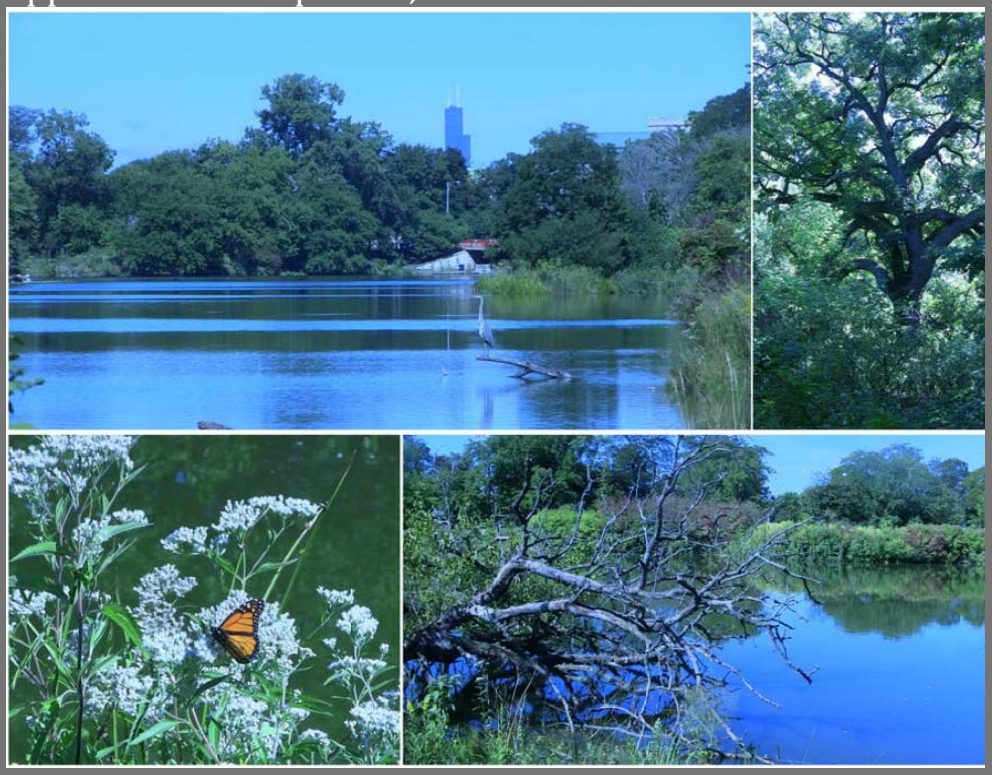
2014

Jackson Park Section 506 Great Lakes Fishery & Ecosystem Restoration Study

Appendix A – Compliance, Coordination & Information



Chicago District
US Army Corps of Engineers
05/13/2014

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A6 – PLANNING INFORMATION

A1 – SECTION 404(B)(1) EVALUATION

I. Project Description

a. Location

Jackson Park is located in Chicago, Illinois along the western coast of Lake Michigan. The park resides between 56th Street to the north and 67th Street to the south. The eastern boundary is Lake Shore Drive and Lake Michigan and to the west Stony Island Avenue. The study parcels consists of various natural area parcels of land that total about 162-acres, all of which are owned by the Chicago Park District within Jackson Park. The natural area parcels have the potential to provide pond, hemi-marsh, savanna and woodland habitat

b. General Description

Before the 1830's, the Jackson Park area was a sandy ecosystem of primarily of dune, wetland and savanna ecotypes. Over a period of several decades, this ecosystem was severely altered by human activities. Currently, Jackson Park no longer provides a diversity of habitats, nor is the existing habitat quality sufficient to maintain structure and support healthy plant and animal communities. Based on site inventory and characterization by the USACE, a set of Problems and Opportunities were developed by the study team, non-Federal Sponsors and supporting stakeholders. These drive the need for action, which is summarized as the historic loss of significant migratory bird, fish and wildlife habitats. The purpose of this feasibility study and integrated environmental assessment is to identify the most environmentally beneficial, cost effective and publicly supported habitat restoration project to restore resources lost by the alteration of coastal habitat via the creation of Jackson Park.

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, Chicago's shoreline was lush with vast expanses of wetlands. While restoring wetlands in Chicago to their historical conditions is unlikely, converting small expanses of land into structurally diverse wetlands will provide critical habitat for a number of organisms. These patches of wetland and buffering plant communities would serve as an important refuge for migrant and resident bird species, as well as a variety of aquatic organisms (fish, amphibians, aquatic insects, etc.).

Objective 1 – Reestablish Hydrogeomorphology to Support Natural Communities

Currently, Jackson Park is a result of filling in coastal wetlands and sand dunes, thusly there is no recovery mechanism aside from a glacial event. This included altering the site's hydrology via soil and clay fill materials and grading-out micro-topography. Thusly, changes to the current hydrologic regime desired are those that will rehydrate certain patches. These affects would be sustained over the life of the project and optimistically in perpetuity. This objective seeks to reestablish natural hydrologic and geomorphic parameters to support critical wetland and riparian habitats within the Jackson Park natural area. Improvement is predicted via the increase in quantity (acres) and increase in quality (Mean C Value of the FQA) of native plant communities.

Objective 2 – Eradicate Invasive Species from Pond, Wetland, & Riparian Communities

Currently, Jackson Park's pond, wetland, and riparian habitats are dominated by non-native and invasive plant species. This condition resulted from alteration to the natural hydrogeomorphic regime, disturbance to native soils, prevention of natural processes, and the planting of non-native and native weedy (ruderal) plants. The domination of plant communities by certain species such as buckthorn, honeysuckle and Eurasian grasses have also caused pond banks to unravel, further exacerbating adverse affects to the pond and fringing emergent zone. Thusly, the changes to the native plant community desired are those that will reestablish a base native plant community that will diversify overtime. These affects would be sustained and increased over the life of the project and optimistically in perpetuity. This objective seeks to reestablish native plant community richness and structure to support critical wetland and riparian habitats within the Jackson Park's natural areas. Improvement is predicted via the increase in quantity (acres) and increase in quality (Mean C Value of the FQA) of native plant communities.

d. Proposed Fill Material

1) General Characteristics

Soil removed from bank grading and scraping activities onsite at Jackson Park and placement of large limestone slabs for the creation of mudpuppy habitat.

2) Quantity

- Estimated 1.6 acres of soils
- Estimated 54 cubic feet of limestone slab

3) Source

Soils will be from onsite grading and scraping activities. No soil will be transported for use on the project from an offsite source. Limestone slabs for the proposed construction will be clean, inert materials obtained from a commercial supplier.

e. Proposed Discharge Site

1) Location

Soil will be discharged within eastern portions of Jackson Park lagoon to create and expand fringe wetlands. Limestone slabs will be placed within the South Harbor within Jackson Park. See **Figure 1** within the study for more detail.

2) Size, Type, and Habitat

1.6 acres of sandy loam soils will be placed in various locations within Jackson Park lagoon to provide fringe wetland habitat for a variety of fish and bird species. Soils will be sourced from onsite with no materials being brought from offsite locations.

Limestone slabs measuring 3'x 3' x 3' will be placed in two locations wit in the South Harbor at Jackson Park. These slabs will provide much needed mudpuppy habitat along the banks of the harbor. This measure will mimic naturally occurring limestone outcroppings which occur within the Chicagoland area.

3) Timing and Duration of Discharge

The creation of the fringe marsh and placement of the limestone slabs would take no longer than three months to complete.

f. Placement Method

Small bobcat like vehicles and handwork would be the primary means of placing and contouring materials. Coconut coir logs will be used to contain fine sandy material placed within the lagoon.

II. Factual Determinations

a. Physical Substrate Determinations

1) Substrate Elevation and Slope

Elevation of the lagoon substrates is between 580 and 572 NVGD. There is no meaningful slope to this system since it is a lentic body of water.

2) Sediment Type

Soils removed from the bank of the lagoon will be placed within the eastern portions of the lagoon to create small islands. The soil consists of a layer of topsoil with sand beneath.

3) Material Movement

There would be no significant movement of fill material after construction of the fringe marsh. Placement of soil within Jackson Park lagoon would be contained by coconut coir logs which will form the outer ring of the fringe marsh. The fringe marsh would be stabilized after completion to prevent soil erosion from occurring after construction is complete via plantings.

Limestone slabs placed in the South Harbor for mudpuppy habitat are resistant to movement because of their size and weight.

4) Physical Effects on Benthos

Existing benthos directly beneath where the soil for the fringe marsh and limestone slabs would be placed would be covered; however, the effects to the aquatic assemblage would be positive through the enhancement of improved hydraulics and native riparian plant communities, which would greatly increase species richness. 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

soil erosion and sediment control measures including, but not limited to placement of coconut coir logs, silt fencing and biodegradable erosion control fabric.

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 introducing native aquatic plant and fish species to the lagoon.

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 of Jackson Park lagoon.

4) Salinity Gradients

Not applicable to freshwater environments.

5) Actions 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.

c. Suspended Particulate/Turbidity Determinations

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

There would be minor increases in suspended particulates and turbidity levels in the immediate area of the proposed fill activity during construction.

2) Effects on Chemical and Physical Properties of Water Column

There would be negligible effects to light penetration or dissolved oxygen levels during construction. The placement of clean fill will not introduce metal, organic, or pathogens to the project area. Aesthetics will be improved in the long-term after habitat heterogeneity is established in the lagoon.

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 as appropriate would be implemented to minimize the temporary turbidity impacts associated with the proposed activity.

d. Contaminant Determination

The proposed fill material would not introduce any new contaminants into Jackson Park lagoon, 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

No affects to planktonic organisms.

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 and invertebrate population. 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. Additionally, existing fish species will be eradicated and native fish introduced after proposed fill is to be placed within the lagoon. 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 the beneficial effects the overall project will have on the 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 – none present; no significant impact

6) Threatened and Endangered Species

Coordination with the Illinois Department of Natural Resources (IDNR) was initiated with a project Scoping Letter dated 24 October 2013. The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location: Peregrine Falcon (*Falco peregrinus*). 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 24 October 2013. 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.

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 Jackson Park lagoon or any associated waterways within or adjacent to Jackson Park and would comply with all applicable water quality standards. Water quality would ultimately improve via the removal of bioturbation caused by common carp and bullheads and the reestablishment of aquatic macrophytes where there currently are none.

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.

A detailed history of Jackson Park is provided as attachment in Appendix A of the stud. It is important to note that that the historic designs and designer's intents are in harmony with restoring natural geomorphic and native plant communities within the park's natural areas. Preliminary coordination with the State Historic Preservation Office and the CPD's historical experts are in concurrence with these concepts and fully support the restoration of ecosystem features that would incidentally restore and polish the historical magnificence of this beautiful park.

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 Jackson Park 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.

A2 – 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 A3.

B. Joint Application Form

The joint application for this notification is provided in Section A3.

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 discing 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 1.75 acres of open water and lagoon banks. The impact is beneficial since the project provides newly created structural habitat. 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 6 & 7,** for project mapping.

I. Site Coordinates

Decimal Degrees - Longitude (-87.581) Latitude (41.785)

J. Site Documentation

See **Chapeter2 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 **Chapter 2 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 wetlands within the project area meet the criteria for soils, hydrology and hydrophytic plants required. See Section A6 for Florist Quality Assessment.

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 E**. All project real estate is owned by the CPD.

N. Engineering Drawings

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

O. Schedule

φ 30 Day Public Review Start	April 2014
φ 30 Day Public Review Ends	May 2014
φ Final FS Report for Approval	June 2014
φ Design Complete	Summer 2014
φ Open Bids	Fall 2014
φ Contract Award	September 2014
φ Notice to Proceed	Fall 2014
φ Construction Complete	Fall 2019

P. Soil Erosion Sediment Control Plan

Although the affected area of disturbance is more than 1-acre, significant erosion and sediment release is not expected. The SESC plan is part of the plans and specifications, and consists of BMP measures such as silt fencing, and biodegradable erosion control fabric and permanent project features such as 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

Correspondence and clearance with the ILSHPO is provided in Section A4 in a letter dated 10 December 2013.

T. Applicable Watershed Plans

There is no applicable watershed plan associated with Jackson Park.

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 Chicago Park District

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.

There are no intentions of relocating or channelizing any streams within the project area. 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 agricultural and Spring Creek would not be converted to another aquatic use. The manipulation of Spring Creek's hydraulics or hydrology to create an impoundment for anthropogenic uses is not indented out come. 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.

No part of the project area of the project would be converted to another aquatic use. The project is solely intended for ecological restoration. 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 F**.

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 Chicago Park District.

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 September 2014.

A3 – 401 Joint Application Form

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

REPLY TO ATTENTION OF

Planning Branch
Environmental Formulation Section

Mr. Al Keller
Illinois Environmental Protection Agency
Division of Water Pollution Control
Facility Evaluation Unit
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

RE: Section 404/401 Water Quality Certification Regional Permit – Jackson Park Ecosystem Restoration

Dear Mr. Keller,

Enclosed is documentation for work associated with the USACE Chicago District's Jackson Park Ecosystem Restoration project. The documentation details the requirements set forth by Regional Permit 5 Category I for Wetland & Stream Restoration and Enhancement, under which this project qualifies. This application is being submitted solely to the ILEPA since there are no project features that require permits from Illinois Department of Natural Resources, Office of Water Resources.

The proposed project involves bank grading; creation of vernal pools; new islands within Jackson Park lagoon, and new mudpuppy habitat; and establishment of native plant and fish species. Measures to be covered by Regional Permit 5 Category II include the work restore the native plant communities within Jackson Park. Complete details are included in the enclosed application and supporting documents.

If you have any questions regarding the permit application or the project, please contact Frank Veraldi at 312-846-5589 or Monica Ott, Project Manager, at 312-846-5591.

Sincerely,

DRAFT

Susanne J. Davis
Chief of Planning
District Commander

Enclosures

PM-PL-E
PM-PL-E
PM-PM
OC
DE

JOINT APPLICATION FORM FOR ILLINOIS

ITEMS 1 AND 2 FOR AGENCY USE

1. Application Number	2. Date Received

3. and 4. (SEE SPECIAL INSTRUCTIONS) NAME, MAILING ADDRESS AND TELEPHONE NUMBERS

3a. Applicant's Name Company Name (if any) Address Email Address	3b. Co-Applicant/Property Owner Name (if needed or if different from applicant) Company Name (if any) Address Email Address	4. Authorized Agent (an agent is not required) Company Name (if any) Address Email Address
Applicant's Phone Nos. w/area code Business: Residence: Cell: Fax:	Applicant's Phone Nos. w/area code Business: Residence: Cell: Fax:	Agent's Phone Nos. w/area code Business: Residence: Cell: Fax:

STATEMENT OF AUTHORIZATION

I hereby authorize, _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

_____ Applicant's Signature

_____ Date

5. ADJOINING PROPERTY OWNERS (Upstream and Downstream of the water body and within Visual Reach of Project)

Name	Mailing Address	Phone No. w/area code
a.		
b.		
c.		
d.		

6. PROJECT TITLE:

Jackson Park 506 Great Lakes Fishery & Ecosystem Restoration Project

7. PROJECT LOCATION

LATITUDE: 41.785 LONGITUDE: -87.581	UTMs Northing: Easting:				
STREET, ROAD, OR OTHER DESCRIPTIVE LOCATION The park resides between 56th Street to the north and 67th Street to the south. The eastern boundary is Lake Shore Drive and Lake Michigan and to the west Stony Island Avenue.	LEGAL DESCRIPT	QUARTER SW 1/4	SECTION 13	TOWNSHIP NO. 38N	RANGE 14E
☒ IN OR ☐ NEAR CITY OF TOWN (check appropriate box) Municipality Name Chicago, IL	WATERWAY Jackson Park Lagoon			RIVER MILE (if applicable)	

COUNTY	STATE	ZIP CODE		
Cook	IL	60637		n/a

Revised 2011

☐ Corps of Engineers ☐ IL Dept of Natural Resources ☐ IL Environmental Protection Agency ☐ Applicant's Copy

8. PROJECT DESCRIPTION (Include all features):

9. PURPOSE AND NEED OF PROJECT: ecological restoration of various areas within Jackson Park. By restoring aquatic and buffering habitats and addressing invasive species issues, this project would provide scarce and essential habitat for fish, migratory birds, reptiles and amphibians within a highly urbanized area.

COMPLETE THE FOLLOWING FOUR BLOCKS IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

10. REASON(S) FOR DISCHARGE: Construction of new islands within Jackson Park lagoon and installation of limestone slabs along banks for mudpuppy habitat

11. TYPE(S) OF MATERIAL BEING DISCHARGED AND THE AMOUNT OF EACH TYPE IN CUBIC YARDS FOR WATERWAYS:

TYPE: See Section G1, I, d of Appendix G for materials and quantities.

AMOUNT IN CUBIC YARDS: 54 cyds of limestones slabs

12. SURFACE AREA IN ACRES OF WETLANDS OR OTHER WATERS FILLED (See Instructions)

1.75 acres.

13. DESCRIPTION OF AVOIDANCE, MINIMIZATION AND COMPENSATION (See instructions)

All impacts to WOUS are planned to provide the greatest net benefit to the surrounding aquatic resources on the project site.

14. Date activity is proposed to commence: Spring 2014

Date activity is expected to be completed: Winter 2015

15. Is any portion of the activity for which authorization is sought now complete? Yes ☐ No ☒

NOTE: If answer is "YES" give reasons in the Project Description and Remarks section. Indicate the existing work on drawings.

Month and Year the activity was completed: n/a

16. List all approvals or certification and denials received from other Federal, interstate, state, or local agencies for structures, construction, discharges or other activities described in this application.

Issuing Agency	Type of Approval	Identification No.	Date of Application	Date of Approval	Date of Denial

17. CONSENT TO ENTER PROPERTY LISTED IN PART 7 ABOVE IS HEREBY GRANTED. Yes X No

18. APPLICATION VERIFICATION (SEE SPECIAL INSTRUCTIONS)

Application is hereby made for the activities described herein. I certify that I am familiar with the information contained in the application, and that to the best of my knowledge and belief, such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities.

Signature of Applicant or Authorized Agent — Date

Signature of Applicant or Authorized Agent — Date

Signature of Applicant or Authorized Agent

Date

☐ Corps of Engineers Revised 2011 ☐ IL Dept of Natural Resources ☐ IL Environmental Protection Agency ☐ Applicant's Copy

SEE INSTRUCTIONS FOR ADDRESS

LOCATION MAP

Revised 2011

☐ Corps of Engineers ☐ IL Dept of Natural Resources

☐ IL Environmental Protection Agency

☐ Applicant's Copy

PLAN VIEW

FOR AGENCY USE ONLY

Revised 2011

☐ Corps of Engineers ☐ IL Dept of Natural Resources ☐ IL Environmental Protection Agency ☐ Applicant's Copy

A4 – Agency Coordination

From: Bullock, Peter Y LRC
To: "Haaker, Anne"
Subject: RE: Jackson Park in Chicago (UNCLASSIFIED)
Date: Monday, October 29, 2012 11:41:00 AM
Attachments: JP CLC Proposal 25SEP2012.pdf

Classification: UNCLASSIFIED
Caveats: NONE

Anne, This is all that we have so far, the proposal that went to our Division. After Washington Park, the Corps is afraid to spend a lot of money on a project that may not go through. My usual concern is that the planned ecological restoration is based on pre-settlement conditions and fails to take into consideration the historic landscape. A meeting would be good. What dates would work for you in November?

Peter Y. Bullock
Archaeologist
USACE
CELRC-PM-PL-E
312-846-5587
FAX 312-886-2891

-----Original Message-----
From: Haaker, Anne [mailto:Anne.Haaker@Illinois.gov]
Sent: Monday, October 29, 2012 11:08 AM
To: Bullock, Peter Y LRC
Subject: RE: Jackson Park in Chicago (UNCLASSIFIED)

That appears to be a big change, although I have not looked at the original design. Do they have more developed plans? How would you like to proceed? We should probably have a face to face meeting with them in Chicago.

-----Original Message-----
From: Bullock, Peter Y LRC [mailto:Peter.Y.Bullock@usace.army.mil]
Sent: Monday, October 29, 2012 10:27 AM
To: Haaker, Anne
Subject: Jackson Park in Chicago (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Anne, The Chicago District's been approached by the Chicago Park District about a possible environmental restoration project at Chicago's Jackson Park. Since Jackson Park is on the National Register it seemed prudent after the Washington Park experience, to discuss it with your office first to see if it is even doable. Here is the complete list of potential actions.

Restore lagoons that are connected to Lake Michigan
- o Investigate measures that would increase estuarine fish and amphibian habitat
- o Minor grading for shoreline habitat improvement
- o Removal of non-native aquatic weed beds
- o Establishment of native aquatic weed beds and fringing marsh
- o Investigations into common carp exclusion areas

Restore and connect natural area patches
- o Minor grading for ephemeral wetlands
- o Non-native tree and shrub removal
- o Non-native herbaceous plant removal
- o Reestablish native plant communities: lacustrine, marsh, wet prairie and savanna

All of the light green areas on the map would be included, expect the Japanese Osaka Garden area on Wooded Island would not be touched. The question is would these actions fit with the Jackson Park listing on the National Register? If you remember, in particular the fringe wetland plants were an issue at Washington Park.

Sincerely

Peter Y. Bullock
Archaeologist
USACE
CELRC-PM-PL-E
312-846-5587
FAX 312-886-2891

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

From: Haaker, Anne
To: Bullock, Peter Y LRC
Subject: RE: Jackson Park in Chicago (UNCLASSIFIED)
Date: Monday, October 29, 2012 11:09:18 AM

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Anne, The Chicago District's been approached by the Chicago Park District about a possible environmental restoration project at Chicago's Jackson Park. Since Jackson Park is on the National Register it seemed prudent after the Washington Park experience, to discuss it with your office first to see if it is even doable. Here is the complete list of potential actions.

Restore lagoons that are connected to Lake Michigan
- Investigate measures that would increase estuarine fish and amphibian habitat
- Minor grading for shoreline habitat improvement
- Removal of non-native aquatic weed beds
- Establishment of native aquatic weed beds and fringing marsh
- Investigations into common carp exclusion areas

Restore and connect natural area patches
- Minor grading for ephemeral wetlands
- Non-native tree and shrub removal
- Non-native herbaceous plant removal
- Reestablish native plant communities: lacustrine, marsh, wet prairie and savanna

All of the light green areas on the map would be included, expect the Japanese Osaka Garden area on Wooded Island would not be touched. The question is would these actions fit with the Jackson Park listing on the National Register? If you remember, in particular the fringe wetland plants were an issue at Washington Park.

Sincerely

Peter Y. Bullock
Archaeologist
USACE
CELRC-PM-PL-E
312-846-5587
FAX 312-886-2891

Classification: UNCLASSIFIED
Caveats: NONE

Illinois Historic
Preservation Agency

FAX (217) 782-8161

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

Cook County
Chicago
Ecosystem Restoration at Jackson Park
6401 S. Stony Island Ave.

COEC
IHPA Log #017102912

December 10, 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:

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". Jackson Park Historic Landscape and Midway Plaisance were entered into the National Register of Historic Places on December 15, 1972.

We have reviewed the preliminary concept plans for the ecosystem restoration project and have the following comments:

1. As currently designed, the park retains a great deal of its integrity. While some of the original features have been modified, or removed, the remaining defining characteristics such as the overall plan developed by Olmstead, Olmstead, and Elliot as depicted on the 1905 map must be respected. These include, but are not limited to, the Golden Lady statue, the Osaka Garden, the current roadway configuration, the beach house, and the configuration of the lagoons.

2. We support the rehabilitation of some of the plantings located within the golf course, but would find the introduction of new water features and/or wetlands to be an adverse effect.

3. We support the effort to retain and enhance the lagoon shorelines and the addition, or re-establishment, of islands within the lagoons so long as they reflect the configuration of islands in the 1905 plan. We also support the re-establishment of communication between the various lagoons and Lake Michigan.

4. We also support the re-introduction and/or enhancement of plantings using Olmsted's 1896 plant list.

We look forward to working with the Chicago Corps of Engineers, the Chicago Park District, and our preservation partners on this complex and worthy project and will review items as quickly as possible as specific aspects of the project are proposed.

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

Sincerely,

Anne E. Haaker

Anne E. Haaker
Deputy State Historic
Preservation Officer
AEH

Illinois Historic Preservation Agency

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

Cook County PLEASE REFER TO: IHPA LOG #017102912
Chicago
6401 S. Stony Island Ave.

COEC
Ecosystem Restoration at Jackson Park

March 1, 2013

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 are in receipt of the North Lagoon Potential Habitat Layout, the Potential Habitat Layout w/ Olmsted Plan, and the Potential Habitat Layout. It is clear that an extensive amount of planning has taken place and we appreciate the respect paid to Olmsted's vision.

We would like to meet on site so that the biologists may explain the planting schemes to us and to clarify definitions such as the difference between wetlands and the sedge meadows proposed in the golf course. Please propose a date on which we might meet at the park.

Any other aspects of this worthy undertaking that are ready for our review should be submitted in advance of the meeting so that we may incorporate as many elements of the design into our conversation at the park as possible.

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

Sincerely,

Anne E. Haaker

Anne E. Haaker
Deputy State Historic
Preservation Officer
AEH

Illinois Historic Preservation Agency

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

Cook County
Chicago
6401 S. Stony Island Ave.

PLEASE REFER TO: IHPA LOG #017102912

COEC
Ecosystem Restoration at Jackson Park

April 26, 2013

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:

Thank you for hosting our meeting at Jackson Park on April 16, 2013. The tour helped us understand the planting scheme that is being developed for the park. We support the Ecosystem Restoration and appreciate the attention paid to Olmstead's plan for Jackson Park.

Please forward plans to us for review as they become available so that we can work towards a finding of no adverse effect for this undertaking. If you have questions please contact David J. Halpin, Cultural Resources Manager, at 217-785-4998.

Sincerely,

Anne E. Haaker

Anne E. Haaker
Deputy State Historic
Preservation Officer
AEH

Scoping Letter Distribution List

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

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

IDNR, Office of Realty and Environmental Planning
1 Natural Resource Way
Springfield, IL 62702
ATTN: Stefanie Fitzsimons

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

Illinois DNR
Illinois Coastal Management Program
160 N. LaSalle St,
Suite S-700
Chicago, Illinois 60601
ATTN: Diane Tecic

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

Friends of the Parks
17 N. State Street
Chicago, IL 60602
Attn: Erma Tranter

Jackson Park Advisory Council
c/o Jackson Park Fieldhouse
6401 S. Stony Island
Chicago, IL 60637
ATTN Louise Curry

Hyde Park-Kenwood Community Conference
1525 E 53rd St # 907
Chicago, IL 60615

Hyde Park Historical Society
5529 S Lake Park Ave
Chicago, IL 60637

Judy Pollock
Director of Bird Conservation,
Audubon Chicago Region
1718 Sherman Ave. #210
Evanston, IL 60201

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

Miami Tribe of Oklahoma
P.O. Box 1326
Miami, OK 74355
Attn: Mr. George Strack

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

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

Nottawaseppi 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

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

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

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
231 SOUTH LA SALLE STREET, SUITE 1500
CHICAGO IL 60604

REPLY TO
ATTENTION OF

Planning Branch
Environmental Formulation Section

24 OCT 2013

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

Dear Mr. Westlake:

The Chicago District is preparing a National Environmental Policy Act (NEPA) document on impacts of an ecosystem restoration project in the City of Chicago, Cook County, Illinois. As part of the scoping process the Chicago District would appreciate your comments. A map of the park is included with the project area colored blue.

Jackson Park was designed by Fredrick Olmsted in 1890 and is listed on the National Register of Historic Places. Ongoing consultations with the Illinois Historic Preservation Agency are being conducted as part of the planning process to insure all effort is made to adhere to the intent and visual aesthetics of Olmsted's original plans and designs for the park.

The project will include the restoration of several aspects of Olmsted's original plan, including the reconstruction of several former islands within the lagoons. The project will also focus on the restoration of native fish species within the lagoons, the removal of non-native invasive plants, and the planting of native plant species.

Please comment within 30 days, marking your reply to the attention of Mr. Peter Bullock, U.S. Army Corps of Engineers, 231 South La Salle Street, Suite 1500, Chicago, Illinois 60604. Questions may be directed to Mr. Bullock at 312/846-5587, or at peter.y.bullock@usace.army.mil. Your assistance is appreciated.

Sincerely,

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

Enclosure

Bullock PM-PL-E 10/17/2013
Veraldi PM-PL-E 10/17/13
Fleming PM-PL-E 10/17/13
Ott PM-PM
Davis PM-PL 10/18/13

Kickapoo Tribe of Oklahoma

P.O.Box 70
407 N. Hwy 102
McLoud, Oklahoma 74851

Administration Department
Phone: 405-964-7053; Fax: 405-964-7065
Email: kwilson@kickapootribeofoklahoma.com

October 30, 2013

U.S. Army Corps of Engineers
Chicago District
ATTN: Peter Bullock
231 South La Salle Street, Suite 1500
Chicago, IL 60604

RE: Ecosystem Restoration Project-Jackson Park
City of Chicago, Cook County, IL

Dear Mr. Bullock:

Thank you for consulting with the Kickapoo Tribe of Oklahoma in regard to the above referenced site(s). At this time, the Kickapoo Tribe of Oklahoma has no objections to the proposed improvement project at the intended site(s). However, in the event burial remains and/or artifacts are discovered during the development or construction process, the Kickapoo Tribe of Oklahoma would ask for immediate notification of such findings.

Should I be of any further assistance, please contact me at (405) 964-4227.

Sincerely,

Kent Collier
NAGPRA Contact
Kickapoo Tribe of Oklahoma

Cc: File

Illinois Historic
Preservation Agency

1 Old State Capitol Plaza, Springfield, IL 62701-1512

FAX (217) 782-8161
www.illinoishistory.gov

Cook County
Chicago
Ecosystem Restoration at Jackson Park
6401 S. Stony Island Ave.
IHPA Log #017102912

November 14, 2013

Peter Bullock
U.S. Army Corps of Engineers, Chicago District
231 S. LaSalle St., Suite 1500
Chicago, IL 60604

Dear Mr. Bullock:

We have reviewed the documentation provided for the referenced project Jackson Park Historic Landscape and Midway Plaisance were entered into the National Register of Historic Places on December 15, 1972.

In our opinion the project meets the Secretary of the Interior's "Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings" and we concur in a finding of no adverse effect pursuant to 36 CFR Part 800 provided that the following condition is met:

1. Plans are developed in consultation with our office.

Notifying our office of agreement with these conditions and their subsequent implementation constitutes compliance with Section 106 of the National Historic Preservation Act of 1966, as amended.

If you have any questions, please contact me at 217/785-5027.

Sincerely,

Anne E. Haaker

Anne E. Haaker
Deputy State Historic
Preservation Officer

From:	Pollock, Judy
To:	Veraldi, Frank M LRC
Subject:	[EXTERNAL] RE: Jackson Park 506 Restoration Project (UNCLASSIFIED)
Date:	Thursday, November 07, 2013 2:11:10 PM

HI Frank,

These are my comments about the plan, which looks very good for birds and habitat.

Ecological aspects related to birds:
It would be a good idea to have trees on a few of the islands to vary the habitat.

Page 2 - Some of the woody invasives you mention such as weeping willow at the water's edge and cultivars of crabapple and hawthorn should be retained for bird habitat. Warblers use all these extensively. It is very good that you are salvaging the larger unwanted trees to provide cover until the other desired ones grow.

Page 3 - you know, I'm sure, that these isolated islands are the biggest contributor to Canada Goose populations. Planting shrubs, as you have planned, seems like it might be a good way to deter them from nesting. You might want to address this.

Again leaving a few trees on the islands might be desirable to vary the habitat. Herons, kingbirds, orioles, etc. will use them to nest.

Shorter stature marsh grasses will be an excellent addition to the site.

Sedge meadow measures should include a very very low threshold for invasives since you can lose this to reed canary grass in a very short time.

Public acceptance measures:
Page 2 - Many of the invasives you mention such as Kentucky bluegrass, plantain, yarrow and white clover are widely recognized not to be very problematic in restoration settings. I think people will know that plants like these are not degrading habitat as you claim and it weakens your case to include them. On the other hand, I love your language about "disturbed prairie community" on that page. I find it confusing that planted nature shrubs are included in the paragraph about opportunistic native trees that you want to remove - it seems as if you are planning to remove them - I hope that's not the case.

Page 4 - this is both a habitat and a public acceptance issue - Dense shrubs near any water provide the best bird-watching and the best habitat. Many of these are invasive. The goal should be to phase in new vegetation while retaining as much of the density as possible - both for the sake of biodiversity and in order to appeal to birders who are one of the key user groups in the park. This was done on the island and a similar phased plan should be done here. The set of bullet points just above Fish Community Restoration should explicitly mention shrubs, probably in the middle bullet.

I would suggest you talk to Steve Thompson at Lincoln Park Zoo if you haven't' already - he might have some lessons learned about public reaction to rotenone treatment. Audubon would be very eager to be involved in the public outreach about this plan.

Have you thought about an osprey pole?

Thanks for sending it - please let me know if I should be providing these comments in some other format than this email

Judy
-----Original Message-----
From: Veraldi, Frank M LRC [mailto:Frank.M.Veraldi@usace.army.mil]
Sent: Tuesday, October 29, 2013 11:18 AM
To: Pollock, Judy

Subject: Jackson Park 506 Restoration Project (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hi Judy,

I was wondering if you received my message on Jackson Park? I was wondering if the attachment was too big to send through to you.

Cheers

Frank Veraldi, PM-PL-E
Ecosystem Planner
USACE, Chicago District
231 S. LaSalle St, Suite 1500
Chicago, Illinois 60604

Office: 312-846-5589
Work Blackberry: 312-860-5461
CHICAGO USACE WEB SITE: http://www.lrc.usace.army.mil
FACEBOOK: http://www.facebook.com/usacechicago

Classification: UNCLASSIFIED
Caveats: NONE

JACKSON PARK Project Meeting (Section 506) 11/18/2013

Peter Bullock	US Corps of Engineers	prefer. y. bullock ~~pbullock~~ @usace.army.mil
Nick Barkowski	USACE	nicholas.A.Barkowski@.usace.army.mil
Frank Veraldi	USACE	Frank.M.Veraldi@USACE.ARMY.MIL
John O'Connell	FOTP	OCONNEJ@FOTP.ORG
RAY JOHNSON	JPAC	FRIENDS OF THE WHITE CITY@gmail.com
Norma Bell	CPD Steward/JPAC	parrybell@amer.tech.net
Gail Parry	CPD Steward/JPAC	"
Mitch Murdock	CPD Natural Areas	mitchell.murdock@chicagoparkdistrict.com
~~James~~ S. Vanderoort	JPAC	vanbussand@sbcglobal.net
Gary Osmanski	JPAC Sec	garyosmanski@yahoo.com
Kenneth Newman	JPAC	rctgkcoach@hotmail.com
CARLA TOUR		
Vicky Ranney	Olmsted Papers	vranney@aol.com
Joseph Kelly	Boy Scout Commissioner JAPAC, Englewood Chamber of Commerce	773-331-1165
Louise McCurry	JPAC	commissioner761@comcast.net 773 844-2225
Erma Trantere	FOTP	Trantere@fotp.org

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

NOV 20 2013

REPLY TO THE ATTENTION OF:
E-19J

Peter Bullock
U.S. Army Corps of Engineers - Chicago District
231 N. LaSalle St., Ste. 1500
Chicago, Illinois 60604

RE: Scoping comments – Jackson Park Ecosystem Restoration; City of Chicago, Cook County, Illinois

Dear Mr. Bullock:

The U.S. Environmental Protection Agency has received U.S. Army Corps of Engineers (USACE) correspondence (hereafter: scoping document) dated October 24, 2013, requesting EPA's review of and comments on a proposed ecosystem restoration project at Jackson Park in Chicago, Illinois. Jackson Park was designed by renowned landscape designer Fredrick Law Olmsted in 1890. Jackson Park was the site of the 1893 World's Fair. Due to its significant historical and cultural history, Jackson Park is listed on the National Register of Historic Places.

EPA has reviewed your correspondence and figure provided for the aforementioned project. This letter provides our comments on the scoping document pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality's NEPA Implementing Regulations (40 CFR 1500-1508), and Section 309 of the Clean Air Act.

As proposed in your scoping document, the ecosystem restoration project proposes "restoration of several aspects of Olmsted's original plan, including the reconstruction of several former islands within the lagoons. The project will also focus on the restoration of native fish species within the lagoons, the removal of non-native invasive plants, and the planting of native plant species." Your scoping document did not provide any additional information such as the baseline health or status of the current environments and habitats, coverage and types of invasive species proposed to be removed, restoration activities proposed to be undertaken, or how USACE proposes to restore native plant communities within the project area. These elements, along with information on how USACE will ensure that non-native invasive species do not return to restoration areas, and how restoration areas will be protected from trampling and other disturbances, should all be analyzed and discussed in the upcoming environmental assessment (EA).

Due to the lack of information provided in your scoping document, EPA is unable to provide substantive comments or recommendations on your proposal.

Due to the sensitive nature of this area and its listing on the National Register of Historic Places, EPA recommends that, before you finalize plans, you coordinate with the State Historic Preservation Office (SHPO) and the Chicago Park District to ensure that the project will not detrimentally affect the original plans and design for Jackson Park or its historic designation. In the Draft EA, in addition to providing updates on the status of National Historic Preservation Act Section 106 consultation with the SHPO, EPA requests that you include copies of correspondence sent to, and received from, the SHPO. The Draft EA should also include figures defining the Area of Potential Effect (APE) for this project.

Coordination with the U.S. Fish and Wildlife Service (USFWS) and the Illinois Department of Natural Resources (IDNR) should also be undertaken to ensure that any proposals will not detrimentally effect any federally-endangered or threatened species or critical habitat or any state-endangered or threatened species or critical habitat that are likely to be present at the project site. The Fish and Wildlife Coordination Act[1] requires that agencies consult with the state wildlife agencies and USFWS concerning the conservation of wildlife resources where the water of any stream or other water body is proposed to be controlled or modified by a Federal agency or any public or private agency operating under a Federal permit. As this project potentially involves modifications to waterbodies, consultation with these agencies appears to be warranted.

The Draft EA should also discuss potential construction timeframes and seasons, and how visitors might be impacted based on typical uses of the area. Due to the likelihood of public involvement and site visitation during project implementation, installation of signage during project implementation (covering the different phases of construction, maintenance activities, and anticipated final results, among others) is strongly encouraged.

Additionally, the Draft EA should identify where the project documents will be available for review (e.g., libraries, community centers, etc.). Because the project has potential to impact residents and visitors, EPA recommends that USACE reach out to both types of users (i.e., post a notice of construction on the City of Chicago tourism website and Park District website, in addition to other forms of notification).

Finally, EPA recommends that a Monitoring and Adaptive Management Plan be developed. The plan should include a description of proposed monitoring activities at the project location, include quantifiable and measureable success criteria for the ecosystem restoration work, and should specify the length of the monitoring period(s). Additional information on the party(ies) who will maintain the site in perpetuity, as well as USACE's point of contact at the Chicago Park District, should also be included in the Draft EA.

Additional recommendations are as follows:

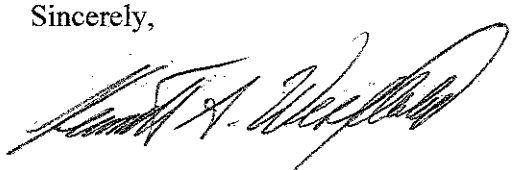
- EPA recommends that the Draft EA list all required permits (and their issuing agencies) that will be required for project implementation.
- EPA recommends that the forthcoming EA recommend specific measures and best management practices (BMPs) that will be undertaken to minimize construction impacts to air quality, water resources, soil, and other regulated resources.

[1] 16 U.S.C. §§661-666c; PL 85-624

- The Draft EA should include narrative information on site access, construction equipment staging, and how the project will be constructed. Measures to be taken to further minimize impacts to onsite lagoons, wetlands and sensitive aquatic habitats should be discussed in the Draft EA.
- The forthcoming EA should identify and discuss existing air quality and air quality impacts at the project location, and those potentially associated with future construction and operations at site of the proposed project. The proposed action's impacts on air quality should be assessed by evaluating the impact of the proposed actions on the National Ambient Air Quality Standards (NAAQS).
- The Draft EA should demonstrate that USACE has determined whether hazardous wastes as defined in 40 CFR part 261 (RCRA) will be generated, disturbed, transported or treated, stored or disposed, by the action(s) under consideration. If so, management of these wastes is regulated by 40 CFR parts 260-280 and transportation is governed by 49 CFR parts 171-199. An appropriate level of review regarding the hazardous nature of any materials or wastes to be used, generated, or disturbed by the proposed action, as well as the control measures to be taken, should be provided in the EA.
- The forthcoming EA should document how proposed future actions to be undertaken are in compliance with existing guidance and procedures, including, but not limited to: Environmental Justice: Guidance Under the National Environmental Policy Act, December 10, 1997; Final Guidance for Consideration of Environmental Justice in Clean Air Act 309 Reviews, July 1999; and Executive Order 12898.
- For all environmental impact categories requiring coordination with other Federal or state agencies, EPA recommends that you provide copies of both your letters to those agencies, as well as the responses from those agencies, as appendices to the EA.

Thank you for the early solicitation of EPA's comments regarding the proposal. We are available to discuss our comments with you in further detail if requested. Please send one paper copy and one CD-ROM copy of the Draft EA to my attention once it becomes available. If you have any questions about this letter, please contact Ms. Liz Pelloso, PWS, of my staff at 312-886-7425 or via email at pelloso.elizabeth@epa.gov.

Sincerely,



Kenneth A. Westlake, Chief
NEPA Implementation Section
Office of Enforcement and Compliance Assurance

cc: Anne Haaker, Illinois Historic Preservation Agency (SHPO)
Kathi Davis, IDNR
Shawn Cirton, USFWS
William Tillis, Chicago Park District

From:	Cirton, Shawn
To:	Bullock, Peter Y LRC
Cc:	Veraldi, Frank M LRC
Subject:	[EXTERNAL] Jackson Park Ecosystem Restoration Project
Date:	Wednesday, November 20, 2013 2:23:58 PM

Peter,

We received your letter indicating that the Chicago District is preparing a National Environmental Policy Act (NEPA) document for the Jackson Park ecosystem restoration project. As you know, Jackson Park is an important migratory bird stopover area. At this time, we are not aware of any particular issues that should be addressed during the scoping process regarding this project. We will plan to respond to your request to review the NEPA documents when they are complete.

Sincerely,

Shawn Cirton
Fish and Wildlife Biologist
USFWS - Chicago Illinois Field Office
1250 South Grove Avenue, Suite 103
Barrington, IL 60010
(847)381-2253 xt.19
(847)381-2285 Fax
Wednesdays and Fridays - USACOE - (312)846-5545
http://midwest.fws.gov/chicago

Bullock, Peter Y LRC

From: Bullock, Peter Y LRC
Sent: Thursday, November 21, 2013 9:25 AM
To: 'Haaker, Anne'
Subject: Jackson Park IHPA Log # 017102912 (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

IHPA #01710291 Jackson Park Ecosystem Restoration

Anne,
A brief update on the early planning for Jackson Park.

1) A tree survey is being conducted and has found a larger number of huge legacy trees from the 1893 fair than expected. So far these are primarily hackberry, white mulberry, and Gingko. All of the legacy trees (including non-natives) that are healthy will be saved.

2) Adding the former additional islands to the lagoon proved to be too expensive and is no longer part of this project. They may be done as a project at a later date.

3) The western bank of the West Lagoon (along South Cornell Ave.) is badly eroded and has collapsed in places. We propose to recontour that section of the bank and restore it to Olmsteds original configuration. The existing footpath along the bank will be replaced. This is the only area of planned earth work within the project. The rest of the project will be limited to invasive plant removal and replanting with native plants.

Earlier this week the Friends of the Parks held a meeting about Jackson Park with the Corps, the Park District, and the Jackson Park Advisory Council. It went well. There was a lot of community support expressed for the project. It was suggested that the Park District should hire a landscape architect with Olmsted experience since they have no one suitable on staff. The Corps has worked with landscape architects in the past and has no problem with the idea.

The idea here is to keep you folks updated as we work through the planning process with the Park District. If you have any questions, comments or concerns, please share. I am

Sincerely,

Peter Bullock

Classification: UNCLASSIFIED
Caveats: NONE

Bullock, Peter Y LRC

From: Fitzsimons, Stefanie [Stefanie.Fitzsimons@Illinois.gov]
Sent: Tuesday, November 26, 2013 4:03 PM
To: Bullock, Peter Y LRC
Subject: [EXTERNAL] Jackson Park Ecosystem Restoration

Hi Peter

This is going to be real informal because I see I missed the deadline on the comments on the scoping process for the Jackson Park Ecosystem Restoration project.

In the Environmental Assessment would you be able to provide a survey of fish species that you find in the lagoons whether they are native or non native species. Also a survey of the nonnative invasive plant species you plan on addressing and a list of the native species you plan on planting in their place. This will help IDNR OREP assess the possible impacts that may occur to the listed species in the vicinity of the project. I received the letter from USEPA and I concur with what they asked to be included in the EA as well.

I'm guessing you also contacted the Office of Water Resources in our Chicago building as well. They may have ideas on what needs to be included regarding water resources.

Sorry about the informality of the email.

Thanks for the opportunity to comment.

Stef

Stefanie Fitzsimons

Resource Planner - Impact Assessment

IDNR, Office of Realty and Environmental Planning

1 Natural Resource Way

Springfield, IL 62702

217-524-0501

Illinois Historic Preservation Agency

1 Old State Capitol Plaza, Springfield, IL 62701-1512

FAX (217) 524-7525
www.illinoishistory.gov

Cook County
Chicago
Ecosystem Restoration at Jackson Park
6401 S. Stony Island Ave.
IHPA Log #017102912

January 31, 2014

Peter Bullock
U.S. Army Corps of Engineers, Chicago District
231 S. LaSalle St., Suite 1500
Chicago, IL 60604

Dear Mr. Bullock:

Thank you for taking the time to bring us up to date on the Jackson Park Ecosystem Restoration project. We are glad to hear that the project design is coming along although we are disappointed to hear that lagoon island restoration will not be a part of the project.

As we stated in our earlier letter of October 13, 2013, it will be necessary to arrive at a plan that is based on the original Olmsted design. It would be most beneficial to add the expertise of an historic landscape architect to the design team to ensure a design, including detailed planting plans, is arrived at that meets the Secretary of the Interior's Standards and Guidelines for the Treatment of Cultural Landscapes. In your last email to our office, you stated that it was suggested that the Chicago Park District hire a landscape architect with Olmsted knowledge and experience and we strongly agree with that opinion.

We understood previously that this project is on a tight schedule due to the availability of these specific ecosystem restoration funds. Adding an Olmsted specialist to the team would most certainly assist that effort. We look forward to reviewing the design and planting plans as they are developed.

Sincerely,

Anne E. Haaker

Anne E. Haaker
Deputy State Historic
Preservation Officer

c: Adam Schwerner, Chicago Park District
Zhanna Yernakov, Chicago Park District

From: Bullock, Peter Y LRC
To: "Haaker, Anne"
Subject: Jackson Park Update (UNCLASSIFIED)
Date: Tuesday, February 25, 2014 8:38:00 AM

Classification: UNCLASSIFIED
Caveats: NONE

Jackson Park Ecosystem Restoration
IHPA Log# 017102912

Anne,

Here is a brief update on the Jackson Park Project.
The project has been approved by our Division to go forward.
The Chicago Park District has hired an Olmsted expert landscape architect.
The landscape architect has been made aware of the Corps rule regarding the use of only native plants, and is currently reviewing all of the various Olmsted plans for Jackson Park.
The architect will be meeting with Chicago District staff botanist and biologists in the next week or so to begin formulating plans for the parks restoration.

We look forward to having something to show you in the near future.

Sincerely,

Peter Bullock

Classification: UNCLASSIFIED
Caveats: NONE

Sign In Jackson Park 3-13-14

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

REPLY TO
ATTENTION OF

Planning Branch
Environmental Formulation Section

20 MAR 2014

Kenneth A. Westlake, Chief
NEPA Implementation Section
Office of Enforcement and Compliance Assurance
U. S. Environmental Protection Agency, Region 5
71 West Jackson Boulevard
Chicago, Illinois 60604

Dear Mr. Westlake:

The Chicago District, US Army Corps of Engineers (USACE) thanks you for providing a response to the USACE Letter on Scoping dated October 24, 2013 in the development of the Jackson Park Great Lakes Fisheries & Ecosystem Restoration (GLFER) Integrated Feasibility Study and Environmental Assessment (Integrated Report). Ensuring that high quality native habitats are increased and restored within the Great Lakes basin is imperative for the preservation of endemic biodiversity that has been adversely impacted over the past 200-years. The Jackson Park GLFER ecosystem restoration project is a unique site that noted landscape architect, Fredrick Law Olmsted restored to wetland and woodland, more than 100 years ago. Olmsted's use of natural landform morphology perfectly complements this ecosystem restoration project, especially since the subsurface sandy Equality Formation is still present. In order to ensure habitat quality is maximized and historic characteristics preserved, the Chicago District has taken your suggestions and recommendations into consideration and provides a response as follows:

1. USACE scoping letters are intended to inform Federal, State, local agencies, Indian Tribes and other interested persons that a Feasibility Study is about to begin so that interested parties have the ability to provide input into the current conditions of the site, independent of intended actions and focus on significant issues to be analyzed in depth. The USACE will utilize input from interested parties during the feasibility study process. The scoping letter is not intended to convey a plan or action to the regulating agency.

2. SHPO Coordination – Consultations with the Illinois Historic Preservation Agency (IHPA) have been ongoing since the project conception (letter of December 12, 2012). Because Jackson Park is listed on the National Register of Historic Places as an Olmsted designed park, it has been advantageous for the USACE to work closely with the IHPA to ensure that the park's integrity is maintained. Early consultations with the IHPA began at the conceptual level of the project (letter dated March 1, 2013). Staff from the IHPA participated in a site visit at Jackson Park on April 16, 2013 and expressed support for the project (letter of April 26, 2013). Approval of the conceptual plans for the Jackson Park restoration was received from the IHPA (letter of November 14, 2013). A progress report was presented to the IHPA (email of November 21, 2013) and acknowledged in a response (letter dated January 31, 2014). A second update that included notification of the CPD hiring of an Olmsted expert landscape architect was sent to IHPA (email dated February 25th, 2014). A preliminary design meeting with IHPA and the contracted Olmsted expert landscape architect began to discuss planting lists, planting schemes, and geomorphic contouring (March 13, 2014). The landscape architect will aid in the design of the planting and contouring

plan (memo to be provided with the NEPA document). The IHPA understands as well that native habitat benefits need to be accrued and the use of noxious, invasive and/or non-native plant species are not acceptable to both State and Federal Agencies. Consultations will continue to insure that this project is a success.

3. State and Federal Fish & Wildlife Coordination

a. The USFWS responded to the scoping letter with an email dated 20 November 2013. The USFWS indicated that they will conduct their review during the 30-day Agency and Public comment period. The USACE will be providing a determination of "no effect" to Federally Listed Endangered and Threatened Species or their critical habitats to USFWS for their consideration during the review period. The determination by USACE is supported by the absence of critical habitat and the absence of Federal T&E Species within the project footprint.

b. The Illinois Department of Natural Resources (ILDNR) is part of the Council of Lake, GLFER Subcommittee. This subcommittee is a selection panel comprised of Great Lake's State and Tribal representatives that determines if a candidate project has merit for acceptance into the GLFER Program. The subcommittee accepted Jackson Park into the GLFER program, and subsequent coordination with the ILDNR took place during the initial stage of feasibility phase of this study. The ILDNR provide comments as result of this coordination, which was incorporated into the plan formulation of plans and is summarized as follows:

> 1. It was not clear if you plan to remove non-native fish or just non-native plants during the restoration. We suggest that you do not attempt to remove non-native fish from the harbors for the obvious reason that non-natives from adjacent nearshore areas of the lake will rapidly repopulate the harbors. We also do not want to see stocked trout and salmon removed. Although not native to Lake Michigan, stocked trout and salmon are an important component in maintaining predator-prey balance in the lake's fish community and they provide for a more diverse angling experience for area fishers. Establishing a salmonine fish community and managing for predator-prey balance are important concepts outlined in the Fish Community Objectives for Lake Michigan (Lake Michigan Committee) and pursued by Illinois' Lake Michigan fisheries management program.
>
> *The USACE concurs with Comment 1 and can confirm that there would be no fish eradication in an open and connected system for the exact reasons the ILDNR has provided. The North Lagoon would be targeted for invasive fish species removal since it is a closed and controllable system. Although counterintuitive to ecological restoration and invasive species concerns throughout the region, stocked, non-native Salmonids* (Salmoninae) *would not be affected by the Federal Interest Alternative.*
>
> 2. We suggest that any manipulations planned for the harbor shoreline are done in a way to provide better access and sight-lines for anglers so that the area will remain useful for shore anglers and as safe as possible.

The USACE concurs with Comment 2 and has plans to maintain public access for fishing. It is anticipated by the USACE that fishing access would actually be improved, as well as the angling experience itself.

3. We would recommend not connecting the lagoon to the lake at this time due to hydrology issues with the lake's current low water levels and the potential for an influx to the lagoon of the numerous aquatic invasive species that exist in nearshore areas of the lake (e.g., zebra and quagga mussels, round goby and white perch among others).

The USACE concurs with Comment 3 and has recommended in the Federal Interest Determination (FID) that the lake connection option for the North Lagoon be removed. At a site visit on 25 February 2013, USACE restoration ecologists confirmed the decision to maintain the current conditions (current hydrology/invasive species impacts).

4. When restoring the North Lagoon and Columbia Basin, we suggest that you follow the principles used by the forest preserve districts of Cook and DuPage counties and create "fishing access" points in strategically located positions around the lagoon. This will give people a place to fish without having to cut back trees or stomp down plants to access the shoreline. Flag stone outcrops with paths leading to them provide nice access points for anglers and wildlife watchers as they move between locations searching for their next big fish or wildlife picture.

The USACE concurred with Comment 4 and will work with the CPD's public fishing group, the ILDNR and other interested parties on how to best incorporate high quality fishing access points while maintaining the ecological integrity of the immediate area surrounding the access point. Currently, the USACE cannot cost share in the design or implementation of recreational features of this project. Any costs associated with fishing access construction will be the responsibility of the non-Federal sponsor.

5. As indicated above, the Jackson Park area is flush with anglers craving access and opportunities. Access to the lagoon is currently hampered by somewhat steep inaccessible shorelines and obstructive oftentimes non-native vegetation. It makes sense to re-contour the shorelines, establish good (safe) sight-lines and restore habitat that could help maintain a balanced fishery and benefit other wildlife species, as well (e.g., migrating birds, amphibians and reptiles). A combination of native sport fish, including largemouth bass, black crappie, bluegill or pumpkinseed, and channel catfish and native non-game species, such as blackchin shiner, blacknose shiner, Iowa darter, banded killifish, central mudminnow, lake chubsucker or grass pickerel can be introduced to create a diverse fish community while still maintaining fishing opportunities.

The USACE concurs with Comment 5 and shares the same end point vision for the native fish assemblage as a whole, instead of focusing on a small suite of game fish. The USACE will work with the ILDNR, CPD and Shedd Aquarium to develop alternatives for reestablishing the native pond fish assemblage for the North Lagoon during the Feasibility Study.

c. The EcoCat was consulted 09 October 2013 and provided information that the Peregrine Falcon (*Falco peregrinus*) has known occurrence here. Since there is no available nesting habitat within the study

footprint, the USACE has determined that there would be "no effect" to the stability of the Peregrine Falcon City of Chicago population. This species most likely nests on window ledges or other structures on the vertical faces of nearby high rises within Hyde Park. This project is predicted to benefit this species due to an increase in hunting habitat and prey species (small birds).

d. An email from the Impact Assessment Branch of the ILDNR was received on 26 November 2013 requesting lists of fish and plant species, both the invasive ones to be removed and the native ones to be established. This information is currently documented in Section 2.3 and 4.1 of the Integrated Report and Appendix A - Compliance, Coordination & Information. The ILDNR Coastal Zone Management will also be coordinated with during the 30-day Agency & Public Review comment period to ensure consistency with CZM goals and objectives.

4. USACE and the CPD have intentions to post signage and information throughout the park before, during and after construction. The signage would be tailored to the phase and provide concise and critical information on current conditions and importance of activities.

5. The 30-day Agency and Public Review will be publicized to the fullest extent, primarily using social media avenues and conventional signage within the park and park house. The CPD has hired a consultant to bolster the quality and intensity of the public communication aspect of the project, including signage.

6. The monitoring and adaptive management plan is currently documented in Appendix F – Monitoring & Adaptive Management. The prime criterion is to maintain the Mean C coefficient of the Floristic Quality Assessment as identified in the Integrated Report and Monitoring Plan. The secondary target is the fish and mussel community within the East and West Lagoons, since this will be an important replication of a Lake Michigan coastal pond community, such as the Grand Mere Lakes in Berrien County, Michigan. Adaptive management should be minimal for a project that is designed to ebb and wan with present site conditions. Climate change is a long term natural process, and the heterogeneity of the native plants should prove adaptable to shifts in temperature and precipitation.

7. All potential permits are currently listed in Section 6.4 of the Integrated Report. The USACE is currently determining what permits will be required by law in order to construct this project. Section 401 Water Quality Certification will be acquired via the Regional 5 Permit, which is a more refined version of the Nation Wide 27. Actions triggering 401 Certification include placing stacked limestone flags for mudpuppy habitat and a removable metal ¼" fence to separate the Columbia Basin and East/West Lagoon fish communities.

8. General BMPs are recommended in Section 6.2 of the Integrated Report and will be detailed during the design phase.

9. Staging and construction considerations are currently documented in the Appendix B – Civil Engineering, to be further detailed during the design phase.

10. All direct, indirect and cumulative effects are currently documented in Chapter 5, which includes Air Quality. The public document will be an Integrated Report, which means the whole document and appendices should be reviewed as one cohesive discussion. Chapter 5 should not be reviewed as a standalone Environmental Assessment.

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CHICAGO IL 60606-7206

11. USACE has determined, avoided and documented areas of potential HTRW. The HTRW Analysis is currently documented in Appendix D – Hazardous, Toxic and Radio Active Wastes, and in the Integrated Report in Section 2.2.4.

12. Compliance with Law, Statutes and Regulations are currently documented in Section 5.6.

13. The USACE has paper reduction guidelines, therefore, an electronic copy will be provided directly to Liz Pelloso (elizabeth@epa.gov) via the USACE AMRDC Safe Access File Exchange. All regulatory agencies will receive the 30-day Agency and Public Review Integrated Report in this manner to ensure and time-stamp receipt. The Agencies may then internally distribute the documents as needed.

Thank you for your input prior to public review of the Jackson Park GLFER Integrated Report. The Chicago District is available to discuss the project in further detail if requested. If you have any questions about this letter or project, please contact Mr. Frank Veraldi of my staff at 312-846-5589 (Frank.M.Veraldi@usace.army.mil or Mr. Peter Bullock for Cultural Resources at 312-846-5587 (Peter.Y.Bullock@usace.army.mil).

Sincerely,

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

CC : cc: Anne Haaker, IHPA
Rachel Liebowitz, IHPA
Karen Miller, ILDNR
Kathi Davis, IDNR
Vic Santucci, ILDNR
Diane Tesic, ILDNR
Stefanie Fitzsimons, ILDNR
Shawn Cirton, USFWS
William Tillis, Chicago Park District

JACKSON PARK FIELD WORKSHOP NOTES

Jackson Park Fieldhouse 23-24 April 2014

PROJECT:	Jackson Park Natural Areas
LOCATION:	Fieldhouse, Jackson Park, 6401 S Stony Island Ave
ATTENDANCE:	Julia Bachrach, Robbie Silwinski, Patricia O'Donnell, Peter Viteretto, both days Ganiyat Faye Leffler, Wednesday Zhanna Yermakov, part of Wednesday Michael Lange, start up and summary meetings Robert Karr, summary meeting Andrew Roscoe, start-up meeting and Thursday afternoon review

An introductory discussion focused on the basic objectives of field workshop to discuss proposed work on the ground and develop approaches toward detailing the work in order to determine responsibilities. The project directive is to achieve the Corps goals of habitat units with integrated Olmsted landscape character to revitalize the park landscape as a cultural and natural resource.

Chicago Park District, Project 120 and Heritage Landscapes wish to remove the East Lawn acreage from the Corps project. Part of the focus of the field review was directed toward defining places where that acreage could be swapped out for other contiguous project locations. Robbie noted Thursday morning that he had discussed the issue with Frank and that it could be accommodated. A plan from CPD noting new areas of equal acreage is needed. The definition of these areas on a plan or aerial is a near term task for us to develop and send to the Corps.

Over the two days the team field walk reviewed existing circulation and areas where new circulation is needed to link to historic paths due to changed park landscape. There is a clear need to rebuild the existing paths and design new path segments to address the changed land masses. For logical construction sequence the path system should be reconstructed and newly built in parallel with the Corps project as planting areas will be defined along these paths.

The team discussed grading along east edge of east lagoon as a character element of the work. There is a need to retain and strengthen an Olmsted character of edge with undulating profile, rather than same gradient and regular edge. New path segments would bring park users to overlooks and paved waterfront locations from the walk along Cornell Avenue. New triangular path intersection would be formed where needed. There is an interesting example of a slope and knoll between path and lagoon to be preserved, that includes concave and convex forms unlike the balance of the sloped bank. Faye has a preliminary grading plan for this area that she will send to us for review and comment. Since there is limited grading (8.2 acres) in the Corps project, defined principally as banks and wet margins, a

functional approach to the work may be for Faye to develop draft grading plans and Peter and Patricia to provide detailed comments for refinement.

Faye mentioned that part of the poor condition Cornell Ave. path was included in the Corps project. A potential fix for extensive landing area at the former boathouse was discussed. It was agreed that a partial demolition and construction of new side paths to reach paved waterside platform would be a cost effective approach. The wood fishing dock should be removed and paths developed into the corner area to provide an Olmstedian movement pattern and take advantage of the overlook view down the length of the lagoon where some of the large limestone slabs may remain as a water edge hardening solution. Islands are unmanaged today and require removals of volunteer staghorn sumac, deadwood with new replacement plantings arranged for a scenic composition. A discussion of downed trees resulted in agreement that in general very limited deadwood would remain within the park landscape. There should be some trees for mass and shadow. More native trees would be planted along the lagoon margins as well. Canopy composition needs to be developed for specific areas in relation to the dominant trees identified in the inventory. A preliminary discussion of edges or markers to define planting zones noted a need and a solution to be developed as the project proceeds.

There was fruitful discussion of the preliminary plant palette in the field by area and type listed here as A through J. The following are taken from workshop field notes without checking back to plant lists so there are likely a number of misspellings to fix.

A **Foredune**

On sandy soils, near Lakeshore Drive with potential to use spoils of grading and dredging operations to form low berms in specific areas.
Trees to be added
Hypericum kalminum
Juniperus horizontalis
Prunus pumila
Pinus banksia
Hudsonia tomentosa with gray foliage favored by Manning
Calamogrostis longifolia -sand reed may not want grasses and instead favor shrubs
Arctostaphyllus

B **Upland area**

Quercus alba/white oak
Quercus velutina/black oak
Corylus americana/hazelnut
Amelanchier laevis
Amelanchier canadensis
Amelanchier interior
Cercis canadensis/Redbud
Cornus siberica/redtwig dogwood
Vaccinium pallidum/downy blueberry
Rhus aromatic/fragrant sumac
Diervilla lonicera/

Polystichum arcostichoides/ Christmas fern
Gaylussacia brachycera/box huckleberry
Vaccinium angustifolium/low bush blueberry
plus spring ephemerals

C **Wet Margin** along water **edges**
Trees to be added
Acer rubrum/Red maple
Platanus occidentalis/American sycamore
Salix nigra/black willow
Spirea tomentosa
Spirea alba
Onoclea sensibilis/sensitive fern
Interrupted fern
Equistem palustre
Equistem fluviate
Thelypteris palustris/Eastern marsh fern

D **Dry Upland, Sunny**
Trees to be added
Tilia americana/American basswood
Salix humilis/willow
Comptonia peregrina/sweet fern
Pteridium aquilimum/bracken fern

E **Sedge Meadow**
Trees to be added
Caltha palustris
Carex haydenii
Onoclea sensibilis
Iris virginia
Carex stricta
Schizachyrium scoparium/little bluestem
Geranium maculatum
Maianthemum stellatum

F **Sedge Lawn** in part shade, sedge with spring ephemerals
Trees to be added
Carex pennsylvanica (dominant plant in this grouping)
Antennaria plantaginaria
Antennaria neglecta
Pedicularis canadensis 6" yellow flower
Hepatica acutiloba
Hepatica obtusfolia
Commandera umbellata/bastard toadflax (is hemi-parasitic to keep grasses down)

G **Future Woodland** park has lost canopy over time, areas of full future canopy to be developed

Trees add hardwoods and understory trees over ground plane forbs
Canopy
Carya cordifomis/Hickory
Carya macronatus
Carya ovata
Carya tomentosa
Juglans nigra/black walnut
Tilia americana/American basswood
Quercus alba/white oak
Quercus macrocarpa/burr oak
Quercus velutina/black oak
Understory
Carpinus betulus/Hornbeam
Cercis canadensis/Redbud
Crateagus crusgalli/cockspur hawthorn
Malus coronaria/
Malus ionensis/crabapple
Ostrya virginia/musclewood
Forbs
Solidago ulmifolia/zigzag goldenrod
Phlox divaricata/woodland phlox
Erigeron pulchellis
Mertensia virginica/bluebells
Ceanothus herbaceus/Jersey tea
Ceanothus americanus/New Jersey tea
Gaylussacia brachycera/box huckleberry
Vaccinium ?
Add woodland mix

H **Islands** scenic purpose to be integrated with habitat wet margins and uplands of islands
Trees for canopy arching over water and sky silhouette
Plantings to suppress invasives and colonies of staghorn sumac
List to be developed

I **69th Street margins along Golf Course**
Understory trees over forbs and bulbs
Cercis canadensis/Redbud
Crateagus crusgalli/cockspur hawthorn
Malus coronaria/
Malus ionensis/crabapple

J **North 59th St Harbor Foredune**
Opuntia/prickly pear cactus
Spartina humefusa
Hypericum kalminum
Prunus pumila 6 ft tall

Summary

Schedule sent by Faye was reviewed with key dates called out. The need for the tree survey and more detailed locations of existing paths as soon as possible was noted.

Paths are a priority issue. The potential to obtain transportation funding for the paths was discussed. Michael noted that the first step was designating the paths as bicycle or multiple-use bicycle and pedestrian routes. A rough estimate of pathways length was developed for the field work carried out on Monday which resulted in approximately 31,300 lf at 12 feet in width for 375,600 sf. A ballpark estimate for just those paths at $15/sf yields $5.63 M. This amount represents about 70% of the paths adjacent to the Corps project areas with those reviewed on Thursday in the same very poor condition and in need of reconstruction.

Workshop discussions led to a preliminary summary of the 130 acres within the Corps natural areas project as targets for the design phase with the following categories, and very rough cost estimates assigned:

Shrubs	20 acres	$2.8 M 1 per 6sf/140,000- 1 gallon pots $20 each
Carex Turf	30 acres	$2.2 M 18" spacing of plugs plus ephemerals
Marine and margins	20 acres	$2.0 M include dredging, grading and planting
Seeded low meadow	60 acres	$1.2 M
Future Woodland	undefined- possibly 20 acres from the seeded category	
Invasive removals		$ .5 M
Totals	130 acres	$8.7 M which is above the $7.9 M budget by $.8M

This rough estimate is to be refined as the collaboration proceeds.

Next Steps

The following steps were defined or implied during the course of the field workshop:

- Patricia to develop field workshop notes into a memo to distribute, which is this memo.
- Faye to provide preliminary grading plan for Heritage review and comment, drawing provided via ftp site Monday 28 April 2014.
- Robbie and Patricia will exchange the preliminary plant lists (in this memo) refining and augmenting by type and area to develop more complete lists for team review and for use in the planting plan.
- Heritage Landscapes and Chicago Park District to develop alternate acreage plan for contiguous project areas.
- Heritage Landscapes to develop samples of planting plan approach for Corps and CPD review and comment.

- CPD, P120 and Heritage to collaborate on defining park path needs for areas adjacent to the Corps project and overall, work on bicycle/pedestrian multi-modal designation and begin process of seeking funding for path construction.

Notes prepared by Heritage Landscapes. Please respond to this draft with any comments of clarifications within 5 work days.

2014

NO OBJECTION
U.S. Fish & Wildlife Services
Chicago Illinois Field Office
acting Shawn Cirton 5-2-14
Supervisor Date

Jackson Park Section 506 Great Lakes Fishery & Ecosystem Restoration Study

Draft Detailed Project Report & Environmental Assessment

Alternative Formulation Briefing Document - BackCheck

Chicago, Cook County, Illinois

Chicago District USACE
Chicago Park District
April 2014

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

MAY 05 2014

REPLY TO THE ATTENTION OF:

E-19J

Peter Bullock
U.S. Army Corps of Engineers - Chicago District
231 N. LaSalle St., Ste. 1500
Chicago, Illinois 60604

RE: Draft Environmental Assessment – Jackson Park Ecosystem Restoration; City of Chicago, Cook County, Illinois

Dear Mr. Bullock:

The U.S. Environmental Protection Agency has reviewed a Draft Environmental Assessment (Draft EA) on a proposed ecosystem restoration project at Jackson Park in Chicago, Illinois. This letter provides our comments on the Draft EA, pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality's NEPA Implementing Regulations (40 CFR 1500-1508), and Section 309 of the Clean Air Act.

Jackson Park, a city park owned by the Chicago Park District (CPD), was designed by renowned landscape designer Fredrick Law Olmsted in 1890. Due to its significant historical and cultural history, Jackson Park is listed on the National Register of Historic Places as an historic landscape.

The CPD has requested that the U.S. Army Corps of Engineers (USACE) initiate a study under Section 506 of the Water Resources Development Act (2000) - Great Lakes Fishery and Ecosystem Restoration authority to ascertain the feasibility of restoring important migratory bird, fish and wildlife habitat within the natural area portions of Jackson Park. The project need has been summarized as the historic loss of significant migratory bird, fish, and wildlife habitats within the park. The purpose of the Draft EA is to identify the most environmentally beneficial, cost effective and publicly-supported habitat restoration project to restore degraded natural resources lost by the historic alteration of coastal habitat via the development of Jackson Park. Specifically, the Draft EA's purpose is to identify problems and solutions (and implement an ecological restoration plan) that restores aquatic and buffer habitats and addresses invasive species issues, in order to provide essential habitat for native fish, migratory birds, reptiles, and amphibians within a highly urbanized area. The study area consists of various natural area parcels of land totaling approximately 155 acres, all of which are owned by the Chicago Park District (CPD).

The Draft EA discusses three proposed actions, including four action alternatives and the "No Action" alternative. Proposed Actions are as follows:

Alternative 1: No Action

Alternative 2: (MH) Mudpuppy Habitat, (IPR) Invasive Plant Species Removal, (P) Pond , (EI) Existing Islands, (FF) Fish Community Separator, (FIR) Invasive Fish Species Removal, (FNS) Native Pond Species Introduction

Alternative 3: (MH) Mudpuppy Habitat, (IPR) Invasive Plant Species Removal, (P) Pond, (EI) Existing Islands, (FF) Fish Community Separator, (FIR) Invasive Fish Species Removal, (FNS) Native Pond Species Introduction, (GC) Geomorphic Contouring, (VP) Vernal Pool, (SM) Sedge Meadow, (OSW) Savanna / Open Woodland

Alternative 4: (MH) Mudpuppy Habitat, (IPR) Invasive Plant Species Removal, (P) Pond, (EI) Existing Islands, (FF) Fish Community Separator, (FIR) Invasive Fish Species Removal, (FNS) Native Pond Species Introduction, (GC) Geomorphic Contouring, (VP) Vernal Pool, (SM) Sedge Meadow, (OSW) Savanna / Open Woodland, (FM) Fringe Marsh

Alternative 5: (MH) Mudpuppy Habitat, (IPR) Invasive Plant Species Removal, (P) Pond, (EI) Existing Islands, (FF) Fish Community Separator, (FIR) Invasive Fish Species Removal, (FNS) Native Pond Species Introduction, (GC) Geomorphic Contouring, (VP) Vernal Pool, (SM) Sedge Meadow, (OSW) Savanna / Open Woodland, (FM) Fringe Marsh, (NIC) New Island Creation, (NI) New Island

The plan that reasonably maximizes net National Ecosystem Restoration (NER) benefits and is consistent with the Federal objective, authorities and policies, is identified by USACE the NER plan. The NER Plan is considered the Preferred Plan for direct, indirect and cumulative effects assessment under NEPA. The Draft EA identified Alternative 4 as the NER/Preferred Plan. The Project Descriptions associated with the NER/Preferred Plan are as follows:

- **Mudpuppy Habitat (MH)** – Creation of two mudpuppy spawning habitat areas within the South Lagoon. Each habitat area will consist of nine 3' by 3' by 3" stones layered in a pyramid, to be placed over 6" of gravel.
- **Invasive Plant Species Removal (IPR)** – Treatment of 113.3 acres of invasive and non-native plant species from all plant communities located with Jackson Park.
- **Pond (P)** – Installation of submergent macrophytes within the East and West Lagoons (referred to together as the North Lagoon) and golf course slough; plantings total approximately 17.7 acres.
- **Existing Islands (EI)** – Existing small island areas within the North Lagoon will be planted with wet prairie grass, forb, and shrub species. Approximately 2 acres of total small island habitat will be planted.
- **Fish Community Separator (FF)** – Separation of the Columbia Basin game fishery from the fish communities of the North Lagoon via installation of ¼" meshed fish fence between the Columbia Basin and North Lagoon.

- **Invasive Fish Species Removal (FIR)** – Inventory of all fish in the North Lagoon, followed by a collection of native species to be set aside for reintroduction. Then, a drawdown of the North Lagoon, followed by administration of rotenone to kill non-native and invasive fish species.
- **Native Species Reintroduction (FNS)** – Reintroduction of native mussel, fish and newt species into the North Lagoon.
- **Geomorphic Contouring (GC)** - This measure consists of contouring a total of approximately 8.3 acres of bank areas (in areas of the North Lagoon, South Lagoon, and Jackson Park Golf Course) that are unnaturally steep, in order to expose hydrology in certain reaches and promote healthy native plant cover.
- **Vernal Pool Creation (VP)** – Construction of ephemeral wetlands meant to hold water long enough to support critical life cycles of amphibians and invertebrates, but dry out/draw down in the summer, as natural vernal pools do.
- **Sedge Meadow (SM)** – Reestablishing and replanting of a total of 2.3 acres of sedge meadow areas in the Jackson Park Golf Course.
- **Oak Savanna/Open Woodland (OSW)** – Restoration of approximately 25 acres of existing degraded oak savanna habitat through plug planting, overseeding, invasive species removal, and prescribed burns.
- **Fringe Marsh (FM)** – Establishment and planting of a total of 20 acres of fringe marsh in both the North and South Lagoons.

USEPA's comments on the Draft EA are as follows, and are grouped by subject.

WILDLIFE

- The Draft EA proposes installation of two rock outcroppings to serve as mudpuppy[1] habitat. However, the Draft EA is silent as to whether or not there is an existing mudpuppy community in Jackson Park. Furthermore, it is unclear why the mudpuppy rock outcroppings are proposed to be installed in the South Lagoon, which, while it functions as a lagoon with a direct connection to Lake Michigan, is also a boat/yacht harbor.
  Recommendations: **The Final EA should clarify if mudpuppies are currently using, or were historically known to have used, any of the lagoons in Jackson Park. If there is no history of mudpuppy use in Jackson Park, the Final EA should clarify how creation of mudpuppy spawning habitat in a lagoon that also serves as a harbor should be clarified.**

- Page 6 of Appendix F - Monitoring & Adaptive Management states that "*Monitoring amphibian populations would be coupled with other monitoring activities and would note the presence or absence of amphibian species. Specific monitoring for the presence/absence of mudpuppies would be conducted at the locations mudpuppy habitats was [sic] installed.*"
  Recommendation: The Final EA Appendix F should be amended to include additional, specific information on proposed efforts to monitor for presence of the mudpuppy in areas of mudpuppy habitat installation.

[1] Mudpuppies (*Necturus maculosus*) are state-threatened salamanders that spend their entire life underwater, foraging rocky shoals for crayfish. Mudpuppies have been historically linked with the Chicagoland area and within park lagoons that have a connection with Lake Michigan (such as Jackson Park). Mudpuppies require an entirely aquatic habitat with a sheltered surface, such as limestone slabs, to deposit their eggs onto during nesting season.

- The Draft EA - Description of Native Species Reintroduction (FNS) states on page 38 that four species of mussels are proposed to be introduced (location unspecified) and results monitored. However, page 6 of Appendix F - Monitoring & Adaptive Management states, "*Should native mussels be reintroduced into the Jackson Park lagoons, a specific monitoring plan to document introductions, recruitment and establishment would be drafted.*" While the Draft EA states that mussels will be introduced, Appendix F language describes uncertainty in mussel reintroduction.
  Recommendation: These discrepancies should be amended in the Final EA and appendices.

- The Draft EA - Description of Native Species Reintroduction (FNS) states on page 38 that the eastern newt is proposed to be introduced to ponds and vernal pools and results monitored. However, page 6 of Appendix F - Monitoring &Adaptive Management states, "*If the reintroduction of Eastern Newt is implemented, a detailed and specific monitoring plan could be contracted out to a local institution such as the Field Museum of Natural History, Illinois Natural History Survey or Shedd Aquarium.*" While the Draft EA states that the eastern newt is proposed to be reintroduced, Appendix F language describes uncertainty in reintroduction of the eastern newt.
  Recommendation: These discrepancies should be amended in the Final EA and appendices.

- The Draft EA - Description of Native Species Reintroduction (FNS) states on page 38 that the eastern newt is proposed to be introduced to ponds and vernal pools and results monitored. However, the Draft EA and Appendix F - Monitoring &Adaptive Management are both silent on the timeframes for introduction of the eastern newt post-construction of vernal pools.
  Recommendation: The Final EA and Appendices should include additional information on the timing of introduction of species in relation to timing of construction activities.

MONITORING/ADAPTIVE MANAGEMENT

- Pages 68-69 of the Draft EA briefly mention components and parameters of the Jackson Park ecosystem restoration project to be monitored for a period of 10 years. Component 2 – Biological Response, #4, mentions "Other Fish and Wildlife Communities" but does not specifically mention amphibian or mussel monitoring. As noted earlier in this letter, Appendix F does not mention any specifics of monitoring for amphibians or mussels.
  Recommendation: Both the Final EA and Appendix F should be updated to include information on mussel and amphibian monitoring.

- Page70 of the Draft EA states, "*It will be required to monitor for the presence of native fish species that will be introduced into Jackson Park lagoon. It will also be encouraged to monitor for the presence of native bird and amphibian species, especially mudpuppies.*"
  Recommendation: Both the Final EA and Appendix F should be updated to require monitoring for amphibians (mudpuppies and the eastern newt) and mussels, as well as native fish and other fauna.

AGENCY COORDINATION

- From information provided in the Draft EA, USACE expects to receive "no effect determination" for impacts to Federally-endangered or threatened species from the U.S. Fish and Wildlife Service (USFWS) and for impacts to state-endangered or threatened species from the Illinois Department of Natural Resources (IDNR). USACE also expects to receive a coastal zone consistency determination from IDNR. Finally, coordination with the Illinois Historic Preservation Agency (IHPA) has been ongoing since the start of this project.
  Recommendations: EPA requests that you provide copies of the following documents in the Final EA:
  - **The "no effect" determinations for threatened and endangered species from the USFWS and the IDNR;**
  - **Correspondence sent to and received from USFWA and IDNR regarding Fish and Wildlife Coordination Act consultation;**
  - **Confirmation from the IDNR that this project meets coastal zone consistency determination requirements;**
  - **Correspondence/confirmation from the IHPA stating that no historic properties are affected within the project's Area of Potential Effects.**

CLARIFICATION/DISCREPANCIES/OTHER ISSUES

- Page 34 of the Draft EA describes the Invasive Plant Species Removal (IPR) as 113.3 acres, but Plate 3 shows IPR areas as totaling 115.3 acres.
  Recommendation: This discrepancy should be amended in the Final EA and appendices.

- Page 5 of Appendix B says 12 vernal pools will be constructed, but Plate 3 shows 10 vernal pools. The Draft EA is silent as to the number of vernal pools to be constructed.
  Recommendation: This discrepancy should be amended in the Final EA and appendices. The Final EA should include the total number of vernal pools to be constructed.

- Page 5 of Appendix B says the depths of the vernal pools will be 4 to 6 feet and have bottom areas varying between 100 square feet and 1000 square feet. However, page 34 of the Draft EA states that says vernal pools will be "small excavations" that would hold "no more than 6" of standing water."
  Recommendation: The discrepancies on vernal pool depth and size should be amended in the Final EA and appendices. The Final EA should include additional information on the size and depth of vernal pools that matches information in Appendix B and the Plates.

- Page 14 of Appendix A makes reference to Spring Creek in the Section 404(b)(1) alternative analysis; it is assumed this is an incorrect relic from a prior document.
  Recommendation: This discrepancy should be amended in the Final EA and appendices.

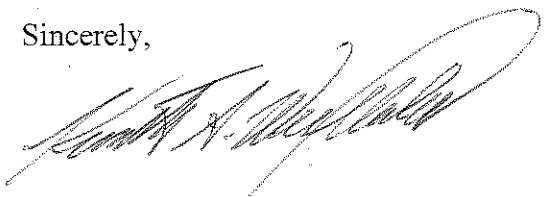
- Page 67 of the Draft EA discusses an existing concrete sidewalk that must be removed to implement oak savanna/woodland ecosystem restoration activities, and that the sidewalk will be replaced by USACE. The sidewalk is proposed to be replaced in-kind, as a new concrete sidewalk. Replacement of this sidewalk is an excellent opportunity to install a green sidewalk made of permeable pavement/porous pavers.
  Recommendation: Due to the sensitive nature of Jackson Park, and to support the goals of ecosystem restoration and water quality improvements at Jackson Park, EPA strongly encourages USACE to install a permeable sidewalk onsite. This should be reflected in the Final EA, as well as page 8 (#27) of Appendix B.

- The Draft EA is silent regarding how any of the ecosystem improvements will benefit public access or fishing access by the public.
  Recommendation: The Final EA should include information on how these ecosystem restoration activities benefit the public, particularly as it will relate to fishing access at Jackson Park.

Thank you for the early solicitation of EPA's comments regarding the proposal; we appreciate that USACE took EPA scoping comments into consideration when preparing the Draft EA. We fully support this project as it will provide beneficial habitat and ecological restoration in Jackson Park.

We look forward to reviewing future NEPA documents prepared for this project. Please send one hard copy and one CD of the Final EA for this project to this office when it is released. If you have any questions about this letter, please contact Ms. Liz Pelloso, PWS, of my staff at 312-886-7425 or via email at pelloso.elizabeth@epa.gov.

Sincerely,



Kenneth A. Westlake, Chief
NEPA Implementation Section
Office of Enforcement and Compliance Assurance

cc: Shawn Cirton, USFWS
Anne Haaker, Illinois Historic Preservation Agency
Kathi Davis, IDNR
Stefanie Fitzsimons, IDNR
Al Keller, IEPA
William Tillis, Chicago Park District

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
231 SOUTH LA SALLE STREET, SUITE 1500
CHICAGO IL 60604

REPLY TO
ATTENTION OF

Planning Branch

06 May 2014

Federal Consistency Coordinator
Illinois Coastal Management Program
Illinois Department of Natural Resources
160 N LaSalle, Ste 700
Chicago IL 60601

Mr. Casey:

The Jackson Park Section 506 Great Lakes Fishery & Ecosystem Restoration study was released for agency and public review on April 12th, 2014. The Chicago District has provided the Illinois Coastal Zone Manager, Ms. Diane Tesic, with a copy of the integrated Detailed Project Report and Environmental Assessment, which contains all pertinent mapping and information for your review of the plan. Based on the information provided in the integrated report, the proposed activity complies with Illinois' approved coastal management program and will be conducted in a manner consistent with such policies.

In the case that you have not obtained a copy of the agency and public review documentation, this can be downloaded anytime from the Chicago District's Civil Work's webpage: (http://www.lrc.usace.army.mil/Missions/CivilWorksProjects/JacksonPark.aspx).

Any request for clarification or additional information can be directed to:

Frank Veraldi
Ecosystem Planner
Frank.M.Veraldi@usace.army.mil

Thank you for your continued support of highly beneficial Great Lakes ecosystem restoration projects.

Sincerely,

Susanne J. Davis
Planning Chief

CC: Diane Tesic

Community Meeting w. JPAC Sign In Sheet- MAY 7, 2014

Name	Address	Phones	EMAIL	Affils, interests, memb
[illegible]	5637 S Dorchester	7736431350		BIRDS
Leslie Hudson	1157 E 58th St			all
Brenda McKinney	251 W. Harrison Desplaines IL 60016	847/594-4137	[illegible]	good JDK
Christine Vollmer	5448 S Cornell Ave	773-793-3127		
Carlo Rotella		617 308 6854	carlo.rotella@bc.edu	
Jeanette Ruder		Jeanette Ruder@gmail.com		
Pat Durkin			pat.durkin@cmap.illinois.gov	
Jane Master	5223 S Dorchester #3	773 502 3159	mastodons@me.com	
RUTWIK KHARKAR	5254 S DORCHESTER Ave	312 804 6867	rutwikk@gmail.com	
Fred Reid	2325 E 71st ST	773-324-5555	fred.Reid@cityofchicago.org	
Jerome Scott	1406 E 54th St 60615			Park Dist. employee
Jeff Bishko-Asbell	1435 E HP Blvd.	773-829-5553	jeffhla@gmail.com	HP Herald
Joanne Cohen	4940 S. Eastlake Apt 10A		raptorhal3@gmail.com	
Paul Clyne	5538 S. Blackstone	773 955 1376	paulclyne2000@yahoo.com	BIRDS
Norm Bell	5489 S Cornell	773-288-1260	normbell@ameritech.net	JPAC - CPD Steward
Stan Denkowski	5471 So. Ellis	773-752-8314	[illegible]	JPAC HPHS

Community Meeting w. JPAC Sign In Sheet- MAY 7, 2014

Name	Address	Phones	EMAIL	Affils, interests, memb
Gary Osewrade	1165 E 55th Bldg		gary[illegible].com	JPAC
MAUREEN Archey	6740 S. Cregier	(312) 933-0373	Moarchey@gmail.com	
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Julia Bachrach	CPD	(312) 742-4698	julia.bachrach@chicagoparkdistrict.com	
Richard Hudson	1157 E 56th St #4, Chic.			
Rich Knack	5000 E. End #2A	773-324-7328	rknack@gmail.com	
Bob Nelson	6736 S. Constance	752-6408		
JAKE YOUNG	5438 S. EAST VIEW PARK	773-363-7490	JAKE.R.YOUNG@GMAIL.COM	
Eric Ginsburg	5433 S. Blackstone	773 3248475		
Alan Borrelli		312-246-5336	alan.p.borrelli@[illegible]	
Ann + Cal Audrain	5743 S. Dorchester	773 947-8227	acaudrain@sbcglobal.net	
Jennie Strable	5838 Stony Island		jstrable@hotmail.com	
Gail Parry	5489 S. Cornell	773-288-1260	parrybell@ameritech.net	
SAM GUARD	5321 Woodlawn	773 288-8561	samguard@sbcglobal.net	JPAC
Kenneth Hawkins	1367 EAST 55th Place	773-363-8117	nofckcoach@hotmail.com	

Park: Jackson Park - GLFR
Date: 5.7.2014
Time/ # of Hours:
Group:
CPD Contact:

chicago park district

~~Special Event Volunteer Waiver Form~~

We appreciate your time and commitment to your neighborhood parks and nature areas.
Thank you for participating in this volunteer event!

Please read before signing:
I wish to participate as a volunteer in this Special Event. I understand that I am responsible for my own safety and personal property while volunteering in the park. I agree to assume such responsibility. I agree that I will not hold the Chicago Park District, its employees, Board of Commissioners, officers or sponsors responsible for any injuries or losses I might sustain working as a volunteer.

Name (Please Print)	Address (post or e-mail)	Phone Number	Signature
SALLY MARTINI	4940 S. EAST END AVE 1E e Mail Martini60615@yahoo.com	773-684-5736	Sarah V. Martini

* **Please return completed form to:** Chicago Park District, Department of Natural Resources, 541 Fairbanks - 6th Floor, Chicago, IL 60611.

Illinois Department of
Natural Resources
One Natural Resources Way Springfield, Illinois 62702-1271
http://dnr.state.il.us

Pat Quinn, Governor
Marc Miller, Director

May 8, 2014

Mr. Peter Bullock
U.S. Army Corps of Engineers
Chicago District, Regulatory Branch
231 South LaSalle Street, Suite 1500
Chicago, Illinois 60604-1437

Re: Draft Environmental Assessment – Jackson Park Ecosystem Restoration; Chicago, IL

Dear Mr. Bullock:

The Illinois Department of Natural Resources (Department) has reviewed the Draft Environmental Assessment (Draft EA) for the above mentioned project. Major components of the project include the removal of non-native invasive fish species and restoration of native fish and amphibian species within the park lagoons. Non-native invasive plants will also be removed followed by the planting of native plant species.

State Threatened and Endangered Species

The Illinois Natural Heritage Database (INHD) indicates the state-threatened peregrine falcon (*Falco peregrinus*) may occur within Jackson Park. The Department has no records of this species nesting within the park and concurs with your assessment on page 59 of the Draft EA that impacts to the peregrine falcon are unlikely.

The INHD also contains a record from 1908 of the state-threatened mudpuppy (*Necturus maculosus*) occurring in Jackson Park. This collection is reportedly by the Illinois Natural History Survey. The Department commends your efforts to include mudpuppy habitat in the restoration project in anticipation they will reestablish a population in Jackson Park. The Department also commends your efforts to include several state-threatened fishes in the restoration project. Those species are the blackchin shiner (*Notropis heterodon*), banded killifish (*Fundulus diaphanous*), and Iowa darter (*Etheostoma exile*).

It should be noted that certain permits will likely be required to capture, relocate, and later survey the reintroduction success of state listed species to maintain compliance under the *Illinois Endangered Species Protection Act* [520 ILCS 10/11]. Many non-listed fish and mussel species, and the amphibian eastern newt (*Notophthalmus viridescens*) are also proposed for stocking, which may require certain permits from the Department. Please contact the Department's Office of Resource Conservation and Fisheries Division in advance to obtain the proper permits for these actions.

Migratory Birds

Jackson Park is well known for hosting hundreds of migratory bird species during migration and for breeding. The Department understands that measures are being taken to mitigate potential impacts to migratory birds during the restoration process. These include leaving approximately 90% of overhanging trees, deadfall, and limiting canopy removal along with planting thousands of native plants. Native

minnows and shiners will also be stocked immediately after the removal of non-native invasive fish species to provide forage for water birds. Recent conversations with the U.S. Army Corps and Fish and Wildlife Service have also indicated a tree clearing restriction will be accommodated from March 1st through October 1st to protect the time of greatest migration. Further, surveys will be conducted for early nesting owls and raptors if tree clearing is required between February 1st and March 1st and trees identified containing active nests will be avoided. The Department concurs with these mitigation measures to protect the migratory birds.

Thank you for the opportunity to comment, please contact me at 217-524-0501 if I can be of further assistance.

Sincerely

Nathan Grider
Biologist
Impact Assessment, OREP

cc: Shawn Cirton, USFWS
Kenneth Westlake, USEPA
William Tillis, Chicago Park District
Anne Haaker, Illinois Historic preservation Agency
Diane Tecic, IDNR, Illinois Coastal Management Program

This recommendation regarding the issuance/denial of the US Army Corps of Engineers permit by the IDNR, Office of Realty and Environmental Planning does not preclude permit decisions made by the IDNR, Office of Water Resources under the Illinois Rivers. Lakes. and Streams Act.

A5 – DRAFT FONSI

Finding of No Significant Impact
Jackson Park Ecosystem Restoration

Background

The non-Federal sponsor, the Chicago Park District, has 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

One crucial component that is important to ecosystem integrity and integrates both aquatic and riparian or buffer habitat, is wetlands. Historically, Chicago's shoreline was lush with vast expanses of wetlands. While restoring wetlands in Chicago to their historical conditions is unlikely, converting small expanses of land into structurally diverse wetlands will provide critical habitat for a number of organisms. These patches of wetland and buffering plant communities would serve as an important refuge for migrant and resident bird species, as well as a variety of aquatic organisms (fish, amphibians, aquatic insects, etc.). The main problems at Jackson Park are as follows:

- Absence of submergent aquatic beds (macrophytes/hydrophytes)
- Unnatural geomorphic conditions that promote invasive species success
- Fragmentation of inter and intra site habitat patches
- Absence of species rich coastal plant communities
- Absence of rare and sensitive coastal plant and animal species
- Lack of critical habitat for locally endangered and rare fauna
- Lack of migratory bird resting and forage habitats

Brief Summary of Findings

Fifteen (15) measures, including the No Action measure, were input into the IWR-Planning Suite in terms of costs and benefits. Vernal Pool (VP) restoration was dependent on restoring Sedge Meadow (SM) and Savanna/Woodland (OSW) habitats. Fish Community Separator (FF), Invasive Fish Species Removal (FIR), Mudpuppy Habitat (MH) and Native Species Reintroduction (FNS) were dependent on restoring Pond (P) habitat. All plant community habitat restorations (P), (EI), (NI), (FM), (SM) and (OSW) were dependent on Invasive Species Removal (IPR). Patches of Sedge Meadow (SM), Fringe Marsh (FM) and Savanna/Woodland (OSW) were dependent on Geomorphic Contouring (GC). New Island (NI) plant community was dependent on New Island Creation (NIC). Based on these inputs and criteria, the IWR-Planning software generated 66 alternative combinations for ecosystem restoration. These alternative combinations were analyzed with the IWR Planning Suite Cost Effective & Incremental Cost Analysis, which are presented in the following sections.

The cost effectiveness analysis was used to ensure that certain options would be screened out if they produced the same amount or less output at a greater cost than other options with a lesser cost. Sixty six (66) alternative combinations were analyzed for cost effectiveness. Of these, seventeen (17) cost effective combinations were identified, which is inclusive of the six (6) Best Buy Plans. The No Action plan is always deemed cost effective and a Best Buy Plan. Forty-nine (49) alternative combinations were screened out as non-cost effective.

The following alternative plan(s) that qualified for further consideration were assessed in order to identify whether the benefits are worth Federal investment. The effects include a measure of how well the plan(s) achieve the planning objectives, benefits and costs. Previously in the evaluation process, the positive effects of each plan on Jackson Park's ecosystem were considered individually and compared to the without-project condition. In this step, supportive facts are presented to determine if it is worthwhile to select a plan as the NER Plan for implementation. The supportive facts include the reality of the ecosystem outputs; significance of the ecosystem outputs; completeness, acceptability, effectiveness and efficiency of the potential plan, and any associated risks or uncertainties that may affect or result from the potential plan.

Alternative 1 – No Action Plan

Alternative 2 – (MH) Mudpuppy Habitat, (IPR) Invasive Plant Species Removal, (FF) Fish Community Separator, (FIR) Invasive Fish Species Removal, (FNS) Native Pond Species Introduction, (P) Pond

Alternative 3 – (MH) Mudpuppy Habitat, (IPR) Invasive Plant Species Removal, (FF) Fish Community Separator, (FIR) Invasive Fish Species Removal, (FNS) Native Pond Species Introduction, (P) Pond, (GC) Geomorphic Contouring, (VP) Vernal Pool, (SM) Sedge Meadow, (OSW) Savanna / Open Woodland

Alternative 4 – (MH) Mudpuppy Habitat, (IPR) Invasive Plant Species Removal, (FF) Fish Community Separator, (FIR) Invasive Fish Species Removal, (FNS) Native Pond Species Introduction, (P) Pond, (GC) Geomorphic Contouring, (VP) Vernal Pool, (SM) Sedge Meadow, (OSW) Savanna / Open Woodland, (EI) Existing Islands

Alternative 5 – (MH) Mudpuppy Habitat, (IPR) Invasive Plant Species Removal, (FF) Fish Community Separator, (FIR) Invasive Fish Species Removal, (FNS) Native Pond Species Introduction, (P) Pond, (GC) Geomorphic Contouring, (VP) Vernal Pool, (SM) Sedge Meadow, (OSW) Savanna / Open Woodland, (EI) Existing Islands, (FM) Fringe Marsh

Alternative 6 – (MH) Mudpuppy Habitat, (IPR) Invasive Plant Species Removal, (FF) Fish Community Separator, (FIR) Invasive Fish Species Removal, (FNS) Native Pond Species Introduction, (P) Pond, (GC) Geomorphic Contouring, (VP) Vernal Pool, (SM) Sedge Meadow, (OSW) Savanna / Open Woodland, (EI) Existing Islands, (FM) Fringe Marsh, (NIC) New Island Creation, (NI) New Island

The NER/Preferred Plan

The plan that reasonably maximizes net National Ecosystem Restoration benefits and is consistent with the Federal objective, authorities and policies, is identified as the NER plan. This NER Plan is considered as the Preferred Plan for direct, indirect and cumulative effects assessment under NEPA in the following Chapter. The NER/Preferred Plan was determined to be Alternative 5. Alternative 5 would restore over 155 acres of habitat within Jackson Park which includes hydrogeomorphic and native plant community restoration.

The Preferred Plan presented in this integrated Environmental Assessment are in compliance with appropriate statutes, executive orders and memoranda including the Natural Historic Preservation Act of 1966; the Endangered Species Act of 1973; the Fish and Wildlife Coordination Act; Executive Order 12898 (environmental justice); Executive Order 11990 (protection of wetlands); Executive Order 11988 (floodplain management); and the Rivers and Harbors Act of 1899. The potential project is in compliance with the Clean Air Act; the Clean Water Act, and the National Environmental Policy Act of 1969.

Major Compliance Items

Environmental Justice

Executive Order 12898 (environmental justice) requires that, 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 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.

A database search of the EPA EJView mapping tool (Accessed 6 November 2013), revealed that within the portion of Chicago containing the Jackson park project site, that majority of the population (30-100%) is considered below the poverty line. Similarly, the majority of the population (30-100%) is considered as a minority. Since the overall project and the preferred plan is considered ecosystem restoration, no adverse human health effects or environmental effects on minority populations and/or low income populations are expected. It is anticipated that this habitat restoration project would have beneficial affects to local communities in terms of aesthetics, wildlife, green open space, recreational opportunity, cleaner surface waters and cleaner air.

Clean Air Act

The local air quality in Chicago and Cook County are considered ‘non-attainment’ under the Clean Air Act for ozone, particulates (PM-10 and PM-2.5), and lead. The project is within the non-attainment zone. Once implemented, the project itself will be neutral in terms of air quality, with no features that either emit or sequester air pollutants to a large degree. During the project construction, heavy equipment would cause minor, temporary air quality impacts, however all equipment will be in compliance with current air quality control requirements for diesel exhaust, fuels, and similar requirements. A general conformity analysis was not conducted due to the short and temporary nature of any air quality impacts.

Section 401 of the Clean Water Act

A Section 404(b)(1) analysis was completed for the preferred plan and is located in Appendix A. Features addressed by the 404 include the fill materials for mudpuppy and wetland restoration. No adverse effects were determined. Since project activities under the jurisdiction of Section 401 are very limited and are all restorative in terms of aquatic ecosystem and water quality, Section 401 Water Certification is already granted via Regional Permit 5 as this project fits all of the requirements. A courtesy copy of the NEPA Document, 401 Certification Application and 404(b)(1) Analysis will be provided to the ILEPA for their records and comment opportunity.

USFWS Coordination

Coordination with the USFWS commenced with a project scoping letter dated 24 October 2014. This environmental assessment identified the NER/Preferred Plan to have "no effects" on federally endangered species or their habitats as determined by following the protocol and guidelines provided by Region 3 Fish & Wildlife Service (http://www.fws.gov/midwest/endangered/section7/index.html); therefore Section 7 is precluded and in compliance. Coordination under the FWCA of the NER/Preferred Plan will continue through the NEPA process and would be precluded before the signing of a FONSI or other determinations made. It is anticipated that the USFWS will have "No Objection" based on informal verbal coordination and study contributions of habitat design recommendations.

State of Illinois Historic Preservation Act

Coordination with the IHPA commenced with a project scoping letter dated 10 December 2012. In a letter dated _____, the Illinois Historic Preservation Agency (IHPA) informed USACE that no historic properties are affected by the NER/Preferred Plan.

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 will be held 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 EA is to evaluate the impacts that would be associated with the restoration of the 155-acres at Jackson Park. 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. 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.

Frederic A. Drummond Jr. Date: _____
Colonel, U.S. Army
District Commander

A6 – Planning Information

Savanna/Woodland ExC/FWOP

Species Name (NWPL/Mohlenbrock)	Species(Synonym)	Common Name	C Value	Midwest WET indicator	WET indicator (numeric)	Habit	Duration	Nativity
Acer negundo	Acer negundo var. violaceum	Ash-Leaf Maple	0	FAC	0	Tree	Perennial	Native
Acer platanoides	ACER PLATANOIDES	Norway Maple	0	UPL	2	Tree	Perennial	Adventive
Acer saccharinum	Acer saccharinum	Silver Maple	0	FACW	-1	Tree	Perennial	Native
Acer saccharum	Acer saccharum	Sugar Maple	3	FACU	1	Tree	Perennial	Native
Achillea millefolium	ACHILLEA MILLEFOLIUM	Common Yarrow	0	FACU	1	Forb	Perennial	Adventive
Aesculus glabra	Aesculus glabra	Ohio Buckeye	3	FAC	0	Tree	Perennial	Native
Aesculus hippocastanum	AESCULUS HIPPOCASTANUM	Horse Chestnut	0	UPL	2	Tree	Perennial	Adventive
Agastache nepetoides	Agastache nepetoides	Yellow Giant-Hyssop	5	FACU	1	Forb	Perennial	Native
Ageratina altissima	Eupatorium rugosum	White Snakeroot	4	FACU	1	Forb	Perennial	Native
Ailanthus altissima	AILANTHUS ALTISSIMA	Tree-of-Heaven	0	FACU	1	Tree	Perennial	Adventive
Alisma subcordatum	Alisma subcordatum	American Water-Plantain	4	OBL	-2	Forb	Perennial	Native
Alliaria petiolata	ALLIARIA PETIOLATA	Garlic-Mustard	0	FAC	0	Forb	Biennial	Adventive
Allium cernuum	Allium cernuum	Nodding Onion	7	FACU	1	Forb	Perennial	Native
Alnus glutinosa	ALNUS GLUTINOSA	European Alder	0	FACW	-1	Tree	Perennial	Adventive
Ambrosia artemisiifolia	Ambrosia artemisiifolia elatior	Annual Ragweed	0	FACU	1	Forb	Annual	Native
Ambrosia trifida	Ambrosia trifida	Great Ragweed	0	FAC	0	Forb	Annual	Native
Andropogon gerardii	Andropogon gerardii	Big Bluestem	5	FAC	0	Grass	Perennial	Native
Aquilegia canadensis	Aquilegia canadensis	Red Columbine	6	FACU	1	Forb	Perennial	Native
Arctium minus	ARCTIUM MINUS	Lesser Burrdock	0	FACU	1	Forb	Biennial	Adventive
Asclepias syriaca	Asclepias syriaca	Common Milkweed	0	FACU	1	Forb	Perennial	Native
Asclepias verticillata	Asclepias verticillata	Whorled Milkweed	1	FACU	1	Forb	Perennial	Native
Astragalus canadensis	Astragalus canadensis	Canadian Milk-Vetch	10	FAC	0	Forb	Perennial	Native
Atriplex patula	ATRIPLEX PATULA	Halberd-Leaf Orache	0	FACW	-1	Forb	Annual	Adventive
Bidens cernua	Bidens cernua	Nodding Burr-Marigold	5	OBL	-2	Forb	Annual	Native
Bidens frondosa	Bidens frondosa	Devil's-Pitchfork	1	FACW	-1	Forb	Annual	Native
Bidens tripartita	Bidens comosa; Bidens connata	Three-Lobe Beggarticks	5	OBL	-2	Forb	Annual	Native
Bouteloua curtipendula	Bouteloua curtipendula	Side-Oats Grama	8	UPL	2	Grass	Perennial	Native
Bromus inermis	BROMUS INERMIS	Smooth Brome	0	FACU	1	Grass	Perennial	Adventive
Bromus pubescens	Bromus pubescens	Hairy Woodland Brome	5	FACU	1	Grass	Perennial	Native
Bromus tectorum	BROMUS TECTORUM	Downy Chess	0	UPL	2	Grass	Annual	Adventive
Carex blanda	Carex blanda	Eastern Woodland Sedge	1	FAC	0	Sedge	Perennial	Native
Carex pensylvanica	Carex pensylvanica	Pennsylvania Sedge	5	UPL	2	Sedge	Perennial	Native
Catalpa speciosa	CATALPA SPECIOSA	Northern Catalpa	0	FACU	1	Tree	Perennial	Adventive
Celtis occidentalis	Celtis occidentalis	Common Hackberry	3	FAC	0	Tree	Perennial	Native
Centaurium pulchellum	CENTAURIUM PULCHELLUM	Branched Centaury	0	FACU	1	Forb	Annual	Adventive
Chenopodium album	CHENOPODIUM ALBUM	Lamb's-Quarters	0	FACU	1	Forb	Annual	Adventive
Cichorium intybus	CICHORIUM INTYBUS	Chicory	0	FACU	1	Forb	Perennial	Adventive
Circaea canadensis	Circaea lutetiana canadensis	Broad-Leaf Enchanter's-Nightshade	1	FACU	1	Forb	Perennial	Native
Cirsium arvense	CIRSIUM ARVENSE	Canadian Thistle	0	FACU	1	Forb	Perennial	Adventive
Cirsium vulgare	CIRSIUM VULGARE	Bull Thistle	0	FACU	1	Forb	Biennial	Adventive
Convolvulus arvensis	CONVOLVULUS ARVENSIS	Field Bindweed	0	UPL	2	Forb	Perennial	Adventive
Cornus obliqua	Cornus obliqua	Pale Dogwood	6	FACW	-1	Shrub	Perennial	Native
Cornus racemosa	Cornus racemosa	Gray Dogwood	1	FAC	0	Shrub	Perennial	Native
Corylus americana	Corylus americana	American Hazelnut	5	FACU	1	Shrub	Perennial	Native
Crataegus mollis	Crataegus mollis	Downy Hawthorn	2	FAC	0	Tree	Perennial	Native
Dactylis glomerata	DACTYLIS GLOMERATA	Orchard Grass	0	FACU	1	Grass	Perennial	Adventive
Daucus carota	DAUCUS CAROTA	Queen Anne's Lace	0	UPL	2	Forb	Biennial	Adventive
Dicentra cucullaria	Dicentra cucullaria	Dutchman's-Breeches	6	UPL	2	Forb	Perennial	Native
Diervilla lonicera	Diervilla lonicera	Dwarf Honeysuckle	9	UPL	2	Shrub	Perennial	Native
Digitaria sanguinalis	DIGITARIA SANGUINALIS	Hairy Crab Grass	0	FACU	1	Grass	Annual	Adventive
Echinacea purpurea	Echinacea purpurea	Purple Coneflower	3	UPL	2	Forb	Perennial	Native
Echinochloa crus-galli	Echinochloa crusgalli	Large Barnyard Grass	0	FACW	-1	Grass	Annual	Native
Eleocharis palustris	Eleocharis erythropoda; Eleocharis palustris major; Eleocharis smallii	Common Spike-Rush	2	OBL	-2	Sedge	Perennial	Native
Elymus canadensis	Elymus canadensis	Nodding Wild Rye	4	FACU	1	Grass	Perennial	Native
Elymus hystrix	Hystrix patula	Eastern Bottle-Brush Grass	5	FACU	1	Grass	Perennial	Native
Elymus virginicus	Elymus virginicus	Virginia Wild Rye	4	FACW	-1	Grass	Perennial	Native
Epilobium coloratum	Epilobium coloratum	Purple-Leaf Willowherb	3	OBL	-2	Forb	Perennial	Native
Erigeron annuus	Erigeron annuus	Eastern Daisy Fleabane	0	FACU	1	Forb	Biennial	Native
Erigeron canadensis	Erigeron canadensis	Canadian Horseweed	0	FACU	1	Forb	Annual	Native
Euonymus alatus	EUONYMUS ALATUS	Winged Euonymus	0	UPL	2	Shrub	Perennial	Adventive
Euonymus atropurpureus	Euonymus atropurpureus	Eastern Wahoo	8	FAC	0	Shrub	Perennial	Native
Eupatorium serotinum	Eupatorium serotinum	Late-Flowering Thoroughwort	0	FAC	0	Forb	Perennial	Native
Euphorbia corollata	Euphorbia corollata	Flowering Spurge	2	UPL	2	Forb	Perennial	Native
Eutrochium purpureum	Eupatorium purpureum	Sweet-Scented Joe-Pye-Weed	7	FAC	0	Forb	Perennial	Native
Frangula alnus	RHAMNUS FRANGULA	Glossy False Buckthorn	0	FACW	-1	Shrub	Perennial	Adventive
Fraxinus pennsylvanica	Fraxinus pennsylvanica subintegerrima	Green Ash	1	FACW	-1	Tree	Perennial	Native
Fraxinus pennsylvanica	Fraxinus pennsylvanica subintegerrima	Green Ash	1	FACW	-1	Tree	Perennial	Native
Gaura biennis	Gaura biennis	Biennial Beeblossom	2	FACU	1	Forb	Biennial	Native
Glechoma hederacea	GLECHOMA HEDERACEA	Groundivy	0	FACU	1	Forb	Perennial	Adventive
Gleditsia triacanthos	Gleditsia triacanthos	Honey-Locust	2	FACU	1	Tree	Perennial	Native
Gymnocladus dioicus	Gymnocladus dioica	Kentucky Coffee Tree	8	UPL	2	Tree	Perennial	Native
Hackelia virginiana	Hackelia virginiana	Beggar's-Lice	0	FACU	1	Forb	Biennial	Native
Humulus lupulus	Humulus lupulus	Common Hop	5	FACU	1	Vine	Perennial	Native
Impatiens capensis	Impatiens capensis	Spotted Touch-Me-Not	3	FACW	-1	Forb	Annual	Native
Juglans nigra	Juglans nigra	Black Walnut	5	FACU	1	Tree	Perennial	Native
Juncus dudleyi	Juncus dudleyi	Dudley's Rush	4	FACW	-1	Forb	Perennial	Native
Lactuca serriola	LACTUCA SERRIOLA	Prickly Lettuce	0	FACU	1	Forb	Biennial	Adventive
Laportea canadensis	Laportea canadensis	Canadian Wood-Nettle	3	FACW	-1	Forb	Perennial	Native
Lemna minor	Lemna minor	Common Duckweed	5	OBL	-2	Forb	Annual	Native
Leonurus cardiaca	LEONURUS CARDIACA	Motherwort	0	UPL	2	Forb	Perennial	Adventive
Lespedeza capitata	Lespedeza capitata	Round-Head Bush-Clover	4	FACU	1	Forb	Perennial	Native
Leucanthemum vulgare	CHRYSANTHEMUM LEUCANTHEMUM PINNATIFIDUM	Ox-Eye Daisy	0	UPL	2	Forb	Perennial	Adventive
Liatris aspera	Liatris aspera	Rough Gayfeather	6	UPL	2	Forb	Perennial	Native
Liatris spicata	Liatris spicata	Dense Gayfeather	6	FAC	0	Forb	Perennial	Native
Lobelia siphilitica	Lobelia siphilitica	Great Blue Lobelia	6	OBL	-2	Forb	Perennial	Native
Lonicera X bella	LONICERA X BELLA	0	0	FACU	1	Shrub	Perennial	Adventive
Lycopus uniflorus	Lycopus uniflorus	Northern Water-Horehound	7	OBL	-2	Forb	Perennial	Native
Maianthemum stellatum	Smilacina stellata	Starry False Solomon's-Seal	5	FAC	0	Forb	Perennial	Native
Matricaria discoidea	MATRICARIA MATRICARIOIDES	Pineapple-Weed	0	FACU	1	Forb	Annual	Adventive
Medicago lupulina	MEDICAGO LUPULINA	Black Medick	0	FACU	1	Forb	Annual	Adventive
Melilotus albus	MELILOTUS ALBA	White Sweet-Clover	0	UPL	2	Forb	Biennial	Adventive
Melilotus officinalis	MELILOTUS ALBA	Yellow Sweet-Clover	0	FACU	1	Forb	Biennial	Adventive
Mentha arvensis	Mentha arvensis villosa	American Wild Mint	5	FACW	-1	Forb	Perennial	Native
Mertensia virginica	Mertensia virginica	Virginia Bluebells	5	FACW	-1	Forb	Perennial	Native
Monarda fistulosa	Monarda fistulosa	Oswego-Tea	4	FACU	1	Forb	Perennial	Native
Morus alba	MORUS ALBA	White Mulberry	0	FAC	0	Tree	Perennial	Adventive
Muhlenbergia frondosa	Muhlenbergia frondosa	Wire-Stem Muhly	3	FACW	-1	Grass	Perennial	Native
Muhlenbergia schreberi	Muhlenbergia schreberi	Nimblewill	0	FAC	0	Grass	Perennial	Native
Nepeta cataria	NEPETA CATARIA	Catnip	0	FACU	1	Forb	Perennial	Adventive
Oenothera biennis	Oenothera biennis	King's-Cureall	0	FACU	1	Forb	Biennial	Native
Oxalis stricta	Oxalis europaea	Upright Yellow Wood-Sorrel	0	FACU	1	Forb	Perennial	Native
Panicum capillare	Panicum capillare	Common Panic Grass	1	FAC	0	Grass	Annual	Native
Panicum virgatum	Panicum virgatum	Wand Panic Grass	5	FAC	0	Grass	Perennial	Native
Parietaria pensylvanica	Parietaria pensylvanica	Pennsylvania Pellitory	3	FACU	1	Forb	Annual	Native
Parthenocissus inserta	Parthenocissus inserta	Thicket-Creeper	1	FACU	1	Vine	Perennial	Native
Penstemon digitalis	Penstemon digitalis	Foxglove Beardtongue	4	FAC	0	Forb	Perennial	Native
Persicaria hydropiper	Polygonum hydropiper	Mild Water-Pepper	2	OBL	-2	Forb	Annual	Native
Persicaria longiseta	POLYGONUM CESPITOSUM LONGISETUM	Bristly Lady's-Thumb	0	FAC	0	Forb	Annual	Adventive
Persicaria maculosa	POLYGONUM PERSICARIA	Lady's-Thumb	0	FACW	-1	Forb	Annual	Adventive
Persicaria virginiana	Polygonum virginianum	Jumpseed	2	FAC	0	Forb	Perennial	Native
Phalaris arundinacea	PHALARIS ARUNDINACEA	Reed Canary Grass	0	FACW	-1	Grass	Perennial	Adventive
Phellodendron amurense	PHELLODENDRON AMURENSE	Amur Cork Tree	0	UPL	2	Tree	Perennial	Adventive
Phragmites australis ssp. australis	Phragmites australis	Common Reed	0	FACW	-1	Grass	Perennial	Adventive
Physalis subglabrata	Physalis subglabrata	Smooth Ground Cherry	0	UPL	2	Forb	Perennial	Native
Phytolacca americana	Phytolacca americana	American Pokeweed	1	FACU	1	Forb	Perennial	Native
Plantago lanceolata	PLANTAGO LANCEOLATA	English Plantain	0	FACU	1	Forb	Perennial	Adventive
Plantago rugelii	Plantago rugelii	Black-Seed Plantain	0	FAC	0	Forb	Annual	Native
Platanus occidentalis	Platanus occidentalis	American Sycamore	9	FACW	-1	Tree	Perennial	Native
Poa pratensis	POA PRATENSIS	Kentucky Blue Grass	0	FAC	0	Grass	Perennial	Adventive
Poinsettia dentata	EUPHORBIA DENTATA	Wild Poinsettia	0	UPL	2	Forb	Annual	Adventive
Polygonatum biflorum var. commutatum	Polygonatum canaliculatum	King Solomon's-Seal	3	FACU	1	Forb	Perennial	Native
Polygonum arenastrum	POLYGONUM ARENASTRUM	Sidewalk Knotweed	0	UPL	2	Forb	Annual	Adventive
Populus alba	POPULUS ALBA	White Poplar	0	UPL	2	Tree	Perennial	Adventive
Portulaca oleracea	PORTULACA OLERACEA	Little-Hogweed	0	FACU	1	Forb	Annual	Adventive
Prunella vulgaris ssp. lanceolata	Prunella vulgaris lanceolata	Common Selfheal	0	FAC	0	Forb	Perennial	Native
Prunus americana	Prunus americana	American Plum	5	UPL	2	Tree	Perennial	Native
Prunus virginiana	Prunus virginiana	Choke Cherry	3	FACU	1	Shrub	Perennial	Native
Ptelea trifoliata	Ptelea trifoliata	Common Hoptree	7	FACU	1	Shrub	Perennial	Native
Quercus alba	Quercus alba	Northern White Oak	5	FACU	1	Tree	Perennial	Native
Quercus macrocarpa	Quercus macrocarpa	Burr Oak	5	FAC	0	Tree	Perennial	Native
Quercus palustris	Quercus palustris	Pin Oak	8	FACW	-1	Tree	Perennial	Native
Quercus rubra	Quercus rubra	Northern Red Oak	7	FACU	1	Tree	Perennial	Native
Ratibida pinnata	Ratibida pinnata	Yellow Coneflower	4	UPL	2	Forb	Perennial	Native
Rhamnus cathartica	RHAMNUS CATHARTICA	European Buckthorn	0	FAC	0	Shrub	Perennial	Adventive
Rhus hirta	Rhus typhina	Staghorn Sumac	1	UPL	2	Tree	Perennial	Native
Ribes americanum	Ribes americanum	Wild Black Currant	7	FACW	-1	Shrub	Perennial	Native
Rudbeckia hirta	Rudbeckia hirta	Black-Eyed-Susan	1	FACU	1	Forb	Perennial	Native
Rudbeckia laciniata	Rudbeckia laciniata	Green-Head Coneflower	5	FACW	-1	Forb	Perennial	Native
Salix amygdaloides	Salix amygdaloides	Peach-Leaf Willow	5	FACW	-1	Tree	Perennial	Native
Salix babylonica	SALIX BABYLONICA	Chinese Willow	0	FAC	0	Tree	Perennial	Adventive
Sambucus nigra ssp. canadensis	Sambucus canadensis	Black Elder	1	FACW	-1	Shrub	Perennial	Native
Sanicula odorata	Sanicula gregaria	Clustered Black-Snakeroot	2	FAC	0	Forb	Perennial	Native
Saponaria officinalis	SAPONARIA OFFICINALIS	Bouncing-Bett	0	FACU	1	Forb	Perennial	Adventive
Schizachyrium scoparium	Andropogon scoparius	Little False Bluestem	5	FACU	1	Grass	Perennial	Native
Scilla sibirica	SCILLA SIBIRICA	Squill	0	UPL	2	Forb	Perennial	Adventive
Scrophularia lanceolata	Scrophularia lanceolata	Lance-Leaf Figwort	5	FACU	1	Forb	Perennial	Native
Setaria faberi	SETARIA FABERI	Japanese Bristle Grass	0	FACU	1	Grass	Annual	Adventive
Setaria pumila	SETARIA GLAUCA	Yellow Bristle Grass	0	FAC	0	Grass	Annual	Adventive
Silphium laciniatum	Silphium laciniatum	Compass-Plant	5	UPL	2	Forb	Perennial	Native
Silphium perfoliatum	Silphium perfoliatum	Cup-Plant	5	FACW	-1	Forb	Perennial	Native
Solanum americanum	Solanum americanum	American Black Nightshade	0	FACU	1	Forb	Annual	Native
Solanum dulcamara	SOLANUM DULCAMARA	Climbing Nightshade	0	FAC	0	Vine	Perennial	Adventive
Solidago altissima	Solidago altissima	Tall Goldenrod	1	FACU	1	Forb	Perennial	Native
Solidago gigantea	Solidago gigantea	Late Goldenrod	4	FACW	-1	Forb	Perennial	Native
Solidago rigida	Solidago rigida	Hard-Leaf Flat-Top-Goldenrod	4	FACU	1	Forb	Perennial	Native
Sonchus arvensis	SONCHUS ARVENSIS	Field Sow-Thistle	0	FACU	1	Forb	Perennial	Adventive
Sorghastrum nutans	Sorghastrum nutans	Yellow Indian Grass	5	FACU	1	Grass	Perennial	Native
Symphoricarpos orbiculatus	SYMPHORICARPOS ORBICULATUS	Coral-Berry	0	FACU	1	Shrub	Perennial	Adventive
Symphyotrichum drummondii	Aster sagittifolius drummondii	Drummond's Aster	2	UPL	2	Forb	Perennial	Native
Symphyotrichum laeve	Aster laevis	Smooth Blue American-Aster	9	FACU	1	Forb	Perennial	Native
Symphyotrichum lanceolatum	Aster simplex	White Panicled American-Aster	3	FAC	0	Forb	Perennial	Native
Symphyotrichum novae-angliae	Aster novae-angliae	New England American-Aster	4	FACW	-1	Forb	Perennial	Native
Symphyotrichum pilosum	Aster pilosus	White Oldfield American-Aster	0	FACU	1	Forb	Perennial	Native
Symphyotrichum shortii	Aster shortii	Short's Aster	8	UPL	2	Forb	Perennial	Native
Taraxacum officinale	TARAXACUM OFFICINALE	Common Dandelion	0	FACU	1	Forb	Perennial	Adventive
Tilia americana	Tilia americana	American Basswood	5	FACU	1	Tree	Perennial	Native
Trifolium pratense	TRIFOLIUM PRATENSE	Red Clover	0	FACU	1	Forb	Perennial	Adventive
Trifolium repens	TRIFOLIUM REPENS	White Clover	0	FACU	1	Forb	Perennial	Adventive
Verbascum thapsus	VERBASCUM THAPSUS	Woolly Mullein	0	UPL	2	Forb	Biennial	Adventive
Verbena hastata	Verbena hastata	Simpler's-Joy	4	FACW	-1	Forb	Perennial	Native
Verbena urticifolia	Verbena urticifolia leiocarpa	White Vervain	5	FAC	0	Forb	Perennial	Native
Verbesina alternifolia	Actinomeris alternifolia	Wingstem	5	FACW	-1	Forb	Perennial	Native
Veronicastrum virginicum	Veronicastrum virginicum	Culver's-Root	7	FAC	0	Forb	Perennial	Native
Viburnum lantana	VIBURNUM LANTANA	Wayfarinig Tree	0	UPL	2	Shrub	Perennial	Adventive
Viburnum lentago	Viburnum lentago	Nanny-Berry	5	FAC	0	Shrub	Perennial	Native
Viburnum opulus var. opulus	VIBURNUM OPULUS	Highbush-Cranberry	0	FAC	0	Shrub	Perennial	Adventive
Viburnum prunifolium	Viburnum prunifolium	Smooth Blackhaw	5	FACU	1	Shrub	Perennial	Native
Viola sororia	Viola sororia	Hooded Blue Violet	3	FAC	0	Forb	Perennial	Native
Vitis riparia	Vitis riparia	River-Bank Grape	2	FACW	-1	Vine	Perennial	Native
Xanthium strumarium	XANTHIUM STRUMARIUM	Rough Cockleburr	0	FAC	0	Forb	Annual	Adventive

Conservatism-Based Metrics

Mean C (native species)	3.64
Mean C (all species)	2.43
Mean C (native trees)	3.90
Mean C (native shrubs)	5.18
Mean C (native herbaceous)	3.42
FQAI (native species)	39.89
FQAI (all species)	32.57
Adjusted FQAI	29.73
% C value 0	43%
% C Value 1-3	21%
% C value 4-6	27%
% C value 7-10	9%

Additional Metrics

Species Richness (all)	180
Species Richness (native)	120
% Non-native	33%
Wet Indicator (all)	0.47
Wet Indicator (native)	0.25
% hydrophyte (Midwest)	43%
% native perennial	57%
% native annual	8%
% annual	16%
% perennial	77%

Savanna/Woodland FWP

Species Name (NWPL/Mohlenbrock)	Species(Synonym)	Common Name	C Value	Midwest WET indicator	WET indicator (numeric)	Habit	Duration	Nativity
Anemone cylindrica	Anemone cylindrica	Thimbleweed	6	UPL	2	Forb	Perennial	Native
Antennaria plantaginifolia	Antennaria plantaginifolia	Pussy-Toes	3	UPL	2	Forb	Perennial	Native
Aquilegia canadensis	Aquilegia canadensis	Red Columbine	6	FACU	1	Forb	Perennial	Native
Asclepias tuberosa ssp. interior	Asclepias tuberosa	Butterfly-Weed	7	UPL	2	Forb	Perennial	Native
Blephilia hirsuta	Blephilia hirsuta	Hairy Pagoda-Plant	8	FACU	1	Forb	Perennial	Native
Bouteloua curtipendula	Bouteloua curtipendula	Side-Oats Grama	8	UPL	2	Grass	Perennial	Native
Bromus kalmii	Bromus kalmii	Kalm's Brome	10	FAC	0	Grass	Perennial	Native
Carex normalis	Carex normalis	Greater Straw Sedge	5	FACW	-1	Sedge	Perennial	Native
Carex hirsutella	Carex hirsutella	Hairy-Leaf Sedge	4	UPL	2	Sedge	Perennial	Native
Carex muehlenbergii	Carex muhlenbergii	Muhlenberg's Sedge	5	UPL	2	Sedge	Perennial	Native
Carex pensylvanica	Carex pensylvanica	Pennsylvania Sedge	5	UPL	2	Sedge	Perennial	Native
Carex swanii	Carex swanii	Swan's Sedge	8	FACU	1	Sedge	Perennial	Native
Coreopsis lanceolata	Coreopsis lanceolata	Lance-Leaf Tickseed	5	FACU	1	Forb	Perennial	Native
Comandra umbellata	Comandra umbellata	Bastard-Toadflax	7	FACU	1	Forb	Perennial	Native
Dalea candida	Petalostemum candidum	White Prairie-Clover	9	UPL	2	Forb	Perennial	Native
Dalea purpurea	Petalostemum purpureum	Purple Prairie-Clover	9	UPL	2	Forb	Perennial	Native
Dodecatheon meadia	Dodecatheon meadia	Pride-of-Ohio	6	FACU	1	Forb	Perennial	Native
Drymocallis arguta	Potentilla arguta	Prairie Cinquefoil	9	FACU	1	Forb	Perennial	Native
Echinacea pallida	Echinacea pallida	Pale Coneflower	8	UPL	2	Forb	Perennial	Native
Elymus hystrix	Hystrix patula	Eastern Bottle-Brush Grass	5	FACU	1	Grass	Perennial	Native
Erigeron pulchellus	Erigeron pulchellus	Robin's-Plantain	10	FACU	1	Forb	Perennial	Native
Euphorbia corollata	Euphorbia corollata	Flowering Spurge	2	UPL	2	Forb	Perennial	Native
Geranium maculatum	Geranium maculatum	Spotted Crane's-Bill	4	FACU	1	Forb	Perennial	Native
Helianthus occidentalis	Helianthus occidentalis	Few-Leaf Sunflower	10	FACU	1	Forb	Perennial	Native
Heuchera richardsonii	Heuchera richardsonii	Richardson's Alumroot	8	FACU	1	Forb	Perennial	Native
Heserostipa spartea	Stipa spartea	Porcupine Grass	7	UPL	2	Grass	Perennial	Native
Liatris aspera	Liatris aspera	Rough Gayfeather	6	UPL	2	Forb	Perennial	Native
Lilium michiganense	Lilium michiganense	Michigan Lily	6	FACW	-1	Forb	Perennial	Native
Ionactis linariifolius	Aster linariifolius	Flax-Leaf Aster	10	UPL	2	Forb	Perennial	Native
Lupinus perennis var. occidentalis	Lupinus perennis occidentalis	Wild Lupine	7	UPL	2	Forb	Perennial	Native
Maianthemum stellatum	Smilacina stellata	Starry False Solomon's-Seal	5	FAC	0	Forb	Perennial	Native
Monarda fistulosa	Monarda fistulosa	Oswego-Tea	4	FACU	1	Forb	Perennial	Native
Monarda punctata	Monarda punctata	Spotted Beebalm	5	UPL	2	Forb	Perennial	Native
Pedicularis canadensis	Pedicularis canadensis	Canadian Lousewort	9	FACU	1	Forb	Perennial	Native
Penstemon digitalis	Penstemon digitalis	Foxglove Beardtongue	4	FAC	0	Forb	Perennial	Native
Penstemon hirsutus	Penstemon hirsutus	Hairy Beardstongue	9	UPL	2	Forb	Perennial	Native
Phlox pilosa	Phlox pilosa	Downy Phlox	7	FACU	1	Forb	Perennial	Native
Solidago nemoralis	Solidago nemoralis	Gray Goldenrod	4	UPL	2	Forb	Perennial	Native
Solidago speciosa	Solidago speciosa	Showy Goldenrod	7	UPL	2	Forb	Perennial	Native
Tradescantia ohiensis	Tradescantia ohiensis	Bluejacket	2	FACU	1	Forb	Perennial	Native
Schizachyrium scoparium	Andropogon scoparius	Little False Bluestem	5	FACU	1	Grass	Perennial	Native
Viola pedata	Viola pedata lineariloba	Bird-Foot Violet	9	UPL	2	Forb	Perennial	Native
Taenidia integerrima	Taenidia integerrima	Yellow Pimpernel	9	UPL	2	Forb	Perennial	Native
Baptisia bracteata	Baptisia leucophaea	Cream Wild Indigo	10	UPL	2	Forb	Perennial	Native
Baptisia alba var. macrophylla	Baptisia leucantha	White Wild Indigo	8	FACU	1	Forb	Perennial	Native
Symphyotrichum ericoides	Aster ericoides	White Heath American-Aster	5	FACU	1	Forb	Perennial	Native
Coreopsis palmata	Coreopsis palmata	Prairie Tickseed	6	UPL	2	Forb	Perennial	Native
Chamaecrista fasciculata	Cassia fasciculata	Sleepingplant	5	FACU	1	Forb	Annual	Native
Parthenium integrifolium	Parthenium integrifolium	Wild Quinine	8	UPL	2	Forb	Perennial	Native
Asclepias verticillata	Asclepias verticillata	Whorled Milkweed	1	FACU	1	Forb	Perennial	Native
Pycnanthemum tenuifolium	Pycnanthemum tenuifolium	Narrow-Leaf Mountain-Mint	7	FAC	0	Forb	Perennial	Native
Symphyotrichum sericeum	Aster sericeus	Silky Aster	10	UPL	2	Forb	Perennial	Native
Zizia aurea	Zizia aurea	Golden Alexanders	7	FAC	0	Forb	Perennial	Native
Zizia aptera	Zizia aptera	Heart-Leaf Alexanders	10	FACU	1	Forb	Perennial	Native
Dasiphora fruticosa	Potentilla fruticosa	Golden-Hardhack	10	FACW	-1	Shrub	Perennial	Native
Hypericum kalmianum	Hypericum kalmianum	Kalm's St. John's-Wort	10	FACW	-1	Shrub	Perennial	Native
Diervilla lonicera	Diervilla lonicera	Dwarf Honeysuckle	9	UPL	2	Shrub	Perennial	Native
Rosa carolina	Rosa carolina	Carolina Rose	5	FACU	1	Shrub	Perennial	Native
Amelanchier arborea	Amelanchier arborea	Downy Service-Berry	8	FACU	1	Tree	Perennial	Native
Amelanchier interior	Amelanchier interior	Inland Service-Berry	8	UPL	2	Tree	Perennial	Native
Vaccinium angustifolium	Vaccinium angustifolium	Late Lowbush Blueberry	5	FACU	1	Shrub	Perennial	Native
Quercus velutina	Quercus velutina	Black Oak	6	UPL	2	Tree	Perennial	Native
Quercus ellipsoidalis	0	Hill's Oak	4	UPL	2	Tree	Perennial	Native
Gaylussacia baccata	Gaylussacia baccata	Black Huckleberry	9	FACU	1	Shrub	Perennial	Native
Viburnum prunifolium	Viburnum prunifolium	Smooth Blackhaw	5	FACU	1	Shrub	Perennial	Native
Corylus americana	Corylus americana	American Hazelnut	5	FACU	1	Shrub	Perennial	Native
Hamamelis virginiana	Hamamelis virginiana	American Witch-Hazel	8	FACU	1	Shrub	Perennial	Native
Amorpha canescens	Amorpha canescens	Leadplant	9	UPL	2	Shrub	Perennial	Native
Viburnum acerifolium	Viburnum acerifolium	Maple-Leaf Arrow-Wood	9	UPL	2	Shrub	Perennial	Native
Comptonia peregrina	Comptonia peregrina	Sweet-Fern	9	UPL	2	Shrub	Perennial	Native
Ceanothus herbaceus	Ceanothus herbaceus	Inland New Jersey Tea	10	UPL	2	Shrub	Perennial	Native

Conservatism-Based

Mean C (native species)	6.87
Mean C (all species)	6.87
Mean C (native trees)	6.50
Mean C (native shrubs)	7.92
Mean C (native herbaceous)	6.65
FQAI (native species)	57.91
FQAI (all species)	57.91
Adjusted FQAI	68.73
% C value 0	0%
% C Value 1-3	6%
% C value 4-6	38%
% C value 7-10	56%

Additional Metrics

Species Richness (all)	71
Species Richness (native)	71
% Non-native	0%
Wet Indicator (all)	1.28
Wet Indicator (native)	1.28
% hydrophyte (Midwest)	13%
% native perennial	99%
% native annual	1%
% annual	1%
% perennial	99%

Sedge Meadow ExC/FWOP

Species Name (NWPL/Mohlenbrock)	Species(Synonym)	Common Name	C Value	Midwest WET indicator	WET indicator (numeric)	Habit	Duration	Nativity
Acer saccharinum	Acer saccharinum	Silver Maple	0	FACW	-1	Tree	Perennial	Native
Alliaria petiolata	ALLIARIA PETIOLATA	Garlic-Mustard	0	FAC	0	Forb	Biennial	Adventive
Ambrosia trifida	Ambrosia trifida	Great Ragweed	0	FAC	0	Forb	Annual	Native
Arctium minus	ARCTIUM MINUS	Lesser Burrdock	0	FACU	1	Forb	Biennial	Adventive
Bidens frondosa	Bidens frondosa	Devil's-Pitchfork	1	FACW	-1	Forb	Annual	Native
Bromus inermis	BROMUS INERMIS	Smooth Brome	0	FACU	1	Grass	Perennial	Adventive
Celtis occidentalis	Celtis occidentalis	Common Hackberry	3	FAC	0	Tree	Perennial	Native
Cirsium arvense	CIRSIUM ARVENSE	Canadian Thistle	0	FACU	1	Forb	Perennial	Adventive
Convolvulus arvensis	CONVOLVULUS ARVENSIS	Field Bindweed	0	UPL	2	Forb	Perennial	Adventive
Crataegus mollis	Crataegus mollis	Downy Hawthorn	2	FAC	0	Tree	Perennial	Native
Daucus carota	DAUCUS CAROTA	Queen Anne's Lace	0	UPL	2	Forb	Biennial	Adventive
Echinacea purpurea	Echinacea purpurea	Purple Coneflower	3	UPL	2	Forb	Perennial	Native
Fraxinus pennsylvanica	Fraxinus pennsylvanica subintegerrima	Green Ash	1	FACW	-1	Tree	Perennial	Native
Glechoma hederacea	GLECHOMA HEDERACEA	Groundivy	0	FACU	1	Forb	Perennial	Adventive
Helianthus grosseserratus	Helianthus grosseserratus	Saw-Tooth Sunflower	2	FACW	-1	Forb	Perennial	Native
Leonurus cardiaca	LEONURUS CARDIACA	Motherwort	0	UPL	2	Forb	Perennial	Adventive
Monarda fistulosa	Monarda fistulosa	Oswego-Tea	4	FACU	1	Forb	Perennial	Native
Morus alba	MORUS ALBA	White Mulberry	0	FAC	0	Tree	Perennial	Adventive
Nepeta cataria	NEPETA CATARIA	Catnip	0	FACU	1	Forb	Perennial	Adventive
Oenothera biennis	Oenothera biennis	King's-Cureall	0	FACU	1	Forb	Biennial	Native
Osmunda claytoniana	Osmunda claytoniana	Interrupted Fern	9	FAC	0	Fern	Perennial	Native
Physostegia virginiana	Physostegia virginiana	Obedient-Plant	6	FACW	-1	Forb	Perennial	Native
Phytolacca americana	Phytolacca americana	American Pokeweed	1	FACU	1	Forb	Perennial	Native
Plantago lanceolata	PLANTAGO LANCEOLATA	English Plantain	0	FACU	1	Forb	Perennial	Adventive
Plantago rugelii	Plantago rugelii	Black-Seed Plantain	0	FAC	0	Forb	Annual	Native
Poa pratensis	POA PRATENSIS	Kentucky Blue Grass	0	FAC	0	Grass	Perennial	Adventive
Populus deltoides	Populus deltoides	Eastern Cottonwood	2	FAC	0	Tree	Perennial	Native
Ratibida pinnata	Ratibida pinnata	Yellow Coneflower	4	UPL	2	Forb	Perennial	Native
Rhamnus cathartica	RHAMNUS CATHARTICA	European Buckthorn	0	FAC	0	Shrub	Perennial	Adventive
Rhus hirta	Rhus typhina	Staghorn Sumac	1	UPL	2	Tree	Perennial	Native
Salix interior	Salix interior	Sandbar Willow	1	FACW	-1	Shrub	Perennial	Native
Setaria pumila	SETARIA GLAUCA	Yellow Bristle Grass	0	FAC	0	Grass	Annual	Adventive
Solanum dulcamara	SOLANUM DULCAMARA	Climbing Nightshade	0	FAC	0	Vine	Perennial	Adventive
Solidago altissima	Solidago altissima	Tall Goldenrod	1	FACU	1	Forb	Perennial	Native
Solidago altissima	Solidago altissima	Tall Goldenrod	1	FACU	1	Forb	Perennial	Native
Solidago gigantea	Solidago gigantea	Late Goldenrod	4	FACW	-1	Forb	Perennial	Native
Sorghastrum nutans	Sorghastrum nutans	Yellow Indian Grass	5	FACU	1	Grass	Perennial	Native
Symphyotrichum novae-angliae	Aster novae-angliae	New England American-Aster	4	FACW	-1	Forb	Perennial	Native
Symphyotrichum pilosum	Aster pilosus	White Oldfield American-Aster	0	FACU	1	Forb	Perennial	Native
Taraxacum officinale	TARAXACUM OFFICINALE	Common Dandelion	0	FACU	1	Forb	Perennial	Adventive
Viola sororia	Viola sororia	Hooded Blue Violet	3	FAC	0	Forb	Perennial	Native
Vitis riparia	Vitis riparia	River-Bank Grape	2	FACW	-1	Vine	Perennial	Native
Zizia aurea	Zizia aurea	Golden Alexanders	7	FAC	0	Forb	Perennial	Native

Conservatism-Based Metrics	
Mean C (native species)	2.48
Mean C (all species)	1.56
Mean C (native trees)	1.50
Mean C (native shrubs)	1.00
Mean C (native herbaceous)	2.89
FQAI (native species)	12.89
FQAI (all species)	10.22
Adjusted FQAI	19.66
% C value 0	49%
% C Value 1-3	33%
% C value 4-6	14%
% C value 7-10	5%
Additional Metrics	
Species Richness (all)	43
Species Richness (native)	27
% Non-native	37%
Wet Indicator (all)	0.40
Wet Indicator (native)	0.15
% hydrophyte (Midwest)	53%
% native perennial	53%
% native annual	7%
% annual	9%
% perennial	81%

Sedge Meadow FWP

Species Name (NWPL/Mohlenbrock)	Species(Synonym)	Common Name	C Value	Midwest WET indicator	WET indicator (numeric)	Habit	Duration	Nativity
Carex haydenii	Carex haydenii	Cloud Sedge	6	OBL	-2	Sedge	Perennial	Native
Arnoglossum plantagineum	Cacalia plantaginea	Groove-Stem Indian-Plantain	10	FAC	0	Forb	Perennial	Native
Thalictrum dasycarpum	Thalictrum dasycarpum hypoglaucum	Purple Meadow-Rue	5	FACW	-1	Forb	Perennial	Native
Onoclea sensibilis	Onoclea sensibilis	Sensitive Fern	8	FACW	-1	Fern	Perennial	Native
Carex pellita	Carex pellita	Woolly Sedge	4	OBL	-2	Sedge	Perennial	Native
Lysimachia quadriflora	Lysimachia quadriflora	Four-Flower Yellow-	9	OBL	-2	Forb	Perennial	Native
Iris virginica var. shrevei	Iris virginica shrevei	Virginia Blueflag	5	OBL	-2	Forb	Perennial	Native
Anemone canadensis	Anemone canadensis	Round-Leaf Thimbleweed	4	FACW	-1	Forb	Perennial	Native
Cicuta maculata	Cicuta maculata	Spotted Water-Hemlock	6	OBL	-2	Forb	Perennial	Native
Doellingeria umbellata	Aster umbellatus	Parasol White-Top	9	FACW	-1	Forb	Perennial	Native
Lythrum alatum	Lythrum alatum	Wing-Angle Loosestrife	7	OBL	-2	Forb	Perennial	Native
Eleocharis palustris	Eleocharis erythropoda; Eleocharis palustris major; Eleocharis smallii	Common Spike-Rush	2	OBL	-2	Sedge	Perennial	Native
Galium obtusum	Galium obtusum	Blunt-Leaf Bedstraw	5	FACW	-1	Forb	Perennial	Native
Caltha palustris	Caltha palustris	Yellow Marsh-Marigold	5	OBL	-2	Forb	Perennial	Native

Conservatism-Based Metrics	
Mean C (native species)	6.07
Mean C (all species)	6.07
Mean C (native trees)	n/a
Mean C (native shrubs)	n/a
Mean C (native herbaceous)	6.07
FQAI (native species)	22.72
FQAI (all species)	22.72
Adjusted FQAI	60.71
% C value 0	0%
% C Value 1-3	7%
% C value 4-6	57%
% C value 7-10	36%

Additional Metrics	
Species Richness (all)	14
Species Richness (native)	14
% Non-native	0%
Wet Indicator (all)	-1.50
Wet Indicator (native)	-1.50
% hydrophyte (Midwest)	100%
% native perennial	100%
% native annual	0%
% annual	0%
% perennial	100%

Fringe Marsh/Pond ExC/FWOP

Species Name (NWPL/Mohlenbrock)	Species(Synonym)	Common Name	C Value	Midwest WET indicator	WET indicator (numeric)	Habit	Duration	Nativity
Acer negundo	Acer negundo var. violaceum	Ash-Leaf Maple	0	FAC	0	Tree	Perennial	Native
Acer platanoides	ACER PLATANOIDES	Norway Maple	0	UPL	2	Tree	Perennial	Adventive
Acer saccharinum	Acer saccharinum	Silver Maple	0	FACW	-1	Tree	Perennial	Native
Ailanthus altissima	AILANTHUS ALTISSIMA	Tree-of-Heaven	0	FACU	1	Tree	Perennial	Adventive
Alisma subcordatum	Alisma subcordatum	American Water-Plantain	4	OBL	-2	Forb	Perennial	Native
Alnus glutinosa	ALNUS GLUTINOSA	European Alder	0	FACW	-1	Tree	Perennial	Adventive
Ambrosia artemisiifolia	Ambrosia artemisiifolia elatior	Annual Ragweed	0	FACU	1	Forb	Annual	Native
Arctium minus	ARCTIUM MINUS	Lesser Burrdock	0	FACU	1	Forb	Biennial	Adventive
Asclepias syriaca	Asclepias syriaca	Common Milkweed	0	FACU	1	Forb	Perennial	Native
Atriplex patula	ATRIPLEX PATULA	Halberd-Leaf Orache	0	FACW	-1	Forb	Annual	Adventive
Bidens cernua	Bidens cernua	Nodding Burr-Marigold	5	OBL	-2	Forb	Annual	Native
Bidens frondosa	Bidens frondosa	Devil's-Pitchfork	1	FACW	-1	Forb	Annual	Native
Bidens tripartita	Bidens comosa; Bidens connata	Three-Lobe Beggarticks	5	OBL	-2	Forb	Annual	Native
Celtis occidentalis	Celtis occidentalis	Common Hackberry	3	FAC	0	Tree	Perennial	Native
Centaurium pulchellum	CENTAURIUM PULCHELLUM	Branched Centaury	0	FACU	1	Forb	Annual	Adventive
Chenopodium album	CHENOPODIUM ALBUM	Lamb's-Quarters	0	FACU	1	Forb	Annual	Adventive
Cichorium intybus	CICHORIUM INTYBUS	Chicory	0	FACU	1	Forb	Perennial	Adventive
Cirsium arvense	CIRSIUM ARVENSE	Canadian Thistle	0	FACU	1	Forb	Perennial	Adventive
Cirsium vulgare	CIRSIUM VULGARE	Bull Thistle	0	FACU	1	Forb	Biennial	Adventive
Convolvulus arvensis	CONVOLVULUS ARVENSIS	Field Bindweed	0	UPL	2	Forb	Perennial	Adventive
Cornus obliqua	Cornus obliqua	Pale Dogwood	6	FACW	-1	Shrub	Perennial	Native
Dactylis glomerata	DACTYLIS GLOMERATA	Orchard Grass	0	FACU	1	Grass	Perennial	Adventive
Daucus carota	DAUCUS CAROTA	Queen Anne's Lace	0	UPL	2	Forb	Biennial	Adventive
Digitaria sanguinalis	DIGITARIA SANGUINALIS	Hairy Crab Grass	0	FACU	1	Grass	Annual	Adventive
Eleocharis palustris	Eleocharis erythropoda; Eleocharis palustris major; Eleocharis smallii	Common Spike-Rush	2	OBL	-2	Sedge	Perennial	Native
Elodea canadensis	Elodea canadensis	Canadian Waterweed	5	OBL	-2	Forb	Perennial	Native
Elymus canadensis	Elymus canadensis	Nodding Wild Rye	4	FACU	1	Grass	Perennial	Native
Epilobium coloratum	Epilobium coloratum	Purple-Leaf Willowherb	3	OBL	-2	Forb	Perennial	Native
Erigeron canadensis	Erigeron canadensis	Canadian Horseweed	0	FACU	1	Forb	Annual	Native
Euonymus alatus	EUONYMUS ALATUS	Winged Euonymus	0	UPL	2	Shrub	Perennial	Adventive
Euonymus atropurpureus	Euonymus atropurpureus	Eastern Wahoo	8	FAC	0	Shrub	Perennial	Native
Eupatorium serotinum	Eupatorium serotinum	Late-Flowering Thoroughwort	0	FAC	0	Forb	Perennial	Native
Fraxinus pennsylvanica	Fraxinus pennsylvanica subintegerrima	Green Ash	1	FACW	-1	Tree	Perennial	Native
Glechoma hederacea	GLECHOMA HEDERACEA	Groundivy	0	FACU	1	Forb	Perennial	Adventive
Gleditsia triacanthos	Gleditsia triacanthos	Honey-Locust	2	FACU	1	Tree	Perennial	Native
Hackelia virginiana	Hackelia virginiana	Beggar's-Lice	0	FACU	1	Forb	Biennial	Native
Hibiscus moscheutos	Hibiscus palustris	Crimson-Eyed Rose-Mallow	9	OBL	-2	Forb	Perennial	Native
Impatiens capensis	Impatiens capensis	Spotted Touch-Me-Not	3	FACW	-1	Forb	Annual	Native
Iris pseudacorus	IRIS PSEUDACORUS	Pale-Yellow Iris	0	OBL	-2	Forb	Perennial	Adventive
Iris virginica var. shrevei	Iris virginica shrevei	Virginia Blueflag	5	OBL	-2	Forb	Perennial	Native
Juncus dudleyi	Juncus dudleyi	Dudley's Rush	4	FACW	-1	Forb	Perennial	Native
Lactuca serriola	LACTUCA SERRIOLA	Prickly Lettuce	0	FACU	1	Forb	Biennial	Adventive
Lemna minor	Lemna minor	Common Duckweed	5	OBL	-2	Forb	Annual	Native
Lonicera X bella	LONICERA X BELLA	0	0	FACU	1	Shrub	Perennial	Adventive
Lycopus uniflorus	Lycopus uniflorus	Northern Water-Horehound	7	OBL	-2	Forb	Perennial	Native
Matricaria discoidea	MATRICARIA MATRICARIOIDES	Pineapple-Weed	0	FACU	1	Forb	Annual	Adventive
Melilotus albus	MELILOTUS ALBA	White Sweet-Clover	0	UPL	2	Forb	Biennial	Adventive
Melilotus officinalis	MELILOTUS ALBA	Yellow Sweet-Clover	0	FACU	1	Forb	Biennial	Adventive
Mentha arvensis	Mentha arvensis villosa	American Wild Mint	5	FACW	-1	Forb	Perennial	Native
Mentha spicata	MENTHA LONGIFOLIA	Spearmint	0	FACW	-1	Forb	Perennial	Adventive
Morus alba	MORUS ALBA	White Mulberry	0	FAC	0	Tree	Perennial	Adventive
Muhlenbergia schreberi	Muhlenbergia schreberi	Nimblewill	0	FAC	0	Grass	Perennial	Native
Myriophyllum sibiricum	Myriophyllum exalbescens	Siberian Water-Milfoil	7	OBL	-2	Forb	Perennial	Native
Myriophyllum spicatum	MYRIOPHYLLUM SPICATUM	Eurasian Water-Milfoil	0	OBL	-2	Forb	Perennial	Adventive
Nepeta cataria	NEPETA CATARIA	Catnip	0	FACU	1	Forb	Perennial	Adventive
Nuphar advena	Nuphar advena	Yellow Pond-Lily	7	OBL	-2	Forb	Perennial	Native
Oenothera biennis	Oenothera biennis	King's-Cureall	0	FACU	1	Forb	Biennial	Native
Oxalis stricta	Oxalis europaea	Upright Yellow Wood-Sorrel	0	FACU	1	Forb	Perennial	Native
Parietaria pensylvanica	Parietaria pensylvanica	Pennsylvania Pellitory	3	FACU	1	Forb	Annual	Native
Parthenocissus inserta	Parthenocissus inserta	Thicket-Creeper	1	FACU	1	Vine	Perennial	Native
Persicaria hydropiper	Polygonum hydropiper	Mild Water-Pepper	2	OBL	-2	Forb	Annual	Native
Phalaris arundinacea	PHALARIS ARUNDINACEA	Reed Canary Grass	0	FACW	-1	Grass	Perennial	Adventive
Phragmites australis ssp. australis	Phragmites australis	Common Reed	0	FACW	-1	Grass	Perennial	Adventive
Physalis subglabrata	Physalis subglabrata	Smooth Ground Cherry	0	UPL	2	Forb	Perennial	Native
Plantago lanceolata	PLANTAGO LANCEOLATA	English Plantain	0	FACU	1	Forb	Perennial	Adventive
Platanus occidentalis	Platanus occidentalis	American Sycamore	9	FACW	-1	Tree	Perennial	Native
Poa pratensis	POA PRATENSIS	Kentucky Blue Grass	0	FAC	0	Grass	Perennial	Adventive
Poinsettia dentata	EUPHORBIA DENTATA	Wild Poinsettia	0	UPL	2	Forb	Annual	Adventive
Polygonum arenastrum	POLYGONUM ARENASTRUM	Sidewalk Knotweed	0	UPL	2	Forb	Annual	Adventive
Prunella vulgaris ssp. lanceolata	Prunella vulgaris lanceolata	Common Selfheal	0	FAC	0	Forb	Perennial	Native
Ptelea trifoliata	Ptelea trifoliata	Common Hoptree	7	FACU	1	Shrub	Perennial	Native
Rhus hirta	Rhus typhina	Staghorn Sumac	1	UPL	2	Tree	Perennial	Native
Salix amygdaloides	Salix amygdaloides	Peach-Leaf Willow	5	FACW	-1	Tree	Perennial	Native
Salix babylonica	SALIX BABYLONICA	Chinese Willow	0	FAC	0	Tree	Perennial	Adventive
Sambucus nigra ssp. canadensis	Sambucus canadensis	Black Elder	1	FACW	-1	Shrub	Perennial	Native
Sanicula odorata	Sanicula gregaria	Clustered Black-Snakeroot	2	FAC	0	Forb	Perennial	Native
Saponaria officinalis	SAPONARIA OFFICINALIS	Bouncing-Bett	0	FACU	1	Forb	Perennial	Adventive
Schoenoplectus pungens	Scirpus pungens	Three-Square	5	OBL	-2	Sedge	Perennial	Native
Setaria faberi	SETARIA FABERI	Japanese Bristle Grass	0	FACU	1	Grass	Annual	Adventive
Setaria pumila	SETARIA GLAUCA	Yellow Bristle Grass	0	FAC	0	Grass	Annual	Adventive
Solanum americanum	Solanum americanum	American Black Nightshade	0	FACU	1	Forb	Annual	Native
Solanum dulcamara	SOLANUM DULCAMARA	Climbing Nightshade	0	FAC	0	Vine	Perennial	Adventive
Solidago altissima	Solidago altissima	Tall Goldenrod	1	FACU	1	Forb	Perennial	Native
Solidago gigantea	Solidago gigantea	Late Goldenrod	4	FACW	-1	Forb	Perennial	Native
Sonchus arvensis	SONCHUS ARVENSIS	Field Sow-Thistle	0	FACU	1	Forb	Perennial	Adventive
Spartina pectinata	Spartina pectinata	Freshwater Cord Grass	4	FACW	-1	Grass	Perennial	Native
Stuckenia pectinata	Potamogeton pectinatus	Sago False Pondweed	5	OBL	-2	Forb	Perennial	Native
Symphyotrichum lanceolatum	Aster simplex	White Panicled American-Aster	3	FAC	0	Forb	Perennial	Native
Symphyotrichum novae-angliae	Aster novae-angliae	New England American-Aster	4	FACW	-1	Forb	Perennial	Native
Symphyotrichum pilosum	Aster pilosus	White Oldfield American-Aster	0	FACU	1	Forb	Perennial	Native
Taraxacum officinale	TARAXACUM OFFICINALE	Common Dandelion	0	FACU	1	Forb	Perennial	Adventive
Trifolium pratense	TRIFOLIUM PRATENSE	Red Clover	0	FACU	1	Forb	Perennial	Adventive
Trifolium repens	TRIFOLIUM REPENS	White Clover	0	FACU	1	Forb	Perennial	Adventive
Vallisneria americana	Vallisneria americana	American Eel-Grass	7	OBL	-2	Forb	Perennial	Native
Verbascum thapsus	VERBASCUM THAPSUS	Woolly Mullein	0	UPL	2	Forb	Biennial	Adventive
Verbena hastata	Verbena hastata	Simpler's-Joy	4	FACW	-1	Forb	Perennial	Native
Verbena urticifolia	Verbena urticifolia leiocarpa	White Vervain	5	FAC	0	Forb	Perennial	Native
Viburnum opulus var. opulus	VIBURNUM OPULUS	Highbush-Cranberry	0	FAC	0	Shrub	Perennial	Adventive
Vitis riparia	Vitis riparia	River-Bank Grape	2	FACW	-1	Vine	Perennial	Native

Conservatism-Based Metrics	
Mean C (native species)	3.14
Mean C (all species)	1.78
Mean C (native trees)	2.63
Mean C (native shrubs)	5.50
Mean C (native herbaceous)	3.10
FQAI (native species)	23.52
FQAI (all species)	17.69
Adjusted FQAI	23.64
% C value 0	58%
% C Value 1-3	16%
% C value 4-6	18%
% C value 7-10	8%
Additional Metrics	
Species Richness (all)	99
Species Richness (native)	56
% Non-native	43%
Wet Indicator (all)	0.00
Wet Indicator (native)	-0.52
% hydrophyte (Midwest)	54%
% native perennial	44%
% native annual	10%
% annual	19%
% perennial	72%

Fringe Marsh/Pond FWP

Species Name (NWPL/Mohlenbrock)	Species(Synonym)	Common Name	C Value	Midwest WET indicator	WET indicator (numeric)	Habit	Duration	Nativity
Acorus americanus	0	Several-Vein Sweetflag	7	OBL	-2	Forb	Perennial	Native
Agalinis tenuifolia	Agalinis tenuifolia	Slender-Leaf False Foxglove	7	FACW	-1	Forb	Annual	Native
Alisma subcordatum	Alisma subcordatum	American Water-Plantain	4	OBL	-2	Forb	Perennial	Native
Angelica atropurpurea	Angelica atropurpurea	Purple-Stem Angelica	7	OBL	-2	Forb	Perennial	Native
Bidens cernua	Bidens cernua	Nodding Burr-Marigold	5	OBL	-2	Forb	Annual	Native
Brasenia schreberi	Brasenia schreberi	Water Shield	10	OBL	-2	Forb	Perennial	Native
Carex comosa	Carex comosa	Bearded Sedge	5	OBL	-2	Sedge	Perennial	Native
Carex lacustris	Carex lacustris	Lakebank Sedge	6	OBL	-2	Sedge	Perennial	Native
Carex stricta	Carex stricta	Uptight Sedge	5	OBL	-2	Sedge	Perennial	Native
Celtis occidentalis	Celtis occidentalis	Common Hackberry	3	FAC	0	Tree	Perennial	Native
Decodon verticillatus	Decodon verticillatus	Swamp-Loosestrife	8	OBL	-2	Shrub	Perennial	Native
Eleocharis acicularis	Eleocharis acicularis	Needle Spike-Rush	2	OBL	-2	Sedge	Perennial	Native
Eleocharis obtusa	Eleocharis ovata	Blunt Spike-Rush	3	OBL	-2	Sedge	Annual	Native
Eleocharis palustris	Eleocharis erythropoda; Eleocharis palustris major; Eleocharis smallii	Common Spike-Rush	2	OBL	-2	Sedge	Perennial	Native
Elodea canadensis	Elodea canadensis	Canadian Waterweed	5	OBL	-2	Forb	Perennial	Native
Eupatorium perfoliatum	Eupatorium perfoliatum	Common Boneset	4	OBL	-2	Forb	Perennial	Native
Hibiscus laevis	Hibiscus laevis	Halberd-Leaf Rose-Mallow	6	OBL	-2	Forb	Perennial	Native
Hibiscus moscheutos	Hibiscus palustris	Crimson-Eyed Rose-Mallow	9	OBL	-2	Forb	Perennial	Native
Impatiens capensis	Impatiens capensis	Spotted Touch-Me-Not	3	FACW	-1	Forb	Annual	Native
Iris virginica var. shrevei	Iris virginica shrevei	Virginia Blueflag	5	OBL	-2	Forb	Perennial	Native
Juncus dudleyi	Juncus dudleyi	Dudley's Rush	4	FACW	-1	Forb	Perennial	Native
Juncus effusus ssp. solutus	Juncus effusus	Lamp Rush	7	OBL	-2	Forb	Perennial	Native
Lemna minor	Lemna minor	Common Duckweed	5	OBL	-2	Forb	Annual	Native
Lobelia siphilitica	Lobelia siphilitica	Great Blue Lobelia	6	OBL	-2	Forb	Perennial	Native
Lycopus americanus	Lycopus americanus	Cut-Leaf Water-Horehound	5	OBL	-2	Forb	Perennial	Native
Lycopus uniflorus	Lycopus uniflorus	Northern Water-Horehound	7	OBL	-2	Forb	Perennial	Native
Lysimachia thyrsiflora	Lysimachia thyrsiflora	Tufted Yellow-Loosestrife	9	OBL	-2	Forb	Perennial	Native
Mentha arvensis	Mentha arvensis villosa	American Wild Mint	5	FACW	-1	Forb	Perennial	Native
Mimulus ringens	Mimulus ringens	Allegheny Monkey-Flower	6	OBL	-2	Forb	Perennial	Native
Myriophyllum sibiricum	Myriophyllum exalbescens	Siberian Water-Milfoil	7	OBL	-2	Forb	Perennial	Native
Nuphar advena	Nuphar advena	Yellow Pond-Lily	7	OBL	-2	Forb	Perennial	Native
Nymphaea odorata	Nymphaea tuberosa	American White Water-Lily	7	OBL	-2	Forb	Perennial	Native
Peltandra virginica	Peltandra virginica	Green Arrow-Arum	10	OBL	-2	Forb	Perennial	Native
Penthorum sedoides	Penthorum sedoides	Ditch-Stonecrop	5	OBL	-2	Forb	Perennial	Native
Persicaria hydropiper	Polygonum hydropiper	Mild Water-Pepper	2	OBL	-2	Forb	Annual	Native
Pontederia cordata	Pontederia cordata	Pickerelweed	10	OBL	-2	Forb	Perennial	Native
Potamogeton natans	Potamogeton natans	Floating Pondweed	7	OBL	-2	Forb	Perennial	Native
Rhynchospora macrostachya	Rhynchospora macrostachya	Tall Horned Beak Sedge	10	OBL	-2	Sedge	Perennial	Native
Rumex britannica	Rumex orbiculatus	Greater Water Dock	8	OBL	-2	Forb	Perennial	Native
Sagittaria latifolia	Sagittaria latifolia	Duck-Potato	4	OBL	-2	Forb	Perennial	Native
Salix amygdaloides	Salix amygdaloides	Peach-Leaf Willow	5	FACW	-1	Tree	Perennial	Native
Schoenoplectus acutus	Scirpus acutus	Hard-Stem Club-Rush	6	OBL	-2	Sedge	Perennial	Native
Schoenoplectus tabernaemontani	Scirpus validus creber	Soft-Stem Club-Rush	5	OBL	-2	Sedge	Perennial	Native
Sium suave	Sium suave	Hemlock Water-Parsnip	7	OBL	-2	Forb	Perennial	Native
Sparganium americanum	Sparganium americanum	American Burr-Reed	10	OBL	-2	Forb	Perennial	Native
Sparganium eurycarpum	Sparganium eurycarpum	Broad-Fruit Burr-Reed	6	OBL	-2	Forb	Perennial	Native
Spiraea alba	Spiraea alba	White Meadowsweet	7	FACW	-1	Shrub	Perennial	Native
Spiraea tomentosa	Spiraea tomentosa rosea	Steeplebush	9	FACW	-1	Shrub	Perennial	Native
Stuckenia pectinata	Potamogeton pectinatus	Sago False Pondweed	5	OBL	-2	Forb	Perennial	Native
Vallisneria americana	Vallisneria americana	American Eel-Grass	7	OBL	-2	Forb	Perennial	Native
Viola lanceolata	Viola lanceolata	Bog White Violet	7	OBL	-2	Forb	Perennial	Native
Vitis riparia	Vitis riparia	River-Bank Grape	2	FACW	-1	Vine	Perennial	Native

Conservatism-Based Metrics	
Mean C (native species)	6.02
Mean C (all species)	6.02
Mean C (native trees)	4.00
Mean C (native shrubs)	8.00
Mean C (native herbaceous)	6.07
FQAI (native species)	43.41
FQAI (all species)	43.41
Adjusted FQAI	60.19
% C value 0	0%
% C Value 1-3	13%
% C value 4-6	42%
% C value 7-10	44%
Additional Metrics	
Species Richness (all)	52
Species Richness (native)	52
% Non-native	0%
Wet Indicator (all)	-1.81
Wet Indicator (native)	-1.81
% hydrophyte (Midwest)	100%
% native perennial	88%
% native annual	12%
% annual	12%
% perennial	88%

Islands ExC/FWOP

Species Name (NWPL/Mohlenbrock)	Species(Synonym)	Common Name	C Value	Midwest WET indicator	WET indicator (numeric)	Habit	Duration	Nativity
Acer saccharinum	Acer saccharinum	Silver Maple	0	FACW	-1	Tree	Perennial	Native
Achillea millefolium	ACHILLEA MILLEFOLIUM	Common Yarrow	0	FACU	1	Forb	Perennial	Adventive
Ageratina altissima	Eupatorium rugosum	White Snakeroot	4	FACU	1	Forb	Perennial	Native
Ailanthus altissima	AILANTHUS ALTISSIMA	Tree-of-Heaven	0	FACU	1	Tree	Perennial	Adventive
Alliaria petiolata	ALLIARIA PETIOLATA	Garlic-Mustard	0	FAC	0	Forb	Biennial	Adventive
Asclepias syriaca	Asclepias syriaca	Common Milkweed	0	FACU	1	Forb	Perennial	Native
Asclepias verticillata	Asclepias verticillata	Whorled Milkweed	1	FACU	1	Forb	Perennial	Native
Bidens cernua	Bidens cernua	Nodding Burr-Marigold	5	OBL	-2	Forb	Annual	Native
Bidens frondosa	Bidens frondosa	Devil's-Pitchfork	1	FACW	-1	Forb	Annual	Native
Bidens tripartita	Bidens comosa; Bidens connata	Three-Lobe Beggarticks	5	OBL	-2	Forb	Annual	Native
Bromus inermis	BROMUS INERMIS	Smooth Brome	0	FACU	1	Grass	Perennial	Adventive
Carex blanda	Carex blanda	Eastern Woodland Sedge	1	FAC	0	Sedge	Perennial	Native
Cirsium arvense	CIRSIUM ARVENSE	Canadian Thistle	0	FACU	1	Forb	Perennial	Adventive
Convolvulus arvensis	CONVOLVULUS ARVENSIS	Field Bindweed	0	UPL	2	Forb	Perennial	Adventive
Cornus racemosa	Cornus racemosa	Gray Dogwood	1	FAC	0	Shrub	Perennial	Native
Daucus carota	DAUCUS CAROTA	Queen Anne's Lace	0	UPL	2	Forb	Biennial	Adventive
Digitaria sanguinalis	DIGITARIA SANGUINALIS	Hairy Crab Grass	0	FACU	1	Grass	Annual	Adventive
Echinochloa crus-galli	Echinochloa crusgalli	Large Barnyard Grass	0	FACW	-1	Grass	Annual	Native
Eleocharis palustris	Eleocharis erythropoda; Eleocharis palustris major; Eleocharis smallii	Common Spike-Rush	2	OBL	-2	Sedge	Perennial	Native
Elymus canadensis	Elymus canadensis	Nodding Wild Rye	4	FACU	1	Grass	Perennial	Native
Epilobium coloratum	Epilobium coloratum	Purple-Leaf Willowherb	3	OBL	-2	Forb	Perennial	Native
Erigeron annuus	Erigeron annuus	Eastern Daisy Fleabane	0	FACU	1	Forb	Biennial	Native
Erigeron canadensis	Erigeron canadensis	Canadian Horseweed	0	FACU	1	Forb	Annual	Native
Eupatorium serotinum	Eupatorium serotinum	Late-Flowering Thoroughwort	0	FAC	0	Forb	Perennial	Native
Euphorbia corollata	Euphorbia corollata	Flowering Spurge	2	UPL	2	Forb	Perennial	Native
Frangula alnus	RHAMNUS FRANGULA	Glossy False Buckthorn	0	FACW	-1	Shrub	Perennial	Adventive
Glechoma hederacea	GLECHOMA HEDERACEA	Groundivy	0	FACU	1	Forb	Perennial	Adventive
Impatiens capensis	Impatiens capensis	Spotted Touch-Me-Not	3	FACW	-1	Forb	Annual	Native
Juncus dudleyi	Juncus dudleyi	Dudley's Rush	4	FACW	-1	Forb	Perennial	Native
Lactuca serriola	LACTUCA SERRIOLA	Prickly Lettuce	0	FACU	1	Forb	Biennial	Adventive
Leucanthemum vulgare	CHRYSANTHEMUM LEUCANTHEMUM PINNATIFIDUM	Ox-Eye Daisy	0	UPL	2	Forb	Perennial	Adventive
Lobelia siphilitica	Lobelia siphilitica	Great Blue Lobelia	6	OBL	-2	Forb	Perennial	Native
Medicago lupulina	MEDICAGO LUPULINA	Black Medick	0	FACU	1	Forb	Annual	Adventive
Monarda fistulosa	Monarda fistulosa	Oswego-Tea	4	FACU	1	Forb	Perennial	Native
Muhlenbergia frondosa	Muhlenbergia frondosa	Wire-Stem Muhly	3	FACW	-1	Grass	Perennial	Native
Muhlenbergia schreberi	Muhlenbergia schreberi	Nimblewill	0	FAC	0	Grass	Perennial	Native
Oenothera biennis	Oenothera biennis	King's-Cureall	0	FACU	1	Forb	Biennial	Native
Oxalis stricta	Oxalis europaea	Upright Yellow Wood-Sorrel	0	FACU	1	Forb	Perennial	Native
Panicum capillare	Panicum capillare	Common Panic Grass	1	FAC	0	Grass	Annual	Native
Panicum virgatum	Panicum virgatum	Wand Panic Grass	5	FAC	0	Grass	Perennial	Native
Parthenocissus inserta	Parthenocissus inserta	Thicket-Creeper	1	FACU	1	Vine	Perennial	Native
Persicaria hydropiper	Polygonum hydropiper	Mild Water-Pepper	2	OBL	-2	Forb	Annual	Native
Persicaria longiseta	POLYGONUM CESPITOSUM LONGISETUM	Bristly Lady's-Thumb	0	FAC	0	Forb	Annual	Adventive
Phalaris arundinacea	PHALARIS ARUNDINACEA	Reed Canary Grass	0	FACW	-1	Grass	Perennial	Adventive
Phragmites australis ssp. australis	Phragmites australis	Common Reed	0	FACW	-1	Grass	Perennial	Adventive
Phytolacca americana	Phytolacca americana	American Pokeweed	1	FACU	1	Forb	Perennial	Native
Plantago lanceolata	PLANTAGO LANCEOLATA	English Plantain	0	FACU	1	Forb	Perennial	Adventive
Plantago rugelii	Plantago rugelii	Black-Seed Plantain	0	FAC	0	Forb	Annual	Native
Poa pratensis	POA PRATENSIS	Kentucky Blue Grass	0	FAC	0	Grass	Perennial	Adventive
Polygonum arenastrum	POLYGONUM ARENASTRUM	Sidewalk Knotweed	0	UPL	2	Forb	Annual	Adventive
Portulaca oleracea	PORTULACA OLERACEA	Little-Hogweed	0	FACU	1	Forb	Annual	Adventive
Rhamnus cathartica	RHAMNUS CATHARTICA	European Buckthorn	0	FAC	0	Shrub	Perennial	Adventive
Rhus hirta	Rhus typhina	Staghorn Sumac	1	UPL	2	Tree	Perennial	Native
Sanicula odorata	Sanicula gregaria	Clustered Black-Snakeroot	2	FAC	0	Forb	Perennial	Native
Saponaria officinalis	SAPONARIA OFFICINALIS	Bouncing-Bett	0	FACU	1	Forb	Perennial	Adventive
Scilla sibirica	SCILLA SIBIRICA	Squill	0	UPL	2	Forb	Perennial	Adventive
Setaria pumila	SETARIA GLAUCA	Yellow Bristle Grass	0	FAC	0	Grass	Annual	Adventive
Solanum americanum	Solanum americanum	American Black Nightshade	0	FACU	1	Forb	Annual	Native
Solanum dulcamara	SOLANUM DULCAMARA	Climbing Nightshade	0	FAC	0	Vine	Perennial	Adventive
Solidago altissima	Solidago altissima	Tall Goldenrod	1	FACU	1	Forb	Perennial	Native
Solidago gigantea	Solidago gigantea	Late Goldenrod	4	FACW	-1	Forb	Perennial	Native
Solidago rigida	Solidago rigida	Hard-Leaf Flat-Top-Goldenrod	4	FACU	1	Forb	Perennial	Native
Sorghastrum nutans	Sorghastrum nutans	Yellow Indian Grass	5	FACU	1	Grass	Perennial	Native
Symphyotrichum lanceolatum	Aster simplex	White Panicled American-Aster	3	FAC	0	Forb	Perennial	Native
Symphyotrichum novae-angliae	Aster novae-angliae	New England American-Aster	4	FACW	-1	Forb	Perennial	Native
Symphyotrichum pilosum	Aster pilosus	White Oldfield American-Aster	0	FACU	1	Forb	Perennial	Native
Trifolium pratense	TRIFOLIUM PRATENSE	Red Clover	0	FACU	1	Forb	Perennial	Adventive
Verbena hastata	Verbena hastata	Simpler's-Joy	4	FACW	-1	Forb	Perennial	Native
Veronicastrum virginicum	Veronicastrum virginicum	Culver's-Root	7	FAC	0	Forb	Perennial	Native
Viburnum lentago	Viburnum lentago	Nanny-Berry	5	FAC	0	Shrub	Perennial	Native
Viburnum opulus var. opulus	VIBURNUM OPULUS	Highbush-Cranberry	0	FAC	0	Shrub	Perennial	Adventive
Viola sororia	Viola sororia	Hooded Blue Violet	3	FAC	0	Forb	Perennial	Native
Vitis riparia	Vitis riparia	River-Bank Grape	2	FACW	-1	Vine	Perennial	Native

Conservatism-Based Metrics	
Mean C (native species)	2.26
Mean C (all species)	1.42
Mean C (native trees)	0.50
Mean C (native shrubs)	3.00
Mean C (native herbaceous)	2.35
FQAI (native species)	15.33
FQAI (all species)	12.17
Adjusted FQAI	17.95
% C value 0	53%
% C Value 1-3	26%
% C value 4-6	19%
% C value 7-10	1%
Additional Metrics	
Species Richness (all)	73
Species Richness (native)	46
% Non-native	37%
Wet Indicator (all)	0.23
Wet Indicator (native)	-0.04
% hydrophyte (Midwest)	52%
% native perennial	47%
% native annual	14%
% annual	22%
% perennial	71%

Islands FWP

Species Name (NWPL/Mohlenbrock)	Species(Synonym)	Common Name	C Value	Midwest WET indicator	WET indicator (numeric)	Habit	Duration	Nativity
Alnus incana	Alnus rugosa	Speckled Alder	8	FACW	-1	Shrub	Perennial	Native
Asclepias longifolia	Asclepias hirtella	Long-Leaf Milkweed	10	UPL	2	Forb	Perennial	Native
Baptisia alba var. macrophylla	Baptisia leucantha	White Wild Indigo	8	FACU	1	Forb	Perennial	Native
Bouteloua curtipendula	Bouteloua curtipendula	Side-Oats Grama	8	UPL	2	Grass	Perennial	Native
Cornus alba	Cornus stolonifera	Red Osier	6	FACW	-1	Shrub	Perennial	Native
Decodon verticillatus	Decodon verticillatus	Swamp-Loosestrife	8	OBL	-2	Shrub	Perennial	Native
Dodecatheon meadia	Dodecatheon meadia	Pride-of-Ohio	6	FACU	1	Forb	Perennial	Native
Eurybia macrophylla	Aster macrophyllus	Large-Leaf Wood-Aster	8	FACU	1	Forb	Perennial	Native
Hypericum kalmianum	Hypericum kalmianum	Kalm's St. John's-Wort	10	FACW	-1	Shrub	Perennial	Native
Koeleria macrantha	Koeleria cristata	June Grass	7	UPL	2	Grass	Perennial	Native
Liatris aspera	Liatris aspera	Rough Gayfeather	6	UPL	2	Forb	Perennial	Native
Monarda fistulosa	Monarda fistulosa	Oswego-Tea	4	FACU	1	Forb	Perennial	Native
Osmunda spectabilis	Osmunda regalis spectabilis	Royal Fern	8	OBL	-2	Fern	Perennial	Native
Packera aurea	Senecio aureus	Golden Groundsel	7	FACW	-1	Forb	Perennial	Native
Pedicularis canadensis	Pedicularis canadensis	Canadian Lousewort	9	FACU	1	Forb	Perennial	Native
Penstemon hirsutus	Penstemon hirsutus	Hairy Beardstongue	9	UPL	2	Forb	Perennial	Native
Physocarpus opulifolius	Physocarpus opulifolius	Atlantic Ninebark	8	FACW	-1	Shrub	Perennial	Native
Rosa palustris	Rosa palustris	Swamp Rose	7	OBL	-2	Shrub	Perennial	Native
Rudbeckia hirta	Rudbeckia hirta	Black-Eyed-Susan	1	FACU	1	Forb	Perennial	Native
Sabatia angularis	Sabatia angularis	Rose-Pink	10	FAC	0	Forb	Biennial	Native
Salix humilis	Salix humilis	Prairie Willow	6	FACU	1	Shrub	Perennial	Native
Salix myricoides	Salix glaucophylloides	Bayberry Willow	7	FACW	-1	Shrub	Perennial	Native
Silene regia	Silene regia	Royal Catchfly	10	UPL	2	Forb	Perennial	Native
Solidago rugosa	Solidago rugosa	Wrinkle-Leaf Goldenrod	6	FAC	0	Forb	Perennial	Native
Spiraea alba	Spiraea alba	White Meadowsweet	7	FACW	-1	Shrub	Perennial	Native
Spiraea tomentosa	Spiraea tomentosa rosea	Steeplebush	9	FACW	-1	Shrub	Perennial	Native
Symphyotrichum ericoides	Aster ericoides	White Heath American-Aster	5	FACU	1	Forb	Perennial	Native
Symphyotrichum oolentangiense	Aster azureus	Azure Aster	8	UPL	2	Forb	Perennial	Native
Thelypteris palustris var. pubescens	Dryopteris thelypteris pubescens	Eastern Marsh Fern	6	OBL	-2	Fern	Perennial	Native
Verbena stricta	Verbena stricta	Hoary Vervain	4	UPL	2	Forb	Perennial	Native
Viola lanceolata	Viola lanceolata	Bog White Violet	7	OBL	-2	Forb	Perennial	Native
Zizia aurea	Zizia aurea	Golden Alexanders	7	FAC	0	Forb	Perennial	Native

Conservatism-Based Metrics

Mean C (native species)	7.19
Mean C (all species)	7.19
Mean C (native trees)	n/a
Mean C (native shrubs)	7.60
Mean C (native herbaceous)	7.00
FQAI (native species)	40.66
FQAI (all species)	40.66
Adjusted FQAI	71.88
% C value 0	0%
% C Value 1-3	3%
% C value 4-6	28%
% C value 7-10	69%

Additional Metrics

Species Richness (all)	32
Species Richness (native)	32
% Non-native	0%
Wet Indicator (all)	0.19
Wet Indicator (native)	0.19
% hydrophyte (Midwest)	50%
% native perennial	97%
% native annual	0%
% annual	0%
% perennial	97%

JACKSON PARK

General List.

COMPLETE PLANTING LIST,

JACKSON PARK, CHICAGO, ILL.

Olmsted, Olmsted & Eliot,
Landscape Architects, July, 1896.

1. Ulmus americana
Elm

2. Ulmus campestris
English Elm

3. Fraxinus pubescens
Red Ash

4. Acer negundo
Box Elder

5. 8 feet apart.
Ilex verticillata
Black Alder
Cornus sericea
Silky Cornel
Rosa multiflora
Ligustrum Ibota
Amoor River Privet
Syringa vulgaris
Lilac
Viburnum opulus
High-bush Cranberry
Hibiscus syriacus
Althea
Philadelphus coronarius
Sambucus canadensis.

6. 2 feet apart.
Pyrus arbutifolia
Choke berry
Berberis thunbergii
Hypericum prolificum
Shrubby St. John'swort
Myrica cerifera
Bayberry

7. 3 feet apart.
Spiraea thunbergii

Spiraea reevesii
Hydrangea paniculata
Forsythia viridissima
Deutzia crenata
Lonicera orientalis
Philadelphus coronarius
Rhodotypos kerrioides
Weigelia rosea
Rosa rugosa
Cydonia Japonica
Japan Quince.

8. 3 ft. apart.

Rosa wichuraiana
Lonicera halleana

9. 2 ft. apart.

Potentilla fruticosa
Shrubby cinquefoil
Rhus copallina
Sumac
Rosa nitida
Rosa lucida
Ribes cynosbati
Gooseberry
Spiraea salicifolia
Meadow-sweet
Berberis vulgaris
Barberry
Berberis thunbergii
Symphoricarpos occidentalis
Wolfberry
Spiraea tomentosa
Steeple bush
Cornus sanguinea
Red Dogwood
Viburnum acerifolium
Dockmackie
Myrica cerifera
Bayberry
Rhus aromatica
Sumac
Celastrus scandens
Bitter-sweet
Spiraea opulifolia
Nine-bark
Ilex verticillata
Beach Alder
Staphylea trifoliata
Bladder-nut.

Symphoricarpos vulgaris
Indian Currant
Aralia spinosa
Hercules Club
Rhamnus catharticus
Buckthorn
Pyrus arbutifolia
Chokeberry
Xanthoxylum americanum
Prickly Ash.

10. 5 feet apart.

Sassafras officinale
Sassafras
Cornus florida
Dogwood
Cercis canadensis
Red-bud
Crataegus crus-galli
Cockspur thorn
Acer pennsylvanicum
Moosewood
Pyrus aucuparia
Mountain ash
Ptelea trifoliata
Hop Tree
Acer spicatum
Mountain Maple
Amelxanchier canadensis
Shad-bush
Crataegus coccinea
Viburnum dentatum
Arrowwood
Hamamelis virginica
Witch hazel
Rhus typhina
Staghorn Sumac

11. 4 feet apart.

Betula papyracea
Paper Birch
Betula lenta
Sweet Birch
Acer dasycarpum
Silver Maple
Acer saccharinum
Sugar Maple
Acer rubrum
Red Maple
Quercus palustris
Pin Oak

Quercus alba
White Oak
Quercus coccinea
Scarlet Oak
Quercus rubra
Red Oak
Acer negundo
Box Elder
Populus balsamea
Balm Gilead
Populus caroliniana
Cotton Wood
Populus fastigiata
Lombardy Poplar.
Salix regalis
Willow
Salix laurifolia
Salix Russian Golden
Catalpa speciosa
Catalpa.

12. 3 feet apart.
Spiraea opulifolia
Nine-bark
Berberis vulgaris
Barberry
Ligustrum vulgare
Privet
Cornus sericea
Silky Cornel
Clethra alnifolia
Sweet pepperbush
Rhus glabra
Sumac
Ligustrum ibota
Amorpha fruticosa
False indigo
Symphoricarpos vulgaris
Indian Currant
Rosa lucida
Wild Rose
Viburnum prunifolium.
Black Haw
Ribes floridum
Wild Black Currant
Viburnum opulus
High-bush cranberry
Cephalanthus occidentalis
Button Bush

13. Acer dasycarpum

14. Acer platanoides
Norway Maple

15. Acer rubrum
Red Maple

16. Alnus americana

17. Catalpa speciosa

18. Salix alba
Willow

19. Tilia americana
Basswood

20. Quercus alba
White Oak

21. Quercus prinus
Chestnut Oak

22. Quercus macrocarpa
Burr Oak

23. Quercus palustris
Pin Oak

24. Quercus rubra
Red Oak

25. Betula papyrifera
Paper Birch

26. Crataegus oxyacantha

27. 3 feet apart.

Ligustrum vulgare
Privet

Clethra alnifolia
Sweet-pepper Bush

Cornus sericea
Silky Cornel

Cornus stolonifera
Red Osier

Ligustrum ibota

Symphoricarpos vulgaris
Indian Currant

Xanthoxylum americanum
Prickly Ash

Carpinus americana
Hornbeam

Viburnum dentatum
Arrow-wood
Spiraea opulifolia
Nine-bark

28. Trees 20' apart.
Shrubs 3' apart.

Betula papyrifera
Paper Birch
Betula lenta
Black Birch
Acer rubrum
Red Maple
Quercus alba
White Oak
Quercus coccinea
Scarlet Oak
Quercus rubra
Red Oak
Ligustrum vulgare
Privet
Clethra alnifolia
Cornus sericea
Silky Dogwood
Cornus stolonifera
Red Osier
Ligustrum ibota
Symphoricarpos vulgaris
Indian Currant
Xanthoxylum americanum
Prickly Ash
Carpinus americanus
Hornbeam
Viburnum dentatum
Arrow-wood
Spiraea opulifolia
Nine-bark

29. Populus monolifera
Cottonwood

30. Platanus orientalis
Oriental Plane

31. Lonicera halleana, 3 feet apart.

32. 3 feet apart.
Rhus glabra
Sumac
Corylus americana
Hazel Nut

Salix in var.
Hamamelis virginiana
Witch Hazel
Sambucus canadensis
Elder
Cephalanthus occidentalis
Button Bush
Tamarix gallica
Symphoricarpos racemosus
Snowberry
Xanthoxylum americanum
Prickly Ash
Carpinus americana
Hornbeam
Populus tremuloides
Aspen

33. 5 feet apart.

Betula papyrifera
Paper Birch
Catalpa speciosa
Populus balsamea
Balsam Poplar
Populus monolifera
Cottonwood
Populus alba
Silver Poplar
Salix laurifolia
Laurel-leaved Willow
Salix vitellina
Salix viminalis
Acer negundo
Box Elder
Pyrus americana
Mountain Ash.

34. Vitis labrusca, 3 feet apart.

35. Ailanthus glandulosa
Tree of Heaven.

36. Betula lenta
Black Birch
37. Betula lutea
Yellow Birch
38. Betula nigra
River Birch
39. Celtis occidentalis
Hackberry
40. Fraxinus americana

41. Fraxinus viridis
Green Ash

42. Liriodendron tulipifera
Tulip Tree

43. Populus alba
White Poplar

44. Populus balsamifera
Balsam Poplar

45. Acer pennsylvanicum
Moosewood

46. Carpinus americana
Hornbeam

47. Cercis canadensis
Red bud

48. Cornus florida
Dogwood

49. Ostrya virginica
Hop Hornbeam

50. Pyrus americana
Mountain Ash

51. Salix caprea
Goat Willow

52. Xanthoxylum americanum

53. Acer saccharinum
Sugar Maple

54. Liquidamber styraciflua
Sweet Gum

55. Quercus coccinea
Scarlet Oak

56. Fagus ferruginea
Beech

57. Gymnocladus canadensis
Kentucky Coffee Tree

58. Nyssa sylvatica
Tupelo

59. Fraxinus sambucifolia
Black Ash

60 Halesia tetraptera

61. Cladrastis lutea
Yellow Wood

62. Chionanthus virginica
White Fringe

63. Salix laurifolia
Laurel-leaved Willow

64. Quercus bicolor
Swamp White Oak

65. Quercus phellos
Willow Oak

66. Tilia heterophylla
Linden

67. Juniperus virginiana
Red Cedar

68. Salix in var. (shrubby form) 3 feet apart.
Willow

69. Arctostaphyles uva-ursi, 2 feet apart.
Bear Berry

70. Hudsonia tomentosa, 1 foot apart.

71 Juniperus sabina

72. Sassafras officinale
Sassafras

73. Quercus nigra
Black Oak

74. Pinus banksiana
Gray Pine

75. Salix nigra
Black Willow

76. Celastrus scandens, 3 feet apart.
Bitter-sweet.

77. 1 foot apart.
Ammophila arundinacea
Sea Sand Reed.

Elymus canadensis
Wild Rye

Elymus mollis

Panicum virgatum
Panic grass

Calamagrostis longifolia
Reed Bent Grass

Agropyrum repens
Couch Grass

Agropyrum dacystackyum

Lathyrus maritimus
Beach Pea

Solidago in var.

Asters in var.

Anemone multifida

Campanula rotundifolia var. arctica
Harebell

Cyperus in var.
Carex in var.
Sedge
Cnicus pitcherii
Thistle
Smilacina stellata
Artemisea canadensis

78. Cornus stolonifera, 3 feet apart.
Red Osier.
79. Cornus sericea, 3 feet apart.
Silky Cornel
80. Prunus pumila, 3 feet apart.
Dwarf cherry
81. Rhus aromatica, 2 feet apart.
Sumac
82. Ptelea trifoliata, 4 feet apart.
Hop Tree

83. Cephalanthus occidentalis, 4 feet apart.
Button-bush

84. Corylus rostrata, 4 feet apart.
Hazel-nut
85. Hypericum kalmianum, 2 feet apart.

86. Potentilla fruticosa, 2 feet apart.
Shrubby cinquefoil

87. Rosa blanda, 2 feet apart.

88. Rosa humilis, 2 feet apart.
89. 4 feet apart.

Salix in var.
Willow
Cornus stolonifera
Red Osier
Cornus sericea
Silky Cornel
Prunus pumila
Dwarf Cherry
Ptelea trifoliata
Hop Tree
Cephalanthus occidentalis
Button Bush.
Corylus rostrata
Hazel-Nut
Hypericum kalmianum
Potentilla fruticosa

Rosa blanda
Rosa humilis

90. 3 feet apart.

Cytissus purpureus
Cytissus nigricans
Genista tinctoria
Woad Waxen
Hypericum densiflorum
Hypericum prolificum
Desmodium penduliflorum
Desmodium [illegible] japonicum
Coronilla emerus
Scorpion Senna
Corema couradii
Helianthemum vulgare
Sun Rose.
Empetrum nigrum

91. Iva frutescens
Marsh Elder
Potentilla fruticosa
Shrubby Cinquefoil
Rosa blanda
Hypericum densiflorum

92. 2 feet apart.

Cotoneaster buxifolia
Cotoneaster microphylla
Cotoneaster horizontalis
Potentilla fruticosa
Shrubby Cinquefoil
Philadelphus microphyllus
Coriaria myrtifolia

93. 3 feet apart.
Symphoricarpos vulgaris
Indian Currant
Symphoricarpos racemosus
Snowberry
Salix tristis
Sand Willow
Gaylussacia resinosa
Huckleberry
Diervilla trifida
Bush Honeysuckle
Lycium barbarum
Matrimony Vine
Lycium europeum
Lonicera alberti

94. 5 feet apart.
Hippophae rhamnoides
Sea Buckthorn
Sheperdia canadensis
Buffaloberry
Tamarix gallica
Tamarix tetrandra purpurea

95. Pinus mughos

96. Potentilla tridentata, 1 foot apart.

97. 2 feet apart.
Rhus aromatica,
Sumac
Rosa blanda
Rosa humilis

98. 5 feet apart.
Corylus avellana
Hazel-nut
Cephalanthus occidentalis
Button Bush
Sassafras officinale
Sassafras
Ptelea trifoliata
Hop tree

99. 3 feet apart.
Cornus stolonifera
Red Osier
Cornus sericea
Silky Cornel
Salix in var.
Prunus pumilla
Dwarf Cherry

100. 2 feet apart.
Potentilla fruticosa
Shrubby cinquefoil
Hypericum kalmianum
Artemesia frigida

101 4 feet apart.
Cephalanthus occidentalis
Button Bush
Alnus serrulata
Alder
Viburnum opulus
High-bush Cranberry

102.

102. 3 feet apart.
Clethra alnifolia
Sweet-pepper Bush
Azalea viscosa
Swamp Honeysuckle

103. 3 feet apart.
Cornus stolonifera
Red Osier
Cornus sanguinea
Red Dogwood
Rosa carolina
Wild Rose
Myrica Gale
Sweet Gale.

104. Clethra alnifolia, 3 feet apart.
Sweet-pepper Bush

105. Rosa carolina, 2 feet apart.

106 Myrica gale, 3 feet apart.

107. Water plants.

108. 2 feet apart.

Potentilla fruticosa
Shrubby Cinquefoil
Rosa nitida
Wild Rose
Rosa lucida
Dwarf Wild Rose
Ribes cynosbati
Gooseberry
Spiraea salicifolia
Meadow-sweet
Berberis thunbergii
Symphoricarpos occidentalis
Wolf-berry
Myrica cerifera
Bayberry
Rhus aromatica
Fragrant Sumac
Celastrus scandens
Symphoricarpos vulgaris
Indian Currant
Rosa blanda
Early Wild Rose
Rosa humilis
Prunus pumila
Sand Cherry
Hypericum kalmianum
Myrica gale
Sweet Gale
Rosa carolina
Swamp Rose

109. Kalmia angustifolia, 2 feet apart.
Lambkill

110. Ceanothus americanus, 2 feet apart.

111. Myrica cerifera

112. Myrica asplenifolia, 2 feet apart.

113. Gaultheria procumbens, 1 foot apart in clumps
Wintergreen

114. Rubus hispidus, 1 1/2 feet apart.
Swamp Blackberry.

115. 2 feet apart.

Vaccinium pennsylvanicum

Vaccinium vacillans

Kalmia angustifolia
Lambkill
Gaylussacia resinosa
Huckleberry

116. Viburnum acerifolium, 2 feet apart.