

**US Army Corps
of Engineers®**

CHICAGO DISTRICT

HORLICK DAM: ROOT RIVER RESTORATION RACINE, WI

**SECTION 506
GREAT LAKES FISHERY & ECOSYSTEM RESTORATION**

Integrated Feasibility Report & Environmental Assessment

**Appendix B:
404(b)(1) Analysis**

September 30, 2021

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A1 – SECTION 404(B)(1) EVALUATION FOR NATIONWIDE PERMIT 27 CERTIFICATION

Water resources projects developed by USACE do not obtain Department of the Army permits through a self-permitting process. Instead, the project documentation (i.e., main report) and environmental compliance work performed by USACE serves as the functional equivalent of self-permitting, ensuring that the same level of review is performed.

The Guidelines state that if a General permit is applicable, the applicant needs merely to comply with its terms, and no further action by the permitting authority is necessary. USACE has established numerous General permits known as nationwide permits (NWP) to authorize activities that have no more than minimal individual and cumulative adverse environmental effects.

For the Horlick Dam Section 506 Great Lakes Fishery & Ecosystem Feasibility Study, one such NWP does apply: NWP 27 – Aquatic Habitat Restoration, Enhancement, and Establishment Activities. While there would be no permit – and consequently, no permit terms with which to comply – the project would be in compliance with the Guidelines by performing an analysis sufficient to demonstrate the applicability of NWP 27. This analysis must show that NWP 27 would apply to the project (if USACE were not the lead agency), and that the project would comply with applicable NWP regional and general conditions.

Nationwide Permit 27 (NWP 27) – Aquatic Habitat Restoration, Enhancement, and Establishment Activities, authorizes activities in water of the United States associated with the restoration, enhancement, and establishment of tidal and non-tidal wetlands and riparian areas, the restoration and enhancement of non-tidal streams and other non-tidal open waters, and the rehabilitation or enhancement of tidal streams, tidal wetlands, and tidal open waters, provided those activities result in net increases in aquatic resource functions and services.

To the extent that a Corps permit is required, activities authorized by this NWP include, but are not limited to:

- the removal of accumulated sediments;
- the installation, removal, and maintenance of small water control structures, dikes, and berms, as well as discharges of dredged or fill material to restore appropriate stream channel configurations after small water control structures, dikes, and berms, are removed;
- the installation of current deflectors;
- the enhancement, rehabilitation, or re-establishment of riffle and pool stream structure;
- the placement of in-stream habitat structures; modifications of the stream bed and/or banks to enhance, rehabilitate, or re-establish stream meanders;
- the removal of stream barriers, such as undersized culverts, fords, and grade control structures;
- the backfilling of artificial channels;
- the removal of existing drainage structures, such as drain tiles, and the filling, blocking, or reshaping of drainage ditches to restore wetland hydrology;
- the installation of structures or fills necessary to restore or enhance wetland or stream hydrology;
- the construction of small nesting islands;
- the construction of open water areas;
- the construction of oyster habitat over unvegetated bottom in tidal waters;
- shellfish seeding;
- activities needed to reestablish vegetation, including plowing or discing for seed bed preparation and the planting of appropriate wetland species;

- re-establishment of submerged aquatic vegetation in areas where those plant communities previously existed;
- re-establishment of tidal wetlands in tidal waters where those wetlands previously existed;
- mechanized land clearing to remove non-native invasive, exotic, or nuisance vegetation; and,
- relocation of non-tidal waters, including non-tidal wetlands and streams, on the project site provided there are net increases in aquatic resource functions and services.

NWP 27 does not authorize the conversion of a stream or natural wetlands to another aquatic habitat type (e.g., the conversion of a stream to wetland or vice versa) or uplands. Changes in wetland plant communities that occur when wetland hydrology is more fully restored during wetland rehabilitation activities are not considered a conversion to another aquatic habitat type. NWP 27 does not authorize stream channelization. Only native plant species should be planted at the site authorized by NWP 27.

Compensatory mitigation is not required for activities authorized by this NWP since these activities must result in net increases in aquatic resource functions and services.

Typically, to qualify for NWP authorization, a prospective permittee must comply with the NWP general conditions as applicable. Applicable regional and general conditions and compliance with them are enumerated in Tab A2 of this appendix. The following sections under Tab A1 of this appendix present the 404(b)(1) evaluation for applicability of NWP 27.

I. Project Description

a. Location

The Root River watershed upstream of the focused study area is approximately 198 square miles encompassing portions of Waukesha, Milwaukee, Kenosha and Racine counties (**Error! Reference source not found.**). The study area is a reach of small sized river that is affected by the past and present versions of the Horlick Dam. This large run of the river dam is located on the Root River in Racine, Wisconsin and specifically resides at river mile 5.3, or 5.3 miles upstream of Lake Michigan. The impoundment is created on the north side of Northwestern Ave between Old Mill drive to the west and Green Bay Rd to the east (**Error! Reference source not found.**).

b. General Description

Alternative A was selected as the National Ecosystem Restoration (NER) (synonymous with the Preferred Plan and Tentatively Selected Plan). Rationale for selecting the NER/Preferred Plan is presented in *Chapter 3: Alternative Evaluation* of the main report. Alternative A – Full Dam removal is described in *Section 2.5 Alternative Screening* of the main report. The implementation of Alternative A would restore riverine fish habitat and connectivity.

The implementation of this alternative is generally described in *Chapter 5 – Description of the NER Plan* of the main report. General construction activities and sequencing would include:

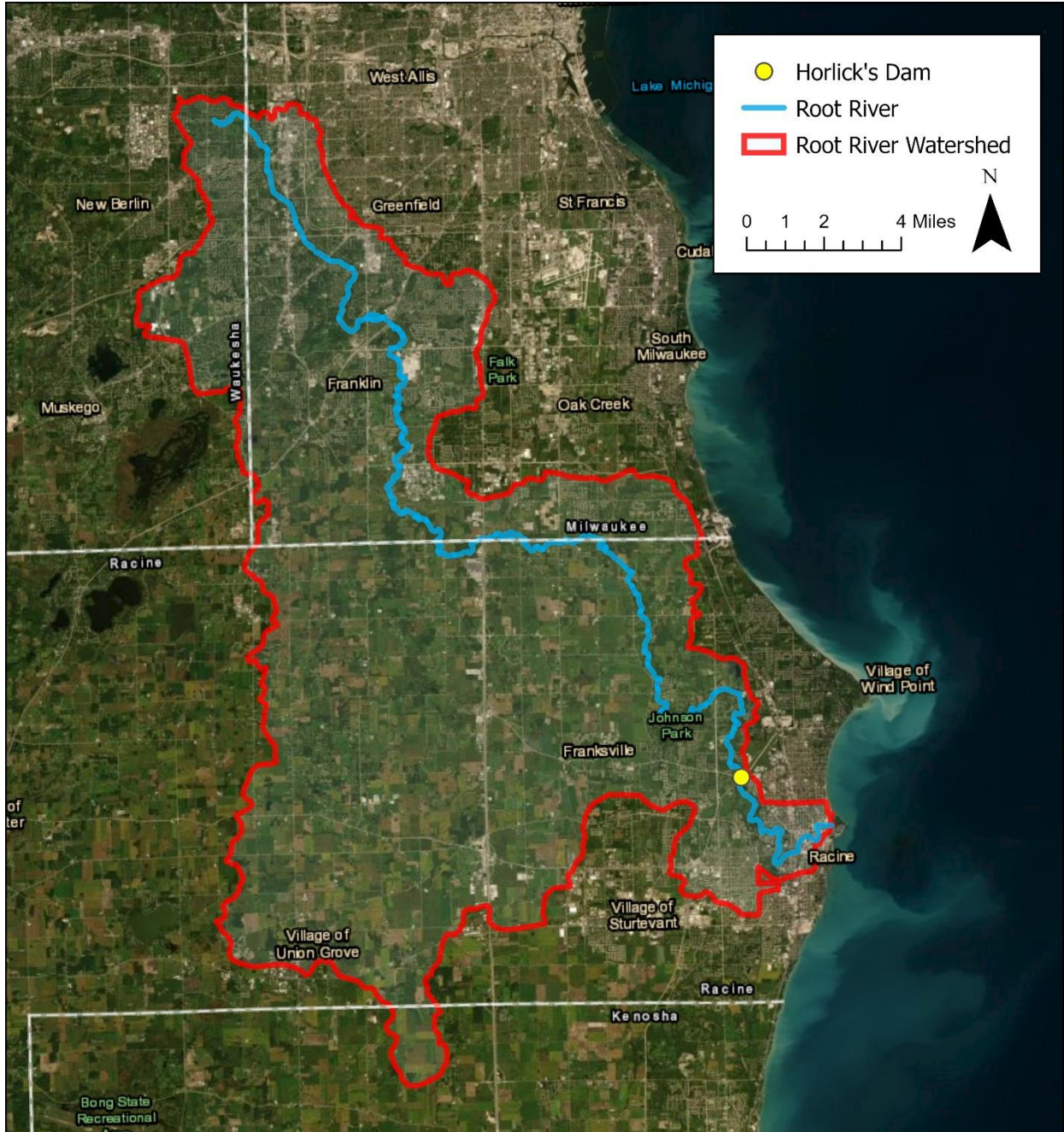


Figure 1 - Location of the project within the Root River Watershed.

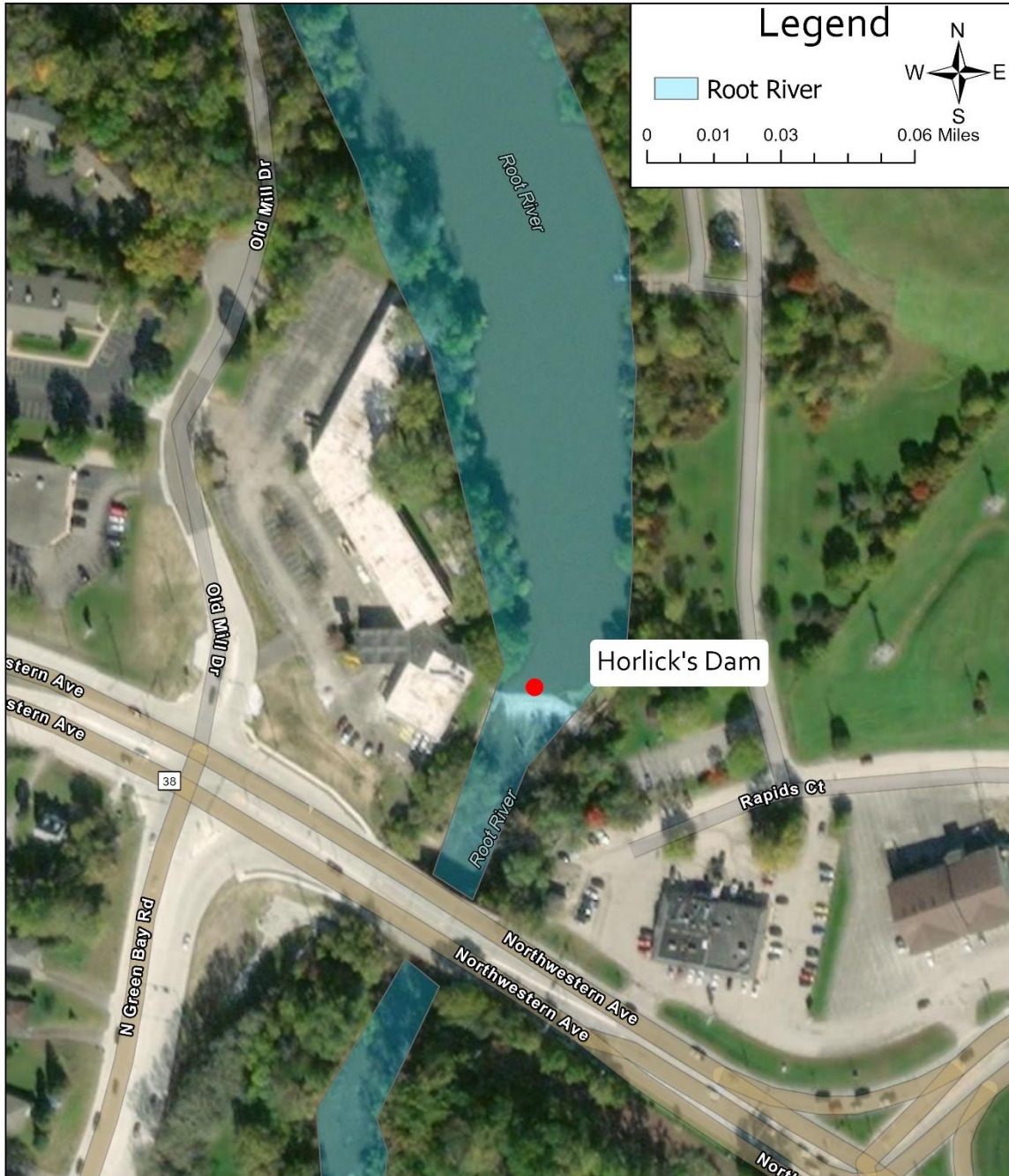


Figure 2: Horlick Dam Focused Study Area

(1) Site Preparation – The first actions for construction would be to properly alert local agencies and citizens that work is starting. This would be followed by the contractor setting up staging and access and then mobilizing equipment and materials to the site. The construction site and any staging/storage areas would have some type of exclusionary fencing depending on local requirements. The construction site and supporting areas would also have signage placed to indicate the federal project, agencies and contractors participating.

(2) Staged Dewatering – A passive sediment management plan with a staged drawdown has been selected as the preferred sediment management strategy for TSP. This methodology will use the existing stoplogs within the dam to slowly draw down the impoundment levels and allow a new channel to begin forming in the impoundment sediment upstream of the dam. A slow drawdown will prevent a large and sudden release of sediment downstream that would smother downstream aquatic habitat and benthic organisms. The proposed gradual drawdown will allow the sediment to be transported downstream at a relatively gradual rate. The three considered alternatives, active sediment management, passive sediment management, and passive sediment management with a staged drawdown are compared in the attached Sediment Management Plan. The positives of the selected option are that it has a medium risk of release of turbidity and suspended solids over an elongated period of time, allows for an adaptive management plan to be implemented, and has a low cost compared to an active sediment management approach. The following sequence outlines the plan for dam removal and sediment management:

1. Begin the first stop log removal near the end of April. This time coincides approximately with the end of spring Longnose Sucker and Northern Pike migration and the beginning of the growing season.
2. Remove one stop log per week until they are all gone. The exact number of stop logs is unknown; however, there are likely at least 10. This will require at least two months over which the impoundment would be drawn down.
3. After all stoplogs have been removed and water levels have stabilized, remove the remaining concrete structure. The top portion of the dam will be removed first rather than chipping away at the base, so that the materials can be removed in a safe and organized fashion. The top down removal of the concrete structure will allow more time for vegetation to establish on new, exposed sediments before base level is completely removed.
4. The dam will be removed down to at least 2 feet below the existing channel bed unless bedrock is encountered first.
5. The edge of the dam will be left intact on both sides to buttress the existing retaining walls with the option to add riprap if necessary. At least an 80-foot wide opening will be removed to match the anticipated new channel width.
6. Remnant material from the previous, upstream dam structure will be removed after the main structure is removed.

Possible adjustments to the rate of drawdown may be necessary during the removal. High turbidity or sediment deposition could cause the process to be delayed.” (GRAEF, 2021, p. 26)

The potential impacts due to sediment transport from the impoundment or the new flow regime that will reemerge within the old impoundment are discussed in the following sections.

(3) Dam & Spillway Demolition – Plan, profile, and section of the proposed dam removal areas per Horlick Dam Removal Application (prepared by GRAEF) are shown in Figures G-8, G-9, and G-10, respectively. The entire spillway will be removed to the base of the structure, as well as the remaining rock and masonry portion of the old dam and the sediment impoundment at the upstream portion of the dam (shown in Figure G-10). A portion of the dam at the banks will be left in place from the base of the dam to the top of the wall on the west side to support the wall (at a 1:1 slope cut), and to the top of the bank on the east side (at a 1:1 slope cut) as shown in Figure G-9. Also, the toe of the apron and the keyway will also be left in place.

Dam removal procedures starts with dewatering of the sediment impoundment, creating a shallow notch at the top of the dam to slowly draw the water down, then removing of the stop logs. Once the stop logs are removed, dismantling of the structure can begin. The dam appears to be mass concrete with some reinforcing steel. The use of hydraulic equipment such as excavators (equipped with a breaker or jack hammer) should be sufficient for this operation. Blasting is not recommended for this operation due its vibration impact on a commercial building (Riverside Inn), and a bridge structure that are close proximity to dam removal area.

(4) Recycling & Disposal –

Concrete from the dam demolition is considered “Clean Construction and Demolition Debris”. These materials are recycled commercially into new concrete. All materials from the dam demolition will be taken to a commercial CCDD facility for reuse.

(5) Utilities – There are four utility crossing locations located within the former impoundment near River Miles 6.2, 7.2, 8.3 and 8.6, based on the HEC-RAS model River Miles. The crossing at River Mile 6.2 is the only one located within the “erodible” section of the impoundment. According to collected data, the utility is a 24” sanitary sewer main that is located between 8 and 10 feet beneath the riverbed. Based on the sediment survey, the “erodible” portion of the channel is only expected to degrade by a maximum of 4.2’ at this location. The utility crossing at Rive Mile 7.2 is a 20” sanitary sewer main that is set at the river bottom. Although the channel bed is not as erodible in this area, the expected channel velocities at this location for the 66.7% AEP flow are expected to nearly double from about 2 ft/s to 4 ft/s. Monitoring of the river bed elevation will be conducted periodically to monitor whether adaptive management is needed for utility protection. As part of the adaptive management measures, an option would be added to the contract for stone should scouring occur. The Sediment Management Plan provides utility maps and documentation in Appendix G.

(6) Best Management Practices (BMPs) – Soil erosion and sediment control measures would be incorporated into the design documents and will comply with local and federal environmental requirements. A 5 year period of BMPs and erosion prevention would be implemented by the contractor. The minimum measures required at the project site may include:

- Hydroseeding, seeding, and mulching to stabilize disturbed areas
- Installation of silt fences around graded slopes and stockpile areas
- Protection of the waterway where grading occurs with silt fencing prevent sediments from traveling into the waterway
- Stabilizing construction entrances to limit soil disturbance at the ingress/egress from the site
- Installing erosion blanket over unprotected finished grades that are to be unplanted for at least two weeks
- Lowering of the pool by stoplog management to limit the release of accumulated sediments behind the dam.

(7) Monitoring & Adaptive Management Plan – A monitoring plan will be implemented for this project (*Appendix C*). The USACE, Chicago District would conduct monitoring in conjunction with the non-federal sponsors to determine the success of the project. The principal goal of a resulting project is to restore stream connectivity to provide upstream migration for local fish. Baseline data for current conditions in the Root River at Horlick Dam are detailed in this IFR. The following specific monitoring objectives were established to determine the effectiveness of this project:

- Restore stream habitat as measured by the presence of naturalized stream hydrology and hydraulics
- Reestablish natural fluvialgeomorphic parameters (hydraulics, substrates) and structures to support riverine and riparian habitats within the study area. Improvement is measured via the predicted increase in quality of riverine habitat (QHEI)

(9) Operations & Maintenance – The OMRR&R costs of the project are estimated to a total cost of \$0. The natural of the alternative as turning the river back to nature does not require anything further than taking the dam out, stabilizing the bank areas and letting the river flow.

c. Authority and Purpose

This study is authorized under Section 506 of the Water Resources Development Act (WRDA) of 2000 (as amended), Great Lakes Fishery & Ecosystem Restoration Authority is given to plan, design, and construct projects to support the restoration of the fishery, ecosystem, and beneficial uses of the Great Lakes.

The Racine County Public Works (RCPW) requested that the Chicago District, United States Army Corps of Engineers (USACE) initiate a study under the Great Lakes Fishery & Ecosystem Restoration Section 506 of WRDA 2000 (as amended) to ascertain the feasibility of restoring important riverine habitat and connectivity for fishes, mussels and wildlife along a stretch of the Root River. This report has evaluated the feasibility and environmental effects of restoring hydrology, hydraulics, riverine substrates and geomorphic features. The main purpose of the Integrated Feasibility Report and Environmental Assessment (IFR/EA) is to recommend a plan, including consideration of the No Action Plan, for ecological restoration of the identified study area.

The purpose of the proposed project is to restore riverine habitat and connectivity to a stretch of river chronically impacted by the presence of the Horlick Dam. Generally, the need for the proposed project is driven by the presence of an impoundment that has changed riverine habitat (lotic) to lake-like (lentic) conditions, induced abnormal hydrogeomorphic settings, fragmented the river system, degraded substrate transport and sorting above and below the dam, and has degraded water quality within the study reach. These adverse habitat, connectivity and water quality conditions both reduce abundance and species richness of riverine specific species. The habitat quality assessment of the riverine habitats utilizing the QHEI, provided a qualitative basis for confirming these holistic and chronic problems.

Based on site qualitative and quantitative investigations, the main aquatic resource problems within the Root River by Horlick Dam in which the 506 Authority may take opportunity to address are as follows:

- Riverine fragmentation
 - Prevents fish/mussel passage during all flows, inhibiting natural migrations and genetic exchange contributing to upstream biodiversity loss
 - Prevents riparian corridor passage for certain amphibians, reptiles and mammals
 - May be impeding migratory fishes from Lake Michigan, such as Longnose Sucker (*Catostomus catostomus*), and important fishery species like Northern Pike (*Esox lucius*) Smallmouth Bass (*Micropterus dolomieu*) and Walleye (*Sander vitreus*).
 - Could be impacting native mussel propagation and dispersal
- Altered natural fluvial processes by dam
 - Altered natural riverine hydraulics / impounding flows / lentic (lake) conditions

- Altered sediment transport by trapping bedload (sands, gravels, cobbles)
- Accelerated bedload transport downstream of the dam, or substrate/habitat scouring
- Artificially induced / unsustainable hydrology for wetlands by raising water table upstream of dam within the impoundment
- Lost ability to absorb flood pulses

- Altered Riparian Zone
 - Loss of native plant communities, including wild rice wetlands
 - Loss of woodland habitat, including birds and small mammals
 - Loss of native organic and large woody debris inputs to the river

- Water Quality Degradation
 - Impoundment causes water to warm up and lose dissolved oxygen
 - Impoundment allows for the accumulation of fine sediments that typically store nutrients, further lowering dissolved oxygen through algal blooms; further decreasing dissolved oxygen
 - Super-critical flows (water fall conditions) can strip nitrogen from the water column or super saturated water with dissolved gases

- Human Safety
 - Hazardous conditions for recreating around the dam; presence of entraining roller
 - Impedes and fragments blue trail (water course for paddling/floating); need to portage down steep banks

- Aesthetic Degradation
 - Presence of dam detracts from gorge and scenic river vistas
 - Collects foreign debris / trash
 - Algal blooms and turbid waters
 - Accumulate sediment with nutrients can give off decaying odors

d. General Description of Fill Material

1) General Characteristics and Purpose of Material

The project involves removing an existing concrete structure and leaving both wingwalls in place for stabilization. There is the option to add riprap for erosion control purposes. Therefore, the possibility for placing fill in the river exists.

2) Quantity of Material

56 tons

3) Source of Material

Commercial licensed vendor

e. Description of Proposed Discharge Site

1) Location

No fill or solid discharges are proposed. The project would include the gradual release of impounded water and sediment from behind Horlick Dam.

2) Size

NA

3) Type of Site

The project site is Horlick Dam, on the Root River, Racine County, Wisconsin.

4) Type of Habitat

Stream (4.5 mi) – The riverine habitat upstream of the Horlick Dam is more similar to that of a lentic system than a lotic system. The impoundment surface area is approximately 60 acres and noticeably backs up one mile upstream of the dam, but potentially propagates 4 miles upstream. Upstream of the dam, the substrate includes extensive silt and muck throughout with a mixture of sand and gravel in the furthest reaches upstream from the dam. Instream cover is sparse with limited overhanging vegetation, logs and woody debris. Further upstream from the dam there are some oxbows and backwaters that can provide some instream cover for fishes. Development is poor with no functional riffles in the impoundment as the area is a large pool with slow water velocity.

Immediately, downstream of the dam, the Root River's habitat changes back to a lotic system. The substrate and sediments have been largely scoured away down to the bedrock, with exposed boulders and slabs which creates some nooks and crevices for potential habitat. There is moderate instream cover with a variety of coverage of boulders, shallows, logs, woody debris, pools and rootmats. Functional pools, riffles and runs are observed throughout the downstream reach, providing heterogenous habitats for fishes.

Net Gains/Losses

There would be no net loss in wetland or habitat quantity. Approximately 4.5 miles of riverine habitat would be restored by the removal of Horlick Dam.

5) Timing and Duration of Discharge

USACE ecosystem restoration projects are typically 5-years. In the first couple months to year, all the physical and heavy construction work would be completed. All earthwork and concrete removal would be completed within the first year of the construction contract. All materials would be placed during weather dry enough not to cause flooding or erosion. The timing and duration of the sediment discharge through the slow draw down is discussed in the sediment management plan in Appendix D: Hydrology, Hydraulics and Climate Change.

f. Description of Placement Method

The removal of stoplogs would be completed with small equipment (a backhoe). The removal of the concrete structure would be completed using heavy equipment. If placement of riprap occurs, it would be placed with small equipment (backhoe).

II. Factual Determinations

a. Physical Substrate Determinations

1) Substrate Elevation and Slope

The current sediment accumulation behind Horlick Dam is estimated to be up to 4 feet of material at the most shoaled location.

2) Sediment Type

Sediment samples taken in December 2020 indicate that the material is fine grained to a depth of approximately 3 feet. Measured sediment grain sizes are summarized in Table 1.

Table 1: Sediment Grain Size near Horlick Dam

River Mile	% clay/silt	% sand	% gravel
6.2	79.7	16.8	3.5
6.5	51.8	47.4	0.9
9.2	49.2	44.2	6.6
9.5	22.3	67.4	10.3

3) Fill Material Movement

There is the option for riprap to be placed at the wingwalls after the dam is removed. Due to the nature of and placement location of riprap, it is unlikely that movement outside of the placement area will occur. It is anticipated that some existing sediment behind the dam will be released, however the lowering of the pool using stoplogs is expected to reduce the volume of sediment that will be released as the pool is lowered. Sediment quality testing revealed no chemical compounds detectable as listed in 4.2.7 of the main report. The Root River is on the 303(d) list for Total Phosphorus and sediment quality testing confirmed high levels of Total Phosphorus. A sediment management plan has been developed that includes staged dam removal and post-removal monitoring and adaptive management measures.

4) Physical Effects on Benthos

As described in the Draft IFR/EA (*Section 4.3.3. Aquatic Macroinvertebrates*) the benthic community within the Root River near Horlick Dam is considered highly tolerant, which is indicative of poor water quality conditions. The project would temporarily disturb benthic communities since benthic invertebrates that do not move or that exhibit low vagility would be removed or covered during dam removal and the drawdown of the upstream pool that does include erodible sediments. Stabilization of exposed sediment will include the installation of native seeding to reduce the erodibility of these areas. After the construction period, the natural processes of sediment transport will be restored and recolonization from upstream macroinvertebrates are expected to occur. The restoration of a natural ecosystem and fluvial processes would be a positive change overall. The newly formed hydraulic zones in the channel and increased riverine habitats are expected to provide diverse habitats for macroinvertebrates. There are no significant adverse effects expected.

5) Other Effects

There would be no other significant sediment/substrate impacts since the removal of the dam will help restore a natural riverine habitat.

6) Actions Taken to Minimize Impacts

Although there are no significant or resources of quality to protect within the study area, special measures would be taken to minimize the temporary impacts on physical substrates associated with the proposed activity. These include the careful lowering of the pool, removal of the existing dam structure from the top down, the use of biodegradable erosion control fabric and native plantings and other stabilization and erosion control methods as needed. This project itself is restoring aspects that the Clean Water Act protects, which is primarily habitat quality improvements.

b. Water Circulation, Fluctuation, and Salinity Determinations

1) Water

(a) Salinity

N/A. The project is in a freshwater river.

(b) Water Chemistry

Water chemistry typical of a riverine environment will be restored by the removal of Horlick Dam. This includes improvements to dissolved oxygen and a more natural temperature regime.

(c) Clarity

Temporary impacts to water clarity may be experienced due to the drawdown of the pool and the release of shoaled sediment. A sediment management plan is proposed to minimize these impacts. Once stabilized, the restored river will not have any impacts to clarity.

(d) Color

No impacts to color are anticipated.

(e) Odor

The exposure of shoaled sediment after drawdown of the pool may cause local, temporary swampy or earthy type odors. These will dissipate as the sediment dries and vegetation grows.

(f) Taste

The water near Horlick Dam is not used for drinking water. There are no anticipated taste impacts.

(g) Dissolved Gas Levels

The drawdown of the pool may release turbidity as well as anoxic waters from the pool; these may have a temporary impact to water quality during drawdown. Post drawdown, a more natural riverine dissolved oxygen profile will be established in the project area, as opposed to the stagnant and low oxygen conditions in the dam pool.

(h) Nutrients

The project does not introduce nutrients into the system. Nutrients associated with shoaled sediment may be released with suspended solids during the drawdown period. The sediments upstream of the Horlick Dam were tested and indicated high levels of Total Phosphorus. This would be a temporary condition.

(i) Eutrophication

The current pool exhibits eutrophic characteristics consistent with a stagnant pond. The removal of Horlick Dam will rectify this condition.

(j) Other

All project aspects support the Clean Water Act principles and intent. The Root River is listed as impaired on the Wisconsin 303d list for Total Phosphorus with the impairments of low DO and degraded biological community. The Root River Watershed Restoration Plan includes the recommendation for the removal of Horlick Dam to address the impairments.

2) Current Patterns and Circulation

See *Section 4.2.5 Hydrology & Hydraulics* of the Draft IFR for description of project site's hydrology.

(a) Current Patterns and Flow

The project implementation is expected to restore natural riverine flow conditions to the Root River within the project area.

(b) Velocity

The impoundment area upstream of the dam has submerged naturally occurring riffle-pool complexes, thereby altering velocities within the channel. The implementation of the project would increase flow velocities in the former impoundment as well as during both normal and flood flows. The reduction of the impoundment area and the return of higher velocities of a natural lotic channel will reveal riffle-pool complexes; however, these changes would be beneficial to aquatic life by creating diverse velocities within the channel. There would be no affects to flow during large flood events over the bank-full width scenario.

(c) Stratification

The impoundment area upstream of the has unnatural limnic stratification that would be removed with the implementation of the project. This would return the reach back to the natural lotic stratification.

(d) Hydrologic Regime

Implementation of the proposed project will have negligible impacts on the flow regime of the Root River because the existing dam is a run-of-the-river type dam and does not provide any flood storage. There will be no noticeable impacts to base flows or flood flows because of the dam removal. The benefits of the project are more focused on river connectivity, fish passage, and other water quality improvements within the dam impoundment.

3) Normal Water Level Fluctuations

Water level fluctuations at the site are influenced by precipitation, evapotranspiration, and urban runoff. While the removal of the dam would reduce the unnaturally high-water levels, the implementation of the project would not alter normal water level fluctuations; therefore, no impacts are expected.

4) Salinity Gradients

Not applicable to freshwater environments.

5) Actions that will be Taken to Minimize Impacts

No special measures would be taken to minimize the temporary impacts on water circulation and fluctuation since there are no predicted adverse effects. As part of the adaptive management measures, an option would be added to the contract for stone should scouring occur near utilities. The purpose of the project is to restore riverine habitats and connectivity for a reach of the Root River.

c. Suspended Particulate/Turbidity Determinations

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

The lowering of the pool may result in the temporary release of accumulated sediment; implementation of the sediment management plan is expected to slow these releases to minimize suspended particulates and turbidity. Post dam removal, the stabilized river is not expected to have suspended solids or turbidity different from the upstream portions of the Root River.

2) Effects on Chemical and Physical Properties of the Water Column

(a) Light Penetration

Localized turbidity increases could occur during drawdown and construction activities. These minor increases in turbidity could temporarily decrease light penetration; however, the impacts are expected to be minor and short-term in duration.

(b) Dissolved Oxygen

The release of sediment during drawdown may have an impact on dissolved oxygen levels downstream, however the implementation of the sediment management plan is expected to mitigate the extent of those impacts to downstream reaches of the Root River. The removal of Horlick Dam is expected to improve dissolved oxygen levels over the long term.

(c) Toxic Metals and Organics

Based on sediment testing conducted in 2020, there are no toxic metals present at detectable levels and there are high levels of organics, such as total phosphorus, in the sediment.

(d) Pathogens

No effects are expected with the implementation of the proposed project.

(e) Aesthetics

There could be temporary increases in turbidity during the staged drawdown and dam removal activities. However, these increases would be minor and temporary in duration. Overall, positive effects are expected via removing the dam, restoring in-stream habitat, gently sloping banks, and restoring native plant communities.

(f) Other

No other effects are expected with the implementation of the proposed project.

3) Effects on Biota

(a) Primary Production, Photosynthesis

There could be localized turbidity increases during removal of the dam. The minor increases in turbidity during initial construction could impact primary production/photosynthesis by reducing water clarity; however, the affect would be minor and temporary. Overall, primary production would increase via the restoration of the natural ecosystem and fluvial processes.

(b) Suspension/Filter Feeders

There could be localized turbidity increases during removal of the dam. The minor increases in turbidity during initial construction could impact suspension/filter feeders; however, the affect would be minor and temporary. Overall, suspension and filter feeders are expected to increase due to the increase in a balanced primary production of zooplankton and phytoplankton. Improvement in saprophyte species richness such as shredding macroinvertebrates and crayfishes are expected due to expected increases in primary productions from substrate and velocity reestablishment, and high-quality sources of organic input (i.e., allochthonous material).

(c) Sight Feeders

There could be localized turbidity increases during removal of the dam. The minor increases in turbidity during initial construction could impact sight feeders; however, the affect would be minor and temporary. Overall, the implementation of the project is expected to contribute to clarifying water inputs via the restoration of a natural ecosystem and fluvial processes.

4) Actions Taken to Minimize Impacts

The slow drawdown of the pool and careful removal of the existing dam structure and related construction activities from the top down would be implemented to minimize the temporary turbidity impacts associated with the proposed activity. All proposed activities would be well under the turbidity threshold caused by a moderate rainstorm. This project itself is restoring aspects that the Clean Water Act protects, which is primarily habitat quality improvements.

d. Contaminant Determinations

A HTRW Phase I Environmental Site Assessment was prepared for the study area and is included in Appendix H – Hazardous, Toxic and Radioactive Waste (HTRW) Report. No HTRW issues were identified during the investigation.

e. Aquatic Ecosystem and Organism Determinations

1) Effects on Plankton

Beneficial affects to planktonic organisms are expected due to expected increases in primary productions from substrate and velocity reestablishment, and natural fluvial geomorphology.

2) Effects on Benthos

The project would temporarily disturb benthic communities in the vicinity of the dam since benthic invertebrates that do not move or that exhibit low vagility would be removed or covered during dam removal and the drawdown of sediments. Riverine macroinvertebrates are well adapted to sediment transport and deposition that occurs during and after strong floods. The sediment management plan with the slow drawdown would eliminate or minimize disturbance caused by fine sediment deposition. Effects would be like those imparted during a natural flood event. After the construction period, the natural processes of sediment transport will be restored and recolonization from upstream and downstream macroinvertebrates is expected to occur.

Existing benthos directly beneath where materials would be placed would be negligible since benthic communities inhabiting concrete channels are typically highly tolerant (i.e. Chironomids [bloodworms and midges]). These species immediately colonize anything in any type of stream. Beneficial affects to benthic communities are expected due to expected increases in primary productions from substrate and velocity reestablishment and natural fluvial geomorphology.

3) Effects on Nekton

Fish eggs and larvae would not be smothered by the proposed fill activity since the anticipated construction activities will occur during non-reproductive or rearing seasons.

4) Effects on Aquatic Food Web

If there are any effects on aquatic food web, it would be temporary due to the temporary decrease in benthic invertebrate communities during the construction period. However, the species present are highly tolerant (i.e. chironomids, tubifex worms, and *Hydropsyche* caddisflies), and immediately colonize streams after disturbances. Overall, beneficial improvements to the food web are expected due to restoration of natural fluvial processes, the diversification of substrate and in-channel velocities.

5) Effects on Special Aquatic Sites

- a) Sanctuaries and Refuges – None present; no significant impact.
- b) Wetlands – Current unsustainable fringe wetland stands are anticipated to relocate to new water's edge. Forested/shrub wetlands near impoundment area will be experience fewer inundations but will still be seasonally flooded and it is anticipated for deciduous woody plant community to remain the same. There is the possibility for the creation of new wetlands in previously impounded area.
- c) Mud Flats – None present; no significant impact.
- d) Vegetated Shallows – None currently present; pockets of persistent marsh and transitional meadow will be restored with project implementation.
- e) Coral Reefs – None present; no significant impact.
- f) Riffle and Pool Complexes – None currently present due to the impoundment area; riffle and pool complexes will be restored with project implementation.

6) Threatened and Endangered Species

Federal T&E Species

A query of the USFWS IPaC identified several threatened or endangered species that may be present at the site. These species include: federally threatened Northern long-eared bat (*Myotis septentrionalis*) and federally threatened Red Knot (*Calidris canutus rufa*). The wooden riparian area may provide opportunities for summer roosting of the Northern long-eared bat, however a query of the Wisconsin Natural Heritage Inventory Data revealed that there are no records of this species in Racine county. Additionally, the project site does not overlap the Karner Blue Butterfly (*Lycæides melissa samuelis*) High Potential Range or the Rusty Patched Bumble Bee (*Bombus affinis*) Primary Dispersal Zone.

Species Name	Federal Status	Habitat	Potential to Occur
Northern long-eared bat (<i>Myotis septentrionalis</i>)	Threatened	Hibernates in caves and mines – swarming in surrounding wooded areas in autumn. Roosts and forages in upland forests and woods during the summer.	Not expected to occur; No known hibernacula. Wooded riparian areas may provide opportunities for summer roosting, but no records of species in the county (WI DNR 2021)
Red knot (<i>Calidris canutus rufa</i>)	Threatened	Sandy beaches, saltmarshes lagoons, mudflats, mangrove swamps, and shorelines of large lakes.	Not expected to occur; lack of suitable habitat.
Karner blue butterfly (<i>Lycæidea melissa samuelis</i>)	Endangered	Oak savannas and pine barren ecosystems	Not expected to occur; lack of suitable habitat.
Rusty patched bumble bee (<i>Bombus affinis</i>)	Endangered	Natural and semi-natural upland grassland, shrubland, woodlands and forests	Not expected to occur; project area outside of high potential dispersal zone.

Implementation of the proposed project would have no adverse impacts to endangered and threatened species. Currently, no Federal or state listed endangered or threatened species or their critical habitats have been recorded from the project site. Based on the information listed above and site assessments, the Corps has determined the recommended alternative would have ‘no effect’ on these species.

State T&E Species

See Appendix A – Planning & Coordination of the Draft IFR for a list of Threatened and Endangered species in Wisconsin.

7) Other Wildlife

No other wildlife would be adversely impacted by the proposed activity. There is the possibility of temporary construction noise that could deter species from using the area for foraging and as a movement corridor. However, this impact would be short-term in duration, only lasting as long as construction is occurring. This project would restore about 4.5 miles of riverine habitat.

8) Actions to Minimize Impacts

General construction scheduling and sequencing would minimize impacts to reproducing macroinvertebrates and fishes. Erosion control fabric, silt fencing, and silt curtains would be implemented to minimize the temporary turbidity impacts associated with the proposed activity. A No Tree Clearing

Window will be established in the contract set that would protect migratory birds between 01 March and 01 October.

f. Proposed Disposal/Discharge Site Determinations

1) Mixing Zone Determination

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

2) Determination of Compliance with Applicable Water Quality Standards

The proposed activity would not cause significant or long-term degradation of water quality within Root River and would comply with all applicable water quality standards. This project has clear benefits to water quality and aquatic habitats.

3) Potential Effects on Human use Characteristics

(a) Municipal and Private Water Supply

No effects expected with project implementation.

(b) Recreational and Commercial Fisheries

Positive effect expected due to increase in productivity through the removal of the largest fish passage obstruction on the Root River, which would reconnect Lake Michigan fishes to migrate upstream into the Root River Watershed. The removal of the dam would remove the prolific “stacking up” that occurs at the dam of salmonids. However, additional habitat and riffles at the Horlick Dam site and upstream are expected to be created that fish will utilize and have the potential to “stack up” as they swim upstream through the rapids, where fishing could occur. Overall, the increased fish passage and riffles would increase fishing opportunities in the Root River.

(c) Water Related Recreation

Positive effects are expected due to improvements in migratory bird habitat, fish habitat, and native aesthetics of communities, and water quality improvement. The removal of the dam would create an approximately 4-foot drop over the distance of 35-40 feet at the site of the old dam, thus creating a riffle area that kayakers can utilize as a paddling opportunity.

(d) Aesthetics

Positive effects are expected with dam removal and riverine restoration.

(e) Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves

All protected historical and cultural resources would not be affected by this project.

g. Determination of Cumulative Effects on the Aquatic Ecosystem

The proposed project would restore aquatic and riparian habitat structure and function. There are no significant adverse effects expected; however, there are important beneficial affects expected.

h. Determination of Secondary Effects on the Aquatic Ecosystem

No adverse significant impacts to the Root River ecosystem are expected as a result of the proposed activity.

III. Findings of Compliance or Non-Compliance with Restrictions on Discharge

a. No adaptation of the Section 404(b)(1) guidelines was made for this evaluation.

b. No practical alternatives are available that produce fewer adverse aquatic impacts than the proposed plan.

c. The proposed project would comply with applicable water quality standards.

d. The project is in compliance with applicable Toxic Effluent Standards under Section 307 of the Clean Water Act; with the Endangered Species Act of 1973; with the National Historic Preservation Act of 1966; and with the Marine Protection, Research, and Sanctuaries Act of 1972.

e. The project has the option to install riprap (fill) at the wingwalls for erosion control and would have no significant adverse impact on human health or welfare, including municipal and private water supplies, recreational and commercial fisheries, plankton, fish, shellfish, or wildlife communities (including community diversity, productivity, and stability), special aquatic sites, or recreational, aesthetic, and economic values.

f. Typical erosion control measures would be taken to minimize construction impacts other than selection of the least environmentally damaging construction alternative.

g. On the basis of the Guidelines, the proposed site for the discharge of fill material is specified as complying with the requirements of these guidelines and those set forth in Nationwide Permit 27, with the inclusion of appropriate and practical conditions to minimize pollution or adverse impacts to the aquatic ecosystem.

A2 – Nationwide Permit 27

To qualify for NWP authorization, a prospective permittee must comply with the NWP regional and general conditions as applicable. Applicable regional and general conditions and compliance with them are enumerated below.

The following Regional Condition is specific to NWP 27:

- 1.) **NWP 27, Aquatic Habitat Restoration, Establishment and Enhancement Activities.** This NWP does not authorize the permanent conversion of forested, bog, fen, sedge meadow, or shrub-carr wetlands to other plant communities.

The proposed project does not include the permanent conversion of wetlands to other plant communities as the forested/shrub wetland plant communities are anticipated to remain with less frequent inundations. The removal of the dam would return the impoundment area upstream of the dam back into its natural lotic system. This has the possibility of creating wetlands in the newly exposed riparian zone as the river returns to its natural fluvial geomorphology.

The following Regional Conditions are applicable to all NWP's:

- 1.) NWP Limitations
 - a. **Limit on Tributary Impacts.** Any regulated activity that would result in the loss of greater than 500 linear feet of a tributary in a single location is not authorized by a NWP with the exception of projects verified by NWPs 13, 27, 32, 37, 53, or 54 where the permanent alteration would have an overall beneficial effect on the aquatic ecosystem associated with discharges proposed.

The proposed project does not include the loss of any linear footage of stream within Root River.

- 2.) Site Protection
 - o. **Restoration for Temporary Impacts.** All temporary impacts in waters of the U.S., including wetlands, that occur as a result of the regulated activity must be fully contained with appropriate erosion control or containment methods, be restored to preconstruction contours and elevations, and revegetated with native, non-invasive vegetation. A project proponent may request, in writing, a waiver from this condition from the District. An acceptable reason for a waiver to this condition may include, but is not limited to, the District allowing natural restoration of the site when the resulting grade and existing seed bank are sufficient for the site to restore to pre-construction conditions.

The proposed project could have potential short-term adverse impacts stemming from increases in turbidity due to construction activities and the release of sediment during the staged removal of the dam; however, these impacts are expected to be short in duration and would be minor, since erosion controls and best management practices (BMPs) would be followed along with the implementation of the sediment management plan. The proposed project includes planting ground cover within the newly exposed riparian zone which would help stabilize Root River's banks long-term.

- p. **Duration of Temporary Impacts.** Temporary impacts in waters of the U.S., including wetlands, must be avoided and limited to the smallest area and the shortest duration required to accomplish the project purpose.

The proposed project includes removal of the Horlick Dam. This work will be accomplished in the shortest duration feasible.

- q. **Best Management Practices.** To minimize adverse effects from soil loss and/or sediment transport that may occur as a result of the authorized discharge and associated earth work, appropriate best management practices shall be maintained and remain in place until the affected area is stabilized with vegetation or ground cover.

Erosion controls and best management practices (BMPs) including the Sediment Management Plan, which follow the Wisconsin Water Quality Standards will remain in place until ground cover that are part of the project become established and are able to stabilize the project area.

- r. **Riprap.** For all NWP that allow for the use of riprap material for bank stabilization, only rock shall be used and it must be of a size sufficient to prevent its movement from the authorized alignment by natural forces under normal or high flows. A project proponent may request from the District, in writing, approval to use alternative riprap materials.

Ground cover vegetation is planned to be used for bank stabilization on the newly exposed land. There is the option for riprap to be installed at the wingwalls if needed for erosion control.

- s. **Clean Construction Equipment.** All construction equipment must be clean prior to entering and before leaving the work site in order to prevent the spread of invasive species.

Construction equipment used for implementation of the project would be cleaned.

The following General Conditions are applicable to all NWPs:

- 1.) **Aquatic Life Movements.** No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitable culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.

In its existing condition, the Horlick Dam is the largest obstruction to upstream fish passage. The removal of the dam would reestablish its connection with Lake Michigan. The dam removal process would begin near the end of April, coinciding with the end of spring Longnose Sucker and Northern Pike migration and the beginning of the growing season.

- 2.) **Spawning Areas.** Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

The dam removal process would begin near the end of April, coinciding with the end of spring Longnose Sucker and Northern Pike migration and the beginning of the growing season.

- 3.) **Migratory Bird Breeding Areas.** Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

It is possible that some migratory birds use the site as a breeding area; however, the project will ensure that no nesting or breeding migratory birds or raptors are disturbed during the construction phase of the project. A No Tree Clearing Window will be established in the contract set that would protect migratory birds between 01 March and 01 October.

- 4.) **Suitable Material.** No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

The project would remove an existing concrete structure and includes the option for installing riprap at the wingwalls for erosion control if needed.

- 5.) **Management of Water Flows.** To the maximum extent practicable, the preconstruction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open water if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

The proposed project will have negligible impacts on the flow regime of the Root River because the existing dam is a run-of-the-river type dam and does not provide any flood storage. There will be no noticeable impacts to base flows or flood flows because of the dam removal, but the dam removal will result in a reduction in the cross section of the river upstream. The primary purpose of the proposed project is aquatic ecosystem restoration and not to impound water or manage high flows.

- 6.) **Fills Within 100-Year Floodplain.** The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

The proposed project would comply with approved state or local floodplain management requirements.

- 7.) **Equipment.** Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

Staging areas and heavy equipment will avoid adjacent wetlands and will avoid disturbance outside of work areas.

- 8.) **Soil Erosion and Sediment Controls.** Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be

permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

In water work is anticipated to take place during a period of low-flow or no-flow, and erosion and sediment best management practices will be incorporated into project design and construction. A Sediment Management Plan will be implemented during drawdown and dam removal activities, and post-construction monitoring. In addition, the contractor will submit a stormwater pollution prevention plan to account for stormwater run-off during the construction phase.

- 9.) **Removal of Temporary Fills.** Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

The project may not need temporary fill, but to the extent that it is deemed necessary, it will be removed, and the area will be treated properly.

- 10.) **Proper Maintenance.** Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

The project would remove an existing concrete structure; therefore, no maintenance is applicable.

- 11.) The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

This analysis applies only to the Horlick Dam Aquatic Ecosystem Restoration project.

- 12.) **Endangered Species.** No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which “may affect” a listed species or critical habitat, unless ESA Section 7 consultation addressing the effects of the proposed activity has been completed. Federal agencies should follow their own procedures for complying with the requirements of the ESA. Authorization of an activity by an NWP does not authorize the “take” of a threatened or endangered species as defined under the ESA.

The project is in compliance with the ESA at this time. USACE has determined that the project would have ‘no effect’ on any threatened and endangered species.

- 13.) The permittee is responsible for ensuring their action complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting appropriate local office of the U.S. Fish and Wildlife Service to determine applicable measures to reduce impacts to migratory birds or eagles, including whether “incidental take” permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

The project will ensure that no nesting or breeding migratory birds or raptors are disturbed during the construction phase of the project. A No Tree Clearing Window will be established in the contract set that would protect migratory birds between 01 March and 01 October.

- 14.) **Historic Properties.** Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. The respective federal agency is responsible for fulfilling its obligation to comply with Section 106.

The project is in full compliance with Section 106 of the National Historic Preservation Act. USACE determined that historic properties would not be adversely affected by the proposed project as there are no known historic properties in the area of potential effects.

- 15.) **Water Quality.** Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

The Wisconsin Department of Natural Resources has granted water quality certification for NWP 27.

- 16.) **Coastal Zone Management.** In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer of a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

The Wisconsin Coastal Management Program is responsible for coastal consistency determination. A federal consistency determination submittal package for the proposed project was provided to the WCMP and it is anticipated upon review of the material and public review of the Draft IFR/EA that consistency concurrence will be obtained from WCMP.

- 17.) **Regional and Case-By-Case Conditions.** The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

The proposed project complies with applicable regional conditions. Refer to the beginning of Section A2 for a list of the applicable regional conditions and how the project complies.