

Appendix A

Coordination

UPPER MISSISSIPPI RIVER RESTORATION SYSTEM
FEASIBILITY REPORT
WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

CRAINS ISLAND HABITAT REHABILITATION
AND ENHANCEMENT PROJECT

MIDDLE MISSISSIPPI RIVER MILES 103.5 THROUGH 105.5
RANDOLPH COUNTY, ILLINOIS

APPENDIX A
COORDINATION

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1 SHPO Coordination



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

July 28, 2016

Engineering and Construction Division
Curation and Archives Analysis Branch (EC-Z)

Ms. Rachel Leibowitz
Deputy State Historic Preservation Officer
Illinois Historic Preservation Agency
1 Old State Capitol Plaza
Springfield, Illinois 62701-1507

Subject: Crains Island Habitat Rehabilitation & Enhancement Project

Dear Ms. Leibowitz:

The United States Army Corps of Engineers (USACE) is presently planning to the Crains Island Habitat Rehabilitation & Enhancement Project. Crains Island is located on the right descending bank of the Mississippi River between river miles 103.5 and 105.5, approximately 4 miles southeast of the City of Chester, in Randolph County, IL. We are contacting your office to initiate consultation under Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA), and its implementing regulation 36 CFR 800.

Background and Authority

This project is being carried out under the auspices of the Upper Mississippi River Restoration Program (UMRR), formally known as the Environmental Management Program, originally authorized by the Water Resources Development Act (WRDA) of 1986.

The Middle Mississippi River National Wildlife Refuge (MMRNWR) is located in southeast Missouri and southwest Illinois on the un-pooled section of the Mississippi River and covers nearly 7,000 acres of riverine (including side channel and islands), floodplain forest, and wetland ecosystems. The U.S. Fish and Wildlife Service manages Crains Island as part of the MMRNWR.

The existing habitat conditions, future habitat needs and proposed general actions required for habitat restoration on the Upper Mississippi River are addressed in the Upper Mississippi River System Habitat Needs Assessment Report (COE 2000). That report estimates that there is a need to create or restore 7,000 acres of isolated backwater habitat along the unimpounded reach of the Upper Mississippi River. The report also recommends secondary channel or contiguous backwaters at least every 5-7 miles on the MMR.

Project

This project will restore side channel/island habitat and improve quality of existing secondary channel habitat, thus providing depth diversity, connectivity, and improved aquatic habitat benefiting a suite of aquatic and floodplain organisms. It will increase contiguous blocks of floodplain and bottomland hardwood forests, improve diversity of non-forested wetlands, and improve water level management capabilities to assist in invasive species management

The tentatively selected plan (TSP) incorporates a number of features (Figure 1). They include:

- Straightening and hydraulically dredging the existing side channel. Dredge material will be placed on the land and used as fill material for the project's other features.
- Filling two side channel remnants with dredge material.
- Constructing a sediment deflection (SD) berm using the dredge material.
- Developing a number of depressional wetlands.
- Reforesting the SD berm and other locations within the project area.

Potential Effect on Cultural Resources

Prehistoric Cultural Resources

There is no known prehistoric occupation of Crains Island, but it has not been archaeologically surveyed. Much of the project area, however, is of recently (post-1930) accreted land and has no realistically possible archaeological sensitivity. The area that may have potential for prehistoric sites is shown in Figure 2.

Geomorphic History

Crains Island, like most in the Mississippi River, has constantly shifted its location since first being recorded. The earliest detailed map available is the plat of 1815 (Figure 3). At that time the main course of the Mississippi River flowed on its Missouri side so the island was platted in Illinois. Approximately two-thirds of the project area was then within the Illinois chute of the island. The 1866 Warren series maps show the island in the same general location, but with some reworking of the river course (Figure 4). By 1880, however, the river's main course had shifted to the Illinois side, and the Missouri chute had largely filled in with the development of Willow Island (Figure 5). Thus the island became an exclave of Illinois.

By 1908 the upstream portion of the island had eroded away and another towhead (Willow towhead) had started to develop (Figure 6). By the late 1920s significant erosion on the Missouri bankline increased the river width by nearly 1000 feet (Figure 7). About half the current project area was then underwater. During the 1920s and early 1930, a series of dikes were constructed which resulted in the accretion of sediment and the development of a new back channel by the 1960s (Figure 8).

Historic Cultural Resources

Sixteen sale-cash patents under the Land Act of 1820 were issued for the island (Figure 9). Eight, comprising 40 percent of the acreage, were sold to the Crain family (John, Ambrose, James and William).

The first Euroamerican settler in Rockwood precinct of Randolph county, Illinois, was Benjamin Crain who settled along Mary's river in 1802 (McDonough 1883: 467). He had seven sons: Benjamin, Squire, William, James, Joel, Lewis, and John. They settled at the mouth of the river and on the island adjacent (i.e., Crains Island). John was the first to move to the island in 1812. He died there in 1850.

On the earliest map indicating land use, the 1880 MRC map, there are areas of cultivation interspersed with low-lying area of Cottonwood, Sycamore, and Elm forests (Figure 5). An 1883 account, using an alternative name for the island, "Mary's River island," records that "much of it is under cultivation" (McDonough 1883:467). The MRC map also indicates a number of buildings on the island. The pattern of land use is almost completely the same on the 1908 Board of Examination map (Figure 6). Early aerial photography shows almost the entire island under cultivation with the exception of the former chutes and northern and southern tips. Again some buildings are visible. The last of the structures in the project area, however, seem to have been removed by 1965 (Figure 8). The land was farmed until 2007 when the property acquired by the U.S. Fish and Wildlife Service and taken out of agricultural use.

At least one buried remnant of a pile dike will likely be cut though during efforts to straighten and deepen the current side channel. As outlined above the pile dikes were constructed in the early 1930s by USACE and are ubiquitous features designed to maintain a nine foot navigation channel for the Mississippi. Thousands were constructed on the river from the middle of the 19th century to the middle of the 20th century.

Shipwrecks

Between July and December of 1988, when the Mississippi River was at a particularly low level, the St. Louis District Corps of Engineers conducted aerial surveys of exposed wrecks between Saverton, Missouri, and the mouth of the Ohio River. Thirty four (34) historic wrecks were documented at that time. Since then, the Corps database has been updated when new wrecks are reported or when research provides new information on wreck location. A separate database of modern (i.e., metal) wrecked or abandoned vessels (including barges), which may pose a risk to navigation is also maintained by the Corps. The combined total of mapped locations is ninety (90). The nearest known historic wreck to the project areas is one and a half miles away. The nearest known modern obstruction is four miles away. The current side channel only developed during the middle of the 20th century and so is very unlikely to be the location of any unknown watercraft.

Archaeological Survey

USACE will conduct, or have conducted, an archaeological survey on the project's Area of Potential Effect (APE) that is within the potentially prehistorically sensitive zone (i.e., land that was not formed in the historic period) identified above (Figure 2). Currently, no haul roads, lay down areas, or other construction infrastructure are planned to be located in the delineated area, but if necessity dictates that they need be, those areas will also be surveyed. The area identified for the survey is a portion of the SD berm footprint along with a 50 foot buffer to insure construction access.

If you have any questions or comments, please feel free to contact me at (314) 331-8466 or Dr. Mark Smith at (314) 331-8831 (e-mail: mark.a.smith4@usace.army.mil).

Sincerely yours,

Michael K. Trimble, Ph.D.
Chief, Curation and Archives
Analysis Branch

Enclosure

5



Figure 2. Area of maximum prehistoric sensitivity for Crains Island

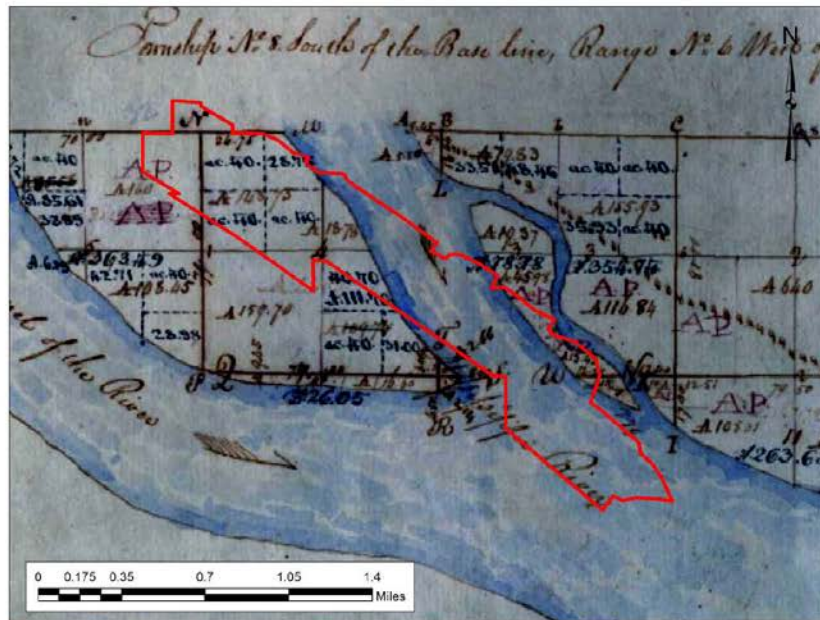


Figure 3. 1815 Plat map showing project boundary

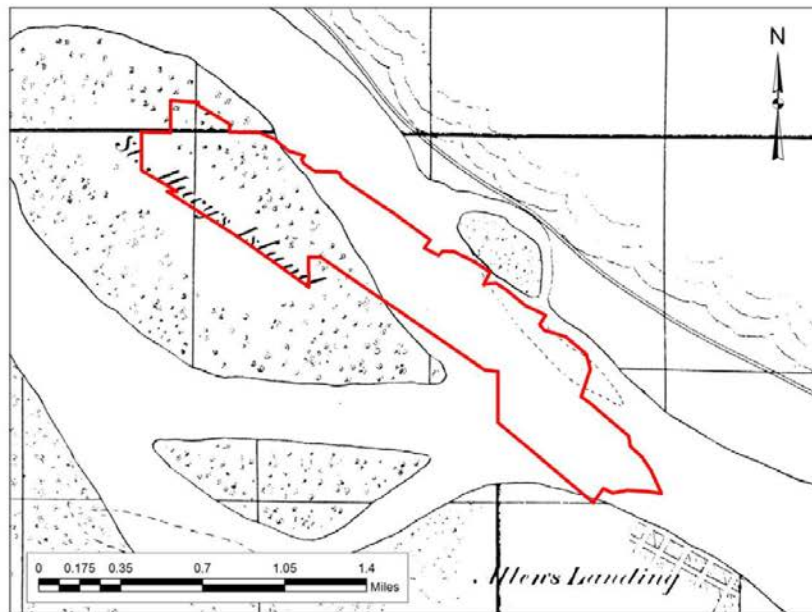


Figure 4. 1866 Warren series map, sheet 21, showing project boundary

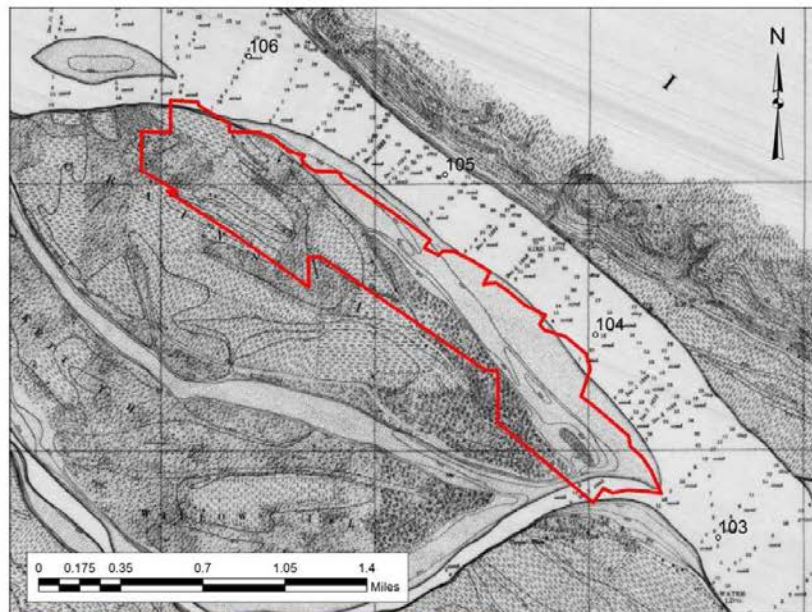


Figure 5. 1880 MRC map, chart 109, showing project boundary

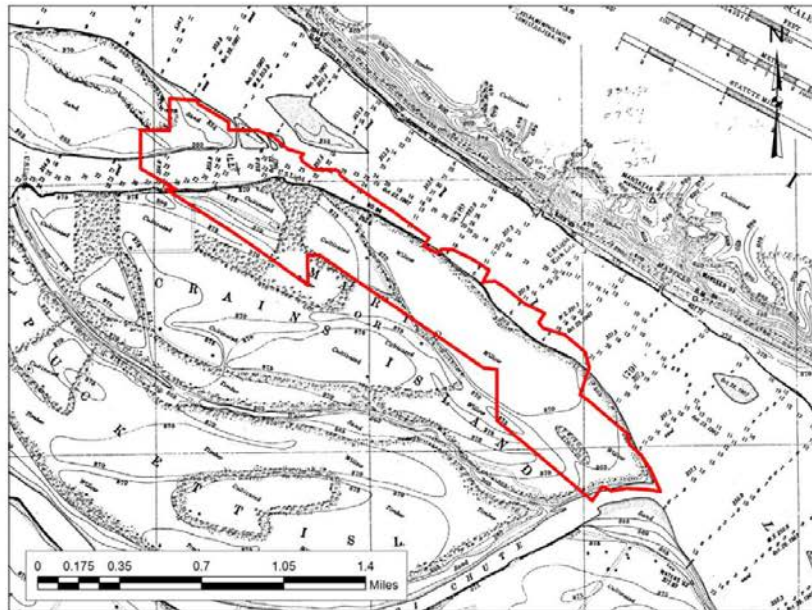


Figure 6. 1908 Board of Examination and Survey of the Mississippi map, chart 8, showing project boundary

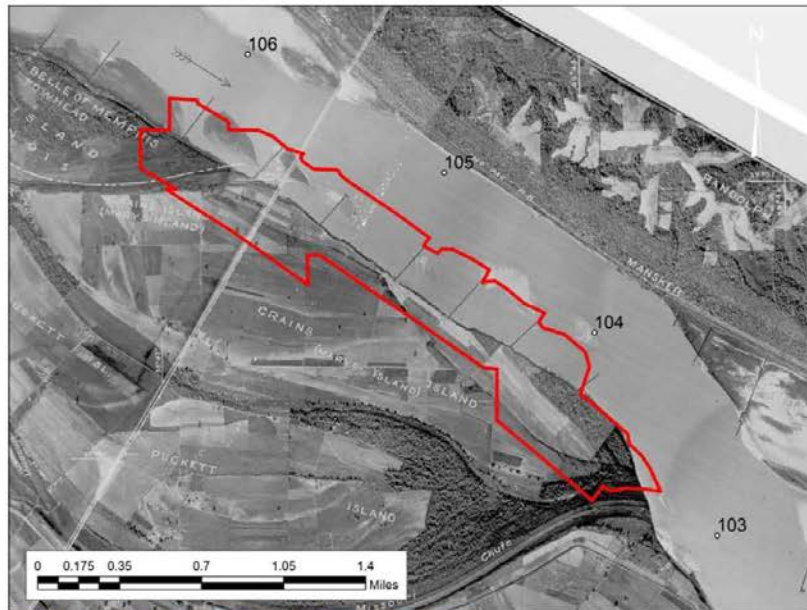


Figure 7. 1931 aerial photograph showing project boundary

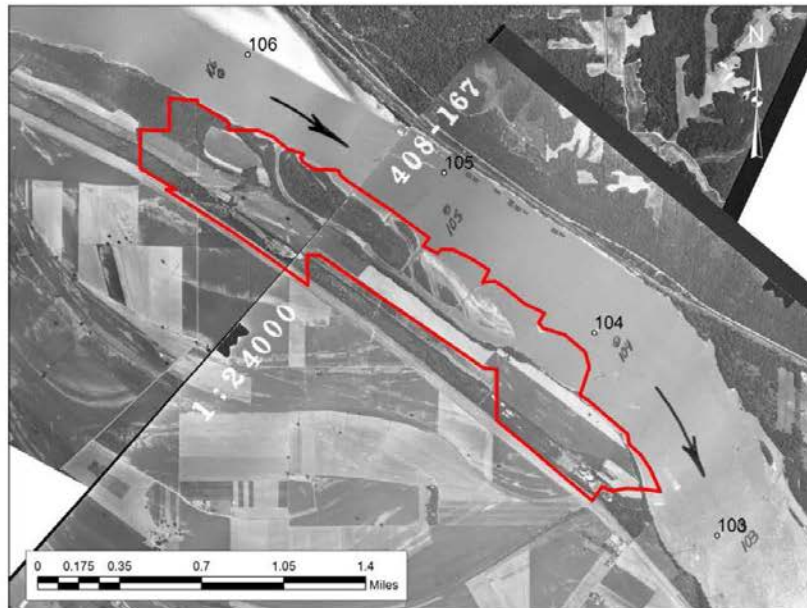


Figure 8. 1965 aerial photograph showing project boundary

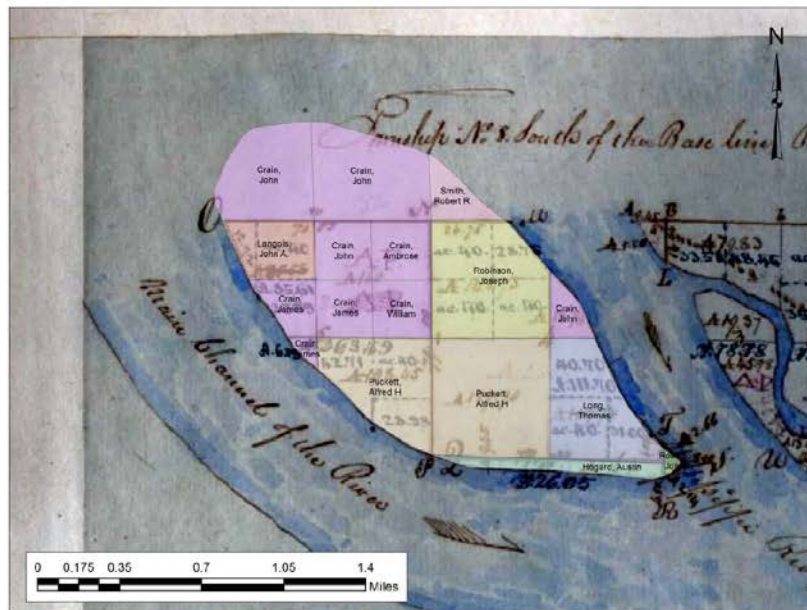


Figure 9. Sale-Cash patents issued for Crains Island

References Cited

Corp of Engineers (COR)

2000 *Upper Mississippi River System—Habitat Needs Assessment, Summary Report*. U.S. Army Corps of Engineers.

McDonough, J. L. & Co (Publishers)

1883 *Combined History of Randolph, Monroe and Perry Counties, Illinois*. J.L. McDonough & Co, Philadelphia.



**Illinois Historic
Preservation Agency**

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

SURVEY REQUEST

FAX 217/524-7525

www.illinoishistory.gov

Randolph County
Chester
Right descending bank between Mississippi River miles 103.5 to 105.5
COESTL
Habitat rehabilitation & enhancement - Crains Island

PLEASE REFER TO: IHPA LOG #004080116

August 4, 2016

Michael K. Trimble, Ph.D., Chief
Department of the Army
St. Louis District, Corps of Engineers
Curation and Archives Analysis Branch (EC-Z)
1222 Spruce St.
St. Louis, MO 63103-2833

Dear Chief Trimble:

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".

The project area has not been surveyed and may contain prehistoric/historic archaeological resources. Accordingly, a Phase I archaeological reconnaissance survey to locate, identify, and record all archaeological resources within the project area will be required. This decision is based upon our understanding that there has not been any large scale disturbance of the ground surface (excluding agricultural activities) such as major construction activity within the project area which would have destroyed existing cultural resources prior to your project. If the area has been heavily disturbed prior to your project, please contact our office with the appropriate written and/or photographic evidence.

The area(s) that need(s) to be surveyed include(s) all area(s) that will be developed as a result of the issuance of the federal agency permit(s) or the granting of the federal grants, funds, or loan guarantees that have prompted this review. In addition to the archaeological survey please provide clear photographs of all structures in, or adjacent to, the current project area as part of the archaeological survey report.

Enclosed you will find an attachment briefly describing Phase I surveys and a list of archaeological contracting services. THE IHPA LOG NUMBER OR A COPY OF THIS LETTER SHOULD BE PROVIDED TO THE SELECTED PROFESSIONAL ARCHAEOLOGICAL CONTRACTOR TO ENSURE THAT THE SURVEY RESULTS ARE CONNECTED TO YOUR PROJECT PAPERWORK.

If you have further questions, please contact Joe Phillippe at 217/785-1279.

Sincerely,

Rachel Leibowitz, Ph.D.
Deputy State Historic
Preservation Officer

Enclosure

For TTY communication, dial 888-440-9009. It is not a voice or fax line.



READY TO
SERVE

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT CORPS OF ENGINEERS
1777 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

November 29, 2016

Engineering and Construction Division
Curation and Archives Analysis Branch (EC-Z)

Ms. Rachel Leibowitz
Deputy State Historic Preservation Officer
Illinois Historic Preservation Agency
1 Old State Capitol Plaza
Springfield, Illinois 62701-1507

Subject: Crains Island Habitat Rehabilitation & Enhancement Project

Dear Ms. Leibowitz:

Per our previous letter dated July 28, 2016, the United States Army Corps of Engineers (USACE) is moving forward with the Crains Island Habitat Rehabilitation & Enhancement Project. Crains Island is located on the right descending bank of the Mississippi River between river miles 103.5 and 105.5, approximately 4 miles southeast of the City of Chester, in Randolph County, IL.

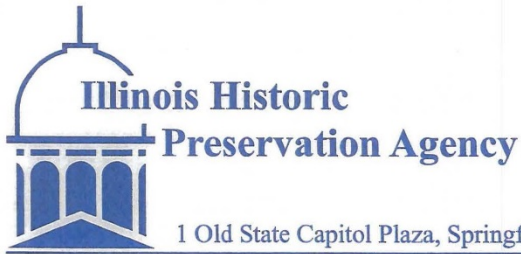
In response to your recommendation in a letter dated August 4, 2016, USACE has conducted an archaeological survey on the project's Area of Potential Effect (APE) that is within the potentially prehistorically sensitive zone (i.e., land that was not formed in the historic period), identified in Figures 1 and 2 of the enclosed survey report. No archaeological material was found during Phase I archaeological survey. We are contacting your office to request your review and subsequent concurrence of the results of the archaeological survey performed.

If you have any questions or comments, please feel free to contact me at (314) 331-8466 or Dr. Mark Smith at (314) 331-8831 (e-mail: mark.a.smith4@usace.army.mil).

Sincerely yours,

Michael K. Trimble, Ph.D.
Chief, Curation and Archives
Analysis Branch

Enclosure



FAX 217/524-7525
www.illinoishistory.gov

Randolph County
Chester
Right descending bank between Mississippi River miles 103.5 to 105.5
COESTL
Habitat rehabilitation & enhancement - Crains Island

PLEASE REFER TO: IHPA LOG #004080116

December 21, 2016

Michael K. Trimble, Ph.D., Chief
Department of the Army
St. Louis District, Corps of Engineers
Curation and Archives Analysis Branch (EC-Z)
1222 Spruce St.
St. Louis, MO 63103-2833

Dear Chief Trimble:

We have reviewed the documentation submitted for the referenced project(s) in accordance with 36 CFR Part 800.4. Based upon the information provided, no historic properties are affected. We, therefore, have no objection to the undertaking proceeding as planned.

Please retain this letter in your files as evidence of compliance with section 106 of the National Historic Preservation Act of 1966, as amended. This clearance remains in effect for two (2) years from date of issuance. It does not pertain to any discovery during construction, nor is it a clearance for purposes of the Illinois Human Skeletal Remains Protection Act (20 ILCS 3440).

If you are an applicant, please submit a copy of this letter to the state or federal agency from which you obtain any permit, license, grant, or other assistance.

Sincerely,



Rachel Leibowitz, Ph.D.
Deputy State Historic
Preservation Officer

For TTY communication, dial 888-440-9009. It is not a voice or fax line.

2 Tribal Coordination

From: Lisa LaRue-Baker - UKB THPO [ukbthpo-larue@yahoo.com]
Sent: Wednesday, September 09, 2015 3:22 PM
To: Hayworth, Roberta L MVS
Cc: ebird@unitedkeetoowahband.org
Subject: [EXTERNAL] Upper Mississippi River Restoration - Habitat Rehabilitation and Enhancement

The UKB has received your letter of August 24, 2015, and at this time, defers to other Federally recognized tribes with a historic interest in this area.

Thank you,

Lisa C. Baker
Acting THPO
United Keetoowah Band of Cherokee Indians in Oklahoma
PO Box 746
Tahlequah, OK 74465

c 918.822.1952
ukbthpo-larue@yahoo.com

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Please FOLLOW our historic preservation page and LIKE us on FACEBOOK



PEORIA TRIBE OF INDIANS OF OKLAHOMA

118 S. Eight Tribes Trail (918) 540-2535 FAX (918) 540-2538

P.O. Box 1527

MIAMI, OKLAHOMA 74355

CHIEF
John P. Froman

SECOND CHIEF
Jason Dollarhide

September 9, 2015

Michael K. Trimble
Chief, Curation and Archives
St. Louis District Corps of Engineers
1222 Spruce Street
St. Louis, Missouri 63103

Re: Request for Section 106 Consultation
Upper Missouri River Restoration-Habitat Rehabilitation and Enhancement Project.
Harlow Island, Crain's Island, and Wilkinson Island
Southeast Missouri and Southwest Illinois

Thank you for providing notice of the referenced project. The Peoria Tribe of Indians of Oklahoma is unaware of any documentation directly linking Indian Religious Sites to the newly proposed project location. There appear to be no objects of cultural significance or artifacts linked to our tribe located on or near the project location.

The Peoria Tribe of Indians of Oklahoma is unaware of items covered under NAGPRA (Native American Graves Protection and Repatriation Act) to be associated with the proposed project site. These items include: funerary or sacred objects; objects of cultural patrimony; or ancestral human remains.

The Peoria Tribe has no objection at this time to the proposed Habitat Rehabilitation Project. If, however, at any time items are discovered which fall under the protection of NAGPRA, the Peoria Tribe requests immediate notification and consultation. In addition state, local and tribal authorities should be advised as to the findings and construction halted until consultation with all concerned parties has occurred.

A handwritten signature in black ink that reads "Logan Pappenfort".

Logan Pappenfort
Special Projects Manager/NAGPRA

TREASURER
Aaron Wayne Blalock

SECRETARY
Tonya Mathews

FIRST COUNCILMAN
Carolyn Ritchey

SECOND COUNCILMAN
Craig Harper

THIRD COUNCILMAN
Alan Goforth



TRIBAL HISTORIC PRESERVATION OFFICE

Date: November 10, 2015

File: 1516-1044MO-10

RE: USACE, St. Louis District corps of Engineers, Upper Mississippi River Restoration-Habitat Rehabilitation and Enhancement Project, Multiple Counties, Missouri and Illinois

St. Louis District, USACE
Roberta Hayworth
1222 Spruce Street
St. Louis, MO 63103-2833

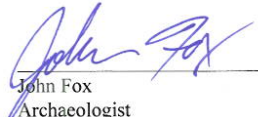
Dear Ms. Hayworth,

The Osage Nation Historic Preservation Office has evaluated your submission and concurs that the proposed USACE, St. Louis District corps of Engineers, Upper Mississippi River Restoration-Habitat Rehabilitation and Enhancement Project, Multiple Counties, Missouri and Illinois most likely will not adversely affect any sacred properties and/or properties of cultural significance to the Osage Nation. **The Osage Nation has no further concern with this project.**

In accordance with the National Historic Preservation Act, (NHPA) [54 U.S.C. § 300101 et seq.] 1966, undertakings subject to the review process are referred to in 54 U.S.C. § 302706 (a), which clarifies that historic properties may have religious and cultural significance to Indian tribes. Additionally, Section 106 of NHPA requires Federal agencies to consider the effects of their actions on historic properties (36 CFR Part 800) as does the National Environmental Policy Act (43 U.S.C. 4321 and 4331-35 and 40 CFR 1501.7(a) of 1969). **The Osage Nation concurs that the St. Louis District, USACE has fulfilled NHPA compliance by consulting with the Osage Nation Historic Preservation Office in regard to the proposed USACE, St. Louis District corps of Engineers, Upper Mississippi River Restoration-Habitat Rehabilitation and Enhancement Project, Multiple Counties, Missouri and Illinois.**

The Osage Nation has vital interests in protecting its historic and ancestral cultural resources. We do not anticipate that this project will adversely impact any cultural resources or human remains protected under the NHPA, NEPA, the Native American Graves Protection and Repatriation Act, or Osage law. **If, however, artifacts or human remains are discovered during project-related activities, we ask that activities cease immediately and the Osage Nation Historic Preservation Office be contacted.**

Should you have any questions or need any additional information please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.


John Fox
Archaeologist

627 Grandview, Pawhuska, OK 74056, (918) 287-5328, Fax (918) 287-5376



Delaware Tribe Historic Preservation Office

1 Kellogg Circle
Roosevelt Hall, RM 212
Emporia State University
Emporia, KS 66801
(620) 341-6699

bobermeyer@delawaretribe.org

September 24, 2015

U.S. Army Corps of Engineers
St. Louis District
Attn: Michael K. Trimble, Ph.D.
1222 Spruce Street
St. Louis, Missouri 63103-2833

Re: Harlow Island, Crain's Island, Wilkinson Island
Restoration-Habitat Rehabilitation and Enhancement Project

Dear Michael K. Trimble,

Thank you for informing the Delaware Tribe on the proposed construction associated with the above referenced project. Our review indicates that there are no religious or culturally significant sites in the project area. As such, we defer comment to your office as well as to the State Historic Preservation Office and/or the State Archaeologist.

We wish to continue as a consulting party on this project and look forward to receiving a copy of the cultural resources survey report if one is performed. We also ask that if any human remains are accidentally unearthed during the course of the survey and/or the construction project that you cease development immediately and inform the Delaware Tribe of Indians of the inadvertent discovery.

If you have any questions, please feel free to contact this office by phone at (620) 341-6699 or by e-mail at bobermeyer@delawaretribe.org

Sincerely,

Brice Obermeyer
Delaware Tribe Historic Preservation Office
1200 Commercial St
Roosevelt Hall, RM 212
Emporia State University
Emporia, KS 66801

*Feasibility Report with Integrated Environmental Assessment
Crains Island HREP*

From: Nekole Alligood [NAlligood@delawarenation.com]
Sent: Tuesday, September 15, 2015 2:14 PM
To: Hayworth, Roberta L MVS
Cc: Corey Smith
Subject: [EXTERNAL] Upper Mississippi River Restoration-Habitat
Rehabilitation and
Enhancement Project at Harlow Island, Crain's Island and Wilkinson Island
of the Middle Mississippi River National Wildlife Refuge

Good afternoon, I hope I am contacting the correct person!

I have reviewed the above mentioned project and on behalf of the Delaware
Nation find no concerns with the restoration and rehabilitation projects
proposed for the three islands.

Please let me know if this message will suffice for concurrence or if you
require a written version; if so I will have it sent along in the next
few
days.

Thank you, and have a nice afternoon.

Nekole Alligood
Director of Cultural Preservation
Delaware Nation
31064 HWY 281
PO Box 281
Anadarko, OK 73005
Phone: 405-247-2448
Fax: 405-247-8905



DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

REPLY TO
ATTENTION OF:

August 24, 2015

Engineering and Construction Division
Curation and Archives Analysis Branch

Governor Edwina Butler-Wolfe
Absentee-Shawnee Tribe of Indians of Oklahoma
2025 South Gordon Cooper Drive
Shawnee, Oklahoma 74810-9381

COPY

Dear Governor Butler-Wolfe:

This letter addresses the proposed Upper Mississippi River Restoration-Habitat Rehabilitation and Enhancement Project at Harlow Island, Crain's Island, and Wilkinson Island of the Middle Mississippi River National Wildlife Refuge (NWR). The Middle Mississippi River NWR is located in southeast Missouri and southwest Illinois on the Mississippi River and covers nearly 7,000 acres of riverine environments (including side channels and islands), floodplain forest, and wetland ecosystems. The refuge extends 195 river miles from the confluence of the Missouri River at St. Louis south to the confluence of the Ohio River at Cairo, Illinois. This is located on the Mississippi River downstream of the lock and dam system.

Harlow Island (1,225 acres) is located on the right descending bank of the Mississippi River between river miles 140.5 and 144, approximately five miles south of Crystal City, in Jefferson County, Missouri. Crain's Island (553 acres) is located on the right descending bank of the Mississippi River between river miles 103.5 and 105.5, approximately four miles southeast of the city of Chester, in Randolph County, Illinois. Wilkinson Island (2,700 acres) is located on the left descending bank of the Mississippi River between river miles 88.5 and 95, approximately thirty-seven miles north of Cape Girardeau, in Perry County, Missouri. The Fish and Wildlife Service manages all three islands and supports the U.S. Army Corps of Engineers project for their ecosystem restoration.

All three islands are no longer cultivated, and the former cropland currently has low species diversity and invasive and non-native plant species have become established. The remainder of the islands consists of bottomland forest and floodplain forest. Reeds Creek, which flows through Wilkinson Island, connects with the drainage ditch of an adjacent levee district. Harlow and Crain's Islands both have side channels that have been disconnected from the Mississippi River. After the 1993 flood, levee breaches remained in disrepair allowing the islands to become exposed to high water flood events carrying coarse sediment loads. All three Islands have (1) lost historical island side channel habitats, (2) fragmented forest habitats with low diversity, (3) the establishment and spread of invasive and non-native plant species, and (4) accretion of the islands to the mainland. This proposed project will restore side channel/island habitat and improve quality of existing secondary channel habitat, thus once again providing diversity, connectivity, and improved aquatic habitat benefiting a suite of aquatic and wetland fish and wildlife species. This proposed project will seek to increase contiguous blocks of floodplain and bottomland hardwood forests and improve diversity of non-forested wetlands.

COPY

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The following are some of the potential measures that could be implemented.

Harlow Island

There are no known prehistoric occupations on Harlow Island. Harlow is a recent island that appeared on navigation charts in the 1880s, but then was largely lost to the river by the 1920s, only to reform once again in the 1930s (see Map 1).

Potential measures may include, but are not limited to, the following.

1. Side channel excavation and reconnection
2. Sediment deflection berm
3. Degradation of existing agricultural levees
4. Reforestation

COPY

Crain's Island

There are no known prehistoric occupations on Crain's Island. Much of the island is post 1930 accreted land (see Map 2).

Potential measures may include, but are not limited to, the following.

1. Side channel excavation and reconnection
2. Reforestation

Wilkinson Island

There are no known prehistoric occupations on Wilkinson Island. In the last one hundred years the Mississippi River has dramatically changed the shape of the island. Most of the project area was washed away in the 1920s–30s, but was re-established when river training structures constructed to maintain the 9-foot navigation channel resulted in the accretion of land, thus leading to the present-day configuration of Wilkinson Island (see Map 3).

Potential measures may include, but are not limited to, the following.

1. Sediment deflection berm
2. Degradation of existing agricultural levees
3. Reforestation

The exact placement and quantities of proposed measures are still under development and are undergoing further design analysis to determine the best solution to meet the project goal and objectives. Impacts to potentially significant historic properties are not anticipated during these activities. However, if archaeological surveys are required, the tribes will be contacted and consultation will take place. Should an inadvertent discovery of human remains occur, then Section 3 of the Native American Graves Protection and Repatriation Act will be followed.

COPY

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COPY

The following Federally recognized tribes are being notified of this project.

Absentee-Shawnee Tribe of Oklahoma
Eastern Shawnee Tribe of Oklahoma
Shawnee Tribe
Cherokee Nation
United Keetoowah Band of Cherokee of
Oklahoma
Delaware Nation, Oklahoma
Delaware Tribe of Indians, Oklahoma
Citizen Potawatomi Nation
Forest County Potawatomi Community
Match-e-be-nash-she-wish Band of
Potawatomi of Michigan
Hannahville Indian Community
Nottawaseppi Band of Huron Potawatomi
Pokagon Band of Potawatomi

Prairie Band Potawatomi Nation
Ho-Chunk Nation of Wisconsin
Winnebago Tribe of Nebraska
Iowa Tribe of Kansas and Nebraska
Iowa Tribe of Oklahoma
Kickapoo Traditional Tribe of Texas
Kickapoo Tribe of Oklahoma
Kickapoo Tribe of Indians of Kansas
Sac & Fox Nation of Oklahoma
Sac & Fox Nation of Missouri in Kansas
and Nebraska
Sac & Fox Tribe of the Mississippi in Iowa
Miami Tribe of Oklahoma
Osage Nation of Oklahoma
Peoria Tribe of Oklahoma
Quapaw Tribe of Indians, Oklahoma

The U.S. Army Corps of Engineers, St. Louis District is requesting you review the maps and information about this project and notify our office if you have any concerns, such as traditional cultural properties or sacred sites that are located within or near the project sites that need to be addressed. Please notify our office no later than October 23, 2015 if you have any areas of concern. If you have any questions regarding this matter, please contact Ms. Roberta L. Hayworth, Native American Coordinator at (314-331-8833), or at roberta.l.hayworth@usace.army.mil. Thank you in advance for your timely review of this request. A copy of this letter has been furnished to Mr. Joseph Blanchard.

Sincerely,



Michael K. Trimble, Ph.D.
Chief, Curation and Archives
Analysis Branch

COPY

Attachments

COPY

3 IDNR



Applicant: US Army Corps of Engineers
Contact: Benjamin McGuire
Address: 1222 Spruce St
St. Louis, MO 63103

IDNR Project Number: 1711605
Date: 05/30/2017
Alternate Number: 1703231, 1703231

Project: Crains Island HREP
Address: Crains Island, Chester

Description: Dredge side channel to increase connectivity, depth, and flow. On-land disposal; construct sediment deflection berm with disposal material; enhance/construct wetlands; reforestation

Natural Resource Review Results

The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location:

Chester South Geological Area INAI Site
Mississippi River - Mudds Landing INAI Site
American Eel (*Anguilla rostrata*)

An IDNR staff member will evaluate this information and contact you to request additional information or to terminate consultation if adverse effects are unlikely.

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Randolph

Township, Range, Section:

7S, 6W, 32
7S, 6W, 33
8S, 6W, 3
8S, 6W, 4
8S, 6W, 5
8S, 6W, 10



IL Department of Natural Resources
Contact
Nathan Grider
217-785-5500
Division of Ecosystems & Environment

Government Jurisdiction
U.S. Army Corps of Engineers

Disclaimer

The Illinois Natural Heritage Database cannot provide a conclusive statement on the presence, absence, or condition of natural resources in Illinois. This review reflects the information existing in the Database at the time of this inquiry, and should not be regarded as a final statement on the site being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are encountered during the project's implementation, compliance with applicable statutes and regulations is required.

IDNR Project Number: 1711605

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Privacy

EcoCAT generates a public record subject to disclosure under the Freedom of Information Act. Otherwise, IDNR uses the information submitted to EcoCAT solely for internal tracking purposes.

From: McGuire, Benjamin M CIV USARMY CEMVP (US)
Sent: Monday, November 28, 2016 9:14 AM
To: 'Grider, Nathan'
Subject: RE: EcoCAT Request 1703231 (UNCLASSIFIED)

Nathan,

That sounds good.

Thanks,
Ben

-----Original Message-----

From: Grider, Nathan [mailto:Nathan.Grider@Illinois.gov]
Sent: Tuesday, November 22, 2016 3:08 PM
To: McGuire, Benjamin M CIV USARMY CEMVP (US) <Benjamin.M.Mcguire@usace.army.mil>
Subject: [EXTERNAL] RE: EcoCAT Request 1703231 (UNCLASSIFIED)

Hi Ben,

I think we are on the right track now. I typically reply to these projects during the scoping process and consider the state resource impacts then. Other USACE projects will do an "information request" to see what we have in the area and address it in the EA. I do not see them at that point. I get the public notices and will reply then.

Thus, include the resources in the report and necessary avoidance minimization measures and I will review during scoping. For now, I will close review on my end as an "information request"

Sound good?

Thanks
Nathan Grider
Biologist
Impact Assessment Section
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702
(217) 524-0501
Fax: 217-524-4177
nathan.grider@illinois.gov

-----Original Message-----

From: McGuire, Benjamin M CIV USARMY CEMVP (US) [mailto:Benjamin.M.Mcguire@usace.army.mil]
Sent: Tuesday, November 22, 2016 2:45 PM
To: Grider, Nathan
Subject: [External] RE: EcoCAT Request 1703231 (UNCLASSIFIED)

Nathan,

IDNR EcoCAT Request 1703231 (UNCLASSIFIED).txt[1/24/2017 11:23:48 AM]

4 USFWS

Marion Ecological Services Office



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Marion Ecological Services Sub-office

Marion Illinois Sub-office

8588 Route 148

Marion, IL 62959-5822

Phone: (618) 997-3344 Fax: (618) 997-8961

<http://www.fws.gov/midwest/Endangered/section7/s7process/step1.html>



In Reply Refer To:
Consultation Code: 03E18100-2017-SLI-0344
Event Code: 03E18100-2017-E-00574
Project Name: Crains Island HREP

April 18, 2017

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The attached species list identifies any federally threatened, endangered, proposed and candidate species that may occur within the boundary of your proposed project or may be affected by your proposed project. The list also includes designated critical habitat if present within your proposed project area or affected by your project. This list is provided to you as the initial step of the consultation process required under section 7(c) of the Endangered Species Act, also referred to as Section 7 Consultation.

Section 7 of the Endangered Species Act of 1973 requires that actions authorized, funded, or carried out by Federal agencies not jeopardize federally threatened or endangered species or adversely modify designated critical habitat. To fulfill this mandate, Federal agencies (or their designated non-federal representative) must consult with the Service if they determine their project "may affect" listed species or critical habitat.

Under 50 CFR 402.12(e) (the regulations that implement Section 7 of the Endangered Species Act) the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally. You may verify the list by visiting the ECOS-IPaC website <http://ecos.fws.gov/ipac/> at regular intervals during project planning and implementation and completing the same process you used to receive the attached list. As an alternative, you may contact this Ecological Services Field Office for updates.

Please use the species list provided and visit the U.S. Fish and Wildlife Service's Region 3 Section 7 Technical Assistance website <http://www.fws.gov/midwest/endangered/section7/s7process/index.html>. This website contains step-by-step instructions which will help you determine if your project will have an adverse effect on listed species and will help lead you through the Section 7 process.

04/18/2017

Event Code: 03E18100-2017-E-00574

2

For all wind energy projects and projects that include installing towers that use guy wires or are over 200 feet in height, please contact this field office directly for assistance, even if no federally listed plants, animals or critical habitat are present within your proposed project or may be affected by your proposed project.

Although no longer protected under the Endangered Species Act, be aware that bald eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.) and Migratory Bird Treaty Act (16 U.S.C. 703 et seq), as are golden eagles. Projects affecting these species may require measures to avoid harming eagles or may require a permit. If your project is near an eagle nest or winter roost area, see our Eagle Permits website <http://www.fws.gov/midwest/midwestbird/EaglePermits/index.html> to help you determine if you can avoid impacting eagles or if a permit may be necessary.

We appreciate your concern for threatened and endangered species. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Marion Ecological Services Sub-office

Marion Illinois Sub-office
8588 Route 148
Marion, IL 62959-5822
(618) 997-3344

This project's location is within the jurisdiction of multiple offices. Expect additional species list documents from the following office:

Columbia Ecological Services Field Office

101 Park Deville Drive
Suite A
Columbia, MO 65203-0057
(573) 234-2132

04/18/2017

Event Code: 03E18100-2017-E-00574

2

Project Summary

Consultation Code: 03E18100-2017-SLI-0344

Event Code: 03E18100-2017-E-00574

Project Name: Crains Island HREP

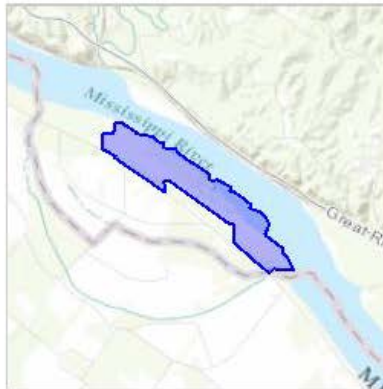
Project Type: LAND - RESTORATION / ENHANCEMENT

Project Description: Ecosystem restoration under the Upper Mississippi River Restoration Program. Project involves excavating side channel, constructing a sediment deflection berm, constructing two ephemeral wetlands, and reforestation.

Project Location:

Approximate location of the project can be viewed in Google Maps:

<https://www.google.com/maps/place/37.85919829190816N89.76012543420413W>



Counties: Randolph, IL | Perry, MO

Endangered Species Act Species

There is a total of 5 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area. Please contact the designated FWS office if you have questions.

04/18/2017

Event Code: 03E18100-2017-E-00574

3

Mammals

NAME	STATUS
Indiana Bat (<i>Myotis sodalis</i>) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat (<i>Myotis septentrionalis</i>) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Birds

NAME	STATUS
Least Tern (<i>Sterna antillarum</i>) Population: interior pop. No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8505	Endangered

Fishes

NAME	STATUS
Pallid Sturgeon (<i>Scaphirhynchus albus</i>) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7162	Endangered

Flowering Plants

NAME	STATUS
Small Whorled Pogonia (<i>Isotria medeoloides</i>) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1890	Threatened

Critical habitats

There are no critical habitats within your project area.

Columbia, MO Ecological Services Office



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Columbia Ecological Services Field Office
101 Park Deville Drive
Suite A
Columbia, MO 65203-0057
Phone: (573) 234-2132 Fax: (573) 234-2181



In Reply Refer To:
Consultation Code: 03E14000-2017-SLI-1131
Event Code: 03E14000-2017-E-01988
Project Name: Crains Island HREP

April 18, 2017

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

This response has been generated by the Information, Planning, and Conservation (IPaC) system to provide information on natural resources that could be affected by your project. The U.S. Fish and Wildlife Service (Service) provides this response under the authority of the Endangered Species Act of 1973 (16 U.S.C. 1531-1543), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), the Migratory Bird Treaty Act (16 U.S.C. 703-712), and the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.).

Threatened and Endangered Species

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and may be affected by your proposed project. The species list fulfills the requirement for obtaining a Technical Assistance Letter from the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. **Note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days.** The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

Consultation Technical Assistance

Refer to the Midwest Region [S7 Technical Assistance](#) website for step-by-step instructions for making species determinations and for specific guidance on the following types of projects: projects in developed areas, HUD, pipelines, buried utilities, telecommunications, and requests for a Conditional Letter of Map Revision (CLOMR) from FEMA.

Federally Listed Bat Species

Indiana bats, gray bats, and northern long-eared bats occur throughout Missouri and the information below may help in determining if your project may affect these species.

Gray bats - Gray bats roost in caves or mines year-round and use water features and forested riparian corridors for foraging and travel. If your project will impact caves, mines, associated riparian areas, or will involve tree removal around these features particularly within stream corridors, riparian areas, or associated upland woodlots gray bats could be affected.

Indiana and northern long-eared bats - These species hibernate in caves or mines only during the winter. In Missouri the hibernation season is considered to be November 1 to March 31. During the active season in Missouri (April 1 to October 31) they roost in forest and woodland habitats. Suitable summer habitat for Indiana bats and northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags 5 inches diameter at breast height (dbh) for Indiana bat, and 3 inches dbh for northern long-eared bat, that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Tree species often include, but are not limited to, shellbark or shagbark hickory, white oak, cottonwood, and maple. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of other forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat and evaluated for use by bats. If your project will impact caves or mines or will involve clearing forest or woodland habitat containing suitable roosting habitat, Indiana bats or northern long-eared bats could be affected.

Examples of unsuitable habitat include:

- Individual trees that are greater than 1,000 feet from forested or wooded areas;
- Trees found in highly-developed urban areas (e.g., street trees, downtown areas);
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees; and
- A stand of eastern red cedar shrubby vegetation with no potential roost trees.

Using the IPaC Official Species List to Make No Effect and May Affect Determinations for Listed Species

1. If IPaC returns a result of “There are no listed species found within the vicinity of the project,” then project proponents can conclude the proposed activities will have **no effect** on any federally listed species under Service jurisdiction. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records. An example ["No Effect" document](#) also can be found on the S7 Technical Assistance website.

2. If IPaC returns one or more federally listed, proposed, or candidate species as potentially present in the action area of the proposed project other than bats (see #3 below) then project proponents can conclude the proposed activities **may affect** those species. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain [Life History Information for Listed and Candidate Species](#) through the S7 Technical Assistance website.

3. If IPaC returns a result that one or more federally listed bat species (Indiana bat, northern long-eared bat, or gray bat) are potentially present in the action area of the proposed project, project proponents can conclude the proposed activities **may affect** these bat species **IF** one or more of the following activities are proposed:

- a. Clearing or disturbing suitable roosting habitat, as defined above, at any time of year;
- b. Any activity in or near the entrance to a cave or mine;
- c. Mining, deep excavation, or underground work within 0.25 miles of a cave or mine;
- d. Construction of one or more wind turbines; or
- e. Demolition or reconstruction of human-made structures that are known to be used by bats based on observations of roosting bats, bats emerging at dusk, or guano deposits or stains.

If none of the above activities are proposed, project proponents can conclude the proposed activities will have **no effect** on listed bat species. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records. An example ["No Effect" document](#) also can be found on the S7 Technical Assistance website.

If any of the above activities are proposed in areas where one or more bat species may be present, project proponents can conclude the proposed activities **may affect** one or more bat species. We recommend coordinating with the Service as early as possible during project planning. If your project will involve removal of over 5 acres of suitable forest or woodland habitat, we recommend you complete a Summer Habitat Assessment prior to contacting our office to expedite the consultation process. The Summer Habitat Assessment Form is available in Appendix A of the most recent version of the [Range-wide Indiana Bat Summer Survey Guidelines](#).

Other Trust Resources and Activities

Bald and Golden Eagles - Although the bald eagle has been removed from the endangered species list, this species and the golden eagle are protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. Should bald or golden eagles occur within or near the project

area please contact our office for further coordination. For communication and wind energy projects, please refer to additional guidelines below.

Migratory Birds - The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The Service has the responsibility under the MBTA to proactively prevent the mortality of migratory birds whenever possible and we encourage implementation of recommendations that minimize potential impacts to migratory birds. Such measures include clearing forested habitat outside the nesting season (generally March 1 to August 31) or conducting nest surveys prior to clearing to avoid injury to eggs or nestlings.

Communication Towers - Construction of new communications towers (including radio, television, cellular, and microwave) creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. However, the Service has developed [voluntary guidelines for minimizing impacts](#).

Transmission Lines - Migratory birds, especially large species with long wingspans, heavy bodies, and poor maneuverability can also collide with power lines. In addition, mortality can occur when birds, particularly hawks, eagles, kites, falcons, and owls, attempt to perch on uninsulated or unguarded power poles. To minimize these risks, please refer to [guidelines](#) developed by the Avian Power Line Interaction Committee and the Service. Implementation of these measures is especially important along sections of lines adjacent to wetlands or other areas that support large numbers of raptors and migratory birds.

Wind Energy - To minimize impacts to migratory birds and bats, wind energy projects should follow the Service's [Wind Energy Guidelines](#). In addition, please refer to the Service's [Eagle Conservation Plan Guidance](#), which provides guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities.

Next Steps

Should you determine that project activities **may affect** any federally listed species or trust resources described herein, please contact our office for further coordination. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

If you have not already done so, please contact the Missouri Department of Conservation (Policy Coordination, P. O. Box 180, Jefferson City, MO 65102) for information concerning Missouri Natural Communities and Species of Conservation Concern.

We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

Karen Herrington

Attachment(s):

04/18/2017

Event Code: 03E14000-2017-E-01988

5

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Columbia Ecological Services Field Office

101 Park Deville Drive
Suite A
Columbia, MO 65203-0057
(573) 234-2132

This project's location is within the jurisdiction of multiple offices. Expect additional species list documents from the following office:

Marion Ecological Services Sub-office

Marion Illinois Sub-office
8588 Route 148
Marion, IL 62959-5822
(618) 997-3344

04/18/2017

Event Code: 03E14000-2017-E-01988

2

Project Summary

Consultation Code: 03E14000-2017-SLI-1131

Event Code: 03E14000-2017-E-01988

Project Name: Crains Island HREP

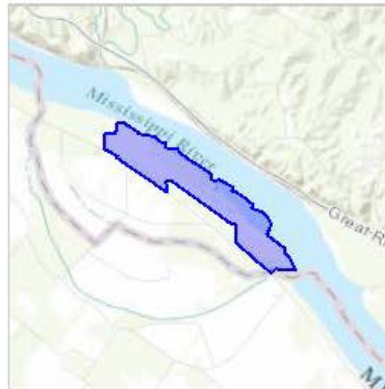
Project Type: LAND - RESTORATION / ENHANCEMENT

Project Description: Ecosystem restoration under the Upper Mississippi River Restoration Program. Project involves excavating side channel, constructing a sediment deflection berm, constructing two ephemeral wetlands, and reforestation.

Project Location:

Approximate location of the project can be viewed in Google Maps:

<https://www.google.com/maps/place/37.85919829190816N89.76012543420413W>



Counties: Randolph, IL | Perry, MO

Endangered Species Act Species

There is a total of 4 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area. Please contact the designated FWS office if you have questions.

04/18/2017

Event Code: 03E14000-2017-E-01988

3

Mammals

NAME	STATUS
Gray Bat (<i>Myotis grisescens</i>) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat (<i>Myotis sodalis</i>) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat (<i>Myotis septentrionalis</i>) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Fishes

NAME	STATUS
Grotto Sculpin (<i>Cottus specus</i>) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1009	Endangered

Critical habitats

There are no critical habitats within your project area.

04/18/2017

Event Code: 03E14000-2017-E-01988

1

USFWS National Wildlife Refuges And Fish Hatcheries

Any activity proposed on [National Wildlife Refuge](#) lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

The following FWS National Wildlife Refuges and Fish Hatcheries lie fully or partially within your project area:

FACILITY NAME	ACRES
---------------	-------

Middle Mississippi River National Wildlife Refuge	1,070
---	-------

Middle Mississippi River National Wildlife Refuge

1293 Rocky Hollow Road

Rockwood, IL 62280-1009

(618) 284-7156

<https://www.fws.gov/refuges/profiles/index.cfm?id=33660>

Wetlands

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

There are no wetlands within your project area.

5 Value Engineering

Full Report available upon request. Executive summary provided here.

Value Engineering Study Report
Harlow and Open River Islands Habitat Rehabilitation and Enhancement Project

Revision Date: 30-Nov-15

1 Executive Summary

1.1 Project Description

The Middle Mississippi River National Wildlife Refuge (MMNWR) is one of almost 550 refuges in the National Wildlife Refuge System administered by the U.S. Fish and Wildlife Service (USFWS). The MMNWR area extends from the Missouri River near St. Louis, MO, to the Ohio River near Cairo, IL. The refuge consists of 7 divisions, including Wilkinson, Crains and Harlow Islands, that were historical farmlands acquired by the USFWS after the 1993 flood. The Corps of Engineers is studying these three islands within the MMNWR for potential Habitat Rehabilitation and Enhancement Project (HREP) improvements as part of the Upper Mississippi River Restoration (UMRR). Historically these islands supported a diverse habitat consisting of side channels, wetlands and bottomland hardwood forest that provided numerous benefits to migratory wildlife and fish. Settlement and agricultural development has led to the disruption and degradation of the island ecosystem. The 1993 flood caused damage to the agricultural levees that protected the islands from high water events subsequently allowing the islands to become exposed to high velocity flows and waters carrying heavy sediment loads. Further disrupting the sites was the establishment of invasive and non-native plant species. The resulting problems at each site include loss of aquatic and wetland ecosystem habitat, invasion of non-native plant species that limits habitat diversity, and diminished ingress/egress hydrologic function along the river. The purpose of this HREP effort is to restore and/or enhance the aquatic and wetland habitats for the project areas as part of the MMNWR.

1.2 Value Engineering Study Results

A Value Engineering (VE) Function Analysis Workshop following the six-phase VE methodology was conducted on 28-31 July 2015 for the Harlow and Open River Islands Habitat Rehabilitation and Enhancement Project. During the evaluation phase of the study, 23 proposals were developed from the 87 generated ideas, 13 for Harlow Island, 7 for Crains Island, and 3 for Wilkinson Island. Additionally 14 comments were developed from the 87 ideas. Finally, 40 of the ideas were incorporated into other proposals or comments. Upon further discussion, the PDT decided to develop the thirteen proposals identified for Harlow Island into one proposed alternative.

All proposals and comments are listed in Table 1-1. Because the VE team is composed of the PDT, the results of the VE are reviewed by the team at the conclusion of the study. Formal presentation of the VE is made, in the form of this report, to Project Management. Through further screening mechanisms the PDT will determine which measures are feasible and will be considered for further analysis in the feasibility study planning process. The rationale will be documented in the Plan Formulation chapter or appendices of the draft integrated feasibility report for this project.

Table 1-1 Proposals and Comments

Proposal (P) or Comment (C) Number	Idea Number	Description
H P1	Harlow 1	Degrade cross levees
H P2	Harlow 2	Release Pecan
H P3	Harlow 3	Remove willow thickets
H P4	Harlow 4	Create raised mounds
H P5	Harlow 5	Improve side channel entrance/exit
H P6	Harlow 6	Create a backwater
H P8	Harlow 8	Reduce bed load definition
H C9	Harlow 9	Maintain/restore early succession
H C11	Harlow 11	Create water management units
H P12	Harlow 12	Create disconnected sand bar habitat
H C14	Harlow 14	Chemically treat invasive species
H P16	Harlow 16	Create wetlands on southern ends
H P17	Harlow 17	Excavate areas in multiple locations to improve wildlife habitat
H C18	Harlow 18	Girdle mature trees for wildlife habitat
H P19	Harlow 19	Use water from side channel or creek
H P20	Harlow 20	Set back ag levee to increase floodway conveyance
H C21	Harlow 21	Improve permanent access
H C22	Harlow 22	Use lowest slope on grade control structure
H C23	Harlow 23	Build a bridge
H C24	Harlow 24	Build pump station/wells
H P26	Harlow 26	Use water from uplands to enhance habitat
C P1	Crains 1	Crane's neck backwater area
C P2	Crains 2	Remove the willow thicket
C P4	Crains 4	Something on the lower end to capture water from levee district pump station
C P5	Crains 5	Widen side channel and increase wetted perimeter
C P9	Crains 9	Create sedimentation deflection berm
C C13	Crains 13	Intensively manage wetlands by pump station
C P15	Crains 15	Sand bar habitat on river side
C P16	Crains 16	Enhance ridge and swale system
W P1	Wilkinson 1	Sediment deflection berms
W P15	Wilkinson 15	Create disconnected sand bar habitat
W C19	Wilkinson 19	Increase access on mid and lower end
W C20	Wilkinson 20	Develop intensively managed levees
W C23	Wilkinson 23	Protect bat/eagle habitat

*Feasibility Report with Integrated Environmental Assessment
Crains Island HREP*

Value Engineering Study Report
Harlow and Open River Islands Habitat Rehabilitation and Enhancement Project

Revision Date: 30-Nov-15

W C24	Wilkinson 24	Improve public access
W C25	Wilkinson 25	Create side channel
W P28	Wilkinson 28	Notch existing dikes for fisheries habitat
W C29	Wilkinson 29	Maintain open fields until project implementation

6 USACE Project Delivery Meetings

During the course of the feasibility study the team held weekly to monthly meetings. The team meeting minutes and decision documents are part of the electronic administrative record and are available upon request.

A Brief list of decision milestones, site visits, and coordination is as follows:

17 Dec 2014 - Site visit with USFWS
24 Mar 2015 - Kick-off Site Visit with PDT and USFWS
21 Apr 2015 - Site Visit to Crains Island with USFWS
19 May 2015 - Site Visit to Crains with USFWS
27-28 July 2015 - Planning Charette/VE with USFWS
31 August - 01 September 2015- Habitat Evaluation workshop with USFWS
20-22 October 2015- Coordination meeting with USFWS and all resource partners -- RRAT trip
13 Nov 2015 - Coordination meeting USWFS @ fox island
18 Nov 2015- Coordination meeting with USFWS @ UMRR CC in St. Paul, MN
05 January 2016- Coordination meeting with USFWS --- update at our district on prelim design of all measures
27 January 2016 - Coordination meeting with USFWS @ Rockwood, IL
24 Feb 2016- Coordination meeting with USFWS @ UMRR CC in Rock Island, IL
31 Mar 2016- Coordination meeting with USFWS and partners -- RRAT tech
13 May 2016 - Coordination meeting with USFWS @ Annada, MO
25 May 2016 - Coordination meeting with USFWS and partners @ UMRR CC in St. Louis, MO
07 July 2016 - Coordinatoin meeting with USFWS presentation of TSP @ Annada, MO
10 Aug 2016 - Coordination meeting with USFWS and partners @ UMRR CC in Lacrosse, WI
22 Aug 2016 - Coordination meeting with USFWS @ Annada, MO
30 Aug - 01 Sep 2016 - Coordination meeting with USFWS and partners @ RRAT trip
11 Oct 2016 - Coordination meeting with USFWS at the St. Louis District Office
09 Nov 2016 - Coordination phone call with Bois Brule Levee District
10 Nov 2016 - Coordination email providing Crains HREP project information to Bois Brule Levee District
16 Nov 2016 - Coordination meeting with USFWS and partners @ UMRR CC St. Paul, MN
17 Jan 2017 - Coordination meeting with USFWS @ Annada, MO
08 Feb 2017 - Coordination meeting with USFWS and partners @ UMRR CC Rock Island, IL
09 Feb 2017 - Coordination meeting with USFWS @ Annada, MO
23 Feb 2017 - Coordination phone call with Bois Brule Levee District
17 Feb 2017 - Coordination meeting with USFWS @ Rockwood, IL
08 Mar 2017 - Coordination meeting with USFWS and partners -- RRAT Tech @ AREC
23 Apr 2017 - Coordination meeting with Bois Brule Levee District in St. Mary, MO

7 Project Partner Letter of Support



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Upper Mississippi River National Wildlife and Fish Refuge
51 E. Fourth Street - Room 101
Winona, Minnesota 55987



September 28, 2016

Colonel Anthony P. Mitchell
District Commander
St. Louis District
U.S. Army Corps of Engineers
1222 Spruce Street
St. Louis, Missouri 63101-2833

Dear Colonel Mitchell:

The U.S. Fish and Wildlife Service (Service) fully supports the U.S. Army Corps of Engineers' (USACE) Tentatively Selected Plans for ecosystem restoration at the Harlow Island Division, Crain's Island Division, and the Wilkinson Island Division of the Middle Mississippi River National Wildlife Refuge. Harlow Island is located in Jefferson County, Missouri between River Miles 140.5 and 144. Crain's Island is located in Randolph County, Illinois between River Miles 103.5 and 105.5. Wilkinson Island is located in Perry County, Missouri and Jackson County, Missouri between River Miles 88.5 and 95. This project has the potential to restore and rehabilitate wetland and aquatic habitats that have been adversely impacted by major flood events and past land uses.

The Tentatively Selected Plan at Harlow Island involves construction of a sedimentation deflection berm, degradation of existing agricultural levees, construction of ridges and swales, reforestation, and excavation and reconnection of the backwater. The Tentatively Selected Plan at Crain's Island involves widening and deepening of the side channel, construction of a sedimentation deflection berm, reforestation, and wetland enhancements. The Tentatively Selected Plan at Wilkinson Island involves construction of a sedimentation deflection berm, degradation of existing agricultural levees, construction of ridges and swales, reforestation, and wetland enhancements.

This project would be constructed at 100% federal costs under the provisions of the Upper Mississippi River Restoration Program (UMRR). As the project sponsor, the Service would be responsible for 100% of the Operations & Maintenance (O&M) costs of the project. The Service's financial support would be dependent on total cost, appropriations authority, O&M responsibility, and benefits to the natural resource.

The Service is very excited about the project and we look forward to working with the Corps to make it a success. Thank you for the opportunity to engage in this process. Please contact me at (507)494-6218 if I could provide additional clarification or information.

Sincerely,

Sabrina Chandler
Refuge Supervisor

8 Draft US Fish & Wildlife Coordination Act Report



United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
Southern Illinois Sub-Office (ES)
8588 Route 148
Marion, Illinois 62959

FWS/MISO

July 17, 2017

Colonel Bryan K. Sizemore
U.S. Army Corps of Engineers
St. Louis District
1222 Spruce Street
St. Louis, Missouri 63103-2833

Attn: Ben McGuire, CEMVP-PD-P

Dear Colonel Sizemore:

This letter constitutes our Draft Fish and Wildlife Coordination Act Report (Report) for the Crains Island Habitat Rehabilitation and Enhancement Project (HREP) located in Randolph County, Illinois. This report is intended to provide partial compliance with Subsection 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and compliance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.); and, the National Environmental Policy Act (83 Stat. 852, as amended P.L. 91-190, 42 U.S.C. 4321 et seq.). This Report has been reviewed by the Missouri Department of Conservation and the Illinois Department of Natural Resources and their concurrence is noted.

Introduction

The Crains Islands HREP is a component of the Upper Mississippi River Restoration Program (UMRR), authorized by Section 1103 of the Water Resources Development Act (WRDA) of 1986. The vision of the UMRR is "A healthier and more resilient Upper Mississippi River ecosystem that sustains the river's multiple uses". The Project addresses habitat rehabilitation and enhancement on Crains Island which is owned by the U.S. Fish and Wildlife and is part of the Middle Mississippi River National Wildlife Refuge. The Project area is located between Upper Mississippi River Miles 103.5 and 105.5 and is comprised of approximately 558 acres of aquatic side channel, floodplain forest, and wetland habitat.

Resource Problems and Opportunities

Human activity over the past two centuries within the Middle Mississippi River (MMR) has altered the hydrology, topography, and biotic communities historically present within the project area. These alterations have reduced the diversity and quality of aquatic side channel habitat,

Colonel Bryan K. Sizemore

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floodplain forest habitat, and wetland habitat which has been reduced and continues to degrade. These stressors are likely to continue, as would the decline of the quality of aquatic side channel, floodplain forest, and wetland habitats.

Within the project area, the side channel habitat is generally shallow, turbid, and has limited connectivity with the main channel primarily due to sedimentation. Wetland habitats within the project area have also declined due to sedimentation and lack of natural hydrologic processes. Without action, it is anticipated that the aquatic habitats would continue to degrade and result in a loss of aquatic habitat for migratory waterfowl and riverine fisheries resources. Forest habitats within the project area have experienced fragmentation and a loss of diversity which is due to land use practices and increased coarse sediment deposition within forested areas. Without action, it is anticipated that these forested habitats will continue to decline and result in a loss of habitat for migratory birds and resident wildlife. The degraded state of the project area, however, provides a significant opportunity to improve the quality and diversity of aquatic, floodplain forest, and wetland habitats within the proposed project area for the benefit of riverine fish, migratory birds, and other wildlife resources.

The primary problems to be addressed by this project include: the degraded side channel structure and connectivity resulting in a loss of side channel habitat, limited wetland diversity, forested habitat fragmentation, and loss or lack of forest community diversity.

Goals and Objectives

The goal of the Crains Islands Project is to restore and improve the quality and diversity of aquatic side channel, floodplain forest, and wetland ecosystem resources within the Project area. To achieve this goal a planning team of biologists from the U.S. Army Corps of Engineers (Corps), Missouri Department of Conservation, Illinois Department of Natural Resources, and Service developed the objectives for the project. The objectives include the following:

- Objective 1: Increase connected aquatic side channel habitat with depth diversity for enhanced fisheries habitat benefits
- Objective 2: Restore and/or enhance wetland ecosystem resources as measured in acres
- Objective 3: Increase acreage protected from coarse sediment deposition and open to backing of water in the Project Area as measured in acres
- Objective 4: Restore and/or enhance floodplain forest communities as measured in acres

The goals and objectives of the Crains Island Project fit well into the system wide objectives for the Upper Mississippi River System (Galat et al., 2007). The system wide objectives include management for:

- a more natural hydrologic regime (hydrology and hydraulics)
- processes that shape a diverse and dynamic river channel (geomorphology)

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- processes that input, transport, assimilate, and output materials within UMR basin river-floodplains: water quality, sediments, and nutrients (biogeochemistry)
- a diverse and dynamic pattern of habitats to support native biota (habitat)
- viable populations of native species and diverse plant and animal communities (biota)

Proposed Project Features

To achieve the project objectives, a number of project plans/features were evaluated. The recommended plan (alternative 2A) consists of the following:

- Construction of a sediment deflection berm to deflect coarse sediment material, reduce high flows, and increase fine sediment deposition within the project area.
- Excavation of the side channel, with benching on either side where opportunistic to increase side channel depth, width, and connectivity.
- Reforestation through the study area to improve habitat quality and reduce forest fragmentation.
- Creation of depressional wetlands to increase wetland diversity and acreage within the project area.

This plan restores approximately 60 acres of side channel habitat by improving bathymetric diversity and flow, restoring approximately 61 acres of floodplain forested habitat through reforestation, restoring 110 acres of floodplain forested habitat by improving soil conditions, and restoring approximately 21 acres of wetland habitat within the Project area.

Methodology to Evaluate Alternatives

The Crains Island HREP was analyzed using the Habitat Evaluation Procedures (HEP). The target species for the HEP included the smallmouth buffalo for the side channel aquatic habitat, the bullfrog for the semi-permanently/permanently flooded wetland habitat, and the fox squirrel for the forested wetland habitat. Existing conditions, future without project conditions and future with project conditions were examined. This analysis was conducted with team members representing the Corps and Service.

The utilized evaluation models produced a rating of habitat quality for each respective habitat type. This rating is referred to as a Habitat Suitability Index (HSI). The HSI, a value ranging from 0.1 to 1.0, measures the existing and future habitat conditions compared to optimum habitat which is 1.0. This value, when multiplied by the available habitat within the project area, will provide a measure of available habitat quality and quantity known as habitat units (HUs). Average annual habitat units (AAHUs) for each species are typically calculated to reflect expected habitat conditions over a 50-year project life.

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Existing, Future without, and Future with Project Conditions

A number of general and site specific assumptions were made as to what the project area and vicinity would be like 50 years in the future with and without the project and can be found in Appendix B of this report.

Forested

The habitat suitability for the fox squirrel improved with the project, while without the project the habitat suitability remained low or was unavailable (Table 1). Habitat suitability for the fox squirrel in areas impacted by the sediment deflection berm improved due to improved forest growth and regeneration while without the project the forested habitat would remain unsuitable and resulted in low HSI scores (Table 1). Habitat quality for the fox squirrel improved in the areas of reforestation due to increased availability of suitable habitat while without the project those areas would continue to be unsuitable. The proposed project increases the amount of available habitat by 60.99 acres and is the primary difference in habitat units (Table 2). The proposed project results in a net increase of 2,905.6 habitat units in the forested areas (Table 2).

Side Channel

The habitat suitability for the smallmouth buffalo improved with the project, while without the project the habitat remains unavailable (Table 1). Habitat quality for the smallmouth buffalo improved with the project due to improved side channel width and flow/connectivity to the main channel, improved water temperatures during the spring and summer, improved dissolved oxygen levels during the spring and summer time periods, improved current velocity during the low flow time period, and increased vegetative cover in the off-channel areas. Over time it was assumed that the quality of habitat would decline slightly due to sedimentation and reduced connectivity to the main channel but would remain highly suitable. Without the project, the side channel would remain disconnected from the main channel and continue to lose depth over time. This will cause the water temperatures during the summer time period to become unsuitable and cause the dissolved oxygen levels during the spring and summer to decline resulting in a HSI score of zero. The proposed project results in a net increase of 1,358.9 habitat units within the side channel area (Table 2).

Wetland

The habitat suitability for the bullfrog improved with the project, while without the project the habitat remains limited (Table 1). Habitat quality for the bullfrog improved with the project due to increased availability of suitable wetland habitat. Without the project, the lack of available wetland habitat resulted in a HSI score of zero. The proposed project increases the amount of available habitat from 0.0 to 21.18 acres and is the reason for the difference (403.0 HUs) in habitat units (Table 2).

Summary

Colonel Bryan K. Sizemore

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The HEP analysis indicates that the sediment deflection berm results in a net increase of 33.4 AAHUs over the no action alternative and that the reforestation results in a net increase of 42.1 AAHUs over the no action alternative. In addition, the restoration of the side channel habitat results in a net increase of 57.2 AAHUs over the no action alternative and the creation of wetland habitats results in a net increase of 16.8 AAHUs. The combination of habitat features in the preferred alternative will yield a net increase of 149.5 AAHUs over the future without project condition.

Conclusions and Recommendations

According to the Incremental Cost Analysis, the preferred alternative ranks 3 out of 9 in costs per AAHU output compared to the other alternatives including the no action alternative. A large portion of the cost for the preferred alternative is attributable to the side channel dredging and construction of a sediment deflection berm. Side channel habitat is an important component of the Mississippi River ecosystem and there are currently limited opportunities to implement side channel restoration projects in the MMR. The *Upper Mississippi River System Habitat Needs Assessment* (Theiling, et al., 2000) emphasizes the need for restoring secondary side channel and contiguous backwater every 5 to 7 miles along the MMR. This plan restores approximately 60 acres of side channel habitat within the MMR. Additionally, it is very difficult to capture the full benefits associated with side channel projects. For purposes of the Incremental Cost Analysis, the model was only able to capture habitat unit benefits associated with the acreage within the immediate project area. However, we believe that the ecosystem benefits of side channel restoration extend beyond the project area for both aquatic and terrestrial species. The *Upper Mississippi River Habitat Needs Assessment* also identifies the need for wetland and floodplain forest restoration in the MMR. This plan restores approximately 21 acres of wetland habitat and 171 acres of floodplain forest habitat. These habitats are critical to migratory birds and provide habitat to other wildlife resources. Although the preferred alternative has a high cost, we fully support the alternative because it would restore a large component of habitat diversity in this portion of the Upper Mississippi River.

Overall, the proposed project (Alternative 2A) will be beneficial to the Mississippi River and biota dependent upon the river by improving habitat quality in this portion of river. The project will improve the quality and diversity of side channel, floodplain forest, and wetland habitats within the project area. Large river fish and other aquatic organisms will gain improved access to important habitats for several life stages, such as spawning, rearing and over wintering. Migratory birds and other terrestrial organisms will have access to improved habitat for resting, feeding, nesting, and escape cover. These areas will also provide an important feeding area for aquatic organisms and serve as a production area for small fish and invertebrates that other terrestrial organisms feed upon. The proposed Crains Island HREP will be beneficial to a variety of fish and wildlife resources. The Service fully supports the proposed Crains Island HREP.

Threatened and Endangered Species

To facilitate compliance with Section 7(c) of the Endangered Species Act of 1973, as amended, Federal agencies are required to obtain from the Fish and Wildlife Service (Service) information concerning any species, listed or proposed to be listed, which may be present in the area of a

Colonel Bryan K. Sizemore

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proposed action. The list for the proposed project area includes the endangered Indiana bat (*Myotis sodalis*), endangered least tern (*Sterna antillarum*), endangered pallid sturgeon (*Scaphirhynchus albus*), threatened northern long-eared bat (*Myotis septentrionalis*), and threatened small whorled pogonia (*Isotria medeoloides*). There is no designated critical habitat in the project area at this time. You can visit our Information, Planning, and Conservation System (IPaC) at the following link below to obtain an updated official U.S. Fish and Wildlife species list <https://ecos.fws.gov/ipac/>.

A biological assessment or evaluation should be prepared for this proposed action. The purpose of the assessment is to identify listed or proposed species likely to be adversely affected by the action and to assist in making a decision as to whether formal consultation should be initiated. In addition, the Service recommends that a bat habitat assessment be conducted to fully inform the determination process.

Although the bald eagle has been removed from the threatened and endangered species list, it continues to be protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act (BGEPA). The Service developed the National Bald Eagle Management Guidelines to provide landowners, land managers, and others with information and recommendations regarding how to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA. The Service is unaware of any bald eagle nests in the proposed project area; however, if a bald eagle nest is found in the project area or vicinity of the project area then our office should be contacted and the guidelines implemented. A copy of the guidelines is available at:

<http://www.fws.gov/midwest/eagle/pdf/NationalBaldEagleManagementGuidelines.pdf>

Thank you for the opportunity to provide this Draft Fish and Wildlife Coordination Act Report. If you have questions, please contact me at (618) 997-3344, ext. 345.

Sincerely,

/s/ Matthew T. Mangan

Matthew T. Mangan
Fish and Wildlife Biologist

cc: USFWS (Wilson)
IDNR (Atwood)
MDC (Vitello)

Attachments: Table 1
Table 2
Appendix A – Literature Cited
Appendix B – Assumptions

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Table 1. Habitat Suitability Index (HSI) scores for Existing, Future with Project (Year 1,5,25 and 50) and Future without Project (Year 1,5,25 and 50), Crains Island HREP.

Habitat Type	Species	Existing	Future With					Future Without			
		0	1	5	25	50	1	5	25	50	
Forested - Berm	Fox Squirrel	0.18	0.18	0.18	0.43	0.93	0.18	0.18	0.18	0.18	
Forested - Reforestation	Fox Squirrel	0.00	0.00	0.00	1.00	0.96	0.00	0.00	0.00	0.00	
Side Channel	Smallmouth buffalo	0.00	0.97	0.99	0.98	0.94	0.00	0.00	0.00	0.00	
Wetland	Bullfrog	0.00	0.85	0.89	0.90	0.88	0.00	0.00	0.00	0.00	

Table 2. Habitat Units for Future with Project (Year 50) and Future without Project (Year 50), Crains Island HREP. Net change is the difference between Future with Project and Future without Project.

Habitat Type	Species	Future With	Future Without	Net
Forested - Berm	Fox Squirrel	1,918.6	507.3	1,411.3
Forested Reforestation	Fox Squirrel	1,494.3	0.0	1,494.3
Side Channel	Smallmouth buffalo	1,358.9	0.00	1,358.9
Wetland	Bullfrog	403.0	0.0	403.0

Colonel Bryan K. Sizemore

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APPENDIX A

LITERATURE CITED

- Galat, D., Barko, J., Bartell, S., Davis, M., Johnson, B., Lubinski, K., . . . Wilcox, D. (2007). *Environmental Science Panel Report: Establishing System-wide Goals and Objectives for the Upper Mississippi River System*. U.S Army Corps of Engineers, Rock Island District, St. Louis District, St. Paul District: Rock Island, Illinois, St. Louis, Missouri, St. Paul, Minnesota
- Theiling, C. H., Korschgen, C., DeHaan, H., Fox, T., Rohweder, J., & Robinson, L. (2000). *Habitat Needs Assessment for the Upper Mississippi River System Technical Report*. La Crosse, WI: U.S. Geological Survey, Upper Midwest Environmental Sciences Center.
- USACE (U.S. Army Corps of Engineers). 2017. Upper Mississippi River Restoration, Feasibility Report with Integrated Environmental Assessment, Crains Island Habitat Rehabilitation and Enhancement Project. U.S. Army Corps of Engineers, St. Louis District, St. Louis, MO.

APPENDIX B ASSUMPTIONS

General and site specific assumptions used in the habitat evaluation. Taken from Appendix G (Habitat Evaluation & Quantification) of the Definite Project Report.

General Assumptions

- It was assumed that target years of 0 (existing condition), 1, 5, 25, and 50 (future without and future with Project conditions) are sufficient to analyze AAHUs and characterize habitat changes over the estimated period of analysis. The period of analysis was determined to be 50 years based on the prediction that some Project features (e.g., reforestation leading to mature trees reproducing; development of key ecological processes needed to restore ecosystem structure and function) would need a longer period of time to reach maximum benefits; and the accrual of benefits were predicted to level off after 50 years.
- For planning purposes, we used existing gage data (H&H Appendix C) to determine that the Project area is located at or under a 50% chance of annual exceedance elevation of 368.00 NAVD 88.
- Early successional floodplain forest species, consisting of willow (*Salix* spp.), silver maple (*Acer saccharinum*), and eastern cottonwood (*Populus deltoides*), exist throughout approximately 40 acres (UMRR-LTRM 2011 landcover data) in the Project Area.
- Based on hydrologic flow data, throughout the Project Area, it is assumed that the site will continue to be inundated approximately every other year.
- Throughout the Project Area, large amounts of coarse sediment (i.e., sand) exist. It is assumed that Without Project conditions that this type of material would continue to be deposited throughout the Project Area. For With Project conditions, it is assumed that coarse sediment deposition would be greatly reduced throughout the Project Area by the sediment deflection berm. It is also assumed that the sediment deflection berm would allow for sheetflow/backing of water into the Project Area behind the sediment deflection berm for high flow conditions up to a 20% chance of annual exceedance elevation of 374.48 NAVD 88. Thus, allowing for silt/loam soil development, overtime accumulating enough to support hard mast trees.
- Without the Project, USFWS will continue to manage the Project Area. USFWS will continue to maintain existing infrastructure like access roads and habitats dependent on funding, staffing, and natural disasters. However, it is assumed no substantial increases to current operation and maintenance budget for the site would occur while efforts to maintain access roads which will take away from habitat management.
- We assumed that operation of Crains Island would continue under the current management plans and objectives for at least the life of the HREP.
- For future with Project conditions, the sediment deflection berm elevation was set at a 20% chance of annual exceedance elevation, 374.48 ft NAVD 88.
- Without the Project, fish use of the existing side channel will continue to be restricted in many years by the lack of connectivity with the main channel.
- The navigation channel will be maintained in its current location.

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- It is anticipated that USFWS would continue to manage Crains Island under the 2004 Mark Twain National Wildlife Refuge Complex Comprehensive Conservation Plan and Environmental Assessment.
- For future with project conditions, we assumed that the side channel would decrease slightly over time. Thus we assumed a 10% reduction at year 25 and an additional 10% relative reduction by year 50. Based on the analysis of transect and multi-beam data, overall depth characteristics of MMR side channels appear to be stable or increasing, although a considerable amount of interannual variability occurs due to shifting sandbar formations in response to changing river stages and flows. Of the 20 side channels for which bathymetric surveys were available for a period spanning at least 15 years, 13 showed an increase in average depth over the period of record and 7 showed a decrease. Likewise, total volume of MMR side channels has increased in the last 15 years. Although the above evaluations exist for “naturally” occurring side channels, no data exists for constructed side channels. Therefore a 10% reduction at year 25 and an additional 10% relative reduction at year 50 were used to conservatively estimate benefits and not over-inflate them.
- For future with project conditions, we assumed that the depressional wetlands would decrease slightly over time. Thus we assumed a 10% reduction at year 25 and an additional 10% relative reduction by year 50.

Site Specific Assumptions

- Sediment Deflection Berm

The fox squirrel (Allen 1982) Corps approved (per EC 1105-2-412) HSI model was used to assess the floodplain forest habitat benefits resulting from the construction of the sediment deflection berm. This species was selected because it requires hard mast tree species as a large component of the forest community in which it lives.

The following assumptions in applying the *fox squirrel HSI model* were made:

Baseline Condition. The forest community composition is currently a more flood tolerant early successional forest community consisting of silver maple (*Acer saccharinum*), willow (*Salix* spp.), and eastern cottonwood (*Populus deltoides*). Hard mast species such as oaks (*Quercus* spp.) and pecans (*Carya illinoensis*) do not exist within the Project Area. The Project Area is highly fragmented due to the deposition of coarse sediment material (i.e., sand), which greatly reduces species diversity as a limited number of species can tolerate this high soil composition of sand.

Future Without Project Conditions: It is assumed that the forest community composition would continue to be degraded through lack of natural succession limited by coarse sediment deposition. Coarse sediment deposition during flood events would continue, limiting hard mast species (i.e., nut-producing trees) establishment. Even-aged low species diversity riverfront forest communities (e.g., silver maple and green ash) would persist throughout the island, thus also limiting the establishment of hard mast species. The lack of hard mast species would continue to provide little habitat benefits for wildlife. It is well documented that hard mast forest communities provide higher habitat value for small and large mammals, neotropical migrants, migratory waterfowl, etc. Without the Project, it is anticipated that formerly cultivated fields would continue to

support dense willow stands, which provide little benefits to ecosystem structure and function.

Future With Project Conditions. It is assumed that the sediment deflection berm would be constructed to a 20% chance of annual exceedance elevation, 374.48 ft NAVD 88. Only the portion behind the sediment deflection berm was evaluated. This total area did not include any other features, including the side channel dredging area (S3 or S7 configurations), reforestation areas (F1 and F2 configurations), or depressional wetland areas (W1). We assumed that the construction of the sediment deflection berm would block coarse sediment deposition from the Project Area and thus allow for sheetflow/backing into the area evaluated. The increased sheetflow/backing of water into the Project Area during high flow events would allow for water velocity reduction and the increased deposition of fine sediment. The increased fine sediment deposition depth would increase over time allowing for the development of soils more suitable for the establishment and survival of hard mast tree species including oaks (*Quercus* spp.) and pecans (*Carya illinoensis*). It is assumed that the ground elevation throughout the area behind the sediment deflection berm would increase such that hard mast species would not be as limited by flood frequency elevation as described in Heitmeyer 2008, in which restoration of hard mast species are targeted elevations between 50%-20% chance of annual exceedance elevations. The reforestation project feature (F1/F2) would ensure that a viable seed sources is available for the regeneration of hard mast tree species when over time, the deposition of fine sediment has accumulated enough to have suitable soils for hardmast tree species.. The forest community throughout the project area would transition passively over time through natural recruitment and regeneration to a more hard mast dominated forest community as site conditions improve. The intent would be that the entire area behind the SD berm become hard mast forest dominant over time. It is likely that hard mast trees establish over time once seed trees become mature enough to produce seed. However, recruitment dependent upon dispersal by high water events as well as mammals (squirrels, etc.) dispersing.

- *Sediment Deflection Berm with additional reforestation acreage (A2*).*

The fox squirrel (Allen 1982) Corps approved (per EC 1105-2-412) HSI model was used to assess the floodplain forest habitat benefits resulting from the construction of the sediment deflection berm. This species was selected because it requires hard mast tree species as a large component of the forest community in which it lives.

The following assumptions in applying the *fox squirrel HSI model* were made:

Baseline Condition. Similar site conditions exist as described in feature *Sediment Deflection Berm (A2)*.

Future Without Project Condition. Similar Future Without Project assumptions were made as described in feature *Sediment Deflection Berm (A2)*.

Future With Project Condition. Similar Future With Project assumptions were made as described in feature *Sediment Deflection Berm (A2)*. However, *Sediment Deflection Berm with additional reforestation acreage (A2*)* differs from A2 in that the berm itself includes an additional 40.1 acres at a 20% chance of annual exceedance elevation (374.48 ft NAVD 88). This feature was developed in an effort to beneficially reuse material from the side channel dredging and provide additional acreage for reforestation. This additional acreage would provide a larger seed source for the entire site behind the sediment deflection berm once the trees have matured, increasing the amount of seed available to increase the likelihood that establishment and regeneration on the site occur.

- *Side Channel Excavation (S3).*

The smallmouth buffalo (Edwards and Twomey 1982) Corps approved (per EC 1105-2-412) HSI model was used to assess the aquatic habitat benefits resulting from the dredging of the side channel. This species was selected because it requires a variety of off channel habitat conditions throughout its life cycle.

The following assumptions in applying the *smallmouth buffalo HSI model* were made:

Baseline Conditions. Currently the side channel at Crains Island has two upstream entrances and one downstream exit. Both of the upstream entrances have been disconnected from the main channel during normal water levels since approximately 2005. From 1998-1999 to 2014, the side channel bottom at Crains has increased in elevation by approximately 2.5 feet. In addition, large deposits of woody debris have accumulated in the entrances since 2012, likely adding to the sedimentation occurring in the side channel. The woody debris has also begun to spread downstream within the side channel, further degrading the already shallow aquatic area. The entrances of the side channel only receive water during above average flow events approximately 33% of the time. After high flow events, water is trapped in several small pockets, where as seen elsewhere, dissolved oxygen concentrations and high temperature conditions lead to anoxic conditions in which no fish species can survive. This habitat does not have the ability to serve as valuable spawning habitat or is able to provide refugia for young of the year fish species that typically use this type of habitat. These deteriorated habitat conditions not only limit fish communities but also reduce the amount in which invertebrates, birds, mammals, reptiles and amphibians can utilize the aquatic habitat thereby limiting the overall ecosystem function of the entire Project Area.

Future Without Project Conditions. It is anticipated that this lack of connectivity would continue into future leading to loss of total side channel length, depth, and aquatic habitat. The side channel habitat is expected to continue to degrade with shallow depths, zero to minimal flow, low dissolved oxygen, less than ideal water temperatures, and little thermal cover. Further, according to USACE, 2015, projections of increased air temperatures, particularly in the summer months, will result in increased water temperatures, which will likely lead to decreased dissolved oxygen levels. Ultimately, the Project Area would not likely support a diversity of native fish assemblages into the future.

Future With Project Conditions. With the dredging of the side channel, it was assumed that restoring connectivity of approximately 66.1 acres of the side channel to the main river would improve dissolved oxygen, temperatures, and depths throughout the year for fish and other aquatic life. This would allow aquatic organism access to the aquatic habitat that does not currently exist, providing benefits to the project area as well as the MMR. Hydraulic and Hydrologic modeling show that the average flow rate through the middle of the side channel is approximately 2.0-2.5 ft/sec, while portions of the inside bend are approximately 0.25-0.75 ft/sec. The side channel would have water approximate 98% of the time and a depth of at least 5 ft throughout approximately 85% of the time.

- *Side Channel Excavation with benches (S7).*

The smallmouth buffalo (Edwards and Twomey 1982) Corps approved (per EC 1105-2-412) HSI model was used to assess the aquatic habitat benefits resulting from the dredging of the side channel. This species was selected because it requires a variety of off channel habitat conditions throughout its life cycle.

The following assumptions in applying the *bullfrog HSI model* were made:

Baseline Conditions. Similar conditions exist as discussed in *Side Channel Excavation (S3)*.

Future Without Project Conditions. Similar assumptions were made as discussed in *Side Channel Excavation (S3) Future Without Project Conditions*.

Future With Project Conditions. Similar assumptions were made as discussed in *Side Channel Excavation (S3) Future With Project Conditions*. However, *Side Channel Excavation with terraces (S7)* includes the addition of creating benches and 66.2 acres total in size. The bathymetric diversity that would be created with the benching in the side channel design would promote plant growth that would allow for improved habitat for fish and macro and micro-invertebrates. The increased aquatic depth would provide refugia for a suite of aquatic organisms.

- *Reforestation (F1 & F2).*

The fox squirrel (Allen 1982) Corps approved (per EC 1105-2-412) HSI model was used to assess the floodplain forest habitat benefits of reforestation on the site. This species was selected because it requires hard mast tree species as a large component of the forest community in which it lives.

The following assumptions in applying the *fox squirrel HSI model* were made:

Baseline Condition. Similar site conditions exist as described in feature *Sediment Deflection Berm (A2)* and *Sediment Deflection Berm with additional reforestation acreage (A2*)*.

Future Without Project Condition. Similar Future Without Project assumptions were made as described in feature *Sediment Deflection Berm (A2)* and *Sediment Deflection Berm with additional reforestation acreage (A2*)*.

Future With Project Condition. Similar Future With Project assumptions were made as described in feature *Sediment Deflection Berm (A2)* and *Sediment Deflection Berm with additional reforestation acreage (A2*)*. However in addition, we assumed that reforestation would not occur without either the *Sediment Deflection Berm (A2)* or *Sediment Deflection Berm with additional reforestation acreage (A2*)* because the reforestation would occur on both of these berm designs for approximately 60.99 acres and 101.09 acres, respectively. It was assumed that the tree plantings would consist of a high density of trees per acre at a 20 foot by 20 foot spacing in order to increase survivability per acre. It was assumed that the reforestation areas would have annual maintenance for the first five years following the initial planting consisting of mowing between the tree planting rows and a spring application of a non-selective and pre-emergent herbicide around the base of the tree to limit competition of woody and non-wood plant competition. This specific maintenance is to be performed in order to encourage more rapid growth over time so that the RPM trees reach maturity and produce seed more quickly.

- *Depressional Wetland (W1).*

The bullfrog (Graves and Anderson 1987) Corps approved (per EC 1105-2-412) HSI model was used to assess restored wetland habitat benefits on the site. This species was selected because relies on permanent bodies of standing or slow-moving water in wetlands.

The following assumptions in applying the *bullfrog HSI model* were made:

Baseline Conditions. Simi-permanently/permanently flooded wetland sites do not currently exist in the Project Area. Much of the Project Area contains large proportions of sand in the overall soil composition, lending itself to poor conditions to collect and maintain areas in which water is present for extended periods. Thus emergent aquatic vegetation wetlands do not exist within the Project Area as well.

Future Without Project Conditions. It is anticipated that conditions would continue to exist in which no semi-permanent and permanent wetland sites with emergent aquatic vegetation within the Project Area. Since many amphibian and reptile species rely on these habitat types, these populations would continue to be limited throughout the Project Area, further contributing to the overall lack of ecosystem diversity.

Future With Project Conditions. It is assumed that with the construction of the depressional wetland feature (W1), the presence of semi-permanently and permanently flooded wetland habitat would exist within the constructed features. This feature would create approximately 21.18 acres of wetland habitat within the Project Area. These features would be approximately 6 feet deep, with the bottom elevation at approximately 358 ft NAVD 88. This would allow the bottom portion of the wetlands to receive ground water input from the river and contain water approximately 80% of the time, barring extreme drought periods. These conditions would allow for emergent vegetation to grow around the perimeter of the depressional wetlands, restoring habitat conditions needed by various amphibian and reptile species where cover is needed adjacent to standing water.