

2013

Ft. Sheridan Ravine & Coastal Restoration

Appendix G – FONSI, 404 & Coordination



Table of Contents

G1. SECTION 404(B)(1) EVALUATION	4
I. PROJECT DESCRIPTION	4
a. Location	4
b. General Description.....	4
c. Authority and Purpose	6
d. General Description of Fill Material.....	10
e. Description of Proposed Discharge Site.....	12
f. Description of Placement Method	12
II. FACTUAL DETERMINATIONS.....	12
a. Physical Substrate Determinations.....	12
b. Water Circulation, Fluctuation, and Salinity Determinations.....	13
c. Suspended Particulate/Turbidity Determinations	15
d. Contaminant Determinations.....	16
e. Aquatic Ecosystem and Organism Determinations.....	16
f. Proposed Disposal/Discharge Site Determinations.....	18
g. Determination of Cumulative Effects on the Aquatic Ecosystem.....	18
h. Determination of Secondary Effects on the Aquatic Ecosystem.....	18
III. FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH RESTRICTIONS ON DISCHARGE	18
G2. DRAFT FONSI	20
BACKGROUND.....	20
BRIEF SUMMARY OF FINDINGS	20
No Action Plan.....	21
The NER/Preferred Plan.....	21
DISCUSSION OF ENVIRONMENTAL COMPLIANCE.....	23
Environmental Justice EO12898	23
Clean Air Act	23
Section 401 & 404 of the Clean Water Act	24
USFWS Coordination	24
State of Illinois Historic Preservation Act	24
Public Interest.....	24
CONCLUSION.....	24
G3. AGENCY COORDINATION.....	26

G1. SECTION 404(B)(1) EVALUATION

I. Project Description

a. Location

The study area is part of the Lake Michigan coastline and is located in northeastern Illinois within the southeast boundary of Lake County. The proposed restoration project would be located east of Sheridan Road within the City of Lake Forest, Town of Ft. Sheridan and City of Highland Park, Illinois; Highland Park Quad Map, Illinois. The Ft. Sheridan Section 506 study area consists of eight main ravines, several small unnamed ravines, the ravines' watersheds, the bluff along the coastline, small foredunes, the beach, and littoral zone of Lake Michigan.

b. General Description

The plan that reasonably maximizes net national ecosystem restoration benefits, consistent with the Federal objective, is identified as the NER plan. Thus, the plan that maximizes net NER benefits and has shown great merit in the trade-off analysis are a number of selected sites with their associated best buy alternative plans. Each plan per site includes a combination of restoration measures as described in the preceding narrative. It is determined that the NER plan consists of the combined Ravine Plan 4, Lacustrine Plan 4 and Bluff Plan 2.

Site Preparation – The first task would be to install safety fencing, signage and other safety features in order for public safety. Staging areas and access roads would be demarcated. All poorly maintained storm sewer infrastructures would need to be removed and discarded or stockpiled and saved depending on the non-Federal sponsors needs.

Ravine Plan 4 – McCormick, Janes, Scott, and Schenck Ravines were identified under the NER for restoration measures.

McCormick and Jane Ravine would have their confluence with each other and to the lake reconstructed. Non-functional and outdated storm sewer infrastructure would be removed and the geomorphology of the mouth sculpted to that of a natural stream once again. A series of riffles and pools would be fashioned to withstand present and future flows within the ravine and provide enough habitat stability and passage for lake fishes. This work would effectively return native fishes to the McCormick Ravine stream once again, in which they currently do not occur. Invasive and non-native plant species would be cleared from the riparian zone and native ravine and oak woodland communities would be reestablished via sowing of seed and planting of live plugs. This component of the NER plan would restore about 49 acres of ravine plant community, 59.4 acres of riparian oak woodland, and about 700-feet of perennial stream; however, by removing the fish passage barrier at the mouth, about 3,000-feet of stream habitat would become available.

Hutchinson Ravine would have a detention basin constructed at the head of the ravine to attenuate urban flows enough to mimic flows if the land cover of the watershed were natural. A detention pond about 1 acre in size would be excavated and designed to look like a natural wetland pond. A set of inflow and outflow pipes would be utilized in conjunction with the pond to detain and attenuate urban runoff flows back to the ravine stream. The pipes are only being used to send the water into and out of the detention basin and the water will ultimately travel the full length of the ravine in the open stream channel. Invasive and non-native plant species would be cleared from the riparian zone and native ravine communities

would be reestablished via sowing of seed and planting of live plugs. This component of the NER plan would restore about 23 acres of ravine plant community and about 3,500-feet of stream habitat.

Scott Ravine would have the check dam currently present at the mouth of the ravine removed to permit connectivity with the lake. Urban induced flows would be dealt with by installing large boulder riffles in order to provide stable instream habitat. A naturalized channel would be constructed to withstand post-project flows. Invasive and non-native plant species would be cleared from the riparian zone and native ravine communities would be reestablished via sowing of seed and planting of live plugs. This component of the NER plan would restore about 2.5 acres of ravine plant community and allow fish passage to about 500-feet of stream habitat.

Schenck Ravine would have the urban induced flows managed through the installation of large cobble riffles, in lieu of the subsurface pipe removing unnatural stormwaters. The riffles described in measure SRK would be sized to handle the future with project condition flows. Cobble would be installed along the first 100 feet of the ravine from the head for stability. The series of riffles and pools would permit connectivity to the lake along the slope of the bluff, while protecting the upstream restoration measures from further head cutting. Invasive and non-native plant species would be cleared from the riparian zone and native ravine communities would be reestablished via sowing of seed and planting of live plugs. This component of the NER plan would restore about 8.3 acres of ravine plant community and allow fish passage and access to about 1,300-feet of stream habitat.

Lacustrine Plan 4 – Lacustrine and dune habitat restoration would be accomplished under the NER Plan via the construction of small rock reefs that would induce larger beaches and submerged sand bars to form, but also allow for dynamic coastal interactions. These sand bars, beaches and dunes would be prefilled with sand to 120% capacity to ensure the littoral drift is not impacted per State of Illinois permitting requirements. The rock reef structures are not intended for storm damage reduction along the coast, but to increase the heterogeneity, size and stability of lacustrine, dune and bluff habitat, but still allow for littoral dynamics. The NER Plan identified three rock reef systems to be implemented; MJL-A, MJL-B, and BL-B as depicted on **Plate 19**. Once the rock reefs are constructed and the cells and dunes filled with sand, native plant communities would be established on the dunes and bluff via invasive species removal, seeding sowing and live plugging. This component of the NER Plan would restore about 12.8 acres of dune/beach habitat and about 12.0 acres of lacustrine structural and hydraulic habitat for fishes.

Bluff Plan 2 – Bluff restoration would be accomplished via alleviating surface water flows down the bluff face, minor grading in areas that were previously affected by these surface waters, invasive plant species removal and establishment of native bluff plant species. The largest problem is at the former mouth of Bartlett Ravine. Since the ravine was turned into a vehicle roadway by the US Army, the water rushing down the road was allowed to careen over the bluff and down onto the beach, which has in turn destroyed previously existing habitat and prevents new habitat from becoming stable enough to support native species. Measure BRF will allow the surface flows over the bluff safe passage to the beach, and further prevent habitat destruction and erosion. About 40-acres of native bluff habitat would be restored. Due to the potential of the USACE not being able to conduct invasive species removal and native seeding in Environmentally Restricted Parcels F and G, an option to exclude these parcels from the project is a possibility. Removal of the bluff habitat restoration within parcels F & G would reduce habitat benefits by 5.7AAHUs and would not affect project costs.

Native Plant Community Establishment – The most effective measure for establishing biological diversity is the establishment of appropriate native plant communities; the establishment of native vegetation is directly related to the abundance and diversity of soil fungi and other microorganisms, insects, birds, and other organisms among various trophic levels. The project would ensure the establishment of native

ravine, bluff and dune plant communities over the remainder of the construction period. Species would be located according to new hydrogeomorphology, soils and substrates established by the previous steps. Once the physical work is complete and all invasive species removed native seed and plugs would be planted. Years 2 – 5 of the project would manage and establish the native plant communities. This work includes spot herbicide application for invasive species regrowth and replanting small areas if necessary.

No unique methods are proposed beyond the physical repairs described within other sections of the report that would help keep plants in place on slopes. Standard practice for establishing plants on slopes will include the placement of erosion control blankets where seed and plugs will be planted. "Placement of erosion control blankets" will be added to each Native Plant Establishment measure within the Measures for Biological Establishment.

The removal of invasive plants and opportunistic woody vegetation will also keep plants in place by allowing adequate amounts of light to reach the ravine's understory. The native plants being introduced that were lost to physical damage and dense shade will restore soil aggregate stability and cohesion with root structures that supply soil organic matter which relates to improved soil structure that increases soil permeability and water holding capacity. This then translates into lower soil bulk density that makes it harder for rainwater to flow over a ravine's slope causing soil erosion which circles back to physical damage that decreases biological diversity.

Prescribed burns would be conducted by a burn crew that is highly trained and experienced in fire management and the prescribed burning of natural areas. The burn crew will be under the direct control of a qualified burn coordinator having completed at least the minimum amount of training, including S-230 (Single Resource Boss), required to provide controlled burning services in a safe and responsible manner. Primary fire breaks will be installed around the boundary of the site and additional fire breaks will be mowed at least 15 feet around any private parcels within the area of the prescribed burn. The resulting smoke from the burn will be minimized by burning during the daytime when transport winds and mixing heights are such that smoke can be lifted and dispersed safely away from roads and residences unless adequate safeguards have been taken such as appropriate notifications and traffic control. Burns will only take place under acceptable weather parameters (air temperature, humidity, etc) and once all required burn permits are obtained.

Recreational Features – Components of recreation are not proposed under this project.

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 2.2** of the Detailed Project Report (DPR).

Lacustrine, Beach, Dune & Bluff – Recreation, industrialization and urban 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 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 where native trees and plants once grew has greatly increased the flow of rainwater runoff via laminar flow and prevents groundwater recharge. The result is an increase in the rate of channel incision through the ravine. 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. In a sense, the ravines are becoming younger instead of maturing due to the constant increase in rainwater runoff. Predictably, over time the slope of the stream bed will level off even further, the steepness of the banks will decline as the ravine further widens, and plants and trees will again be able to survive on the slopes rather than topple over in mudslides. Given enough time, the ravines might adapt to the increased volume of water, although most species of native vegetation specific to the ravines will vanish in the process and won't return because the ravines have lost their morphology and functions that supported such a plant community. In the short term, however, the accelerated rate of erosion spells disaster for the trees, herbaceous growth, stream channel and the fish and wildlife that utilizes them.

The primary goal of this project is to restore critical habitat patches within the Ft. Sheridan natural area for native flora and native and migratory faunal communities within the coastal zone of Lake Michigan.

Planning objectives are statements that describe the desired results of the planning process by solving the problems and taking advantage of the opportunities identified. The planning objectives must be directly related to the problems and opportunities identified for the study and were used for the formulation and evaluation of plans. Objectives must be clearly defined and provide information on the effect desired, the subject of the objective (what will be changed by accomplishing the objective), the location where the expected result will occur, the timing of the effect (when would the effect occur) and the duration of the effect.

Federal Objective

The Federal objective of water and related land resources planning is to contribute to national economic and/or ecosystem development in accordance with national environmental statutes, applicable executive orders, and other Federal planning requirements and policies. The use of the term "Federal objective" should be distinguished from planning/study objectives, which are more specific in terms of expected or desired outputs whereas the Federal objective is considered more of a National goal. Water and related land resources project plans shall be formulated to alleviate problems and take advantage of opportunities in ways that contribute to study objectives and to the Federal objective. Contributions to national

improvements are increases in the net value of the national output of goods, services and ecosystem integrity. Contributions to the Federal objective include increases in the net value of those goods, services and ecosystems that are or are not marketable.

Protection of the Nation's environment is achieved when damage to the environment is eliminated or avoided and important cultural and natural aspects of our nation's heritage are preserved. Various environmental statutes and executive orders assist in ensuring that a water resource planning is consistent with protection. The objectives and requirements of applicable laws and executive orders are considered throughout the planning process in order to meet the Federal objective. The following laws and executive orders that specifically provided guidance for this study are not limited to, but include:

- φ Invasive Species (E.O. 13112)
- φ Nonindigenous Aquatic Nuisance Prevention & Control Act of 1990, as amended (16 U.S.C. 4701 et seq.)
- φ National Invasive Species Act of 1996 (Public Law 104 – 332)
- φ Endangered Species Act of 1973, as amended (16 USC 1531 et seq.)
- φ Fish and Wildlife Coordination Act, as amended (16 USC 661)
- φ **Migratory Bird Treaty Act of 1918, as amended (16 USC 703 et seq.)**
- φ Responsibilities of Federal Agencies to Protect Migratory Birds (E.O. 13186)
- φ Clean Water Act of 1977, as amended (33 USC. 1251 et seq.)
- φ Safe Drinking Water Act of 1986 as amended (42 USC 201)
- φ National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.)
- φ Resource Conservation and Recovery Act of 1976, as amended (42 USC 6901, et seq.)
- φ **Stewardship of the Ocean, Our Coasts, and the Great Lakes (EO 13547)**
- φ **Protection and Restoration of the Great Lakes (EO 13340)**
- φ Protection and Enhancement of Environmental Quality (E.O. 11514)
- φ Floodplain Management (E.O. 11988)
- φ Protection of Wetlands (E.O. 11990)
- φ Wild and Scenic Rivers Act of 1968 (16 USC 1271-1287 Public Law 90-542 82 Stat. 906)
- φ Federal Water Project Recreation Act, as amended (16 USC 460 (L),(12))

Study Objectives

The study non-Federal sponsors, including the Lake County Forest Preserve District (LCFPD), City of Lake Forest, Openlands, and the Town of Ft. Sheridan, have general goals for ecosystem restoration. These are to improve and increase viable habitats and improve ecological functions along the coast of Lake Michigan to support sustainable populations of diverse and valuable plant and animal species. Specifically, this study aims to protect, enhance, naturalize and restore coastal ecosystems. The following objectives are those that were directly measured for alternative analysis within this feasibility study:

Promote Littoral Processes – This objective seeks to naturalize coastal processes and dynamic equilibrium, and provide littoral habitat for native lacustrine fishes. The engineered shore protection structures along the coastline have greatly impaired the littoral drift, which naturally sustains and creates coastal habitat features such as lake bottom, beach, dune. The study area lies within a zone of erosion. If humans did not colonize the coastal zone in this area, the shoreline would naturally erode over the next several hundred years another 1,500 to 3,000-feet. Now that humans have sandwiched natural habitat between development and the lake, natural area managers typically need to implement small coastal features in order to preserve what coastal habitat remains. This objective is measured by the projected increase in native fish species richness (R), and the increase in acreage and mean C of dune plant communities. The area this objective addresses is the lake, beach, dune for a 50-year period of analysis.

Naturalize Ravine Hydraulics – This objective seeks to stabilize channel geomorphology and naturalize flow characteristics. As the small ravine watersheds became developed and land use changed from forest, savanna and grassland to impervious surfaces, all of the ravines within the study area became utilized as discharge points for stormwater, however, Janes Ravine was since restored via the Estuary Habitat Restoration 104 Project. Any hydraulic repair measures for the purpose of stream habitat and riparian restoration would need to target hydraulic conditions that would be able to provide life history requisites for a given assemblage of fishes. It is well known that the force of water over and through in-stream structure creates requisites for lotic (moving water) fishes and macroinvertebrates to colonize. In turn, this also attracts those fish that do not need faster flowing water but feed on those invertebrates and fishes in the riffles, such as rockbass and smallmouth bass. Therefore, under this objective measures would be assessed in terms of how they affect in stream structure to compensate for abnormally high velocities associated with the larger urban flows or how the measure reduces the quantity of urban flow to the naturalized targets provided in **the following table**. Ultimately, this objective translates the naturalized flows or flow conditions to a projected increase in native fish species richness and the mean C of ravine plant communities in response to restored hydraulic regimes.

Simulations for targeted flows were performed using the pre-development models to determine which duration would yield the largest peak flow for the 2-year rainfall event (**Appendix A**). Once the critical events had been determined using HEC-HMS, the peak discharges for the pre-development condition at the locations corresponding to the existing outfalls were identified. **The following table** depicts the restoration target flows in cubic feet per second of the critical duration analysis, as observed at the mouth of the ravines along Lake Michigan.

Durations	Mc/Janes	MacArthur	Scotts	Bartlett	Van Horne	Schenck
2-year Event						
6-hr	41.4	0.4	9.2	23.1	9.3	8.8
12-hr	46.3	0.4	10.2	25.4	10.3	9.7
24-hr	43.8	0.4	9.5	23.7	9.7	9.0
48-hr	29.9	0.3	6.5	16.2	6.7	6.2
72-hr	22.9	0.2	5.0	12.4	5.1	4.7
100-year Event						
6-hr	300.3	2.7	63.5	164.4	55.9	61.3
12-hr	259.4	2.3	55.9	140.7	56.8	53.1
24-hr	190.1	1.6	41.3	103.2	42.1	39.0
48-hr	113.0	1.0	24.6	61.0	25.2	23.2
72-hr	84.3	0.7	18.4	45.6	18.8	15.6

Promote Bluff Stability – This objective seeks to reduce erosion and promote healthy bluff hydrology. Any point in landscape topography where there is a sharp break in elevation, such as the edge of a bluff, the potential for erosion is great, especially when the underlying soils and glacial deposition are of highly erodible materials. Also, the Highland Park Moraine bluff face exhibits sloped-wetlands, which is driven by groundwater discharge slowly through the bluff face. Thusly, the target for bluff restoration would be to remove damaging surficial flows and recharge ground waters to sustain sloped wetlands. This objective is measured by the projected increase in acres and the mean C of native bluff plant communities.

Reduce / Eliminate Invasive Plants – This objective seeks to remove or ease the adverse affects/effects of non-native and invasive species, particularly plant species for this study. Typically, invasive species gain a foot hold and eventually dominate a site due to previous impairments placed on the site, particularly to

hydrologic, soils, or chemical parameters. Once a sites hydrology and geomorphic impairments are remedied, invasive plant species may be addressed quite effectively. It is not uncommon to keep invasive plant species to a minimum or less than 1% of the site's spatial coverage. Measures, alternatives or plants should at minimum keep invasive plant species to less than 5% of the spatial coverage.

NER Constraints

Planning constraints are items of consideration that limit the planning process and are used along with the objectives in the formulation and evaluation of solutions. The establishment of planning constraints is done in concert with the entire study team and in cooperation with stakeholders. A list of planning constraints for the NER purpose follows.

Opportunities are limited by:

- Highly impaired littoral drift processes
- Unnatural discharge of urban runoff from watershed development with impervious surfaces
- Parcel availability and acceptability for water storage and restoration features. The study area is very diverse in parceled out lands and ownerships. This constraint was identified in order to ensure that the real estate would be available and acceptable for USACE ecosystem restoration activities as coordinated with Real Estate and Environmental sections. For example, one of the main parcel constraints is the Historic Parade Ground, which the IL SHPO recommended no modifications to the grounds via a Federal project.

Any measures/alternatives implemented should:

- Avoid adverse impacts to the hydrology, hydraulics and erosion processes of the ravines
- Avoid adverse impacts to the littoral drift of Lake Michigan
- Avoid adverse impacts to the state listed species present on site

d. General Description of Fill Material

1) General Characteristics of Material

Fill material consists primarily of glacial/fluvial stones and lacustrine sand. The following Table details all materials to be used for this ecosystem restoration project.

Table-Materials and Quantities

Area	Bid Item	Quantity	Unit	Area	Bid Item	Quantity	Unit
SHORELINE				SCOTT RAVINE			
0002	Bluff Restoration			0014	Ravine Restoration		
0002A	Bluff Regrading	10.0	AC	0014A	Demo of Check Dam - At Mouth of Ravine	1.0	LS
0002B	Invasive Species Removal	40.4	AC	0014B	Stone Apron/Channel Armor - Head of Ravine	138.7	TON
0002C	Native Plant Establishment	40.4	AC		Storm Sewer		
	Bluff Protect			0014G	30" RCP Storm Sewer	689.0	LF
0002D	Armor Stone	388.7	TON		36" RCP Storm Sewer	90.0	LF
0002E	Underlayment Stone	113.9	TON		42" RCP Storm Sewer	222.0	LF
0003	Dune Restoration			0014H	CA-6 Backfill/Backfill	155.2	CY
0003A	Invasive Species Removal	15.8	AC	0014J	Backfill	999.5	CY
0003B	Native Plant Establishment	15.8	AC	0014K	12" Topsoil	444.4	CY
0003C	Beach Nourishment (sand)	64,906.4	CY	0014L	42" FES	1.0	EA
0004	Stone Breakwaters/Lacustrine Fish Habitat			0014M	Sewer Outfall Apron - Mouth of Ravine	63.9	TON
004A	Remove Sheet Pile Groin	135.0	LF		Tributary Storm Sewer Stone Apron		
004B	Armor Stone	42,627.7	TON	0014N	Stone Apron	44.6	TON
004C	Bedding Stone	24,756.8	TON	0014P	20-2' Baffle Stones	5.1	TON
McCORMICK/JANE RAVINE				0014Q	Ravine Regrading	1.3	AC
0007	Ravine Restoration				Riffles		
0007A	Remove Concrete Structures	1.0	LS	0014R	6" Riffle	74.7	TON
0007B	Crush Existing 30" Storm Sewer (Leave in place)	1.0	LS	0014S	12" Riffle	104.5	TON
0007C	Ravine Regrading	17.8	AC	0014T	Invasive Species Removal	2.5	AC
	Riffles			0014U	Native Plant Establishment	2.5	AC
0007D	McCormick Ravine (6 - 12" Riffle)	261.3	TON	SCHENCK RAVINE			
0007E	Janes Ravine (11 - 12" Riffle)	479.0	TON	0017	Ravine Restoration		
0007F	Plunge Pool/Apron	44.2	TON	0017Q	Storm Sewer Stone Apron	365.3	TON
0007G	Invasive Species Removal	49.5	AC	0017R	Ravine Regrading	1.7	AC
0007H	Native Plant Establishment	49.5	AC	0017S	12" Riffle	391.9	TON
0008	Riparian Woodland Restoration				Riffle Weir - Mouth of Ravine		
0008A	Invasive Species Removal	56.2	AC	0017T	Riffle Stone	268.2	TON
0008B	Native Plant Establishment	56.2	AC	0017U	Riffle Stone Base	694.0	TON
HUTCHINSON RAVINE				0017V	Stone Apron/Channel Armor - Mouth of Ravine	49.1	TON
0011	Ravine Restoration			0017W	Invasive Species Removal	10.0	AC
0011A	Concrete Curb Removal/Replacement	30.0	LF	0017X	Native Plant Establishment	10.0	AC
0011B	Pavement Removal/Replacement	1,350.0	SF	BARTLETT RAVINE			
0011C	Remove Storm Manhole	1.0	EA	0020	Bluff Restoration		
0011D	Remove Storm Sewer	103.0	LF	0020A	Pavement Removal	4,800.0	SF
0011E	12" RCP Storm Sewer	184.0	LF	0020B	3 - 30" RCP Storm Sewer Pipe (125' per pipe)	375.0	LF
0011F	30" RCP Storm Sewer	175.0	LF	0020C	Storm Sewer Drainage Structure w/ Grate	1.0	EA
0011G	2' Dia. Inlet	1.0	EA	0020D	Asphalt Placement & Regrade	4,800.0	SF
0011H	4' Dia. Restrictor Manhole	1.0	EA	0020E	Concrete Gutter (200' per side)	400.0	LF
0011J	5' Dia. Manhole	3.0	EA	0020F	Stone Plunge Pool/Apron/Slope Rip Rap	218.8	TON
0011K	12" Flared End Section w/Grate	1.0	EA	0020G	12" Riffle	136.9	TON
0011L	30" Flared End Section w/Grate	1.0	EA				
0011M	Connect To Existing Storm Manhole	1.0	LS				
0011N	Detention Basin	8,100.0	CY				
0011P	Sod Restoration	1.0	AC				
0011Q	Ravine Regrading	6.2	AC				
0011R	Invasive Species Removal	23.2	AC				
0011S	Native Plant Establishment	23.2	AC				

2) Quantity of Material

See Table above.

3) Source of Material

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

e. Description of Proposed Discharge Site

1) Location

There would be no discharge of aqueous materials. All solid materials identified in **Table above** would be placed within the ravines and along the near shore of Lake Michigan. See Plan sheets in Appendix B.

2) Size, Type, and Habitat

See **Section 2.1.2** of Detailed Project Report for habitat descriptions.

3) Timing and Duration of Discharge

USACE ecosystem restoration projects are typically 5-years. In the first year or two, all of the major earth work and hydraulics restoration measures would be implemented. Years 2 – 5 would be establishment of native plant communities. The placement of sands and glacial stones would be timed during calm Lake Michigan conditions and avoid spring time spawning months.

f. Description of Placement Method

Small bobcat like vehicles and handwork would be the primary means of placing and contouring materials. Rock reef features and sand nourishment could be placed by barge from the water.

II. Factual Determinations

a. Physical Substrate Determinations

1) Substrate Elevation and Slope

General ravine slopes average about 7.5%. The range of ravine stream slopes is between 8 - 13%.

2) Sediment Type

Current ravine substrates include Highland Park Moraine clays, gravels, and small cobbles. Current lacustrine substrates that are transported through this drift cell include sands, cobbles and small boulders.

3) Fill Material Movement

The current without project condition is that the ravines have already significantly eroded into Lake Michigan. There would be no significant movement of fill material after construction. Placement of cobble riffles and woody debris within the restored ravine stream will induce sediment accretion upstream of the structures 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.

The placement of rock reefs in Lake Michigan would be sized not to migrate down drift even during the most severe tempest, gleaned information from the 2014 October 31 storm. Shifting of rock is expected due to storm waves. The movement of sand nourishment material is expected, which is the natural littoral drift condition. The placement of 120% of any cell created would be implemented to not detract from, but supplement the littoral drift volume. The rock reef structures will be designed to pass littoral sands

naturally, therefore, no down or upstream effects are probable since the net sand capture would be zero (0).

4) Physical Effects on Benthos

Existing benthos directly beneath where the 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 and lacustrine 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 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. These include the timing of particular restoration measures, silt control, biodegradable erosion control fabric and lots of native plants.

b. Water Circulation, Fluctuation, and Salinity Determinations

1) Water

(a) Salinity

Not applicable.

(b) Water Chemistry

Since native and inert substrates are being used, not adverse water chemistry changes are expected. Water quality of the ravine streams are expected to improve via erosion reduction and bio-filtration.

(c) Clarity

Water clarity improvements are expected within the ravine streams.

(d) Color

No effects are expected.

(e) Odor

No effects are expected.

(f) Taste

No effects are expected.

(g) Dissolver Gas Levels

Increases in dissolved oxygen are expected within the ravine streams.

(h) Nutrients

Nutrient levels are expected to become more balanced within the ravine streams due to a) improved bio-filtration, b) improved native Coarse & Fine Particulate Matter (CPOM/FPOM), c) reduced channel incision, and d) proper canopy lighting as it affects type of bed and water column algae.

(i) Eutrophication

Nutrient levels within the ravine streams are expected to be moderated.

(j) Other

The prevention of further channel incision within the ravine streams will further induce groundwater flows, termed hyporheic flow, which is beneficial to stream water quality and biodiversity.

2) Current Patterns and Circulation

See **Section 2.1.1** of Detailed Project Report for descriptions of Fluvial Geomorphology and Littoral Processes.

(a) Current Patterns and Flow

The nearshore rock reefs are designed to a) provide fish and diving duck habitat, b) induce dune and sand bar formation, c) not generally impede or sequester littoral drift sands, e) not alter the overall upstream and downstream littoral currents, patterns and drift.

An objective within the ravine streams is to prevent unnatural channel incision and return substrate sorting and hyporheic flow and discharge.

(b) Velocity

Due to the inability to remove urban induced flows from the ravines, velocity reduction becomes the target of this habitat restoration project. Boulder, cobble, gravel, and woody debris would be used to construct stream bed grade control that simultaneously and seamlessly provides aquatic stream habitat. These measures avoid riprap application to the toe of stream banks, which is detrimental to plant growth, aquatic habitat, substrate sources, fluvial processes, channel hydraulics and visual aesthetics of a natural stream.

(c) Stratification

There are no expected affects to limnic or lotic stratification due the project area occurring within the shallow littoral zone of a large oligotrophic lake and shallow ravine streams.

(d) Hydrologic Regime

Minor improvements are expected to groundwater (hyporheic flow) of the ravine streams due to channel incision reduction.

3) Normal Water Level Fluctuations

The proposed fill activity would have no significant impact on normal water level fluctuations upstream or downstream of the ravines. Lake Michigan levels would not be influenced by small breakwater features.

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 associated with the proposed activity since stream hydraulics are being targeted for manipulation. The purpose of the project is to naturalize stream hydraulics and take advantage of littoral currents to increase quantity and quality of coastal habitats.

c. Suspended Particulate/Turbidity Determinations

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

There would be negligible to minor increases in suspended particulates and turbidity levels in the immediate area of the proposed fill activity during construction, most of which are less than any given summer thunderstorm.

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

(a) Light Penetration

No effects are expected.

(b) Dissolved Oxygen

No effects are expected.

(c) Toxic Metals and Organics

No effects are expected.

(d) Pathogens

No effects are expected.

(e) Aesthetics

No effects are expected, all materials used for habitat restoration are indicative of the site's glacial geology.

(f) Other

No other effects discussed.

3) Effects on Biota

(a) Primary Production, Photosynthesis

Primary production would increase on the rock reefs and within the ravine streams due to substrate and hydraulic restoration effects.

(b) Suspension/Filter Feeders

Suspension and filter feeders are expected to increase due to the increase in a balanced primary production of zoo and phytoplankton, and improvement in saprophyte species richness such as shredding macroinvertebrates and crayfishes.

(c) Sight Feeders

Rock reefs are expected to attract smaller fishes due to structure and primary production source; therefore, predatory fishes such as Smallmouth and Rock Bass and birds such as Mergansers and Terns would increase in abundance.

4) Actions Taken to Minimize Impacts

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

d. Contaminant Determinations

The proposed fill material would not introduce any new contaminants into Lake Michigan or the ravines, or release any significant amounts of existing contaminants (if any are present) through bottom disturbance in the construction zone.

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 and lacustrine hydraulics, 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 Special Aquatic Sites

- a) Sanctuaries and Refuges – this project is vital to the Ft. Sheridan Natural Area restoration
- b) Wetlands – increase in hydrophytic vegetation
- c) Mud Flats – none present; no significant impact
- d) Vegetated Shallows – increase in submergent aquatic macrophytes
- e) Freshwater Reefs – created by this project
- f) Riffle and Pool Complexes – would increase along the entire ravine

6) Threatened and Endangered Species

Implementation of the proposed project would only benefit endangered or threatened species if they colonize the project site. Currently, no Federal listed endangered or threatened species have been recorded from the project site; however, numerous state listed species have been recorded. Restoration features would directly increase the quality of the habitat present at Fort Sheridan; hence potentially encouraging colonization or continued habitation of the area by state listed species such as the common tern (*Sterna hirundo*), Forster's tern (*Sterna forsteri*), longnose sucker (*Catostomus catostomus*), lake herring (*Coregonus artedii*), marram grass (*Ammophila breviligulata*), common juniper (*Juniperus communis*), downy Solomon's seal (*Polygonatum pubescens*), seaside spurge (*Chamaesyce polygoniflora*), and sea rocket (*Cakile edentula*).

Coordination with the U.S. FWS and the Illinois Department of Natural Resources (IDNR) was commenced on 15 February 2010 with a project scoping letter. Upon review of this document, the U.S. FWS concluded that the project is not likely to adversely affect federal or state listed species, and their letter dated 15 March 2010, precluded the need for further consultation on the Fort Sheridan ravine and coastal restoration project as required under Section 7 of the Endangered Species Act of 1973, as amended.

7) Other Wildlife

No other wildlife would be significantly impacted by the proposed activity. This project would provide about 200-acres of restored native coastal habitat for migratory birds and fishes.

8) Actions 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 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 Lake Michigan or ravines and would comply with all applicable water quality standards.

3) Potential Effects on Human use Characteristics

(a) Municipal and Private Water Supply

No effects expected.

(b) Recreational and Commercial Fisheries

Positive effect expected due to increase in productivity through the food chain.

(c) Water Related Recreation

Positive effects are expected due to improvements in migratory bird habitat, fish habitat, and native aesthetics of rare Great Lakes' plant communities.

(d) Aesthetics

Positive effects are expected via ugly erosion repair and native plant community 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. This project improves the Ft. Sheridan Natural Area in terms of native habitat, which supports any nearby important habitat areas and preserves.

g. Determination of Cumulative Effects on the Aquatic Ecosystem

The proposed project would restore aquatic habitat structure and function. There are no significant adverse effects expected. See **Section 4.5** of Detailed Project Report for Cumulative Effects Assessment.

h. Determination of Secondary Effects on the Aquatic Ecosystem

No significant impacts on the Lake Michigan or ravine ecosystems 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 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. DRAFT FONSI

DRAFT Finding of No Significant Impact Ft. Sheridan Ravine & Coastal Ecosystem Restoration

Background

Four non-Federal sponsors, the Lake County Forest Preserve District (LCFPD), Openlands, the Town of Ft. Sheridan, and the City of Lake Forest have requested that the Chicago District, USACE initiate a study under Section 506 Fisheries and Ecosystem Restoration to ascertain the feasibility of restoration features to restore the ecological integrity of the combined Ft. Sheridan natural areas. This study evaluates the feasibility and environmental effects of restoring ravines, bluffs and littoral areas. The scope of this study addresses the issues of altered hydrology and hydraulics, native plant community preservation, invasive species, connectivity, rare wetland communities, native species richness and encourages public education. This Feasibility Report and Integrated Environmental Assessment will assess and identify problems and opportunities, identify and evaluate measures, and recommend and design the most cost effective and feasible solution to the ecological problems currently existing within the area of study

The overall problem within the study area is the holistic decrease in biodiversity including species richness, ecosystem complexity and genetic variation. Biodiversity was decreased as a response to the loss of hydrogeomorphic function, fluvialgeomorphic function, littoral processes and land use change; collectively a reduction in abiotic complexity. Specific problems include:

- φ Altered hydraulics and littoral drift from manmade infrastructure
- φ Altered coastal geomorphology from manmade infrastructure and land use
- φ Altered coastal geomorphology from non-native plant species colonization
- φ Altered stream hydraulics from urbanization and infrastructure configuration within the watershed
- φ Altered fluvialgeomorphic processes from urbanized watershed and ill-advised in-ravine infrastructure
 - Channel incision
- φ Altered hydrology, hydraulics and geomorphology from manmade dam at mouth of ravine
- φ Altered geomorphology from invasive plant and tree species
 - Large amounts of unnatural woody debris
 - Unnatural erosion

Brief Summary of Findings

An iterative screening/formulation process ultimately looked at 432 combinations for ravine restoration, 96 for lacustrine restoration and 6 for bluff restoration. The habitat output / cost comparisons identified 7 plans for ravine restoration, 7 plans for lacustrine restoration and 1 plan for bluff restoration that were incrementally justified cost wise for their additions of habitat benefits. After considerations of habitat benefits, costs, risk and uncertainty and plan acceptability, completeness, efficiency, and effectiveness, the NER plan was selected. This plan consists of fully restoring 5 ravines, 40-acres of bluff and about 1.5 miles of coastal lake and dune habitat. This report recommends that combined plans of Ravine Plan 4, Lacustrine Plan 6, and Bluff Plan 2, which consists of establishing a diverse coastal habitat mosaic within the Ft. Sheridan natural area, are the NER/Preferred Plan. This plan provides 628.9 net average annual habitat units over 251-acres of coastal zone.

No Action Plan

The future without project condition or No Action is expected to further decline for lacustrine, bluff and ravine habitat within the Ft. Sheridan study area. The LCFPD and Openlands will likely engage in small vegetation management and plantings; however, the ability to remedy the coastal and ravine hydraulic and extensive invasive species issues is unlikely.

The NER/Preferred Plan

The plan that reasonably maximizes net national ecosystem restoration benefits, consistent with the Federal objective, is identified as the NER plan. Thus, the plan that maximizes net NER benefits and has shown great merit in the trade-off analysis are a number of selected sites with their associated best buy alternative plans. Each plan per site includes a combination of restoration measures as described in the proceeding narrative. It is determined that the NER plan consists of the combined Ravine Plan 4, Lacustrine Plan 4 and Bluff Plan 2.

Site Preparation – The first task would be to install safety fencing, signage and other safety features in order for public safety. Staging areas and access roads would be demarcated. All poorly maintained storm sewer infrastructures would need to be removed and discarded or stockpiled and saved depending on the non-Federal sponsors needs.

Ravine Plan 4 – McCormick, Janes, Scott, and Schenck Ravines were identified under the NER for restoration measures.

McCormick and Jane Ravine would have their confluence with each other and to the lake reconstructed. Non-functional and outdated storm sewer infrastructure would be removed and the geomorphology of the mouth sculpted to that of a natural stream once again. A series of riffles and pools would be fashioned to withstand present and future flows within the ravine and provide enough habitat stability and passage for lake fishes. This work would effectively return native fishes to the McCormick Ravine stream once again, in which they currently do not occur. Invasive and non-native plant species would be cleared from the riparian zone and native ravine and oak woodland communities would be reestablished via sowing of seed and planting of live plugs. This component of the NER plan would restore about 49 acres of ravine plant community, 59.4 acres of riparian oak woodland, and about 700-feet of perennial stream; however, by removing the fish passage barrier at the mouth, about 3,000-feet of stream habitat would become available.

Hutchinson Ravine would have a detention basin constructed at the head of the ravine to attenuate urban flows enough to mimic flows if the land cover of the watershed were natural. A detention pond about 1 acre in size would be excavated and designed to look like a natural wetland pond. A set of inflow and outflow pipes would be utilized in conjunction with the pond to detain and attenuate urban runoff flows back to the ravine stream. The pipes are only being used to send the water into and out of the detention basin and the water will ultimately travel the full length of the ravine in the open stream channel. Invasive and non-native plant species would be cleared from the riparian zone and native ravine communities would be reestablished via sowing of seed and planting of live plugs. This component of the NER plan would restore about 23 acres of ravine plant community and about 3,500-feet of stream habitat.

Scott Ravine would have the check dam currently present at the mouth of the ravine removed to permit connectivity with the lake. Urban induced flows would be dealt with by installing large boulder riffles in order to provide stable instream habitat. A naturalized channel would be constructed to withstand post-project flows. Invasive and non-native plant species would be cleared from the riparian zone and native ravine communities would be reestablished via sowing of seed and planting of live plugs. This component

of the NER plan would restore about 2.5 acres of ravine plant community and allow fish passage to about 500-feet of stream habitat.

Schenck Ravine would have the urban induced flows managed through the installation of large cobble riffles, in lieu of the subsurface pipe removing unnatural stormwaters. The riffles described in measure SRK would be sized to handle the future with project condition flows. Cobble would be installed along the first 100 feet of the ravine from the head for stability. The series of riffles and pools would permit connectivity to the lake along the slope of the bluff, while protecting the upstream restoration measures from further head cutting. Invasive and non-native plant species would be cleared from the riparian zone and native ravine communities would be reestablished via sowing of seed and planting of live plugs. This component of the NER plan would restore about 8.3 acres of ravine plant community and allow fish passage and access to about 1,300-feet of stream habitat.

Lacustrine Plan 4 – Lacustrine and dune habitat restoration would be accomplished under the NER Plan via the construction of small rock reefs that would induce larger beaches and submerged sand bars to form, but also allow for dynamic coastal interactions. These sand bars, beaches and dunes would be prefilled with sand to 120% capacity to ensure the littoral drift is not impacted per State of Illinois permitting requirements. The rock reef structures are not intended for storm damage reduction along the coast, but to increase the heterogeneity, size and stability of lacustrine, dune and bluff habitat, but still allow for littoral dynamics. The NER Plan identified three rock reef systems to be implemented; MJL-A, MJL-B, and BL-B as depicted on **Plate 19**. Once the rock reefs are constructed and the cells and dunes filled with sand, native plant communities would be established on the dunes and bluff via invasive species removal, seeding sowing and live plugging. This component of the NER Plan would restore about 12.8 acres of dune/beach habitat and about 12.0 acres of lacustrine structural and hydraulic habitat for fishes.

Bluff Plan 2 – Bluff restoration would be accomplished via alleviating surface water flows down the bluff face, minor grading in areas that were previously affected by these surface waters, invasive plant species removal and establishment of native bluff plant species. The largest problem is at the former mouth of Bartlett Ravine. Since the ravine was turned into a vehicle roadway by the US Army, the water rushing down the road was allowed to careen over the bluff and down onto the beach, which has in turn destroyed previously existing habitat and prevents new habitat from becoming stable enough to support native species. Measure BRF will allow the surface flows over the bluff safe passage to the beach, and further prevent habitat destruction and erosion. About 40-acres of native bluff habitat would be restored. Due to the potential of the USACE not being able to conduct invasive species removal and native seeding in Environmentally Restricted Parcels F and G, an option to exclude these parcels from the project is a possibility. Removal of the bluff habitat restoration within parcels F & G would reduce habitat benefits by 5.7AAHUs and would not affect project costs.

Native Plant Community Establishment – The most effective measure for establishing biological diversity is the establishment of appropriate native plant communities; the establishment of native vegetation is directly related to the abundance and diversity of soil fungi and other microorganisms, insects, birds, and other organisms among various trophic levels. The project would ensure the establishment of native ravine, bluff and dune plant communities over the remainder of the construction period. Species would be located according to new hydrogeomorphology, soils and substrates established by the previous steps. Once the physical work is complete and all invasive species removed native seed and plugs would be planted. Years 2 – 5 of the project would manage and establish the native plant communities. This work includes spot herbicide application for invasive species regrowth and replanting small areas if necessary.

No unique methods are proposed beyond the physical repairs described within other sections of the report that would help keep plants in place on slopes. Standard practice for establishing plants on slopes will

include the placement of erosion control blankets where seed and plugs will be planted. "Placement of erosion control blankets" will be added to each Native Plant Establishment measure within the Measures for Biological Establishment.

The removal of invasive plants and opportunistic woody vegetation will also keep plants in place by allowing adequate amounts of light to reach the ravine's understory. The native plants being introduced that were lost to physical damage and dense shade will restore soil aggregate stability and cohesion with root structures that supply soil organic matter which relates to improved soil structure that increases soil permeability and water holding capacity. This then translates into lower soil bulk density that makes it harder for rainwater to flow over a ravine's slope causing soil erosion which circles back to physical damage that decreases biological diversity.

Prescribed burns would be conducted by a burn crew that is highly trained and experienced in fire management and the prescribed burning of natural areas. The burn crew will be under the direct control of a qualified burn coordinator having completed at least the minimum amount of training, including S-230 (Single Resource Boss), required to provide controlled burning services in a safe and responsible manner. Primary fire breaks will be installed around the boundary of the site and additional fire breaks will be mowed at least 15 feet around any private parcels within the area of the prescribed burn. The resulting smoke from the burn will be minimized by burning during the daytime when transport winds and mixing heights are such that smoke can be lifted and dispersed safely away from roads and residences unless adequate safeguards have been taken such as appropriate notifications and traffic control. Burns will only take place under acceptable weather parameters (air temperature, humidity, etc) and once all required burn permits are obtained.

Recreational Features – Components of recreation are not proposed under this project.

Discussion of Environmental Compliance

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

Environmental Justice E012898

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

Clean Air Act

Due to the small scale, short duration and relatively unpolluted nature of the restoration project, it is assumed that the project is below the de minimis level of PM 100 tons per year. As a reference, other

USACE projects that are much grander in scale and earthwork have General Conformity Act emissions well below the PM 100 tons per year.

Section 401 & 404 of the Clean Water Act

A Section 404 analysis was completed for the preferred plan. Features addressed by the 404 include the fill materials for stream restoration where cobble, gravel, sand and clean clays would be placed to mimic natural substrates. No adverse effects to water quality or aquatic habitat were determined. Section 401 Water Quality Certification would be applied for should the NER plan be approved for implementation. The Illinois EPA accepts nothing less than final designs for 401 Permitting. It is anticipated this project would receive 401 Water Quality Certification based on the incidental water quality improvements to the ravines and ultimately Lake Michigan.

USFWS Coordination

Coordination with the U.S. FWS and the Illinois Department of Natural Resources (IDNR) was commenced on 15 February 2010 with a project scoping letter. Upon review of this document, the U.S. FWS concluded that the project is not likely to adversely affect federal or state listed species, and their letter dated 15 March 2010, precluded the need for further consultation on the Fort Sheridan ravine and coastal restoration project as required under Section 7 of the Endangered Species Act of 1973, as amended.

State of Illinois Historic Preservation Act

Pursuant to Section 106 of the National Historic Preservation Act (16 U.S.C. § 4701) and 36 C.F.R. Part 800, the staff of the Illinois State Historic Preservation Officer (Illinois SHPO) has conducted an analysis of the materials dated 22 February 2012. Based upon the documentation available, the staff of the Illinois SHPO has identified that any modification to Historic Parade ground constitutes an effect as defined by 36 C.F.R. Part 800. Subsequently, the plan formulation took this into account and developed alternate measures to completely avoid the Historic Parade Ground. All other areas affected by ground disturbance under this project have already been previously disturbed; therefore an archaeological survey is unnecessary and is consistent with the recommendations of the SHPO. Coordination will be finalized during the 30-day NEPA Review Period.

Public Interest

An Environmental Assessment (EA) was prepared for the project and sent to Federal, State and local agencies along with the general public for review. A 30-day Public Review period was held from __ November 2014 to __ December 2014 for the Environmental Assessment. Significant comments from the Federal, State or local agencies or the public were addressed and are attached to this FONSI. All comments and correspondence are attached to this FONSI.

Conclusion

In accordance with the National Environmental Policy Act of 1969 and Section 122 of the River and Harbor and Flood Control Act of 1970, the U.S. Army Corps of Engineers has assessed the environmental impacts associated with this project. The purpose of this integrated Feasibility Study and Environmental Assessment is to evaluate the impacts that would be associated with the restoration of the 200.2-acres at within the Ft. Sheridan natural area. The proposed project has been determined to be in full compliance with the appropriate statutes, executive orders and USACE regulations.

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

Christopher T. Drew
Colonel, U.S. Army
District Commander

G3. Agency Coordination

NEPA Review Period Distribution List

ELECTED OFFICIALS

U.S. Senator Dick Durbin
711 Hart Senate Office Bldg
Washington, DC 20510

U.S. Senator Dick Durbin
230 S. Dearborn St.
Suite 3892
Chicago, IL 60604

U.S. Senator Mark Kirk
230 S. Dearborn St.
Suite 3900
Chicago, IL 60604

U.S. Senator Mark Kirk
524 Hart Senate Office Bldg
Washington, DC 20510
Senator Durbin

U.S. Congressman Brad Schneider
317 Cannon House Office Building
Washington, DC 20515

U.S. Congressman Brad Schneider
111 Barclay Boulevard
Suite 200
Lincolnshire, IL 60069

Governor Pat Quinn
Office of the Governor
207 State House
Springfield, IL 62706

FEDERAL AGENCIES

Kenneth Westlake, Chief
Environmental Review Branch
U.S. EPA ME-19J
77 West Jackson
Chicago, IL 60604

US Fish and Wildlife Service
Chicago Illinois Field Office
1250 South Grove, Suite 103
Barrington, Illinois 60010
Attn: Louise Clemency

STATE AGENCIES

Office of Resource Review
Illinois DNR
One Natural Resource Way
Springfield, IL 62702-1271
ATTN: Todd Rettig

Illinois DNR – Realty/Planning
One Natural Resource Way
Springfield, IL 62702-1271
ATTN: Pat Malone

Illinois DNR/OWR
160 N. LaSalle St,
Suite S-700
Chicago, Illinois 60601
ATTN: Dan Injerd

Illinois EPA
Water Pollution Division
1001 N. Grand
Springfield IL 62794
ATTN: Bruce Yurdin

Illinois Hist. Pres. Agency
1 Old State Capitol Plaza
Springfield, IL 62701
ATTN: Anne Haaker

IDNR/OWR
Lake Michigan Management Section
Michael A. Bilandic Building
160 N. LaSalle Street, Suite s-703
Chicago, IL 60601
Attn: James P. Casey



REPLY TO
ATTENTION OF

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

Planning Branch
Environmental Formulation Section

Kenneth Westlake, Chief
Environmental Review Branch
U.S. EPA ME-19J
77 West Jackson
Chicago, IL 60604

15 FEB 2010

15 FEB 2010

Dear Mr. Westlake:

The Chicago District is preparing a National Environmental Policy Act (NEPA) document on impacts of planned ecosystem restoration at Fort Sheridan, Lake County, Illinois. As part of the scoping process the Chicago District would appreciate your comments. A map of the area is attached.

The project will involve stabilization and naturalization of bluffs, ravines and dunes including invasive species removal and the reestablishment of native plants.

I am particularly interested in your comments regarding impacts to aquatic habitat and threatened or endangered species. Please reply by March 15, 2010, marking your reply to the attention of Mr. Peter Bullock, U.S. Army Corps of Engineers, 111 North Canal Street, Suite 600, Chicago, Illinois 60606. Questions may be directed to Mr. Bullock at 312/846-5587, or at peter.y.bullock@usace.army.mil. Your assistance is appreciated.

Sincerely,

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

Enclosure

MFR: Routine scoping letter as required by NEPA.

Bullock PM-PL-E

Fleming PM-PL-E

Buczak PM-PM KAB 2/11/10

Davis PM=PL-E SJD 2/11/10

FEDERAL AGENCIES

Kenneth Westlake, Chief
Environmental Review Branch
U.S. EPA ME-19J
77 West Jackson
Chicago, IL 60604

Peter J. Fasbender
Acting Field Supervisor
US Fish and Wildlife Service
Chicago Illinois Field Office
1250 South Grove, Suite 103
Barrington, Illinois 60010

Executive Office, MSO-Chicago
U.S. Coast Guard
215 W. 83rd St. Suite D
Burr Ridge, IL 60521

STATE AGENCIES (Illinois)

Todd Rettig
Office of Resource Review
Illinois DNR
One Natural Resource Way
Springfield, IL 62702-1271

Robert Schanzle
Illinois DNR – Realty/Planning
One Natural Resource Way
Springfield, IL 62702-1271

Illinois DNR/OWR
36 S. Wabash Ave.
Room 1415
Chicago, IL 60603
ATTN: Dan Injerd

Illinois EPA
Water Pollution Division
1001 N. Grand
Springfield, IL 62794
ATTN: Bruce Yurdin

Illinois Hist. Pres. Agency
1 Old State Capitol Plaza
Springfield, IL 62701
ATTN: Anne Haaker

Mayor Michael D. Belsky
City of Highland Park,
City Hall
1707 St. Johns Ave.
Highland Park, IL 60035

Mayor James J. Cowhey, Jr.
The City of Lake Forest
City Hall
220 E. Deerpath
Lake Forest, IL 60045

Mayor Charlie Pecaro
City of Highwood
City Hall
17 Highwood Ave.
Highwood, IL 60040

TRIBAL DISTRIBUTION LIST

Kickapoo Tribe of Oklahoma
P.O. Box 70
McCloud, OK 74851

Kickapoo of Kansas
1107 Goldfinch Rd.
Horton, KS 66434

Kickapoo Tribe of Texas
Box HC 1 9700
Eagle Pass, TX 78853

Miami Tribe of Oklahoma
P.O. Box 1326
Miami, OK 74355
ATTN: Joshua Sutterfield

Citizen Potawatomi Nation
1901 S. Gordon Cooper Dr.
Shawnee, OK 74801

Prairie Band Potawatomi Tribal Council
16281 Q RD
Mayetta, KS 66509

Forest County Potawatomi Exec. Council
P. O. Box 340
Crandon, WI 54520

Huron Potawatomi Tribal Office
2221 One-and-a-half Mile Rd.
Fulton, MI 49052

Hannahville Potawatomi Comm., Council
N 14911 Hannahville Road
Wilson, MI 49896-9728

Pokagon Band of Band of Potawatomi Indians
P.O. Box 180
Dowagiac, MI 49047

Miami Nation in Indiana
P.O. Box 41
Peru, IN 46970



CITY OF HIGHLAND PARK

1707 ST. JOHNS AVENUE
HIGHLAND PARK, ILLINOIS 60035 • (847) 432-0800

MICHAEL D. BELSKY
MAYOR

March 8, 2010

Mr. Peter Bullock
U.S. Army Corps of Engineers
111 North Canal Street, Suite 600
Chicago, Illinois 60606

Dear Mr. Bullock,

As part of the Chicago District's scoping process for the preparation of a National Environmental Policy Act (NEPA) document, the U.S. Army Corps of Engineers has requested comments from the City of Highland Park pertaining to aquatic habitat and threatened or endangered species at Fort Sheridan.

With regard to this request, the City of Highland Park contacted Bob Megquier from Openlands and Ken Klick from the Lake County Forest Preserve District to obtain and review the following documents. The City finds that these reports provide valuable information on the ravine-bluff ecosystem in Fort Sheridan and recommends that the U.S. Army Corps take each into consideration in preparing the NEPA document:

- "Fort Sheridan Coastal Habitat Restoration Preliminary Restoration Plan" prepared for and by the U.S. Army Corps of Engineers Chicago District
- "Fort Sheridan Lakefront Preserve Action Plan" prepared for Openlands Project by Conservation Design Forum
- "Lakeshore Bluff Pre-Restoration Strategy Plan" prepared for Openlands Project by Conservation Design Forum and Graef, Anhalt, Schloemer and Associates, Inc.
- Draft Illinois Coastal Management Issue Papers: "Coastal Erosion Along the Illinois Coastal Zone," "Habitat, Ecosystem and Natural Area Restoration," and "Ravine Systems in the Lake Michigan Watershed, Illinois" prepared by various Technical Advisory Groups with the oversight of the Illinois Department of Natural Resources

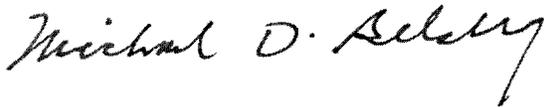


In reviewing the studies available on Fort Sheridan's coastal habitat, it is clear that future plans and projects should take into consideration the area's rare native plant species, aquatic life, extraordinary topography and natural drainage patterns. Furthermore, special attention should be given to lakeshore-specific issues including erosion of the ravines, bluffs and lakebed, slumping, failing infrastructure, ineffectual groins and invasive species infestation.

Please also be aware that any restoration work done within the City of Highland Park is subject to the City's Zoning Code regulations, including those in Article 7 of Chapter 150 pertaining to beach improvements within the designated "Lake Michigan Protection Zone" and those in Article 19 of Chapter 150 pertaining to construction within the designated "Steep Slope Zone." These regulations are in place to minimize impacts on the City's unique ravine-bluff ecosystem and promote thoughtful development and best practices. Variation requests for work proposed within either of these Zones are reviewed by the City's Lakefront Commission and forwarded to the Zoning Board of Appeals or the City Council for final determination as appropriate. For more information, please see the Zoning Code on the City's website at www.cityhpil.com

Should you have any questions regarding these comments or wish to obtain paper copies of the City's regulations, please contact Planner Barbara Cates by phone at 847-926-1611 or bcates@cityhpil.com.

Sincerely,

A handwritten signature in cursive script that reads "Michael D. Belsky". The signature is written in black ink and is positioned above the printed name and title.

Michael D. Belsky
Mayor

MDB:BC:dkg



Illinois Historic Preservation Agency

1 Old State Capitol Plaza • Springfield, Illinois 62701-1512 • www.illinois-history.gov

Lake County
Fort Sheridan
Ecosystem Restoration

PLEASE REFER TO: IHPA LOG #026021610

February 22, 2010

Mr. Peter Bullock
U.S. Army Corps of Engineers
111 North Canal Street, Suite 600
Chicago, Illinois 60606

Gentlemen:

Thank you for requesting comments from our office concerning the possible effects of the project referenced above on cultural resources. Our comments are required by Section 106 of the National Historic Preservation Act of 1966 (16 USC 470), as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties".

Map showing geographical location of project area.

Project narrative, i.e., description of proposed undertaking.

Project plan map(s) showing specifics of proposed undertaking.

If you have further questions, please contact Joseph S. Phillippe, Chief Archaeologist at 217/785-1279.

Sincerely,

Anne E. Haaker
Deputy State Historic
Preservation Officer

AEH



REPLY TO
ATTENTION OF

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

Planning Branch
Environmental Formulation Section

Illinois Historic Preservation Agency
1 Old State Capitol Plaza
Springfield, IL 62701
ATTN: Anne Haaker

Dear Ms. Haaker:

The Chicago District is preparing a National Environmental Policy Act (NEPA) document on impacts of an ecosystem restoration project in the Ft. Sheridan, Lake County, Illinois. The plan seeks to restore water flow in Scotts Ravine.

Aware that Ft. Sheridan is a Historic District listed on the National Register of Historic Places, the Chicago District would like you to review two alternative conceptual designs that involve the post parade ground. We have included a description of the project alternatives we are considering. We would like your input on two of the alternatives, in particular, #6SRF and #7SRG. We have included drawings of these two alternatives for your information.

Alternative #1 (labeled on the map as Ravine Head Option #6 SRF) This design would involve the creation of a water retention basin in the parade ground. This basin would have a proposed volume of 885,000 cubic feet (20.4 acre feet), with a total footprint of approximately 7.2 acres. Of this only 2.8 acres would be frequently inundated during storms. The remainder of the basin would be 3 feet deep and would only be inundated during more extreme weather events.

Alternative #2 (labeled on the map as Ravine Head Option #7 (SRG) This design would involve the construction of a cistern in the parade ground instead of a retention basin. This would measure approximately 750 feet by 150 feet with a depth of approximately 8 feet, and with a storage capacity of 960,000 cubic feet. The cistern would be underground and covered with soil, but grading of the slope would be necessary.

Please mark your reply to the attention of Mr. Peter Bullock, U.S. Army Corps of Engineers, 111 North Canal Street, Suite 600, Chicago, Illinois 60606. You may also contact Mr. Bullock at 312/846-5587, or at peter.y.bullock@usace.army.mil. Your assistance is appreciated.

Sincerely,

//Original Signed 26 April 2012//
Susanne J. Davis, P.E.
Chief, Planning Branch

Enclosure



**Illinois Historic
Preservation Agency**

FAX (217) 782-8161

1 Old State Capitol Plaza • Springfield, Illinois 62701-1512 • www.illinois-history.gov

Lake County
Ft. Sheridan

Ecosystem Restoration

Scott Ravine - Area Bounded by Leonard Wood Ave. North, South, East and West
Alternative #1: Ravine Head Option #6 and Alternative 2: Ravine Head Option #7
IHPA Log #009043012

May 14, 2012

Peter Bullock
Department of The Army
U.S. Army Corps of Engineers
Chicago District
111 North Canal Street, Suite 600
Chicago, IL 60606

Dear Mr. Bullock:

We have reviewed the information provided for the above referenced project. This property was listed on the National Register of Historic Places on April 20, 1984. In our opinion, the addition of a water retention basin or a cistern and the requisite landscaping within the historic parade ground constitutes an adverse effect as defined in as defined in 36 CFR 800.5.

At this time, you should begin consultation with this office to seek ways to avoid this adverse effect. You should also notify the Advisory Council on Historic Preservation of this finding to determine if they wish to join the consultation process.

If you have any questions, please contact David J. Halpin, Cultural Resources Manager, at 217-785-4998.

Sincerely,

Anne E. Haaker
Deputy State Historic
Preservation Officer

AEH:djh

Bullock, Peter Y LRC

From: Bullock, Peter Y LRC
Sent: Thursday, May 16, 2013 10:23 AM
To: 'joe.phillippe@illinois.gov'
Subject: Ft. Sheridan IHPA Log # 026021610 (UNCLASSIFIED)
Attachments: Plate 01 Ft. Sheridan Project Area.pdf; Plate 19 NER Plan.pdf; EXECUTIVE SUMMARY.docx

Classification: UNCLASSIFIED

Caveats: NONE

Ft. Sheridan Ecosystem Restoration
IHPA Log#026021610

Mr. Phillippe, Here is the requested information regarding the Ft. Sheridan project. Within the Ft. Sheridan Historic District the restoration work will be restricted to the existing ravines. We believe this work will constitute a "no adverse affect" to the cultural resources of Ft. Sheridan. IPlease contact me if you have any questions.

Sincerely,

Peter Y. Bullock
Archaeologist
Chicago District, USACE
312-846-5587

Classification: UNCLASSIFIED

Caveats: NONE

MEMORANDUM FOR RECORD

TO: the US Fish & Wildlife Service, Region 3 Barrington Field Office

FROM: Frank Veraldi, Lead Restoration Ecologist, US Army Corps of Engineers, Chicago District

DATE: 13 October 2011

SUBJECT: Section 7 Endangered Species Act Consultation – Ft. Sheridan Ravine & Coastal Restoration Project

The Ft. Sheridan Ravine and Coastal ecosystem restoration area includes 8 ravines and 2 miles of bluff, foredune and littoral zone of Lake Michigan (see attached map). The study area generally encompasses the ravine watersheds from Schenck Ravine to the south along Walker Road and north to McCormick Ravine along Westleigh Road. The area’s eastern boundary is Lake Michigan and to the west the ravine subwatersheds generally end around Sheridan Road. The non-Federal sponsors and primary land holders are the Lake County Forest Preserve District, Openlands and the Town of Ft. Sheridan.

Currently, the areas under consideration for ecological restoration measures are those areas that have been degraded. All high quality remnant areas will be avoided. Habitats that will be restored through this project include the littoral zone of Lake Michigan, beach, foredune, bluff and ravine. Methods include detaining, retaining or rerouting unnatural urban runoff, repairing damage to ravines caused by urban runoff, placing naturalistic in-lake structures to restore littoral zone habitat and stabilize sand drift, removal of invasive species and planting native species specific to ravine, bluff and dune communities. A Feasibility Study and Integrated Environmental Assessment will be provided in the September/November 2011 timeframe detailing the benefits and effects of the recommended plan.

Extensive surveys for biological communities have been performed in the recent past. Federally listed species have not been identified from the area to date. Furthermore, restoration activities would only benefit state listed species. For these reasons, we conclude the Ft. Sheridan Section 506 Restoration Project will have “no effect” on listed species or proposed or designated critical habitat. This memorandum will be attached to the Feasibility Report to document Section 7 coordination.

State Listed Species Documented from Study Area

Species	Common Name	Status
<i>Ammophila breviligulata</i>	marram grass	SE
<i>Cakile edentula</i>	sea rocket	ST
<i>Carix aurea</i>	golden sedge	ST
<i>Chamaesyce polygonifolia</i>	seaside spurge	SE
<i>Juniperus communis</i>	common juniper	ST
<i>Lathyrus ochroleucus</i>	pale vetchling	ST
<i>Poa languida</i>	weak bluegrass	SE
<i>Polygonatum pubescens</i>	downy Solomon's seal	SE
<i>Shepherdia canadensis</i>	buffalo berry	SE
<i>Trientalis borealis</i>	star flower	SE
<i>Viola conspersa</i>	dog violet	ST
<i>Catostomus catostomus</i>	longnose sucker	ST
<i>Coregonus artedii</i>	lake herring	ST
<i>Sterna hirundo</i>	common tern	ST

Frank M. Veraldi
Restoration Ecologist/Fish Biologist
USACE, Chicago District

CC: Illinois DNR – Pat Malone



REPLY TO
ATTENTION OF

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

RECEIVED

FEB 16 2010

CHICAGO ILLINOIS
FIELD OFFICE

Planning Branch
Environmental Formulation Section

Peter J. Fasbender
Acting Field Supervisor
US Fish and Wildlife Service
Chicago Illinois Field Office
1250 South Grove, Suite 103
Barrington, Illinois 60010

10-CPA-0034

February 15, 2010

Dear Mr. Fasbender:

The Chicago District is preparing a National Environmental Policy Act (NEPA) document on impacts of planned ecosystem restoration at Fort Sheridan, Lake County, Illinois. As part of the scoping process the Chicago District would appreciate your comments. A map of the area is attached.

The project will involve stabilization and naturalization of bluffs, ravines and dunes including invasive species removal and the reestablishment of native plants.

I am particularly interested in your comments regarding impacts to aquatic habitat and threatened or endangered species. Please reply by **March 15, 2010**, marking your reply to the attention of Mr. Peter Bullock, U.S. Army Corps of Engineers, 111 North Canal Street, Suite 600, Chicago, Illinois 60606. Questions may be directed to Mr. Bullock at 312/846-5587, or at peter.y.bullock@usace.army.mil. Your assistance is appreciated.

Sincerely,

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

Enclosure

36N
15E
L

NO OBJECTION

U.S. Fish & Wildlife Service
Chicago Illinois Field Office

James E. ...
Supervisor Date