

2019

Ravine 10 Ecosystem Restoration

Appendix H – 404(b) (1) Analysis



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SECTION 404(B)(1) EVALUATION

I. Project Description

a. Location

The study area is located in Highland Park, Cook County, Illinois, along the Lake Michigan coast. The study area core, Moraine Park, specifically resides west of Lake Michigan, east of Sheridan Road, south of Riparian Road and north of Maple Road. The study area also includes the stream channel (~4,800 feet total) within Moraine Park, upstream to Port Clinton Park, and the riparian slopes within Port Clinton Park. Study area parcels are owned by the City of Highland Park, Park District of Highland Park (PDHP), and the North Shore Water Reclamation District (NSWRD).

b. General Description

The recommended plan includes the following measures:

SMC – Stream Morphology & Connectivity – This measure seeks to naturalize sediment transport and provide a connected stream within the study area. Small boulder/cobble riffles, J-hooks and other small stone structures would be placed at strategic points in the ravine stream channel as the primary method to address problems. These small stone structures would slow down channel down-cutting by backing up alluvial materials of silt, sand, gravel and small cobble; i.e. cover up pipes with natural alluvium. These structures are not intended to halt bank erosion, which is currently in a natural state and beneficial to stream habitat and substrate sequestration. At the same time, these stone structures would also provide stream connectivity in terms of flowing water and fish passage. To also naturalize sediment transport and restore stream habitat, foreign debris would be removed under this measure; foreign debris includes broken clay pipe and concrete, wire mesh from broken gabions, riprap from broken gabions and failed erosion measures, filter fabric and large pieces of plastic and construction material. Specific line items for this measure includes:

- Remove foreign debris and trash
- Install boulder/cobble structures
 - Riffles, J-hook, cross-vane, etc.
 - Glacial/fluviol stone, rounded to sub-angular

(RB) Ravine & Bluff Plant Community – This measure seeks to selectively remove invasive and opportunistic woody vegetation shading the ravine and bluff's understory. Selective shrub and tree clearance includes, but is not limited to, Common Buckthorn (*Rhamnus cathartica*), Glossy Buckthorn (*Frangula alnus*), European Highbush Cranberry (*Viburnum opulus*), Black Locust (*Robinia pseudoacacia*), Norway maple (*Acer platanoides*), White Mulberry (*Morus alba*), Green Ash (*Fraxinus lanceolata*), and European Privet (*Ligustrum vulgare*). This measure also includes the removal of invasive herbaceous species by spot application of herbicide as well as the incorporation of a prescribed burn. This measure would plant native species of local genotype that are known to inhabit lakeshore ravine and bluff communities; species harder to establish from seed will be introduced as plugs. Given the unique climate of lakeshore ravines and bluffs and the suite of rare flora that inhabit them, genetic preservation of species, including rare and state listed species, will be maintained by contract growth of certain species that currently reside in low numbers and/or which are not available commercially. Use of contract grown species from sources within the site and nearby areas not only preserves the unique genetics of the area, but also maximizes the success of establishment as local genotypes within or near the study area are more likely adapted to the harsh conditions presented by lakeshore bluffs.

c. Authority and Purpose

This study is authorized under Section 506 of the Water Resources Development Act (WRDA) of 2000, Great Lakes Fishery and Ecosystem Restoration. Authority is given to plan, design, and construct projects to restore the fishery, ecosystem, and beneficial uses of the Great Lakes. Projects are justified by ecosystem benefits alone, while considering affects to the human environment including public health, safety, economic benefits, recreational or any combination of these.

Historically, the Highland Park moraine was dominated by several naturally occurring communities including wetlands, forests, savannas and prairies. By the late 1800s, much of these communities, particularly prairies, savannas and wetlands, were converted to agricultural, urban or industrial use. Subsequently, there was a significant loss of biodiversity and adverse physical effects such as an increase in flooding events and a decrease in water quality. Furthermore, the remnant parcels of natural community types are under pressure from continued human activities. Human induced disturbances to the remaining natural areas include fire suppression, altered hydrology and hydraulics, increase colonization of invasive species and fragmentation. Specific problems that need to be addressed are detailed in **Section 2.6** of the FS Report.

Dune & Bluff – Recreation and residential development has had a major influence on the physical structure of coastal habitat and the processes that created and sustained these habitats. This has allowed invasive nonnative species to colonize these altered areas that no longer provide suitable life requisites for native species. Lacustrine process of littoral drift and wave/current patterns have been altered from their natural state through shoreline development; the construction of harbors, break walls, jetties, piers, etc. Coastal habitat can no longer rely on the natural replenishment and movement of sand down the coast since these structure now intercept a great deal of the material. Sand flats are located far enough from the shore as to not be effected by this; however, near shore, beach, dune and bluffs are dramatically affected by these altered conditions. It is apparent that littoral drift sands accumulate where humans have built structures and erode away from natural areas where there are no effective structures.

Ravine – The colonization and subsequent development of the land surrounding the north shore ravines has greatly accelerated the pace of the geologic forces which first created them. The primary force responsible for the ravines' continued degradation is the increased volume of water flowing into and through them. The proliferation of impervious surfaces and turf grass within the subwatersheds and along the upper perimeter of ravines where native trees and plants once grew has greatly increased the flow of rainwater runoff. The result is an increase in the quantity and velocity of water flowing through the ravine, which increases the rate of erosion. The greater the quantity of water, the level of downward stream cutting increases, making the lower portion of the ravine slopes adjacent to the stream much steeper and increases the frequency of slumping. The slumping in particular has a devastating effect on the ability of plants and trees to grow on the banks. The ravines are secondarily impacted by the numerous storm sewer outlets which drain stormwater from the surrounding streets into the ravines. Ravines within the study area have also been significantly degraded because of fire suppression and dense canopy shading preventing adequate sunlight levels for understory plant establishment further exacerbating rates of soil erosion as bare ground conditions and invasive species persist.

d. Proposed Fill Material

1) General Characteristics

Fill material consists of: stones

2) Quantity

Stones at Each Riffle

Thickness of crest = 2.0 FT

Length of Riffle = 25.0 FT

Depth of Stone = 2.0 FT

Volume = 100.0 FT³

Smaller Stone 6" Thickness= 0.5 FT

Width on both sides riffle = 4.0 FT

Volume = 50.0 FT³

Total Stone Volume = 150.0 FT³

ASSUME 1.6 TON/CY 8.9 TONS

EXTRA 20% 11 TONS EA

Assume 31 Riffle/J-Hooks

3) Source

Commercial sources would be utilized that provides clean inert materials free of fines, weed seeds and foreign debris.

e. Proposed Discharge Site

1) Location

There would be no discharge of aqueous materials. All solid materials identified in **Table 1** would be placed within the footprint of the restored Ravine 10 stream channel.

2) Size, Type, and Habitat

The current stream habitat was degraded by previous sewer and discharge projects. This project would use natural materials and contouring to rebuild stream channel morphology and structure. The affected area is about 4,800 feet total of stream channel.

3) Timing and Duration of Discharge

The stream restoration portion of this project would take up to six months to implement, followed by a monitoring period.

f. Placement Method

Small skid steers, compact excavators, compact utility vehicles, and handwork would be the primary means of placing and contouring materials.

II. Factual Determinations

a. Physical Substrate Determinations

1) Substrate Elevation and Slope

The average slope taken from first and last cross-section is 7.5%. The range of ravine stream slopes of the whole reach is 8 - 13%.

2) Sediment Type

Not applicable. Sediment is not being moved around or removed from the site.

3) Material Movement

The current without project condition is that the ravine has significantly eroded into Lake Michigan. There would be no significant movement of fill material after construction. Placement of cobble riffles within the restored ravine stream will induce sediment accretion upstream of the riffles and direct water flow to the center of the restored channel. Stone selected for establishment of cobble riffles are sized to withstand flood stage hydraulics and no longer allow for the ravine to incise.

4) Physical Effects on Benthos

Existing benthos directly beneath where the riprap/boulder/cobble would be placed would temporarily be covered, but the area is so small it would have insignificant effects on the macroinvertebrate population. Effects to the benthic invertebrate assemblage would be positive through the enhancement of riverine hydraulics and native riparian plant communities, which would greatly increase species richness. These minor impacts are necessary to create improved conditions for benthic invertebrates. There are no significant adverse effects expected.

5) Other Effects

There would be no other significant substrate impacts.

6) Actions Taken to Minimize Impacts

Special measures with silt fencing and biodegradable erosion control would be taken to minimize the temporary impacts on physical substrates associated with the proposed activity since this project is both beneficial to ecology and water quality.

b. Water Circulation, Fluctuation, and Salinity Determinations

1) Water

The proposed fill activity would have no significant negative impacts to water chemistry, water clarity, color, odor, taste, dissolved gas levels, nutrients, or increased eutrophication as a result. Improvements in water clarity, color, dissolved oxygen levels, and levels of eutrophication will be noted in the long-term after placement of the riffles in Ravine 10.

2) Current Patterns and Circulation

NA

3) Normal Water Level Fluctuations

The proposed fill activity would have no significant impact on normal water level fluctuations upstream or downstream of Ravine 10.

4) Salinity Gradients

Not applicable to freshwater environments.

5) Actions Taken to Minimize Impacts

There are no expected impacts to water circulation, although stormwater flows during construction may be temporarily routed around active construction areas to prevent issues. Best Management Practices (BMPs) would be used to minimize temporary construction impacts such as erosion and dust. The work limits will be carefully delineated to protect habitat areas that will not be disturbed.

c. Suspended Particulate/Turbidity Determinations

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

Minor releases of suspended solids during construction would be controlled by the use of BMPs. There are no long term expected changes in suspended particles or turbidity in the seasonal waterway.

2) Effects on Chemical and Physical Properties of Water Column

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

3) Effects on Biota

Only beneficial effects on aquatic biota are expected to result from the restoration activities and minor increase in turbidity or suspended particulates associated with the proposed fill and sediment movement activity is most likely less than that of summer thunderstorm event.

4) Actions Taken to Minimize Impacts

Erosion control fabric, silt fencing and native plantings would be implemented to minimize the temporary turbidity impacts associated with the proposed activity.

d. Contaminant Determination

A contaminant determination was not prepared. There are no known contaminants in the soils of the project area. There is no sediment disturbance associated with this project, and no dredging activities.

e. Aquatic Ecosystem and Organism Determinations

1) Effects on Plankton

Only beneficial affects to planktonic organisms are expected.

2) Effects on Benthos

Existing benthos directly beneath where materials would be placed would temporarily be covered, but the area is so small it would have insignificant effects on the macroinvertebrate population. Effects to the benthic invertebrate assemblage would be positive through the enhancement of riverine hydraulics and instream roughness, which would greatly increase species richness. These minor impacts are necessary to create improved conditions for benthic invertebrates. There are no significant adverse effects expected.

3) Effects on Nekton

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

4) Effects on Aquatic Food Web

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

5) Effects on Aquatic Sites

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

6) Threatened and Endangered Species

Coordination with the Illinois Department of Natural Resources (IDNR) was initiated with a project Scoping Letter dated [April 04, 2019](#). The USACE has concluded in this report that the project is not likely to adversely affect state listed species. It is expected that the Illinois DNR will provide clearance in response to the public/agency release of the NEPA document.

Coordination with the USFWS was initiated with a project Scoping Letter dated [April 04, 2019](#). The USACE has concluded in this report that the project is “not likely to adversely affect federal species”, which precludes the need for further consultation for this project. It is expected that the USFWS will provide a letter of “No Objection” in response to the public/agency release of the NEPA document.

7) Other Wildlife

No other wildlife would be significantly impacted by the proposed activity. Temporary construction disturbances to local fauna are expected to be minimal.

8) Actions Taken to Minimize Impacts

General construction scheduling and sequencing would minimize impacts to reproducing macroinvertebrates and fishes. Erosion control fabric, silt fencing and native plantings would be implemented to minimize the temporary turbidity impacts associated with the proposed activity.

f. Proposed 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 Lake Michigan or Ravine 10 would comply with all applicable water quality standards.

3) Potential Effects on Human use Characteristics

No significant impacts to municipal and private water supplies, water-related recreation, aesthetics, recreational, or commercial fisheries are expected. There are no significant adverse effects expected to National Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves.

g. Cumulative Effects on the Aquatic Ecosystem

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

h. Secondary Effects on the Aquatic Ecosystem

No significant impacts on the Lake Michigan or Ravine 10 ecosystem are expected as a result of the proposed activity.

III. Findings of 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 proposed fill activity would have no significant adverse impact on human health or welfare, including municipal and private water supplies, recreational and commercial fisheries, plankton, fish, shellfish, or wildlife communities (including community diversity, productivity, and stability), 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 with the inclusion of appropriate and practical conditions to minimize pollution or adverse impacts to the aquatic ecosystem.

G2. 404 / 401 Regional Permit 5 Requirements

The following is a checklist of items to be provided to the Illinois EPA for notice of intent of Regional Permit 5 use:

A. Cover Letter

The cover letter for this notification is provided in [Section G5](#).

B. Joint Application Form

The joint application for this notification is provided in [Section G5](#)

C. Special Measures

See Section [II e\) 8\)](#) of 404b1 Analysis for special measures.

D. Project Purpose & Need

See Section [I c\)](#) of 404b1 Analysis for Purpose & Need.

E. Regional Permit Used

The U.S. Army Corps of Engineers, Chicago District Regional Permit (RP)5 Wetland & Stream Restoration and Enhancement permits the restoration, creation and enhancement of wetlands and riparian areas, and the restoration and enhancement of rivers, creeks and streams, and open water areas on any public or private land. Wetland and stream restoration and enhancement activities include the removal of accumulated sediments; installation, removal and maintenance of small water control structures, dikes and berms; installation of current deflectors; enhancement, restoration, or creation of riffle and pool structures; placement of in-stream habitat structures; modifications of the stream bed and/or banks to restore or create stream meanders; backfilling of artificial channels and drainage ditches; removal of existing drainage structures; construction of open water areas; activities needed to reestablish vegetation, including plowing or disking for seed bed preparation; mechanized land-clearing to remove undesirable vegetation; and other related activities. This RP may be used to relocate aquatic habitat types on the project site, provided there are net gains in aquatic resource functions and values.

F. Area of Impact

The area of impacted is about 4,800 feet of ravine stream, which has already been modified to install a sanitary sewer system. The impact is beneficial since the stream's hydraulic and structural habitat would be restored to presettlement conditions. Also, the stream would run free to the lake which would allow for fishes to use this ravine again. The restoration project is planned and designed based on a 50-year period of analysis, however, it is the intention that the restoration features last perpetually.

G. Fill Type & Quantity

See Section [I d\)](#) for types and quantity of fill material.

H. Project Area Map

See **Figures 01** and **02** in the Feasibility Report and **Plates 01, 02, 05** and **07** for project mapping.

I. Site Coordinates

Decimal Degrees - Longitude (-87.786) Latitude (42.188)

J. Site Documentation

See **Section 3 Inventory & Forecasting** of the Feasibility Report for a complete description of current physical, ecological and cultural resources, which includes photos of the site.

K. Wetland Delineation

See **Section 3 Inventory & Forecasting** of the Feasibility Report for a complete description of current physical and ecological resources, which describes the plant communities to be restored. The ravine slopes, stream and bluff are considered wetlands since ground water discharge and hydrophytic plants are quite evident. See **Plates 03** and **04** for Florist Quality Assessment. The temporary disruptive impact is from restoring the stream channel, which is less than 3-acres.

L. Farmed Wetlands

There are no farmed wetlands within the project area.

M. Plat of Survey

Property boundaries and real estate are presented in **Appendix F**.

N. Engineering Drawings

Engineering design drawings are presented in **Appendix B** – Civil Design.

O. Schedule

φ 30 Day Public Review Start	Sep 2019
φ 30 Day Public Review Ends	Oct 2019
φ Final FS Report for Approval	Dec 2019
φ Division Approval of FS Report	Mar 2020
φ Design Complete	Sep 2020
φ Open Bids	Sep 2020
φ Contract Award	Sep 2020
φ Notice to Proceed	Dec 2020
φ Construction Complete	Oct 2025

P. Soil Erosion Sediment Control Plan (SESC Plan)

Since the affected area of disturbance is less than 1-acre, erosion and sediment release are not expected. The SESC plan is a required submittal for the construction contractor, with the requirements specified in the project plans and specifications. SESC features are expected to include BMP measures and consists of BMP measures such as silt fencing, and biodegradable erosion control fabric and permanent project features such as cobble riffles and native vegetation.

Q. Federally Threatened & Endangered Species

See Section [II e\) 6\)](#) of 404b1 Analysis.

R. State Threatened & Endangered Species

See Section [II e\) 6\)](#) of 404b1 Analysis.

S. Illinois Historic Preservation Agency

Coordination with the Illinois Department of Natural Resources (IDNR) was initiated with a project Scoping Letter dated [04 April, 2019](#). Correspondence and clearance with the ILSHPO is provided in Section G4 in a letter dated [24 April 2019](#).

T. Applicable Watershed Plans

Alliance for the Great Lakes. October 2009. Stresses and Opportunities in Illinois Lake Michigan Watersheds Strategic Sub-Watershed Identification Process (SSIP) Report for the Lake Michigan Watershed Ecosystem Partnership.

This report is organized around three aspects of the Lake Michigan land and water ecology: the water quality of Lake Michigan and the streams and rivers feeding into it, the level of erosion in ravines along the coast of the lake, and the range and quality of habitat in the region. Water quality and habitat were analyzed in terms of sub-watershed boundaries, whereas ravine erosion was analyzed ravine-by-ravine. The immediate goals of the study are to 1) prioritize sub-watersheds based on their potential to negatively impact water quality or 2) the quality and extent of habitat within their boundaries; and 3) to rank ravines based on their potential for erosion. The larger goal of the study is to serve as a tool for LMWEP, municipalities and other interested groups, such as private landowners, to make informed decisions about where to focus restoration efforts and resources in order to improve the ecology of the Lake Michigan region.

U. After the Fact Permit

NA

V. Mitigation Plan

This is a restoration plan that requires no mitigation since lost resources are being recovered.

W. Project Funding Source

This project is federally funded 65% by the USEPA managed GLRI appropriations and 35% by the City of Highland Park.

X. Regional Permit 5 Guidelines

Authorization under RP5 is subject to the following requirements which shall be addressed in writing and submitted with the notification:

a. All projects will be processed under Category I.

This project would be processed under Category I.

b. This permit does not authorize activities to relocate or channelize a linear waterway such as a river, stream, creek, etc.

The small ravine stream would be restored to presettlement conditions. There are no intentions of relocating or channelizing the stream. See Section [I b](#).

c. This permit cannot be used for the conversion of a stream or creek to another aquatic use, such as the creation of an impoundment for waterfowl habitat.

The small ravine stream would be restored to presettlement conditions. The manipulation of the stream's hydraulics or hydrology to create an impoundment for anthropogenic uses is not intended outcome. The small earthen plug at the end of the ravine would be removed as well to allow fish passage and free flowing conditions. See Section [I b](#).

d. This permit cannot be used to authorize the conversion of natural wetlands to another aquatic use, such as creation of waterfowl impoundments where a forested wetland previously existed, or the conversion of waterfowl impoundments and wildlife habitat areas.

The ravine, bluff and dune areas of the project would be restored to presettlement conditions in terms of stream hydraulics and native plant community composition. The manipulation of the stream's hydraulics or hydrology to create an impoundment for anthropogenic uses is not an intended outcome. See Section [I b](#).

e. A management and monitoring plan shall be required for the restoration, creation or enhancement of aquatic resources. Upon the District's approval, the management and monitoring plan may be designed to be site specific, with the duration of the plan determined on a case-by-case basis.

Monitoring is required under the GLFER Authority. The monitoring plan is presented in [Appendix H](#).

f. For a project site adjacent to a conservation area, forest preserve holdings, or village, city, municipal or county owned lands, the permittee shall request a letter from the organization responsible for management of the area. The response letter should identify recommended measures to protect the area from impacts that may occur as a result of the development. A copy of the request and any response received from the organization shall be submitted to the District with the notification.

The non-Federal sponsor will be responsible for the maintenance and protection of the restoration project per the legally binding Project Partnership Agreement to be signed after this Feasibility Study is approved and before construction commences. This intent is confirmed by the **Letter of Intent** provided by the City of Highland Park.

g. For projects receiving State or Federal grants or funding sources, the permittee shall submit a copy of the document disclosing the expiration date for use of the funds and the expected calendar date for commencement of the project in order to meet funding deadlines.

The expiration date for USEPA managed GLRI funds to be used for this project is October 2020.