish passage will be completely restored at the former dam site, however fish passage will be restricted for all species and some level of incidental fish mortality will occur during operation throughout the sea lamprey migration season.

**Alternative E- No Barrier with SMRT adaptive management strategy**

Alternative E consists of no initial placement of a physical or electrical barrier following the removal of Lake Kathleen Dam and the expansion of the SMRT control strategy in the upper watershed for a minimum of five years (2019-2023). Sea lamprey spawning success and larval distribution along with transformer outmigration trapping will be monitored to determine if the strategy successfully delays/eliminates the need for TFM treatments in the Maple River including no expansion of TFM treatments into the East and West Branch Maple Rivers. Adaptive management triggers will be established to determine if and when additional alternatives such as a physical or electrical barrier need to be implemented to continue to meet sea lamprey control goals in the watershed. This alternative would provide the physical and biological benefits of the no barrier option while reducing the risk of sea lamprey infestation upstream through the extended use of SMRT. The unique characteristics and small abundance of the sea lamprey population in the Maple River allow for the opportunity to monitor the effectiveness of SMRT without the immediate risk of significantly increasing juvenile sea lamprey recruitment to Lake Huron or increasing TFM treatments above the current dam location potentially adversely affecting endangered HWCB.

**Preferred Alternative**

Alternative E (No barrier with SMRT adaptive management strategy) was selected as the preferred alternative for sea lamprey control following the removal of Lake Kathleen Dam. This alternative provides the greatest ecological benefit to the Maple River watershed and allows complete fish passage for desirable species throughout the year. Alternative A (No barrier) also provides this benefit, however it did not meet sea lamprey control requirements by not incorporating any control measures following removal. Through the continuation of the SMRT strategy in Alternative E, the risk of increasing sea lamprey distribution and TFM treatments is reduced to acceptable levels. Additionally, it addresses sea lamprey control for the entire Maple River, an improvement from current conditions, not just above Lake Kathleen Dam as in alternatives B and C (fixed crest and adjustable barrier). Alternatives B and C were also removed from consideration because they did not restore natural river conditions, fish passage, and had a significant footprint on the river and floodplain. Alternative D (electrical barrier) would restore natural river process and could be placed further downstream in the system at Maple River Road or Brutus Road, but would still prohibit fish passage while in use, introduces incidental fish mortality, and is
susceptible to failure. Therefore the placement of an electrical barrier following dam removal is not the preferred alternative.

The monitoring and adaptive management strategy incorporated into preferred alternative E further reduces the risk by understanding sea lamprey’s response to the dam removal and SMRT program, providing the opportunity to implement additional control measures if needed before TFM treatments are required. Although alternatives C and D were not the initial preferred alternative, a form of electrical barrier or adjustable physical barrier could be utilized in the future, if necessary, through the adaptive management strategy.

The Michigan Department of Natural Resources and Little Traverse Bay Band of Odawa Indians, integral partners in the project have provided the attached letters of support for the preferred alternative E- No barrier with SMRT adaptive management strategy.

The decision to utilize the SMRT strategy without a physical or electrical barrier following the removal of Lake Kathleen dam is due to a unique suite of characteristics of the Maple River and is very unlikely to be appropriate for other dam removal projects in the Great Lakes Basin. The low numbers of sea lamprey adults in the system allows for monitoring and adaptive management of the control measures to ensure that sea lamprey control goals are met into the future.

The preferred sea lamprey control alternative (Alternative E-No barrier with SMRT adaptive management strategy) is currently being proposed to the Sea Lamprey Control Board through its Barrier and Trapping task forces for approval to ensure that the strategy aligns with the goals and objectives for sea lamprey management in the Lake Huron Basin.
November 9, 2017

Matt Kowalski, Fish Passage Program Coordinator
Alpena Fish and Wildlife Conservation Office
480 West Fletcher Street
Alpena, MI 49707

RE: Support for No Barrier Option for Lake Kathleen Dam Removal Project

Aanii (Hello) Mr. Kowalski,

The Little Traverse Bay Bands of Odawa Indians Natural Resource Department (LTBB NRD) Environmental Services and Inland Fisheries and Wildlife Program Staff have been working in partnership with the Conservation Resource Alliance, USFWS, Michigan Department of Natural Resources and others on the Lake Kathleen Dam Removal Project actively for the last two years. A few different sea lamprey control options have been identified through the development of the Environmental Assessment (EA) for this dam removal project to deal with the low abundance sea lamprey population in the Maple River. One of these options is the no barrier with sterile male release technique (SMRT) adaptive management strategy. LTBB NRD is fully supportive of this option.

The no barrier with SMRT adaptive management strategy option is preferred by LTBB NRD because it does not deviate from the original barrier removal and fish passage aspects of the dam removal project. LTBB further supports this option because if the USFWS SMRT project from 2017 through 2019 is successful, it would eliminate the need for the upcoming 2020 TFM lampricide treatment of the upper Cheboygan River Watershed (Pigeon, Sturgeon and Maple Rivers). This TFM chemical treatment is expensive and can negatively impact juvenile lake sturgeon and mayflies. Additionally, this option recognizes the low abundance sea lamprey population within the Maple River and ensures that actions are being taken to further eradicate the landlocked sea lamprey population within the Inland Waterway of the Cheboygan River Watershed. LTBB NRD is willing to assist the USFWS in the continued monitoring of this sea lamprey population through electrofishing surveys and/or fyke netting so that adaptive management actions may occur as needed into the future.

To summarize, LTBB NRD is supportive of the latest alternative “No Barrier with SMRT Adaptive Management Strategy” option as presented in the draft EA for the Lake Kathleen Dam Removal Project. Feel free to contact me at 231-242-1677 if you have any questions.

In a good way,

[Signature]

Maxwell A. Field
Little Traverse Bay Bands of Odawa Indians
Inland Fisheries & Wildlife Biologist
mfield@ltribodywa-aae.gov
November 1, 2017

Matt Kowalski, Fish Passage Program Coordinator
Alpena Fish and Wildlife Conservation Office
480 West Fletcher Street
Alpena, Michigan 49707

RE: Support for No Barrier Option for Lake Kathleen Dam Removal Project

Dear Mr. Kowalski:

Michigan Department of Natural Resources (MDNR) Fisheries Division has been working in partnership with Conservation Resource Alliance, USFWS, Little Traverse Bay Bands of Odawa Indians, and others on the subject project for almost 15 years. Since 2014, Fisheries Division has contributed almost $580,000 in grant funds to the Free Span the Maple River Connectivity Initiative, including an Aquatic Habitat Grant for removal of Lake Kathleen Dam. A number of options have been identified during the development of the Environmental Assessment (EA) for this project to address the low level sea lamprey population in the river. One of these alternatives is for no barrier with sterile male release treatment (SMRT) adaptive management strategy. MDNR Fisheries Division is fully supportive of this option.

The no barrier with SMRT adaptive management strategy is preferred by Fisheries Division for a number of reasons. This option is consistent with the barrier removal and fish passage intent of the project supported by MDNR funding. The option also does not have negative effects on the geomorphology of the stream. It acknowledges that the sea lamprey population in the Maple River is of low abundance, and steps are being taken to eradicate that population from the Maple River and the entire Upper Cheboygan River watershed. The option includes continued monitoring of the sea lamprey population, so that adaptive management actions, in addition to SMRT, may be taken in the future if necessary.

Again, MDNR Fisheries Division is supportive of the latest alternative presented in the draft EA for the Lake Kathleen Dam Removal EA. Specifically, that alternative is for “No Barrier with SMRT adaptive management strategy.” Please contact me if you have any questions.

Sincerely,

Neal Godby, Senior Fisheries Biologist
Northern Lake Huron Management Unit
MDNR Fisheries Division
godbyn@michigan.gov
989-732-3541 Ext. 5071
APPENDIX 2

STREAMSIDE ECOLOGICAL SERVICES’ WETLAND AND TERRESTRIAL ENVIRONMENTS REPORT
WETLAND and ADJACENT TERRESTRIAL ENVIRONMENTS

LAKE KATHLEEN ENVIRONMENTAL ASSESSMENT

Property located in Sections 10 and 11, T36N, R04W, Maple River Township, Emmet County, Michigan

Prepared By:

Prepared For:

Conservation Resource Alliance

March 29, 2017
Introduction

Conservation Resource Alliance (CRA) is working through the process of removing the Maple River Dam that creates the impoundment commonly known as Lake Kathleen. As part of that process, an Environmental Assessment (EA) is being prepared, as required by the National Environmental Policy Act (NEPA), which provides a valuation of the environmental and related social and economic effects to determine the likelihood of impacts from alternative courses of action. The purpose of this report is to present the results of site investigations that assess wetlands and adjacent terrestrial environments for inclusion in the Maple River EA.

Streamside Ecological Services, Inc. (SES) conducted wetland identification and assessments, and terrestrial assessment associated with Lake Kathleen and surrounding lands. This work was conducted at the request of Mr. Chris Pierce of CRA. The purpose of this work was to identify the approximate extent, location and regulatory status of wetlands, identify the types of adjacent terrestrial environments (uplands) present, and identify the general quality of the wetland and terrestrial environments for purposes of assessing impacts for alternatives associated with removal of the Dam.

Methods

Prior to conducting field assessments, SES reviewed available information from the Michigan Department of Environmental Quality (MDEQ), Michigan Department of Natural Resources (MDNR), U.S Fish and Wildlife Service (USFWS), and the Emmet County Soil Survey. Maps were developed from these sources that identify potential wetlands present and soil types surrounding Lake Kathleen.

On September 28 and 29, October 20, and November 21 and 22, 2016, SES conducted wetland and terrestrial identifications and assessments. Wetlands were generally identified pursuant to statutory language and Rules of Part 303, Wetland Protection, of the Natural Resources and Environmental Protection Act (NREPA), 1994 P.A. 451, as amended. As required in Part 303, technical wetland delineation standards were used as set forth in the United States Army Corps of Engineers (USACE) January 1987 wetland delineation manual, technical report Y-87-1, and appropriate regional USACE supplements. However, on site delineations were not conducted and, most wetlands were identified in the field by sketching approximate boundaries on aerial photography, and presence/absence of wetlands was primarily determined using a predominance of wetland rated vegetation and signs of wetland hydrology.
Assessment of wetlands and adjacent terrestrial lands was also conducted by meander searches throughout all areas surrounding Lake Kathleen, documenting dominant vegetation and noting any animals or signs of animal use. Photographs were taken of each area encountered.

**Results and Discussion**

**Existing Information**

Review of existing available information found that wetlands are not present adjacent to or surrounding Lake Kathleen based on the National Wetlands Inventory Map and the Michigan Resource Inventory Map, however, hydric (wetland) soils are present based on the State’s final wetland inventory, and the Emmet County Soil Survey.
Wetland and Terrestrial Plant Communities

Four wetland types and seven terrestrial areas were identified by vegetative community. Plant communities are labeled A through K as shown in the figure below. Areas A, D, F and J were identified as wetland and Areas B, C, E, G, H, I, and K as upland.

Wetland and Upland Areas Surrounding Lake Kathleen
Overall, the lands surrounding Lake Kathleen consist of upland field, deciduous hardwood forests, northern dry pine forest, and coniferous hardwoods over sands and loamy sands that, throughout much of the adjacent shoreline, slope steeply to the lake and adjacent wetlands. Each upland and wetland area identified is briefly described below.

**Area A**

Area A (green line in above figure) consists of a narrow band of wetland between the base of adjacent upland slopes and the water edge of Lake Kathleen. In areas where shallower upland slopes are present, wetlands are located between the Ordinary High Water Mark (OHWM) of the Lake and the water’s edge. Soils consist of sandy loams. Width of the wetland varies between approximately 1 and 10 feet, with most areas averaging 4 feet or less. The majority of the area consists of wet meadow wetlands with scattered shrubs and saplings. Dominant plant species are listed below.

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Wetland Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carex stricta</td>
<td>upright sedge</td>
<td>OBL</td>
</tr>
<tr>
<td>Cornus amomum</td>
<td>silky dogwood</td>
<td>FACW</td>
</tr>
<tr>
<td>Phalaris arundinacea</td>
<td>reed canarygrass</td>
<td>FACW</td>
</tr>
<tr>
<td>Salix amygdaloides</td>
<td>peachleaf willow</td>
<td>FACW</td>
</tr>
<tr>
<td>Salix exigua (S. interior)</td>
<td>sandbar willow</td>
<td>OBL</td>
</tr>
<tr>
<td>Solidago gigantea</td>
<td>giant goldenrod</td>
<td>FACW</td>
</tr>
<tr>
<td>Thuja occidentalis</td>
<td>northern white cedar</td>
<td>FACW</td>
</tr>
<tr>
<td>Viburnum lentago</td>
<td>nannyberry</td>
<td>FAC</td>
</tr>
</tbody>
</table>

**Area B**

Area B is upland adjacent to area A and contains dry, sandy soils with sparse vegetation. The Maple River Dam is located in this area between Area A and Woodland Road. Dominant plant species are identified below.
### Area C

Area C is upland dominated by conifers over dry sandy soils. The overstory is strongly dominated by eastern white pine (*Pinus strobus*) and the understory is dominated by western bracken fern (*Pteridium aquilinum*). These and other species in Area C are noted below.

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Wetland Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Betula papyrifera</em></td>
<td>paper birch</td>
<td>FACU</td>
</tr>
<tr>
<td><em>Pinus strobus</em></td>
<td>eastern white pine</td>
<td>FACU</td>
</tr>
<tr>
<td><em>Pteridium aquilinum</em></td>
<td>western brackenfern</td>
<td>FACU</td>
</tr>
<tr>
<td><em>Rubus allegheniensis</em></td>
<td>blackberry</td>
<td>FACU</td>
</tr>
<tr>
<td><em>Thuja occidentalis</em></td>
<td>northern white cedar</td>
<td>FACW</td>
</tr>
</tbody>
</table>

### Area D

Area D (blue line in above figure) is similar to Area A, but with significantly more woody vegetation. The area consists of a narrow band of wetland generally between the base of adjacent upland slopes and the water edge of Lake Kathleen. In areas where shallower upland slopes are present, wetlands are present between the OHWM of the Lake and the water’s edge. Soils consist of sandy loams. Width of the wetland varies between approximately 1 and 10 feet, with most areas averaging 5 feet or less. The majority of this wetland is scrub shrub with a wet meadow understory and an over story with scattered mature trees. Dominant plant species are listed below:

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Wetland Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Asclepias syriaca</em></td>
<td>common milkweed</td>
<td>FACU</td>
</tr>
<tr>
<td><em>Centaurea solstitialis</em></td>
<td>starthistle</td>
<td>[UPL]</td>
</tr>
<tr>
<td><em>Dactylis glomerata</em></td>
<td>orchardgrass</td>
<td>FACU</td>
</tr>
<tr>
<td><em>Populus tremuloides</em></td>
<td>quaking aspen</td>
<td>FAC</td>
</tr>
<tr>
<td><em>Sordago altissima</em></td>
<td>Canada goldenrod</td>
<td>FACU</td>
</tr>
<tr>
<td><em>Thuja occidentalis</em></td>
<td>northern white cedar</td>
<td>FACW</td>
</tr>
<tr>
<td><em>Ulmus americana</em></td>
<td>American elm</td>
<td>FACW</td>
</tr>
<tr>
<td><em>Verbascum thapsus</em></td>
<td>common mullein</td>
<td>UPL</td>
</tr>
</tbody>
</table>
### Area E

Area E is upland similar to Area B, but with more vegetative cover. This area consists of open field with areas of bare sandy soils and scattered young trees. Plant species noted are listed below.

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Wetland Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Populus tremuloides</em></td>
<td>quaking aspen</td>
<td>FAC</td>
</tr>
<tr>
<td><em>Pteridium aquilinum</em></td>
<td>western brackenfern</td>
<td>FACU</td>
</tr>
<tr>
<td><em>Verbascum thapsus</em></td>
<td>common mullein</td>
<td>UPL</td>
</tr>
<tr>
<td><em>Solidago altissima</em></td>
<td>Canada goldenrod</td>
<td>FACU</td>
</tr>
</tbody>
</table>

### Area F

Area F (pink boundary on map) is located along the East Branch of the Maple River close to where the influence of the dam ends. This wetland contains a mixture of scrub shrub and wet meadow wetland, but is primarily dominated by shrubs adjacent to the river. Soils at the surface are organic. Dominant plant species present are listed below.

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Wetland Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Alnus rugosa</em></td>
<td>alder</td>
<td>OBL</td>
</tr>
<tr>
<td><em>Cornus amomum</em></td>
<td>silky dogwood</td>
<td>FACW</td>
</tr>
<tr>
<td><em>Phalaris arundinacea</em></td>
<td>reed canarygrass</td>
<td>FACW</td>
</tr>
<tr>
<td><em>Populus tremuloides</em></td>
<td>quaking aspen</td>
<td>FAC</td>
</tr>
<tr>
<td><em>Schoenoplectus tabernaemontani</em></td>
<td>softstem bullrush</td>
<td>OBL</td>
</tr>
<tr>
<td><em>Ulmus americana</em></td>
<td>American elm</td>
<td>FACW</td>
</tr>
</tbody>
</table>
**Area G**

Area G is an upland hardwood forest over sandy loam soils, with a significant amount of eastern white pine present. This upland area encompasses the majority land north of Lake Kathleen, between the east and west branches of the Maple River. Common plant species found within this area are listed below.

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Wetland Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acer saccharum</td>
<td>sugar maple</td>
<td>FACU</td>
</tr>
<tr>
<td>Pinus strobus</td>
<td>eastern white pine</td>
<td>FACU</td>
</tr>
<tr>
<td>Populus tremuloides</td>
<td>quaking aspen</td>
<td>FAC</td>
</tr>
<tr>
<td>Pteridium aquilinum</td>
<td>western brackenfern</td>
<td>FACU</td>
</tr>
<tr>
<td>Quercus rubra</td>
<td>northern red oak</td>
<td>FACU</td>
</tr>
</tbody>
</table>

**Area H**

Area G is an upland hardwood forest over sandy loam soils. This area is similar to Area G but lacks a significant amount of conifers. Steep slopes are present down to Area D and Lake Kathleen. Many of the trees are mature. Dominant plant species found within this area are listed below.

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Wetland Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acer saccharum</td>
<td>sugar maple</td>
<td>FACU</td>
</tr>
<tr>
<td>Lonicera sp.</td>
<td>honeysuckle</td>
<td>-----</td>
</tr>
<tr>
<td>Ostrya virginiana</td>
<td>hophornbeam</td>
<td>FACU</td>
</tr>
<tr>
<td>Populus tremuloides</td>
<td>quaking aspen</td>
<td>FAC</td>
</tr>
<tr>
<td>Prunus serotina</td>
<td>black cherry</td>
<td>FACU</td>
</tr>
<tr>
<td>Pteridium aquilinum</td>
<td>western brackenfern</td>
<td>FACU</td>
</tr>
<tr>
<td>Tilia americana</td>
<td>American basswood</td>
<td>FACU</td>
</tr>
</tbody>
</table>

**Area I**

Area I includes 3 upland islands and one small upland peninsula that contain scrubs and young tree growth. These areas are dominated by young quaking aspen (*Populus tremuloides*) with
western brackenfern as a dominant herbaceous plant. Soils consist of a sandy loam. Dominant plants noted are listed below.

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Wetland Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Populus tremuloides</em></td>
<td>quaking aspen</td>
<td>FAC</td>
</tr>
<tr>
<td><em>Pteridium aquilinum</em></td>
<td>western brackenfern</td>
<td>FACU</td>
</tr>
<tr>
<td><em>Solidago altissima</em></td>
<td>Canada goldenrod</td>
<td>FACU</td>
</tr>
<tr>
<td><em>Verbascum thapsus</em></td>
<td>common mullein</td>
<td>UPL</td>
</tr>
</tbody>
</table>

**Area J**

Area J (peach outline on map) is similar to Area F but with less tree growth near the river. This area is a scrub shrub wetland with a high density of reed canarygrass in the herbaceous layer. Areas of open water are also present. Soils consist of organics over sandy loams, with evidence of past sediment deposits from river flooding. Dominant plant species identified are listed below.

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Wetland Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Alnus rugosa</em></td>
<td>alder</td>
<td>OBL</td>
</tr>
<tr>
<td><em>Carex sp.</em></td>
<td>Sedge</td>
<td>****</td>
</tr>
<tr>
<td><em>Eupatorium maculatum</em></td>
<td>joe pye weed</td>
<td>FAC</td>
</tr>
<tr>
<td><em>Phalaris arundinacea</em></td>
<td>reed canarygrass</td>
<td>FACW</td>
</tr>
<tr>
<td><em>Populus tremuloides</em></td>
<td>quaking aspen</td>
<td>FAC</td>
</tr>
</tbody>
</table>

**Area K**

Area K is a small area with northern white cedar as the dominant overstory and western brackenfern as the primary understory species. Based on the understory present, the sandy loam soils, and the lack of visible evidence of hydrology, this area was determined to be upland.

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Wetland Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Thuja occidentalis</em></td>
<td>northern white cedar</td>
<td>FACW</td>
</tr>
<tr>
<td><em>Pteridium aquilinum</em></td>
<td>western brackenfern</td>
<td>FACU</td>
</tr>
</tbody>
</table>
Nearshore Lake Bed
The lake bed nearshore consisted mostly of sandy soils with sparse or no vegetation. Organics and silt deposits were noted further upstream on the East Branch of the Maple River. Slow moving water areas contained scattered white water lily (*Nymphaea odorata*) and *Potamogeton* species.

Wetland/Terrestrial Land Impact and Quality
All wetlands on site have values and functions, especially considering these wetlands are directly contiguous to Lake Kathleen and/or the Maple River. Wetland functions include but are not limited to fish and wildlife habitat, water quality and water storage.

Impacts to these wetlands are dependent on the alternatives reviewed in the EA, and lowering the water in Lake Kathleen would impact the hydrology associated with the wetlands. However, due to the topography of the area, the amount of wetland associated with the Lake, and potentially impacted by removal of the dam is small compared to many other lakes in northern Michigan. In addition, new wetlands are expected to develop adjacent to the new (restored) river channel after removal of the Dam.

Likewise, the terrestrial areas adjacent to Lake Kathleen have values and functions, although generally different from wetlands. Mature upland hardwood areas could be considered some of the higher quality uplands simply due to the length of time that plant community takes to develop. Since these areas are not as dependent on the hydrology of Lake Kathleen, impacts, if any, would likely be minimal after removal of the dam. Additional terrestrial environments would also be expected to develop.

Animal Use
The majority of animals seen, heard, or noted from signs such as tracks and scat were primarily associated with Lake Kathleen and adjacent wetlands. Species noted include:
<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anas discors</td>
<td>Blue-winged Teal</td>
</tr>
<tr>
<td>Anas platyrhynchos</td>
<td>Mallard</td>
</tr>
<tr>
<td>Anas rubripes</td>
<td>American Black duck</td>
</tr>
<tr>
<td>Branta canadensis</td>
<td>Canada Goose</td>
</tr>
<tr>
<td>Castor canadensis</td>
<td>American Beaver</td>
</tr>
<tr>
<td>Haliaeetus leucocephalus</td>
<td>Bald Eagle</td>
</tr>
<tr>
<td>Lophodytes cucullatus</td>
<td>Hooded Merganser</td>
</tr>
<tr>
<td>Odocoileus virginianus</td>
<td>Whitetail Deer</td>
</tr>
<tr>
<td>Ondatra zibethicus</td>
<td>Muskrat</td>
</tr>
<tr>
<td>Procyon lotor</td>
<td>Raccoon</td>
</tr>
</tbody>
</table>

While not many animal species were noted during our assessments, the habitat present throughout and adjacent to Lake Kathleen is likely to support additional animals including numerous species of aquatic and terrestrial macroinvertebrates, fish, small mammals and furbearers, reptiles and amphibians, birds of prey, songbirds and neotropical migrants.

**Wetland Regulation**

In Michigan, wetlands are regulated by Part 303, Wetland Protection of the Natural Resources and Environmental Protection Act (NREPA), PA 451, as amended, if they greater than five acres in size. Wetlands are also regulated if they are contiguous to (within 500 feet of) or have a surface water connection to an inland lake, stream, or pond regardless of size.

Based on our field assessment, all wetlands identified adjacent to or near Lake Kathleen would be considered regulated under Part 303 of NREPA. It should also be noted that Lake Kathleen, the main branch and east and west branches of the Maple River are also regulated under Part 301, Inland Lakes and Streams of NREPA.
Oliver Road Timber Bridge Project, Carp Lake River

In June 2006, the Service issued a Biological Opinion that considered the effects of removal of the existing twin culverts at the Oliver Road crossing of the Carp Lake River and installation of a free-span timber bridge (USFWS 2006). The action is being funded in part with Federal funding from the U.S. Forest Service’s Wood In Transportation Program and the U.S. Fish and Wildlife Service’s Fish Passage program (administered by the Green Bay Fisheries Resource Office). The applicant for this project is the Conservation Resource Alliance, a private conservation organization that is working closely with the Emmet County Road Commission in this effort. The action is expected to have overall benefits to the species by improving habitat at the Oliver Road site through elimination or reduction of ongoing sedimentation off of the roadway and roadside ditches. The project engineers worked with species experts to design a structure that would maintain the existing suitable \textit{B. hungerfordi} habitat. During culvert removal, however, it was expected that the disturbance would result in harm or mortality of individuals in the action area.

Prior to commencement of construction, the action agencies agreed to contract with qualified biologists to locate as many \textit{B. hungerfordi} in the action area as possible. All individuals found at the Oliver Road site were to be captured, transported to a site upstream of Oliver Road, and permanently released. The survey team consisted of Bert Ebbers, Bob VandeKopple, and Michael Grant, species experts with the most experience surveying and conducting research on this species since its listing in 1994. Previous surveys at this site found no more than one beetle found in the past seven years; since 1994, the highest number recorded was four adults. Based on these data and considering the best available information on estimating population size, it was expected that the survey team would find only a few individuals. The team spent a total of two hours each, for a cumulative six hours of searching, and found a total of 28 adult \textit{B. hungerfordi} (Ebbers 2006). The 28 individuals were moved to Gill Road, which has higher quality habitat and supports greater numbers of \textit{B. hungerfordi} compared to the Oliver Road site (Ebbers 2005). Because the Biological Opinion anticipated only a few individuals would be found at the Oliver Road site, the formal consultation was reinitiated in August 2006.
March 21, 2017

JAMES E. MYSTER
REGIONAL HISTORIC PRESERVATION OFFICER / ARCHAEOLOGIST
U.S. FISH AND WILDLIFE SERVICE
MIDWEST REGION
5600 AMERICAN BOULEVARD WEST SUITE 1049
BLOOMINGTON MN 55437-1173

RE: ER17-188 Maple River Fish Passage Project, T36N, R4W, Sec 10, 11; Maple River Twp., Emmet County (USFWS)

Dear Mr. Myster:

Based on the information provided for our review, the State Historic Preservation Officer (SHPO) concurs with the determination of the USFWS that **no historic properties are affected** within the area of potential effects of this undertaking.

This letter evidences the FWS’s compliance with 36 CFR § 800.4 “Identification of historic properties,” and the fulfillment of FWS’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(222,158),(275,173)(277,158),(312,173)(314,158),(344,173) 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:the
REQUEST FOR MIDWEST RHPO NHPA CLEARANCE
For Undertakings that have the Potential to Cause Effects on Historic Properties

Project Background:
Project Name: Maple River, Lake Kathleen Dam Removal Project
County: Emmet State: Mi On USFWS land? Yes No
USFWS Program: FSH
Project Location: Township(s) 36 N S, Range(s) 4 E W, Section(s): 10/11
Total Project Area Size (in Acres): 0.46 If road trail, (linear ft. L and W): 200 x 100
USFWS Project Leader: Scott Koproski Station: Alpena FWCO Phone #: 989-356-5102 x1023
If there is a Governmental/NGO partner(s), please name: Conservation Resource Alliance

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)

☐ Check here if you have done any informal consultation(s) outside the USFWS (if not, check here X).
If so, did you talk with SHPO? Tribes? Did you consult any database with known surveys or sites?
Please attach any information you are regarding your outside informal consultation(s).

☐ Check here if there has been a field survey done in the project area already (if not, check here X).
If so, who conducted it and when? 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).

☐ Check here if there are known buildings/sites* in the project area (if not, check here X).
*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: 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: Andrea Ania/Matt Kowalski Date: 5/27/2015 Phone #: 989-356-5102 x1020
If applicable, submit this form with the Environmental Action Statement (EAS) or NEPA Checklist

**RHPO Only** ****************************

Investigation
☐ 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.
☐ 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: not eligible, concurrence by SHPO on 3/21/2017

☐ Stipulations

Digitally signed by JAMES MYSTER Date: 2017.04.11 15:30:26 -05'00'
James E. Myster, USFWS Midwest RHPO Date 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.