UPPER MISSISSIPPI RIVER RESTORATION
FEASIBILITY REPORT
WITH INTEGRATED ENVIRONMENTAL ASSESSMENT

BEAVER ISLAND
HABITAT REHABILITATION AND ENHANCEMENT PROJECT

POOL 14, UPPER MISSISSIPPI RIVER MILES 513.0-517.0
CLINTON COUNTY, IOWA

APPENDIX A

CORRESPONDENCE

UPPER MISSISSIPPI RIVER RESTORATION
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BEAVER ISLAND
HABITAT REHABILITATION AND ENHANCEMENT PROJECT

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CLINTON COUNTY, IOWA

APPENDIX A

CORRESPONDENCE

TABLE OF CONTENTS

11. Email dated December 10, 2015, from the USFWS to the Rock Island District providing concurrence with the Tentatively Selected Plan

12. Email dated December 10, 2015, from the IADNR to the Rock Island District providing concurrence with the Tentatively Selected Plan

13. Value Management Plan approved by the Rock Island District, and signed and dated by the Value Engineering Officer on January 5, 2016

14. Email dated February 1, 2016, from the Rock Island District to the USFWS providing a biological assessment and requesting concurrence with determinations made by the District regarding federally-endangered or threatened species listed under the Endangered Species Act

15. Letter dated February 29, 2016, from the USFWS to the Rock Island District transmitting concurrence on the biological assessment and determinations made by the District regarding federally-endangered or threatened species listed under the Endangered Species Act

16. Letter of Support dated August 3, 2016 from Tim Yager, Deputy Refugee Manager, Upper Mississippi River National Wildlife and Fish Refuge, regarding the Beaver Island HREP and value of the Project

17. Letter of Support dated August 15, 2016 from Chuck Gipp, Director, Iowa DNR, regarding the Beaver Island HREP and value of the Project

18. Letter dated August 24, 2016 providing the Draft Coordination Act Report from Kraig McPeek, U.S. Fish and Wildlife Service

19. Letter dated September 7, 2016, from the Rock Island District to resource agencies and cultural groups describing the proposed Project and results of historic property surveys

20. E-mail concurrence dated September 13, 2016, from the USFWS in response to District's letter dated September 7, 2016

21. Stamped concurrence dated September 28, 2016, from the SHSI in response to District's letter dated September 7, 2016

22. Letter dated January 12, 2017, from the Rock Island District to resource agencies and cultural groups describing the Tentatively Selected Plan, results of historic property surveys, effect determination and requesting comments on the project

23. Letter dated March 30, 2017, from the USFWS to the Rock Island District providing comments on the public review draft Feasibility Report with Integrated Environmental Assessment

24. Letter dated March 31, 2017, from the USEPA to the Rock Island District providing comments on the public review draft Feasibility Report with Integrated Environmental Assessment

DEPARTMENT OF THE ARMY
MISSISSIPPI VALLEY DIVISION, CORPS OF ENGINEERS
P.O. BOX 80
VICKSBURG, MISSISSIPPI 39181-0080

REPLY TO
ATTENTION OF:

CEMVD-PD-SP

24 April 2006

MEMORANDUM FOR Commander, Rock Island District, ATTN: CEMVR-PM-M

SUBJECT: Upper Mississippi River Restoration (UMRR) - Fact Sheet Approval for the Huron Island, Des Moines County, Iowa, and Beaver Island, Clinton County, Iowa, Habitat Rehabilitation and Enhancement Projects (HREP)

1. Reference memorandum, CEMVR-PM-M, 21 March 2006, subject: Revised Appendix A-Project Study Issue Checklist for the Upper Mississippi River Restoration (UMRR) and Fact Sheet Approval for the Huron Island, Des Moines County, Iowa, and Beaver Island, Clinton County, Iowa, Habitat Rehabilitation and Enhancement Projects (HREP).

2. Subject fact sheets, as revised, are approved for continued HREP planning (encl).

Encl

MICHAEL B. ROGERS, P.E.
Director of Programs

CF:
CEMVD-PD-SP

BEAVER ISLAND COMPLEX

HABITAT REHABILITATION AND ENHANCEMENT PROJECT

Pool 14
Upper Mississippi River Mile
513.0 – 515.5

Clinton County, Iowa
Rock Island District

LOCATION:

The Beaver Island Complex project area is located along the right descending bank of the Upper Mississippi River near Clinton, Iowa. The 270-acre Beaver Island Complex represents 16% of Pool 14 backwater habitat. Project lands are federally owned by the Corps of Engineers and the U.S. Fish and Wildlife Service (USFWS). All the federally owned lands are managed by USFWS as part of the Upper Mississippi River National Wildlife and Fish Refuge, Savanna District. Upstream portions of the island are privately owned, but are not included in the project area.

RESOURCE PROBLEM:

The complex of backwaters and wetlands has historically provided spawning, nursery, and overwintering habitat for fish and feeding and resting habitat for migratory water birds. Excessive sedimentation has negatively affected the habitat quality and wetland functions of this valuable backwater complex.

PROJECT FEATURES:

* Dredge backwaters and connecting sloughs using a combination of hydraulic and/or mechanical dredging.
* Create nesting islands.
* Construct berms (using dredged material) to deflect sediment.
* Plant mast-producing trees on berms.
* Create isolated wetlands (potholes).
* Install a manual control structure or high water diversion gate on the upper end of the complex to reduce sediment loading, while introducing oxygen rich water into the complex when needed.

PROJECT OUTPUTS:

Dredging backwaters and connecting sloughs would provide critically important overwintering habitat for fish, such as bass, crappie, and bluegill. Isolated wetlands would restore feeding habitat for resident and migratory waterfowl, shorebirds, and wading birds. Mast tree plantings would increase species diversity and improve the existing timber stand. The project would maintain the quality and diversity of habitat in the largest backwater complex in Pool 14.

FINANCIAL DATA:

General design and construction costs are estimated at $600,000 and $4,000,000, respectively. A detailed construction cost estimate will be included in the draft Definite Project Report (DPR). Annual costs for operation, maintenance, and repair will be the responsibility of the U.S. Fish and Wildlife Service. The Iowa Department of Natural Resources is the project proponent.

STATUS:

General design of the project has begun. A draft DPR is scheduled for completion in 2007.

Revised 21 April 2006

BEAVER ISLAND
Upper Mississippi River Restoration – Environmental Management Program (UMRR-EMP)
Habitat Rehabilitation and Enhancement Project (HREP)
AFTER ACTION REPORT

1. Introduction. This document serves as the after-action report for the Beaver Is. public scoping meeting held on March 26, 2014. At the public meeting USACE, FWS, and IA DNR representatives were available to discuss the existing and historic conditions at Beaver Island; gather information, comments, and other pertinent data from the public; review the US. Fish and Wildlife Service's Upper Mississippi River Refuge System; and explain the US Army Corps of Engineers planning process. A short formal presentation was held at the beginning of the Open House.

2. Open House Objective. The objective of the open house was to give a short presentation addressing the initiation of the Ecosystem Restoration Feasibility Study and answer questions and listen to comments on the proposed project.

3. Open House Location. The open house was held at Erickson Center, 1401 11th Ave N, Clinton IA.

4. Medium. An announcement was mailed to 286 addressees including congressional interests, federal, state and local governmental agencies; businesses, environmental organizations, media and the general public inviting them to attend an open house. The Corporate Communications Office also sent a news release to area television and radio stations and newspapers.

5. Open House Format.

a. Date/Time: The open house was held on March 26, 2014 from 6:00 pm – 8:00 pm.

b. Staff: The Beaver Island UMRR-EMP/HREP is a joint effort with the following agencies: Rock Island District, Corps of Engineers, the US Fish & Wildlife Service, and the Iowa Dept of Natural Resources. The Corps/agency representatives were present to talk one-to-one with the attendees during the open house and to answer any questions. The representatives were:

Monique Savage – Corps of Engineers
Darron Niles – Corps of Engineers
Marvin Hubbell – Corps of Engineers
Nathan Richards– Corps of Engineers
Kacie Norton – Corps of Engineers
Jon Schultz – Corps of Engineers
Kara Mitvalsky – Corps of Engineers
Mike Siadak – Corps of Engineers
Jason Appel – Corps of Engineers

Jon Klingman – Corps of Engineers
Lucie Sawyer – Corps of Engineers
Mike Griffin – IA Dept of Natural Resources
Scott Gritters – IA Dept of Natural Resources
Jon Duyvejonck - US Fish & Wildlife
Ed Britton – US Fish & Wildlife
Russ Engelke – US Fish & Wildlife
Sharonne Baylor – US Fish & Wildlife

c. Displays. Pop up displays were placed around the room showing EMP, USACE, Historical and Current imagery of Beaver Island, 2013 water depths of Beaver Island, Real Estate map of Beaver Island, 2013 aerial imagery of Beaver Island, and map of EM projects in the Upper Mississippi River (UMR). Fish and Wildlife also had an area set up with information about the UMR Refuge.

6. Attendance. There were approximately 97 in attendance and Senator Harts husband attended on her behalf. The attendees were asked to complete a comment sheet. Results of the returned comments are shown in paragraph 7 below.

7. Public Comments. Attendees were asked to fill out a comment sheet. A total of 18 sheets were received at the meeting.

QUESTION	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
This open house gave me opportunity to better understand the feasibility study	52.9%	47.1%	0%	0%
This open house provided an opportunity for everyone to offer information about Beaver Island	41.2%	52.9%	5.9%	0%
The displays/materials provided were informative	44.4%	55.6%	0%	0%
I had a chance to talk to a study team member	50.0%	50.0%	0%	0%

Summary of Comment Sheet Responses

What do you see as a significant resources at Beaver Island?

- Wildlife, fish, trees, & recreation.
- Various species, environment, etc. Also the history yet to be told.
- See written notes - Monique
- Habitat improvement
  Hunting & fishing
  Wildlife management
  Better water quality
- Spawning Area Fishing
  Total wildlife area
- It is a tremendous wildlife recreation area! Should be improved and maintained

- Wildlife, fishing, boating, hunting, camping & bird watching
- More fishing areas, boating, hunting, sightseeing for tourist, canoeing or boating in backwater. It would benefit both Clinton and Illinois business and tourist area. Our sports of hunting and fishing has been getting scare and this could promote the hunting and fishing for us.
- The wildlife and the function ability of the ecosystem in general
- Fishing and hunting
- Recreation and wildlife watching
- Potential (if restored) over watering habitat for largemouth bass, crappie, and bluegills.
- The history books and general publications about life on the island. The recordings and experiences of those who visited the island.
- Beaver Island use to be crossable. It was great for hunting and fishing. Just to go through the Island knowing the history of its people was a treat. What water is there is not deep enough to hold fish. It should be made into a sanctuary as it was before.
- Fishing and Hunting
- Stop blocking the water would really help tremendously. Dredging would help a lot.
- The fishing in backwaters of the Mississippi is dropping. Back slough are silting in very fast. Rock Creek, Cattail Slough, Johnsons Cut, Willow Slough are diminishing. Beaver Island must be worked on along with many other areas.
- Summer of 2013 I witnessed about 35 pelicans and 20 cormorants coral fish against the bank. From the west side of Drisoll Lake in Sabula to the pond all afternoon over about a 4 hours. They are devastating the area.

Do you have other comments/information regarding this study?

- In the last 20 years I have seen waterways dry up from sedimentation after high water.
- Decreased usage from people due to in accessibility because of shallow water. The fish and waterfowl have steadily declined. I am very interested in working on this project, especially the front end of investigating, gathering info etc. As a recently retired environmental specialist from the University of Iowa and a permanent resident of Camanche, on the main channel, I feel I could help this project in many ways! Call me!
- Will have when other meetings are scheduled
- Need to control silting in /on south end of island so people could have access. Could have a great economic impact to area. Hope more meetings are held to gather more information.
- Go for it!
- Keep barges away from upper cut.
- Start progress developing area before we get too old and die. It has been slow getting the government to finally develop their land for us before money stops for project like them.
- With how much the landscape, hydrology, and ecology of the Upper Mississippi has been changed it would be both interesting and I think worthwhile to restore the area as close as possible to what it was like prior to the building of the lock and dam if not soon after the dam was in place.
- No Beautiful place - make it better.
- The backwater lakes within the island are significantly silted in. I would love to see some dredging and protection from high water infiltration to re-establish and preserve valuable over wintering habitat.
- My family fished in Beaver Slough and visited the Wapsi. Many families had their farms on the island. The home had a piano. We fished crappies, sun fish, bull-heads, etc.
- We entered the island from South 5th Street in South Clinton and made a right turn and went across the slough. My mother took the school census on the island.
- The waterways will have to be opened (dredged) deep enough to allow the sediment to clean its self out. Please restore this wonderful woods and waterway. It could bring back the ducks and geese that used to live there.
- Good luck getting funding.

- In Beaver Slough across from where the boat ramp, main cut that goes into Beaver Island is blocked from fleeting barges which decreases the water flow into Beaver Island a lot. Stop blocking flow of water.
- I think the study of pelican population and cormorant's devastation of the entire area is of greater importance. The belief of their not affecting this area is wrong.

8. Summary. The open house met the objective for a scoping meeting. The discussion between the study team personnel and the public was informative. Attendees generally support the open house format and the project. This report is being distributed to the study team members for their consideration and analysis.

MARSHA DOLAN
Public Involvement Specialist
Economic & Environmental Analysis Branch

CF:
PD-F (M. SAVAGE)
PD-E (N. RICHARDS)
PD-E (M. DOLAN)
PM-M (M. HUBBELL)
PM-M (DIST FILE)

DEPARTMENT OF THE ARMY
MISSISSIPPI VALLEY DIVISION, CORPS OF ENGINEERS
P.O. BOX 80
VICKSBURG, MISSISSIPPI 39181-0080

REPLY TO
ATTENTION OF:

CEMVD-PD-SP

11 AUG 2014

MEMORANDUM FOR Commander, Rock Island District

SUBJECT: Review Plan Approval for the Upper Mississippi River Restoration-Environmental Management Program, Beaver Island

1. References:

a. Memorandum, CEMVR-PD-F, 2 July 2014, subject: Upper Mississippi River Restoration-Environmental Management Program Beaver Island HREP Review Plan (RP) (encl 1).

b. Email, CEMVD-RB-T, 29 July 2014, subject: Beaver Island RP(encl 2).

c. Memorandum, CECW-MVD,16 May 2012, subject: Request for Approval of a Model Peer Review Plan for the Upper Mississippi River System Environmental Management Program (encl 3).

d. EC 1165-2-214, 15 December 2012, subject: Civil Works Review Policy.

2. The enclosed Review Plan (RP) (encl 4) is a combined decision document and implementation document review plan. It includes the MVD EMP checklist and has been prepared in accordance with EC 1165-2-214. The RP has been coordinated between the Business Technical Division and the Upper District Support Team.

3. MVD hereby approves the Beaver Island RP, which is subject to change as circumstances require. Any subsequent revisions to this RP or its execution will require new written approval from this office. Non-substantive changes to this RP do not require further approval. The District should post the approved RP to its website.

4. The MVD point of contact for this action is Mr. Gabe Harris, CEMVD-PD-SP, (601) 634-5926.

4 Encls

for EDWARD E. BELK, JR., P.E., SES
Director of Programs

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, ROCK ISLAND DISTRICT
PO BOX 2004 CLOCK TOWER BUILDING
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

CEMVR-PD-F

JUL 0 2 2014

MEMORANDUM FOR Commander, US Army Corps of Engineers, Mississippi Valley Division (CEMVD-PD-SP/Harris), PO Box 80, 1400 Walnut Street, Vicksburg, Mississippi 39181-0080

SUBJECT: Upper Mississippi River Restoration - Environmental Management Program Beaver Island HREP Review Plan (RP)

1. The subject RP for the Beaver Island HREP Feasibility Study is submitted for your review and approval. The RP includes both the DPR (decision document) and P&S (implementation product). An electronic copy of the subject RP has been sent to Mr. Gabe Harris, CEMVD-PD-SP.

2. The points of contact for this action are Mr. Darron Niles, Study Manager, (309)794-5400, or e-mail: darron.l.niles@usace.army.mil or Mr. Marvin Hubbell, EMP Program Manager, (309)794-5428, or e-mail: marvin.e.hubbell@usace.army.mil.

FOR Paul A. Reed

Encl
as

Mark J. Deschenes
COL, EN
Commanding

ENCL 1

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS - ROCK ISLAND DISTRICT
CLOCK TOWER BUILDING - PO BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

July 16, 2014

T/HANCKS/VOLLMAN/2014/16JUL2014/Beaver Island Init coord_SHPO/mer/5857

Regional Planning and Environmental
Division North (RPEDN)

SEE DISTRIBUTION LIST

The Rock Island District of the U.S. Army Corps of Engineers (District) is currently proposing the Beaver Island Complex Habitat Rehabilitation and Enhancement Project in the Upper Mississippi River System, Pool 14, between River Miles 613 and 617.5, across from Clinton, Iowa in Clinton County Iowa. Beaver Island is approximately 2,100 acres in size and is located within Sections 13 and 23-26 of T81N, R6E and Sections 18-19 of T81N, R7E (Enclosure 1).

The Beaver Island project potentially includes dredging of existing channels, the development of water control structures, channel excavation, placement of dredge material, and river control structures.

Federal Undertaking

Pursuant to the National Historic Preservation Act (NHPA) of 1966, as amended, and its implementing regulations, 36 CFR Part 800, the District has determined that dredging of existing channels, the development of water control structures, channel excavation, placement of dredge material, and river control structures in the proposed locations has potential to cause effects to archeological historic properties [36 CFR 800.3(a)(1)] and as a consequence will require a determination of effect within the Area of Potential Effect.

Area of Potential Effect

The Area of Potential Effect (APE) is the entirety of federally-owned portion of Beaver Island and totals approximately 1,740 acres. The main impacts would be dredge placement areas and total approximately 100 acres and includes all areas where construction of a revetment and confined placement of dredge material may occur (Enclosure 1). The remainder of Beaver Island is also included in the APE to determine the archaeological potential due to the possibility that habitat restoration activities such as tree cutting and planting may occur (Enclosure 1).

Consulting Parties

The District finds the organizations identified on the Distribution List are entitled to be consulting parties, as set out in 36 CFR 800.2, and invites them by copy of this letter to participate in the Section 106 process.

State Historic Preservation Officer (SHPO) Invitation

The District invites the SHPO to:

- identify any other consulting parties as per 36 CFR 800.3(f);
- comment as per 36 CFR 800.2(d)(3) on the District' plan to involve the public by utilizing the District' normal procedures for public involvement under the National Environmental Policy Act (NEPA); and,
- comment on or contribute to identification efforts including definition of the APE, all as per 36 CFR 800.4(a-b).

Identification of Historic Properties

Review of Existing Information and Level of Future Identification Efforts: The District conducted an archival search for historic properties following the Policy and Procedures for the Conduct of Underwater Historic Resource Surveys for Maintenance Dredging and Corps Activities (DGL-89-01, March 1989). The District queried the most updated Iowa Geographic Information Systems site file database and reviewed the report entitled *An Investigation of the Submerged Historic Properties in the Upper Mississippi River and Illinois Waterway,* dated October 1997 (Contract Number DACW25-93-D-0-012, Order No. 27) for historic properties potentially affected by this project.

There are five previously recorded archaeological sites (13CN116 – 120) located on Beaver Island in the northeastern portion adjacent to the current proposed project area. All five are historic habitation sites and have been recommended as ***not eligible for listing*** in the National Register of Historic Places. Four previous archaeological surveys have been conducted in various locations on Beaver Island.

The 1740 acres of Beaver Island will be subject to a geomorphological survey and surface survey to determine the potential for archaeological resources to be present in the immediate future. If it is determined that the areas identified for potential project features have potential for buried archaeological sites additional survey work will be completed.

Request for Information from Consulting Parties: The District is seeking information from all consulting parties regarding their concerns with issues relating to the potential effects of this undertaking on historic properties and, particularly, the tribes' concerns with identifying properties that may be of religious and cultural significance to them and may be eligible for the NRHP [36 CFR 800.4(a)(3-4)]. Concerns about confidentiality [36 CFR 800.11(c)] regarding locations of properties can be addressed under Section 304 of the NHPA which provides withholding from public disclosure the location of properties under several circumstances, including in cases where it would cause a significant invasion of privacy, impede the use of a traditional religious site by practitioners, endanger the site, etc.

The District requests your written comments on this project within 30 days, pursuant to 36 CFR 800.3(c)(4). Results of all consultation and determination shall be included in the Environmental Assessment for additional public review this year.

If you have any questions regarding this matter, please call Mr. Brant Vollman of our Environmental Compliance Branch, (309) 794-5857, or write to our address above, ATTN: Environmental Compliance Branch (Brant Vollman).

Sincerely,

ORIGINAL SIGNED BY

Kenneth A. Barr
Chief, Environmental Planning Branch RPEDN

Enclosure
CF: all with Enclosures
Dist File (PM-M)
PD-F (Niles)
PD-E (Vollman)

7/15/14
RODKEY
PM-M
VOLLMAN
PD-C
BARR
PD-P
MAC for
7/15/2014

DISTRIBUTION LIST

Historic Preservation Coordinator
Sac and Fox Nation of Mississippi in Iowa
349 Meskwaki Road
Tama IA 52339-9629

Iowa Tribe of Kansas and Nebraska
Native American Heritage Museum
RR1 Box 152 C
Highland KS 66035

Tribal Chairperson
Iowa Tribe of Kansas and Nebraska
3345 Thrasher Road #8
White Cloud KS 66094-4028

R&C Coordinator
State Historical Society of Iowa
600 East Locust
Des Moines IA 50319-0290

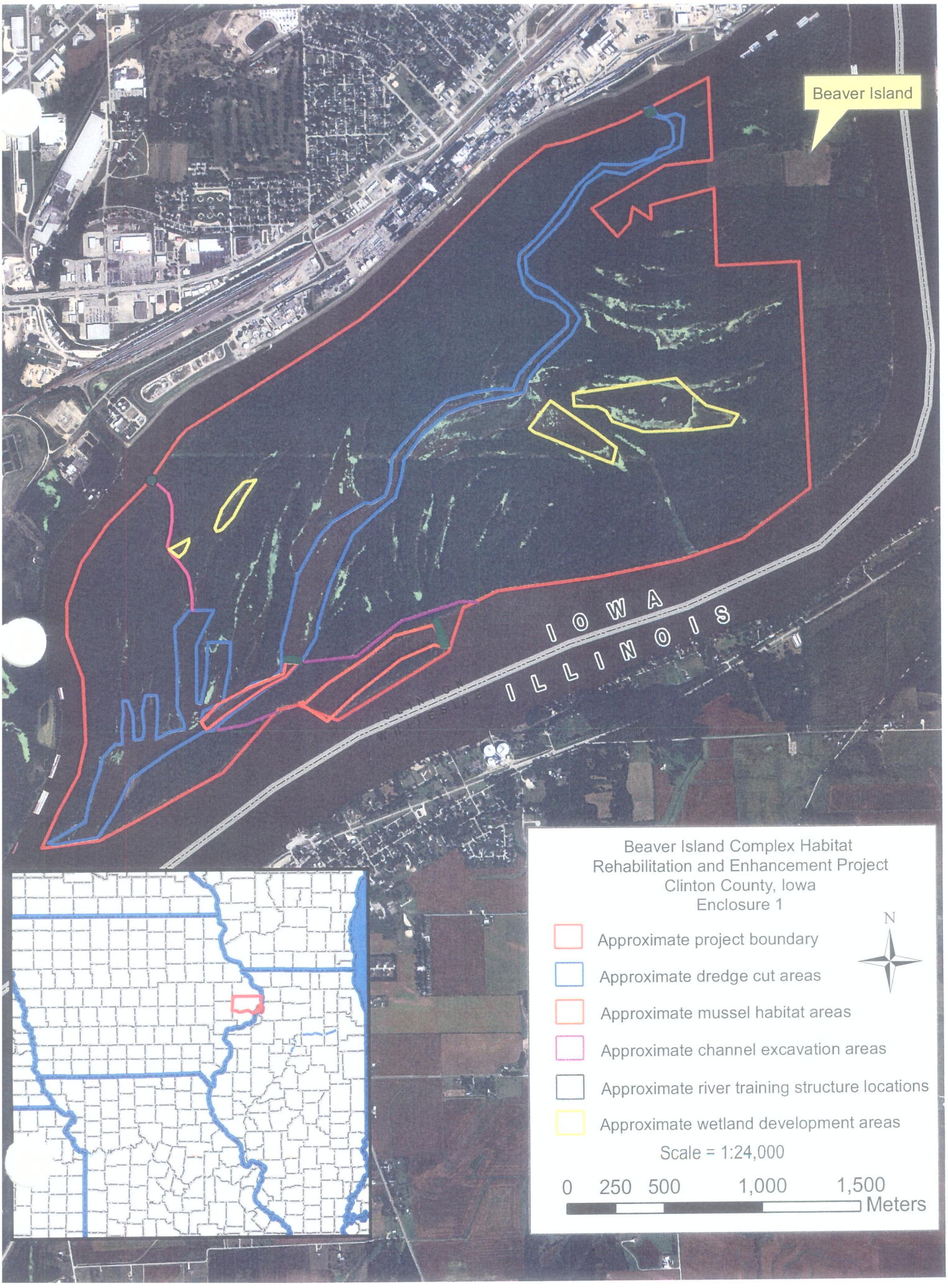
Cultural Preservationist
Iowa Tribe of Oklahoma
Route 1, Box 721
Perkins OK 74059

NAGPRA Coordinator
Sac and Fox Nation of Oklahoma
Route 2, Box 246
Stroud OK 74079

Clinton County Historical Society & Museum
601 South First Street
Clinton Iowa 52732

Assiniboine and Sioux Tribes of the
Fort Peck Indian Reservation
P.O. Box 1027
Poplar MT

NAGPRA Coordinator
Sac & Fox Nation of Missouri in
Kansas and Nebraska
305 North Main
Reserve KS 66434-9723


Beaver Island
IOWA
ILLINOIS
Beaver Island Complex Habitat
Rehabilitation and Enhancement Project
Clinton County, Iowa
Enclosure 1
N
Approximate project boundary
Approximate dredge cut areas
Approximate mussel habitat areas
Approximate channel excavation areas
Approximate river training structure locations
Approximate wetland development areas
Scale = 1:24,000
0 250 500 1,000 1,500
Meters

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS - ROCK ISLAND DISTRICT
CLOCK TOWER BUILDING - PO BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

December 24, 2014

T/HANCKS/ROSS 3014/24DEC2014 Beaver Island/mer/5540

Regional Planning and Environmental
Division North (RPEDN)

Ms. Kathy Gourley
State Historical Society of Iowa
600 East Locust
Des Moines, Iowa 50319-0290

Dear Ms. Gourley:

The U.S. Army Corps of Engineers, Rock Island District (District) initiated consultation with interested parties regarding the Beaver Island Complex Habitat Rehabilitation and Enhancement Project in the Upper Mississippi River System, Pool 14, between River Miles 613 and 617.5, across from Clinton, Iowa in Clinton County Iowa by letter dated July 16, 2014. No comments were received so the District proceeded with field investigations as defined in that correspondence.

The District has reviewed the draft report entitled *Phase I Archeological and Geomorphological Survey for the Beaver Island Complex Habitat Rehabilitation and Enhancement Project, Camanche and Clinton Townships, Clinton County, Iowa* dated December 2014 (Enclosure 1). Messrs. David Benn, Lowell Blikre, and Jared Langseth with Bear Creek Archaeology of Cresco, Iowa prepared the report for the District under terms of Contract W912EK-12-D-0001, Task Order 12.

The geomorphological investigation defined low archeological potential across much of the project area. Beaver Island consists of a complex pattern of sloughs, abandoned channels, and river scrolls with ridge-and-swale topography formed by meandering of the Mississippi River during Middle-Late Holocene eras. Moderate archeological potential is restricted to the Middle-Late Holocene alluvium associated with higher ground, such as natural levees and crevasse splays. Archeological survey was restricted to potential project features within these types of landforms, and the District concurs with this decision.

The archeological survey resulted in the documentation of three previously unrecorded archeological sites that are potentially eligible for inclusion for the National Register of Historic Places (NRHP). The Contractor has recommend avoidance of these properties or Phase II testing to determine NRHP eligibility if avoidance is not possible. The District concurs with this recommendation and will coordinate the formal determination of effect once project features have been finalized.

The District finds the organizations identified on the Distribution List are entitled to be consulting parties, as set out in 36 CFR 800.2, and invites them by copy of this letter to participate in the Section 106 process.

The District requests your written comments on this project within 30 days, pursuant to 36 CFR 800.3(c)(4). Results of all consultation and determination shall be included in the Environmental Assessment for additional public review this year.

If you have any questions regarding this matter, please call Mr. Jim Ross of our Environmental Compliance Branch, (309) 794-5540, or write to our address above, ATTN: Environmental Compliance Branch (Jim Ross).

Sincerely,

ORIGINAL SIGNED BY

Kenneth A. Barr
Chief, Environmental Planning Branch RPEDN

Enclosure
CF: all without Enclosures
Dist File (PM-M)
PD-F (Niles)
PD-E (Ross)

12/23/14

RODKEY
PM-M

~~ROSS~~
PD-C

BARR
PD-P

BEAVER ISLAND

HABITAT REHABILITATION AND ENHANCEMENT PROJECT

POOL 14, UPPER MISSISSIPPI RIVER

RIVER MILES 513.0 THROUGH 515.5

CLINTON COUNTY, IOWA

Meeting Read Ahead

April 20, 2015

The purpose of this document is to provide estimates of excavation and topographic diversity sites at the Beaver Island HREP to the PDT for discussion and refinement. Dredging/excavating activities are being proposed on this project to support the project objectives identified by the PDT. Project objectives for Beaver Island, provided below, were developed utilizing critical habitat needs identified in the Reach and Pool Objectives, UMRR program objectives, Fish and Wildlife Interagency Committee (FWIC), and the River Resources Coordination Team.

Beaver Island Goals, Objectives and Potential Enhancement Features

The reach and pool objectives, as well as input from state and Federal agency natural resource managers, were used to guide the development of the Beaver Island Project objectives. Resource problems, opportunities and constraints, specific habitat requirements, and desirable hydraulic and sediment transport conditions to sustain habitat were factors used to develop these objectives. The Beaver Island goals, objectives and potential enhancement features are shown below.

1. Increase diversification of year round floodplain forest and scrub-shrub habitat on Beaver Island, as measured in acres.

2. Increase the structure and function of year-round aquatic habitat diversity, as measured by acres and native fish use of spawning, rearing, and overwintering habitat in the Project Area.

3. Increase the abundance and function of isolated seasonally flooded wetlands, as measured by acres as well as amphibian and reptile use in the Project Area.

4. Increase the structure and function of year round aquatic habitat diversity, as measured by mussel use in the Project Area.

Proposed Actions Specific to Beaver Island Complex

a. Restore shallow aquatic habitat in the upper reaches of rapidly accreting wetlands. Consider pothole blasting technique.
b. Restore over-wintering habitat for centrarchids with dredging/excavating.
c. Increase island elevation with dredged material to introduce and sustain mixed bottomland tree species.
d. Reduce accelerated sediment accumulation in backwater lakes by diverting high flows with a low, deflection

Lower Dredge Cut

Purpose: The dredge cut would be excavated to provide aquatic diversity through the direct act of dredging/excavating and to provide sufficient material for floodplain forest topographic diversity.

Design Considerations: It was recommended in January 2015 that the alignment of the dredge cut hugs the south bankline to ensure that deep water is hit, or hugs the north bankline to get a direct access to Stewart Lake for fish. This cut would extend from the main channel to Lower Lake in order to access deep water out of the project and to extend to the multiple finger sloughs in the lower portion of Beaver Island. The current design shows the cut on the southeast bankline in order to minimize tree clearing and to avoid closing off the "finger" lakes. A 60 foot minimum width was recommended in January 2015. A deep hole was recommended by the IA DNR near the mouth of this lake near the main channel in January 2015.

- The lower entry into Beaver Island would be excavated **(5,101.73 LF).**
- **Depths will be 8 feet** below flat pool or 563.2 NAVD88 with an excavated bottom width of 100 feet from stations 0+00 to 6+50 and 60 feet from station 6+50 to the end.
- A deep hole will be constructed near the upstream end of the cut.
- The cut is estimated to be constructed at **100 linear feet long by 60 feet wide by an additional 4 feet deep.**
- There will be approximately **11.33 acres** at 4 feet below flat pool.
- To address this dredge amount, a placement site with a **200 foot bottom** will be required. Top elevation will be **579.8** Placement will be on the southeast bank of the cut.
- Approximately **31 acres** will be available for topographic diversity through dredged material placement. Approx. **19 acres** to be cleared of trees.

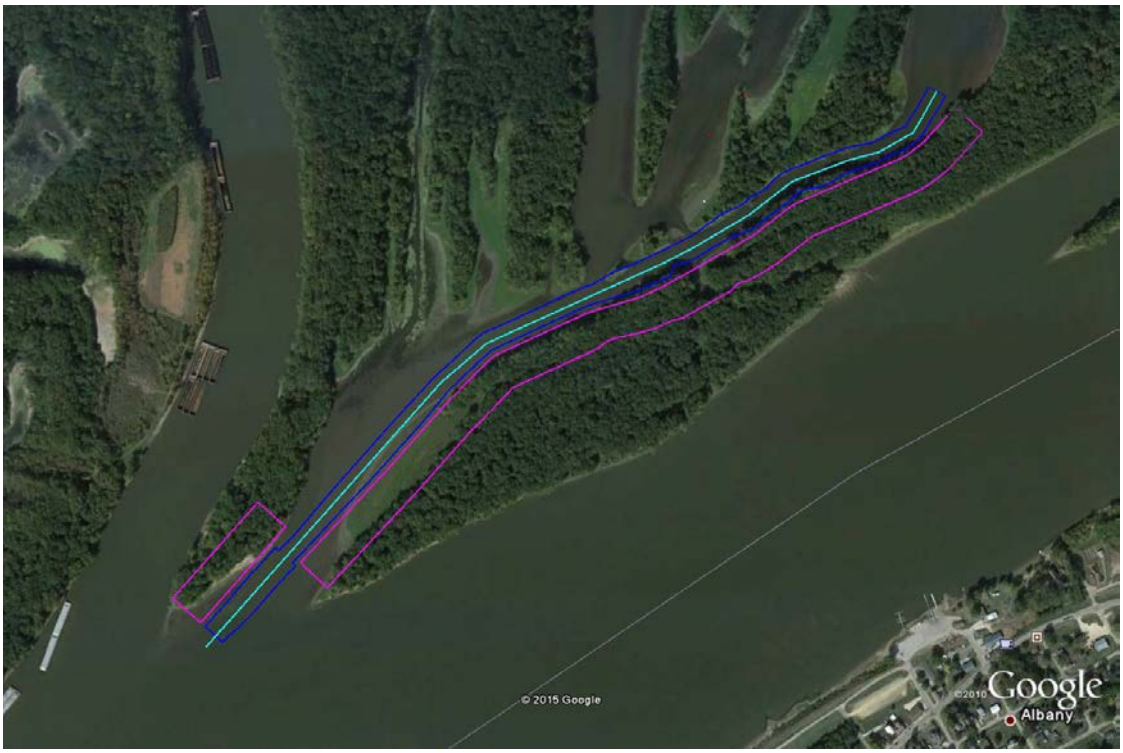


Figure 1. Lower Dredge Cut Proposed Alignment and Material Placement

Stewart Lake Dredge Cut
Purpose: The dredge cut would be excavated to provide aquatic diversity through the direct act of dredging/excavating and to provide sufficient material for floodplain forest topographic diversity.

Design Considerations: The length of this cut optimized to excavate as mush of the area below flat pool as possible, and ends where there are higher quality trees and very shallow depths. The cut would tie into the Lower Entrance Dredge Cut.

- Stewart Lake would be excavated **(1,694.79 LF).** Excavation (bottom) widths are **60 feet**. Depths will be **8 feet** below flat pool or 563.2 NAVD88.
- There will be approximately **3.58 acres** at 4 feet below flat pool.
- To address this dredge amount, a placement sites will be required on both the left and right side of this cut. These placement sites will be shared with Small Lake excavation.
- The right side placement site will have a **200 foot bottom**.
- The left side placement will have a **200 foot bottom** and will be shared with placement from Small Lake excavation.
- Top elevation will be **579.8**.
- Approximately **15 acres** will be available for topographic diversity through dredged material placement. Approx. **11 acres** cleared of trees.

Figure 2. Stewart Lake Dredge Cut Proposed Alignment and Material Placement

"Small Lake" Dredge Cut

Purpose: The dredge cut would be excavated to provide aquatic diversity through the direct act of dredging/excavating and to provide sufficient material for floodplain forest topographic diversity.

Design Considerations: Input from the IA DNR January 2015 suggested this area is completely cupped in with berm and dredge out majority of the substrate. The current design covers the majority of "Small Lake" being excavated, although the northern portion was too narrow and shallow to dredge to design depths. The cut would tie into the Lower Entrance Dredge Cut."Small" Lake would be excavated **(748.06 LF).** Excavation (bottom) widths are **100 feet.**

- Depths will be **8 feet** below flat pool or 563.2 NAVD88.
- There will be approximately **2.27 acres** at 4 feet below flat pool.
- To address this dredge amount, a placement sites will be required on both the left and right side of this cut.
- The left descending bank placement site will have a **200 foot bottom.** The right descending placement site will be shared with Stewart Lake.
- Top elevation will be **579.8.**
- Approximately **5 acres** will be available for topographic diversity through dredged material placement. Approx. **3 acres** cleared of trees.

Figure 3. "Small lake" Dredge Cut Proposed Alignment and Material Placement

Blue Bell Dredge Cut
Purpose: Bluebell cut would have varying widths as accommodated by the existing lake structure to hold fish maybe late in the winter process as oxygen abates. The cut would tie into the Lower Entrance Dredge Cut.

Design Considerations:

- Blue Bell Lake would be excavated **(2633.84 LF).** Excavation (bottom) widths are **150 feet** from Station 0+00 to 10+00 and 18+00 to the end, and 60 feet between stations 10+00 to 18+00.
- Depths will be **8 feet** below flat pool or 563.2 NAVD88.
- A deep hole will be constructed in the cut.
- The cut is estimated to be constructed at **100 linear feet long by 60 feet wide** by an additional 4 feet deep.
- There will be approximately **9.35 acres** at 4 feet below flat pool.
- Placement will be required on both the right and left sides of the dredge cut. Additional material would have to be transported to the lower dredge cut placement site.
- The placement site will have a **200 foot bottom**.
- Top elevation will be **579.8**.
- Approximately **23 acres** will be available for topographic diversity through dredged material placement. Approx. **9 acres** cleared of trees.

Figure 4. Blue Bell Dredge Cut Proposed Alignment and Material Placement

Sand Burr Dredge Cut

Purpose: Sand Burr dredge out a standard UMRR dredge cut but have open lake like pockets that are wider and deeper then the connecting dredge cuts. These "Lake Pockets in the northern portions are to hold fish early in winter but pockets will created in Lower Bluebell and at the bottom end of Lower Cut to hold fish maybe late in the winter process as oxygen abates. The cut would tie into the Lower Entrance Dredge Cut.

Design Considerations:

- Sand Burr Lake would be excavated **(2466.04 LF).** Excavation (bottom) widths are **60 feet** from Station 0+00 to 17+00 +00 and 150 feet between stations 17+00 to the end.
- Depths will be **8 feet** below flat pool or 563.2 NAVD88.
- A deep hole will be constructed in the cut.
- The cut is estimated to be constructed at 100 linear feet long by 60 feet wide by an additional 4 feet deep.
- There will be approximately **6.79 acres** at 4 feet below flat pool.
- Placement will be required on both the right and left sides of the dredge cut. The placement sites will have a **200 foot bottom**. Additional material would have to be transported to the lower dredge cut placement site. Top elevation will be **579.8.**
- Approximately **14 acres** will be available for topographic diversity through dredged material placement. Approx. **9 acres** for tree clearing.

Figure 5. Sand Burr Dredge Cut Proposed Alignment **and Ma**terial Placement

Lower Lake Dredge Cut (narrow cut)

Purpose: The dredge cut would be excavated to provide aquatic diversity through the direct act of dredging/excavating and to provide sufficient material for floodplain forest topographic diversity. This feature is needed to reach Upper Lake Dredge Cut and was identified and supported during the public meeting and will be carried through cost/benefit analysis. The cut would tie into the Lower Entrance Dredge Cut. The cut follows the deeper water in the lake.

Design Considerations:

- Lower Lake would be excavated **(3046.18 LF)**. Excavation (bottom) widths are **60 feet**. Depths will be **8 feet** below flat pool or 563.2 NAVD88.
- There will be approximately **6.43 acres** at 4 feet below flat pool.
- The placement site will have a **200 foot** bottom.
- Top elevation will be **579.8.**
- Approximately **19 acres** will be available for topographic diversity through dredged material placement. Approx **3 acres** for tree clearing.

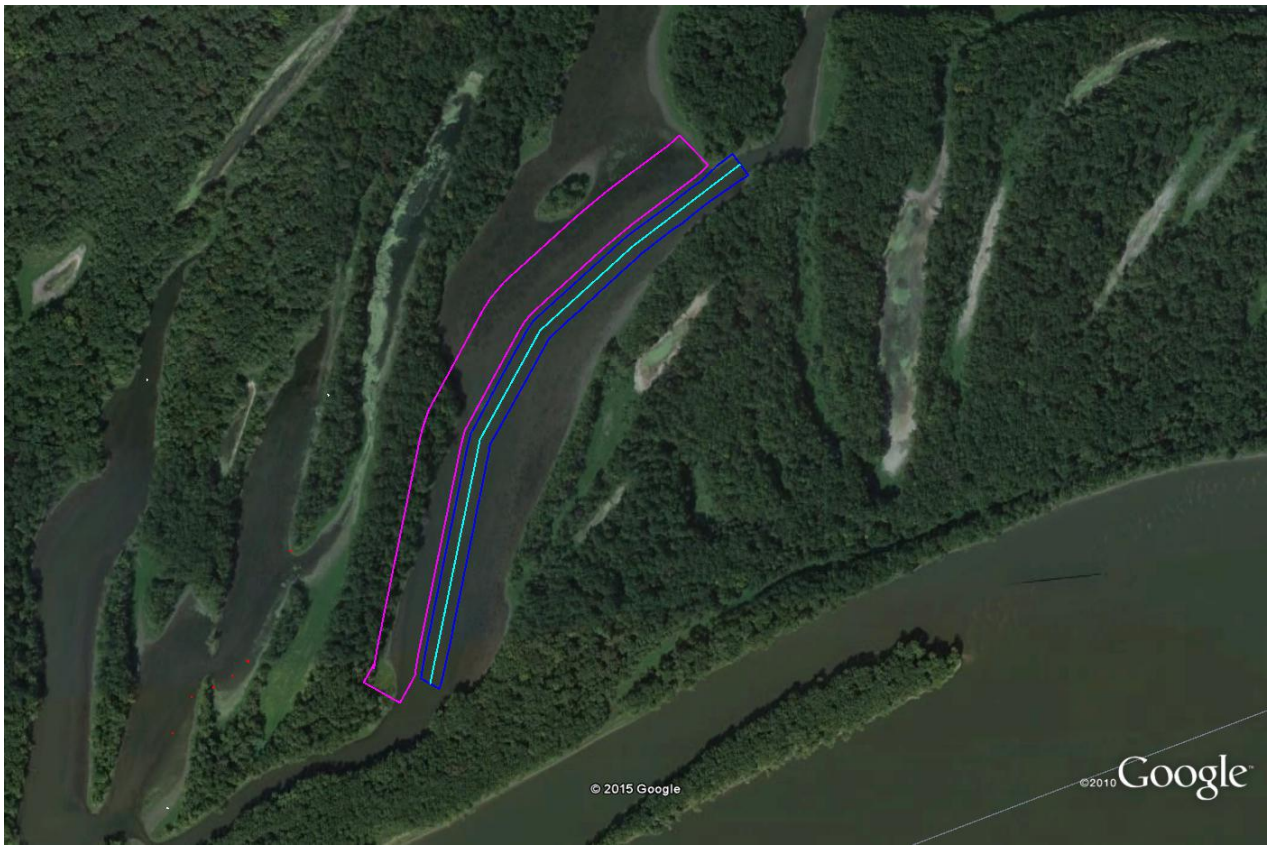


Figure 6. Lower Lake Dredge Cut Proposed Alignment and Material Placement

Upper Lake Dredge Cut

Purpose: The dredge cut would be excavated to provide aquatic diversity through the direct act of dredging/excavating and to provide sufficient material for floodplain forest topographic diversity. This feature is needed to reach Deep Cut/Upper Cut Dredge Cuts and was identified and supported during the public meeting and will be carried through cost/benefit analysis. Coordination with the pipeline and power line utilities is required to work within their right of way. The cut will follow the deeper elevations in the lake. The placement site was relocated to avoid unnecessary tree clearing.

Design Considerations:

- Upper Lake would be excavated **(3500 LF).** Excavation (bottom) widths are **60 feet.** Depths will be **6 feet** below flat pool or 565.2 NAVD88.
- There will be approximately **6.11 acres** at 4 feet below flat pool.
- The placement site will have a **200 foot bottom.**
- Top elevation will be **579.8.**
- Approximately **21 acres** will be available for topographic diversity through dredged material placement. Approx **5 acres** for tree clearing.

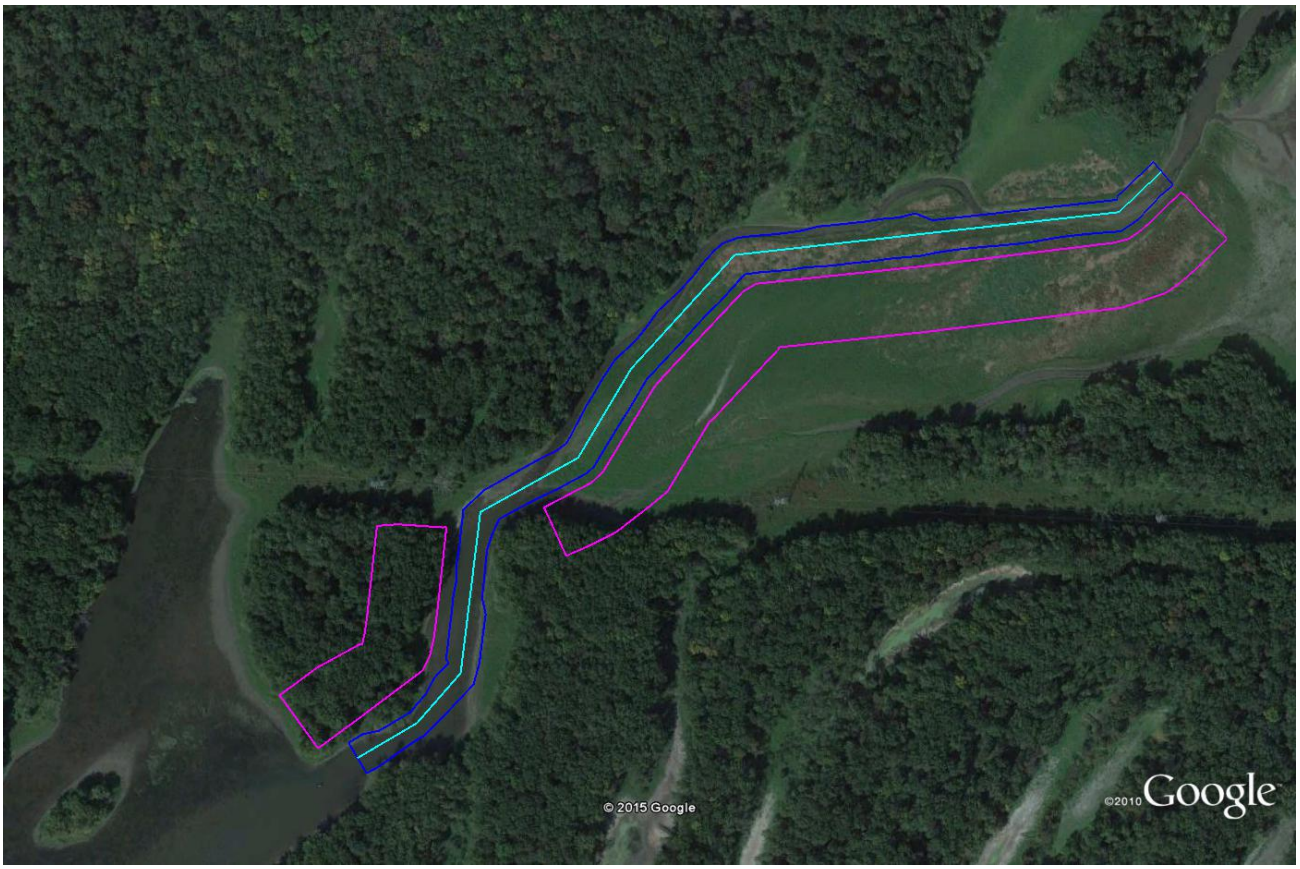


Figure 7. Upper Lake Dredge Cut Proposed Alignment and Material Placement

Deep Cut/Upper Cut Dredge Cut

Purpose: The dredge cut would be excavated to provide aquatic diversity through the direct act of dredging/excavating and to provide sufficient material for floodplain forest topographic diversity. This feature was identified and supported during the public meeting and will be carried through cost/benefit analysis.

Design Considerations: This cut would be narrower and material would be sidecast between existing trees. Only the dredge centerline is shown on the below drawing.

- Deep Cut/Upper Cut would be excavated **(7111.57 LF).** Excavation (bottom) widths are **30 feet.** Depths will be **6 feet** below flat pool or 565.2 NAVD88.
- There will be approximately **7.51 acres** at 4 feet below flat pool.
- The placement site will have a **30 foot bottom** and be on both sides of the channel.
- Top elevation will be **579.8.**
- Approximately **13 acres** will be available for topographic diversity through dredged material placement. Approx **5 acres** for tree clearing.

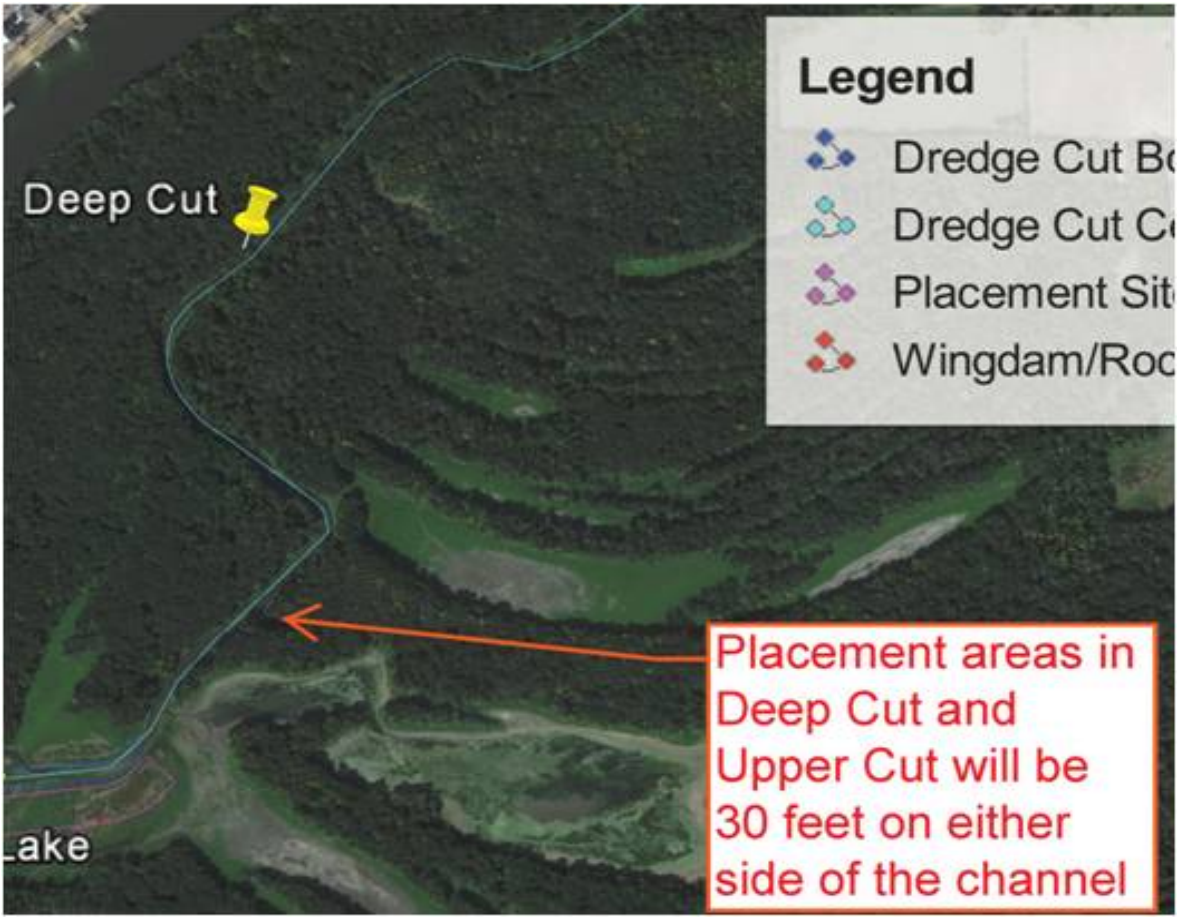


Figure 8. Deep Cut/Upper Dredge Cut Proposed Alignment and Material Placement

SCREENED MEASURES

BEAVER ISLAND MEASURES THAT HAVE BEEN REMOVED FROM ANALYSIS Updated 4/14/15									
	Constraints								
Potential Measure	Navigation Impacts	ESA Impacts	HTRW Impacts	Archeologic Impacts	RE Impacts	Floodplain Impacts	Cost effectiveness Maximized Benefits	Cannot be designed to meet objectives	Other
Lower Dredge Cut (whole lake)							Benefits of narrow cut sufficient for aquatic habitat		
Lower Lake Dredge Cut (Entire Lake)							Benefits of narrow cut sufficient for aquatic habitat		
Lower Lake Dredge Cut (Ring around the lake)							Benefits of narrow cut sufficient for aquatic habitat		
Upper Lake Dredge Cut (Entire Lake)							Benefits of narrow cut sufficient for aquatic habitat		
Beaver Slough Cut								scouring velocities not possible with range in elevation	
Lower Cut		Concerns that this cut would impact mussel habitat in Albany Slough							
Crappie Slough Cut		Concerns that this cut would impact mussel habitat in Albany Slough							

From: Richards, Nathan S
Sent: Tuesday, January 06, 2015 11:28 AM
To:
Cc:
Subject: FW: [EXTERNAL] Beaver Island mussel survey results (UNCLASSIFIED)
Attachments:

-----Original Message-----
From: Duyvejonck, Jon
Sent: Tuesday, January 06, 2015 10:02 AM
To: Richards, Nathan S
Subject: [EXTERNAL] Beaver Island mussel survey results

Nate,
Here is some preliminary information regarding the mussel survey from Beaver I.

--
Jon Duyvejonck
US Fish and Wildlife Service
1511 - 47th ave
Moline, IL 61265

From:	Higginbottom, Daniel [DCA]
To:	Ross, James S MVR; Vollman, Brant J MVR
Cc:	Jones, Doug [DCA]; Gourley, Kathy [DCA]; David Stanley
Subject:	[EXTERNAL] 140723069-COE-Clinton-Clinton-UMR-Beaver island Enhancement Project
Date:	Wednesday, January 14, 2015 1:49:26 PM

January 14, 2015

140723069-COE-Clinton-Clinton-UMR-Beaver island Enhancement Project

Jim-

I've completed my review of the draft BCA report 2104 and find only one editorial recommendation:

1. It appears that a portion of the text treating Artifact Analysis for site 13CN178 (p.27) has been dropped as the narrative between pages 27 and 28 does not follow.

Other than this, it appears that BCA's study and reporting satisfies all of the items outlined in the Corps' Scope of Work (Appendix B). Let me know if there's anything else that needs to be done at this time.

Dan Higginbottom, Archaeologist

STATE HISTORICAL SOCIETY OF IOWA
IOWA DEPARTMENT OF CULTURAL AFFAIRS

State Historic Preservation Office
600 East Locust Street | Des Moines, Iowa 50319

January 14, 2015

Jim-

I'm starting in on the Beaver Island Complex Report (BCA2104) and read through your cover letter. Just to clarify: 1. the scope of the undertaking hasn't yet been finalized and so the Corps hasn't yet made a formal determination of effect; and 2. The purpose of our review at this point is more along the lines of a technical assistance review to offer comments on the draft report. 3. Formal consultation will resume once the project scope has been nailed down and magnitude of effects has been determined?

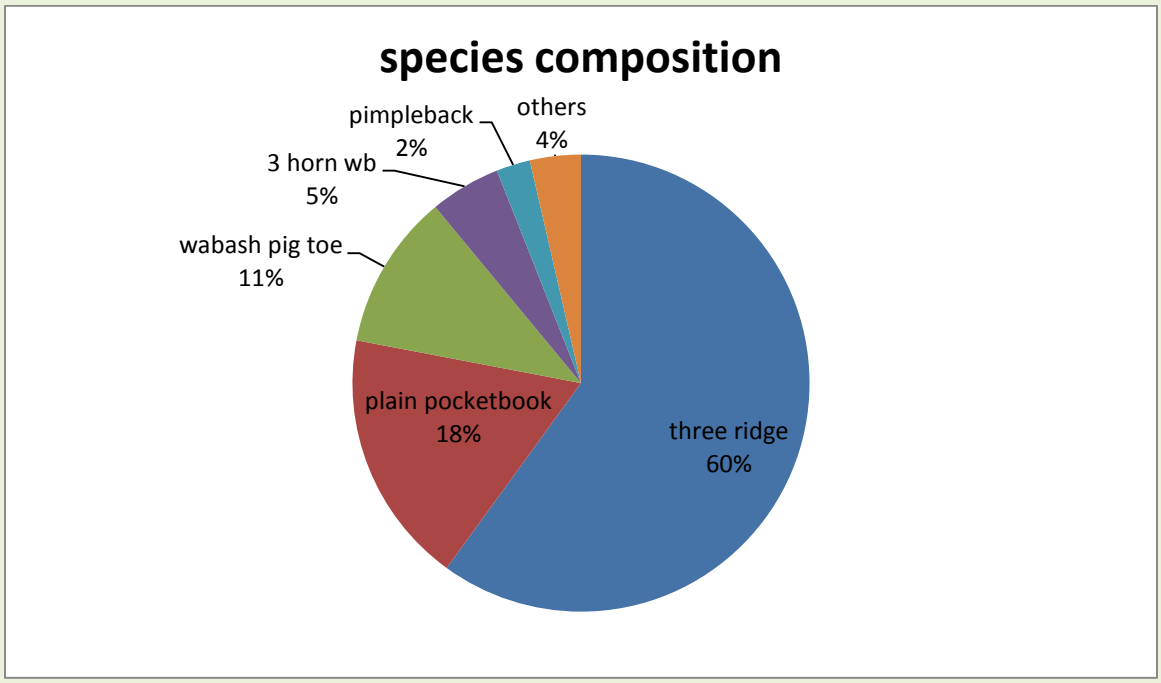
Correct?

Dan Higginbottom, Archaeologist

STATE HISTORICAL SOCIETY OF IOWA
IOWA DEPARTMENT OF CULTURAL AFFAIRS

State Historic Preservation Office
600 East Locust Street | Des Moines, Iowa 50319

Table 1 - Beaver Island Pool 14 Mussel Survey Summary – August 14, 2014														
SPECIES	NUMBER OF INDIVIDUALS COLLECTED AT EACH SAMPLE SITE												Total individuals	%total
	A	B	C	D*	E	F*	G	H*	I*	J	K*	L*		
Three ridge *(A.p)*	17	79	6	109		76	1				17	223	528	.60
Plain pocketbook *(L.c.)*	7	5		13	1	8					13	110	157	.18
3 horn wartyback *(O.r.)*	9	1	7	12		2				1	3	7	42	.05
White heelsplitter *(L.c.)*		1									1	1	3	.003
Pink papershell *(P.o.)*				1								6	7	.008
Giant floater *(P.g.)*		2		2		1						2	7	.008
Fragile papershell *(L.f.)*		1		3		1						5	10	.01
Wabash pig toe *(F.f)*		2		14		11						68	95	.11
Lilliput *(T.p.)*				1									1	.001
Pink heelsplitter *(P.a.)*				1								3	4	.005
Pimpleback *(Q.p.)*	1											20	21	.024
Higgins eye *(L.h.)*												1	1	.001
Hickory nut *(O.o.)*		2										2	4	.005
Rock pocketbook *A.c.)*		1											1	.001
Fawn's foot *(T.d.)*												2	2	.002
Wartyback *(Q.n.)*												1	1	.001
Yellow sandshell *(L.t.a.)*												2	2	.002
Total individuals collected at each sample site	34	94	13	156	1	99	1	0	0	1	34	453	Total mussels collected =886	
Catch per minute Of effort														
Total No. species=17	4	9	2	9	1	6	1	0	0	1	4	15		
* denotes sample collected by pollywogging														


species composition
pimpleback 2%
others 4%
3 horn wb 5%
wabash pig toe 11%
plain pocketbook 18%
three ridge 60%


41.79954 -90.21177
41.79947 -90.21298
41.79937 -90.21251
41.79934 -90.21234
shallow waterpollywog
shoreline
41.79889 -90.21438
shoreline
277 ft
Google earth
Imagery Date: 9/27/2012
1994
lat 41.799067° lon -90.213034° elev 579 ft
Eye alt 1776 ft


41.79623, -90.2186
41.79594 -90.21922
shoreline/pollywog
374 ft
Google earth
Imagery Date: 9/27/2012
1994
lat 41.796807° lon -90.220166° elev 578 ft
Eye alt 2195 ft

Subject: FW: [EXTERNAL] Re: Beaver Island Meeting information (same as outlook) (UNCLASSIFIED)

Attachments: Natural Herp Sites PPT apr 15 2015.pptx

-----Original Message-----
Sent: Thursday, April 16, 2015 5:49 PM
Subject: [EXTERNAL] Re: Beaver Island Meeting information (same as outlook) (UNCLASSIFIED)

Monique/All: Russ and I made a site visit to Beaver Island yesterday to investigate the presence of natural herp sites that are present in the vicinity of the proposed herp sites that would be constructed. We found numerous wetlands scattered throughout. Some are isolated potholes while others are meandering waterways. I included a few pictures from our visit. The last slide is the proposed site of the lower herp site (as best we can tell) and is a very nice wetland. We have not had a spring high water event in Pool 14 so what is present is a good indication of non-flood conditions. After a high water event, I suspect the diversity and number of potholes would greatly increase as the topography varies greatly.

See everyone on Monday.....ed


Beaver Island – Natural Herp Sites
April 15, 2015 Site Investigation


Numerous small wetlands are scattered throughout


Interconnected large and small wetlands

Typical shallow wetland south of powerline

Typical shallow wetland north of powerline

Lower herp site

From: Niles, Darron L
Sent: Wednesday, April 13, 2016 12:58 PM
To: Perrine, Rachel E
Subject: FW: Pool 14 Mussel Blitz data (UNCLASSIFIED)
Attachments: Pool 14 data Gritters corrected 12 4 2015.xlsx

From: Gritters, Scott
Sent: Friday, December 04, 2015 6:00 PM

Subject: [EXTERNAL] Pool 14 Mussel Blitz data

First of all thanks to everyone who helped collect the mussel Blitz data on Albany Slough in Pool 14. It was truly a fun and useful event. Also, much thanks to the UMRCC who paid for the data entry so we could use this data in project design. We collected 1910 mussels with this massive effort but did put out 238 quads and did an additional 310 minutes of timed searches. This was the second survey conducted in 2015 in Albany Slough, as earlier in the year both Iowa and Illinois DNR worked with the USFWS and dived many of the deeper water locations. Together these surveys should give us an unprecedented ability for a pre-project analysis. It has all been entered into an Excel data format which should enable fast loading into the COE Mussel Database! So Aaron, Dan and Davi can do their magic.

Under Iowa DNR standards most places would rank as poor but small parts, mostly on the southern end would rank as good. We did have 154 quads with no mussels. Four species represent almost 90% of the mussels here. Three ridge (53%), Pocketbook (16%), Pigtoe (13%) and three-horn (6%).

No Higgins eye or any other federally endangered mussels were found in this survey. One surprise was the Iowa state listed yellow sandshell which is making a mild comeback on the river and 28 were found here. These mussels live on gar and gar must be doing very well in Albany Slough! Our old buddy the washboard which suffered from massive overharvest in the 90's still is struggling in this region with on ONE found!

NATIVE MUSSELS

No. individuals

1910

No. live species

20

Total species

20

Minutes sampling

310

CPUE (No. Live/Hr)

332.90

CPUE (No. Live/Minute)

5.55

mussels/m2

3.2

Number of Quads taken

238

found in quads

190

Species found in quads only

16

Sites with zero found

154

Scott Gritters Fisheries Biologist
Iowa Department of Natural Resources
24143 Hwy 52 | Bellevue, IA 52031

Leading Iowans in Caring for Our Natural Resources.

SurveyID	Year	River or Stream	Location	Scientific Name	No Ind /FD/ WD/SF	Age	Length	Length Converted to mm	Comments
2015082001	2015	Mississippi Pool 14	4630791/730722		0				Quadrate
2015082001	2015	Mississippi Pool 14	4631331/731592		0				Quadrate
2015082002	2015	Mississippi Pool 14	4630806/730722		0				Quadrate
2015082002	2015	Mississippi Pool 14	4631346/731592		0				Quadrate
2015082003	2015	Mississippi Pool 14	4630776/730737		0				Quadrate
2015082003	2015	Mississippi Pool 14	4631316/731607		0				Quadrate
2015082004	2015	Mississippi Pool 14	4630791/730737		0				Quadrate
2015082004	2015	Mississippi Pool 14	4631331/731607		0				Quadrate
2015082005	2015	Mississippi Pool 14	4630806/730737	*Amblema plicata*	2	10+			Quadrate
2015082006	2015	Mississippi Pool 14	4631346/731607		0				Quadrate
2015082007	2015	Mississippi Pool 14	4631061/731112	*Obliquaria reflexa*	1	4		34	Quadrate
2015082008	2015	Mississippi Pool 14	4630971/730962	*Lampsilis cardium*	1	6		108	Quadrate
2015082014	2015	Mississippi Pool 14	4631316/731622		0				Quadrate
2015082015	2015	Mississippi Pool 14	4631331/731622		0				Quadrate
2015082016	2015	Mississippi Pool 14	4631346/731622		0				Quadrate
2015082017	2015	Mississippi Pool 14	4631361/731622		0				Quadrate
2015082018	2015	Mississippi Pool 14	4632221/731217	*Potamilus ohiensis*	1	1		41	Quadrate
2015082019	2015	Mississippi Pool 14	4631031/731067	*Leptodea fragilis*	1	1		42	Quadrate
2015082020	2015	Mississippi Pool 14	4631316/731637		0				Quadrate
2015082021	2015	Mississippi Pool 14	4631331/731637		0				Quadrate
2015082022	2015	Mississippi Pool 14	4631346/731637		0				Quadrate
2015082023	2015	Mississippi Pool 14	4631361/731637		0				Quadrate
2015082024	2015	Mississippi Pool 14	4631312/731652		0				Quadrate
2015082025	2015	Mississippi Pool 14	4631331/731652		0				Quadrate
2015082026	2015	Mississippi Pool 14	4630821/730737	*Amblema plicata*	1	7		87	Quadrate
2015082027	2015	Mississippi Pool 14	4631346/731652		0				Quadrate
2015082028	2015	Mississippi Pool 14	4631361/731652		0				Quadrate
2015082029	2015	Mississippi Pool 14	4631376/731652		0				Quadrate
2015082030	2015	Mississippi Pool 14	4631331/731667		0				Quadrate
2015082031	2015	Mississippi Pool 14	4631346/731667		0				Quadrate
2015082032	2015	Mississippi Pool 14	4631061/731112	*Obliquaria reflexa*	1	7		47	Quadrate
2015082033	2015	Mississippi Pool 14	4631361/731667		0				Quadrate
2015082034	2015	Mississippi Pool 14	4631376/731667		0				Quadrate
2015082035	2015	Mississippi Pool 14	4631331/731682		0				Quadrate
2015082036	2015	Mississippi Pool 14	4631346/731682		0				Quadrate
2015082037	2015	Mississippi Pool 14	4631361/731682		0				Quadrate
2015082038	2015	Mississippi Pool 14	4631376/731682		0				Quadrate
2015082039	2015	Mississippi Pool 14	4631391/731682		0				Quadrate
2015082040	2015	Mississippi Pool 14	4631346/731697		0				Quadrate
2015082041	2015	Mississippi Pool 14	4631361/731697		0				Quadrate
2015082042	2015	Mississippi Pool 14	4631376/731697		0				Quadrate

SurveyID	Year	River or Stream	Location	Scientific Name	No Ind /FD/ WD/SF	Age	Length	Length Converted to mm	Comments
2015082043	2015	Mississippi Pool 14	4631391/731697		0				Quadrate
2015082044	2015	Mississippi Pool 14	4631346/731712		0				Quadrate
2015082045	2015	Mississippi Pool 14	4630776/730752	*Amblema plicata*	1	8		58	Quadrate
2015082045	2015	Mississippi Pool 14	4631061/731112	*Obliquaria reflexa*	1	10		55	Quadrate
2015082046	2015	Mississippi Pool 14	4631361/731712		0				Quadrate
2015082047	2015	Mississippi Pool 14	4630791/730752	*Amblema plicata*	1	7		74	Quadrate
2015082047	2015	Mississippi Pool 14	4630806/730767	*Amblema plicata*	1	10		83	Quadrate
2015082047	2015	Mississippi Pool 14	4631061/731127	*Obliquaria reflexa*	1	2		19	Quadrate
2015082048	2015	Mississippi Pool 14	4630956/730977	*Lampsilis cardium*	1	10		105	Quadrate
2015082049	2015	Mississippi Pool 14	4630851/730917	*Quadrula pustulosa*	1	6		41	Quadrate
2015082050	2015	Mississippi Pool 14	4631376/731712		0				Quadrate
2015082051	2015	Mississippi Pool 14	4631391/731712		0				Quadrate
2015082052	2015	Mississippi Pool 14	4631406/731712		0				Quadrate
2015082053	2015	Mississippi Pool 14	4631361/731727		0				Quadrate
2015082054	2015	Mississippi Pool 14	4631376/731727		0				Quadrate
2015082055	2015	Mississippi Pool 14	4631391/731727		0				Quadrate
2015082056	2015	Mississippi Pool 14	4631001/731037	*Lampsilis teres*	1	2		27	Quadrate
2015082057	2015	Mississippi Pool 14	4630821/730767	*Amblema plicata*	1	10		85	Quadrate
2015082058	2015	Mississippi Pool 14	4630926/730917	*Fusconaia flava*	1	7		42	Quadrate
2015082059	2015	Mississippi Pool 14	4631061/731127	*Obliquaria reflexa*	1	5		47	Quadrate
2015082060	2015	Mississippi Pool 14	4631406/731727		0				Quadrate
2015082061	2015	Mississippi Pool 14	4631376/731742		0				Quadrate
2015082062	2015	Mississippi Pool 14	4630836/730767	*Amblema plicata*	1	6		53	Quadrate
2015082062	2015	Mississippi Pool 14	4631061/731127	*Obliquaria reflexa*	1	5		65	Quadrate
2015082063	2015	Mississippi Pool 14			0				Quadrate
2015082064	2015	Mississippi Pool 14			0				Quadrate
2015082065	2015	Mississippi Pool 14			0				Quadrate
2015082066	2015	Mississippi Pool 14			0				Quadrate
2015082067	2015	Mississippi Pool 14	4630851/730767	*Amblema plicata*	1	7		76	Quadrate
2015082068	2015	Mississippi Pool 14	4630971/730977	*Lampsilis cardium*	1	10		107	Quadrate
2015082069	2015	Mississippi Pool 14			0				Quadrate
2015082070	2015	Mississippi Pool 14			0				Quadrate
2015082071	2015	Mississippi Pool 14			0				Quadrate
2015082072	2015	Mississippi Pool 14			0				Quadrate
2015082073	2015	Mississippi Pool 14			0				Quadrate
2015082074	2015	Mississippi Pool 14			0				Quadrate
2015082075	2015	Mississippi Pool 14			0				Quadrate
2015082076	2015	Mississippi Pool 14	4631181/731307	*Quadrula quadrula*	1	10		89	Quadrate
2015082077	2015	Mississippi Pool 14	4630776/730782	*Amblema plicata*	1	6		63	Quadrate
2015082077	2015	Mississippi Pool 14	4630791/730782	*Amblema plicata*	1	7		51	Quadrate
2015082077	2015	Mississippi Pool 14	4630806/730782	*Amblema plicata*	1	7		70	Quadrate

SurveyID	Year	River or Stream	Location	Scientific Name	No Ind /FD/ WD/SF	Age	Length	Length Converted to mm	Comments
2015082077	2015	Mississippi Pool 14	4630821/730782	*Amblema plicata*	1	10		73	Quadrate
2015082077	2015	Mississippi Pool 14	4630836/730782	*Amblema plicata*	1	10		101	Quadrate
2015082077	2015	Mississippi Pool 14	4631076/731127	*Obliquaria reflexa*	1	1		15	Quadrate
2015082078	2015	Mississippi Pool 14	4630926/730917	*Fusconaia flava*	1	10		139	Quadrate
2015082079	2015	Mississippi Pool 14	4630946/730852		0				Quadrate
2015082080	2015	Mississippi Pool 14	4630946/730852		0				Quadrate
2015082081	2015	Mississippi Pool 14	4630946/730852		0				Quadrate
2015082082	2015	Mississippi Pool 14	4630946/730852		0				Quadrate
2015082083	2015	Mississippi Pool 14	4630946/730852		0				Quadrate
2015082084	2015	Mississippi Pool 14	4630946/730852		0				Quadrate
2015082085	2015	Mississippi Pool 14	4630946/730852		0				Quadrate
2015082086	2015	Mississippi Pool 14	4630851/730782	*Amblema plicata*	1	10		76	Quadrate
2015082086	2015	Mississippi Pool 14	4630866/730782	*Amblema plicata*	1	10		64	Quadrate
2015082086	2015	Mississippi Pool 14	4631076/731127	*Obliquaria reflexa*	1	6		44	Quadrate
2015082087	2015	Mississippi Pool 14	4630971/730977	*Lampsilis cardium*	1	10		108	Quadrate
2015082088	2015	Mississippi Pool 14	4630946/730852		0				Quadrate
2015082089	2015	Mississippi Pool 14	4630946/730852		0				Quadrate
2015082090	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
2015082091	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
2015082092	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
2015082093	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
2015082094	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
2015082095	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
2015082096	2015	Mississippi Pool 14	4630971/730977	*Lampsilis cardium*	1				Quadrate
2015082096	2015	Mississippi Pool 14	4630971/730977	*Lampsilis cardium*	1				Quadrate
2015082096	2015	Mississippi Pool 14	4631046/731067	*Leptodea fragilis*	1				Quadrate
2015082097	2015	Mississippi Pool 14	4630971/730977	*Lampsilis cardium*	1				Quadrate
2015082097	2015	Mississippi Pool 14	4630971/730977	*Lampsilis cardium*	1				Quadrate
2015082098	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
2015082099	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20140820154	2015	Mississippi Pool 14	4630911/730842	*Amblema plicata*	1	8	65.0		Quadrate
20140820154	2015	Mississippi Pool 14	4631286/731502	*Truncilla Donaciformis*	1	6	24.0		Quadrate
20150820100	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820101	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820102	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820103	2015	Mississippi Pool 14	4630971/730977	*Lampsilis cardium*	1	10		102	Quadrate
20150820104	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820105	2015	Mississippi Pool 14	4630776/730797	*Amblema plicata*	1				Quadrate
20150820105	2015	Mississippi Pool 14	4630791/730797	*Amblema plicata*	1				Quadrate
20150820105	2015	Mississippi Pool 14	4630806/730796	*Amblema plicata*	1				Quadrate
20150820105	2015	Mississippi Pool 14	4630821/730797	*Amblema plicata*	1				Quadrate

SurveyID	Year	River or Stream	Location	Scientific Name	No Ind /FD/ WD/SF	Age	Length	Length Converted to mm	Comments
20150820105	2015	Mississippi Pool 14	4630986/730977	*Lampsilis cardium*	1				Quadrate
20150820105	2015	Mississippi Pool 14	4630866/730917	*Quadrula pustulosa*	1				Quadrate
20150820105	2015	Mississippi Pool 14	4631256/731412	*Truncilla Donaciformis*	1				Quadrate
20150820106	2015	Mississippi Pool 14	4630986/730977	*Lampsilis cardium*	0				Quadrate
20150820107	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820108	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820109	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820110	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820111	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820112	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820113	2015	Mississippi Pool 14	4630836/730797	*Amblema plicata*	1		98.0		Quadrate
20150820113	2015	Mississippi Pool 14	4630926/730917	*Fusconaia flava*	1		56.0		Quadrate
20150820113	2015	Mississippi Pool 14	4630926/730917	*Fusconaia flava*	1		38.0		Quadrate
20150820113	2015	Mississippi Pool 14	4630926/730917	*Fusconaia flava*	1		62.0		Quadrate
20150820113	2015	Mississippi Pool 14	4630986/730977	*Lampsilis cardium*	1		130.0		Quadrate
20150820113	2015	Mississippi Pool 14	4630986/730977	*Lampsilis cardium*	1		122.0		Quadrate
20150820114	2015	Mississippi Pool 14	4630971/730992	*Lampsilis cardium*	1	10	102.0		Quadrate
20150820115	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820116	2015	Mississippi Pool 14	4630851/730797	*Amblema plicata*	1		69.0		Quadrate
20150820116	2015	Mississippi Pool 14	4630881/731082	*Leptodea fragilis*	1		36.0		Quadrate
20150820117	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820118	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820119	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820120	2015	Mississippi Pool 14	4631256/731427	*Truncilla Donaciformis*	1		14.0		Quadrate
20150820121	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820122	2015	Mississippi Pool 14	4630866/730797	*Amblema plicata*	1		68.0		Quadrate
20150820122	2015	Mississippi Pool 14	4630776/730812	*Amblema plicata*	1		96.0		Quadrate
20150820122	2015	Mississippi Pool 14	4630791/730812	*Amblema plicata*	1		57.0		Quadrate
20150820122	2015	Mississippi Pool 14	4630806/730812	*Amblema plicata*	1		34.0		Quadrate
20150820122	2015	Mississippi Pool 14	4630941/730917	*Fusconaia flava*	1		26.0		Quadrate
20150820122	2015	Mississippi Pool 14	4630881/730917	*Quadrula pustulosa*	1		39.0		Quadrate
20150820122	2015	Mississippi Pool 14	4631256/731427	*Truncilla Donaciformis*	1		25.0		Quadrate
20150820123	2015	Mississippi Pool 14	4631076/731127	*Obliquaria reflexa*	1		20.0		Quadrate
20150820123	2015	Mississippi Pool 14	4631076/731127	*Obliquaria reflexa*	1		22.0		Quadrate
20150820123	2015	Mississippi Pool 14	4630896/730917	*Quadrula pustulosa*	1	5	47.0		Quadrate
20150820123	2015	Mississippi Pool 14	4631271/731442	*Truncilla Donaciformis*	1		19.0		Quadrate
20150820124	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820125	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820126	2015	Mississippi Pool 14	4630986/730992	*Lampsilis cardium*	1	0	16.0		Quadrate
20150820127	2015	Mississippi Pool 14	4630821/730812	*Amblema plicata*	1		26.0		Quadrate
20150820127	2015	Mississippi Pool 14	4630896/731082	*Leptodea fragilis*	1		32.0		Quadrate

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20150820128	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820129	2015	Mississippi Pool 14	4630836/730812	*Amblema plicata*	1	22	107.0		Quadrate
20150820129	2015	Mississippi Pool 14	4630851/730812	*Amblema plicata*	1	8	59.0		Quadrate
20150820129	2015	Mississippi Pool 14	4630866/730812	*Amblema plicata*	1	7	51.0		Quadrate
20150820129	2015	Mississippi Pool 14	4630881/730812	*Amblema plicata*	1	4	27.0		Quadrate
20150820129	2015	Mississippi Pool 14	4630986/731007	*Lampsilis cardium*	1	11	116.0		Quadrate
20150820129	2015	Mississippi Pool 14	4631076/731127	*Obliquaria reflexa*	1	0	46.0		Quadrate
20150820129	2015	Mississippi Pool 14	4631136/731247	*Pyganodon grandis*	1	2	131.0		Quadrate
20150820130	2015	Mississippi Pool 14	4631196/731322	*Quadrula quadrula*	1		11.0		Quadrate
20150820131	2015	Mississippi Pool 14	4630776/730827	*Amblema plicata*	1	12	63.0		Quadrate
20150820131	2015	Mississippi Pool 14	4630791/730827	*Amblema plicata*	1	13	84.0		Quadrate
20150820131	2015	Mississippi Pool 14	4630806/730827	*Amblema plicata*	1	15	81.0		Quadrate
20150820131	2015	Mississippi Pool 14	4631076/731127	*Obliquaria reflexa*	1	2	15.0		Quadrate
20150820132	2015	Mississippi Pool 14	4631076/731127	*Obliquaria reflexa*	1		38.0		Quadrate
20150820132	2015	Mississippi Pool 14	4631271/731457	*Truncilla Donaciformis*	1		21.0		Quadrate
20150820132	2015	Mississippi Pool 14	4631271/731472	*Truncilla Donaciformis*	1		21.0		Quadrate
20150820133	2015	Mississippi Pool 14	4630866/730932	*Fusconaia flava*	1	7			Quadrate
20150820133	2015	Mississippi Pool 14	4630881/730932	*Fusconaia flava*	1	9			Quadrate
20150820133	2015	Mississippi Pool 14	4631076/731142	*Obliquaria reflexa*	1	3			Quadrate
20150820133	2015	Mississippi Pool 14	4631106/731187	*Potamilus alatus*	1	3			Quadrate
20150820134	2015	Mississippi Pool 14	4630821/730827	*Amblema plicata*	1	24	95.0		Quadrate
20150820134	2015	Mississippi Pool 14	4630836/730827	*Amblema plicata*	1	7	43.0		Quadrate
20150820134	2015	Mississippi Pool 14	4631076/731142	*Obliquaria reflexa*	1	7	33.0		Quadrate
20150820134	2015	Mississippi Pool 14	4631076/731142	*Obliquaria reflexa*	1	5	29.0		Quadrate
20150820134	2015	Mississippi Pool 14	4631106/731172	*Obovaria olivaria*	1	3	15.0		Quadrate
20150820134	2015	Mississippi Pool 14	4631106/731172	*Obovaria olivaria*	1	3	18.0		Quadrate
20150820135	2015	Mississippi Pool 14	4630896/730932	*Fusconaia flava*	1		48.0		Quadrate
20150820135	2015	Mississippi Pool 14	4631001/731007	*Lampsilis cardium*	1		86.0		Quadrate
20150820135	2015	Mississippi Pool 14	4631076/731142	*Obliquaria reflexa*	1		33.0		Quadrate
20150820136	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820137	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820138	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820139	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820140	2015	Mississippi Pool 14	4630851/730827	*Amblema plicata*	1	6			Quadrate
20150820140	2015	Mississippi Pool 14	4630851/730827	*Amblema plicata*	1	7			Quadrate
20150820140	2015	Mississippi Pool 14	4630866/730827	*Amblema plicata*	1	5			Quadrate
20150820140	2015	Mississippi Pool 14	4630881/730827	*Amblema plicata*	1	6			Quadrate
20150820140	2015	Mississippi Pool 14	4630911/730932	*Fusconaia flava*	1	2			Quadrate
20150820141	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820142	2015	Mississippi Pool 14	4630926/730932	*Fusconaia flava*	1		51.0		Quadrate
20150820142	2015	Mississippi Pool 14	4630941/730932	*Fusconaia flava*	1		50.0		Quadrate

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20150820142	2015	Mississippi Pool 14	4631241/731397	*Toxolasma parvum*	1	5	20.0		Quadrate
20150820142	2015	Mississippi Pool 14	6631286/731472	*Truncilla Donaciformis*	1		19.0		Quadrate
20150820143	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820144	2015	Mississippi Pool 14	4630881/730827	*Amblema plicata*	1	9			Quadrate
20150820144	2015	Mississippi Pool 14	4630956/730932	*Fusconaia flava*	1	11			Quadrate
20150820144	2015	Mississippi Pool 14	4631001/731007	*Lampsilis cardium*	1	9			Quadrate
20150820145	2015	Mississippi Pool 14	4630881/730827	*Amblema plicata*	1	9	61.0		Quadrate
20150820145	2015	Mississippi Pool 14	4630896/730827	*Amblema plicata*	1	12	69.0		Quadrate
20150820145	2015	Mississippi Pool 14	4630986/731022	*Lampsilis cardium*	1	8	125.0		Quadrate
20150820145	2015	Mississippi Pool 14	4631286/731472	*Truncilla Donaciformis*	1	1	15.0		Quadrate
20150820146	2015	Mississippi Pool 14	4631001/731022	*Lampsilis cardium*	1	3	104.0		Quadrate
20150820147	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820148	2015	Mississippi Pool 14	4631031/731052	*Lasmigona complanata*	1	3			Quadrate
20150820149	2015	Mississippi Pool 14	4631076/731142	*Obliquaria reflexa*	1	6			Quadrate
20150820150	2015	Mississippi Pool 14	4630776/730842	*Amblema plicata*	1	6	66.0		Quadrate
20150820150	2015	Mississippi Pool 14	4630791/730842	*Amblema plicata*	1	9	65.0		Quadrate
20150820150	2015	Mississippi Pool 14	4631091/731142	*Obliquaria reflexa*	1	3	37.0		Quadrate
20150820150	2015	Mississippi Pool 14	4631241/731397	*Toxolasma parvum*	1	7	20.0		Quadrate
20150820150	2015	Mississippi Pool 14	4631286/731487	*Truncilla Donaciformis*	1		13.0		Quadrate
20150820151	2015	Mississippi Pool 14	4630806/730842	*Amblema plicata*	1	10	60.0		Quadrate
20150820151	2015	Mississippi Pool 14	4630821/730842	*Amblema plicata*	1	5	57.0		Quadrate
20150820151	2015	Mississippi Pool 14	4630956/730932	*Fusconaia flava*	1	10	54.0		Quadrate
20150820152	2015	Mississippi Pool 14	4630836/730842	*Amblema plicata*	1	7	53.0		Quadrate
20150820152	2015	Mississippi Pool 14	4630851/730842	*Amblema plicata*	1	7	63.0		Quadrate
20150820152	2015	Mississippi Pool 14	4630866/730842	*Amblema plicata*	1	10	97.0		Quadrate
20150820152	2015	Mississippi Pool 14	4630956/730932	*Fusconaia flava*	1	1	20.0		Quadrate
20150820152	2015	Mississippi Pool 14	4631001/731037	*Lampsilis teres*	1	1	31.0		Quadrate
20150820152	2015	Mississippi Pool 14	4631091/731142	*Obliquaria reflexa*	1	9	50.0		Quadrate
20150820152	2015	Mississippi Pool 14	4631091/731142	*Obliquaria reflexa*	1	3	23.0		Quadrate
20150820153	2015	Mississippi Pool 14	4630881/730842	*Amblema plicata*	1	9	73.0		Quadrate
20150820153	2015	Mississippi Pool 14	4630996/730842	*Amblema plicata*	1	7	67.0		Quadrate
20150820153	2015	Mississippi Pool 14	4630956/730932	*Fusconaia flava*	1	8	58.0		Quadrate
20150820153	2015	Mississippi Pool 14	4631001/731037	*Lampsilis teres*	1	6	65.0		Quadrate
20150820153	2015	Mississippi Pool 14	4631091/731157	*Obliquaria reflexa*	1	3	18.0		Quadrate
20150820154	2015	Mississippi Pool 14	4630776/730857	*Amblema plicata*	1	6	75.0		Quadrate
20150820155	2015	Mississippi Pool 14	4630791/730857	*Amblema plicata*	1	10	66.0		Quadrate
20150820155	2015	Mississippi Pool 14	4630806/730857	*Amblema plicata*	1	15	85.0		Quadrate
20150820155	2015	Mississippi Pool 14	4630821/730857	*Amblema plicata*	1	8	65.0		Quadrate
20150820155	2015	Mississippi Pool 14	4630821/730857	*Amblema plicata*	1	8			Quadrate
20150820155	2015	Mississippi Pool 14	4631301/731502	*Truncilla Donaciformis*	1	3	25.0		Quadrate
20150820156	2015	Mississippi Pool 14	4630836/730857	*Amblema plicata*	1	10	69.0		Quadrate

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20150820156	2015	Mississippi Pool 14	4630851/730857	*Amblema plicata*	1	10	90.0		Quadrate
20150820156	2015	Mississippi Pool 14	4630866/730857	*Amblema plicata*	1	10	77.0		Quadrate
20150820156	2015	Mississippi Pool 14	4630881/730857	*Amblema plicata*	1	8	65.0		Quadrate
20150820156	2015	Mississippi Pool 14	4630956/730932	*Fusconaia flava*	1	4	40.0		Quadrate
20150820156	2015	Mississippi Pool 14	4631091/731157	*Obliquaria reflexa*	1	8	44.0		Quadrate
20150820156	2015	Mississippi Pool 14	4631301/731517	*Truncilla Donaciformis*	1	7	24.0		Quadrate
20150820157	2015	Mississippi Pool 14	4630896/730857	*Amblema plicata*	1	10	90.0		Quadrate
20150820157	2015	Mississippi Pool 14	4630911/730857	*Amblema plicata*	1	8	56.0		Quadrate
20150820157	2015	Mississippi Pool 14	4630791/730872	*Amblema plicata*	1	10	90.0		Quadrate
20150820158	2015	Mississippi Pool 14	4631226/731367	*Taxolasma parvum*	1	3	22.0		Quadrate
20150820159	2015	Mississippi Pool 14	4631226/731367	*Taxolasma parvum*	1	4	25.0		Quadrate
20150820160	2015	Mississippi Pool 14	4631001/731037	*Lampsilis teres*	1	6	80.0		Quadrate
20150820160	2015	Mississippi Pool 14	4631016/731037	*Lampsilis teres*	1	9	84.0		Quadrate
20150820161	2015	Mississippi Pool 14	4630806/730872	*Amblema plicata*	1	8	73.0		Quadrate
20150820161	2015	Mississippi Pool 14	4630821/730872	*Amblema plicata*	1	4	27.0		Quadrate
20150820161	2015	Mississippi Pool 14	4631226/731367	*Taxolasma parvum*	1	4	24.0		Quadrate
20150820162	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820163	2015	Mississippi Pool 14	4631106/731187	*Potamilus alatus*	1	5	58.0		Quadrate
20150820164	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820165	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820166	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820167	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820168	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820169	2015	Mississippi Pool 14	4631046/731082	*Megalonaias nervosa*	1	2	7.0		Quadrate
20150820170	2015	Mississippi Pool 14	4631106/731187	*Potamilus alatus*	1	8	94.0		Quadrate
20150820171	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820172	2015	Mississippi Pool 14	4630836/730872	*Amblema plicata*	1	9	75.0		Quadrate
20150820172	2015	Mississippi Pool 14	4631091/731157	*Obliquaria reflexa*	1	4	31.0		Quadrate
20150820173	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820174	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820175	2015	Mississippi Pool 14	4630851/730872	*Amblema plicata*	1	9	71.0		Quadrate
20150820175	2015	Mississippi Pool 14	4630866/730872	*Amblema plicata*	1	10	81.0		Quadrate
20150820175	2015	Mississippi Pool 14	4631016/731037	*Lampsilis teres*	1	5	100.0		Quadrate
20150820176	2015	Mississippi Pool 14	4631091/731157	*Obliquaria reflexa*	1	2	11.0		Quadrate
20150820177	2015	Mississippi Pool 14	4631091/731157	*Obliquaria reflexa*	1	5	43.0		Quadrate
20150820177	2015	Mississippi Pool 14	4631106/731172	*Obliquaria reflexa*	1	6	36.0		Quadrate
20150820178	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820179	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820180	2015	Mississippi Pool 14	4630896/731082	*Leptodea fragilis*	1	5	45.0		Quadrate
20150820181	2015	Mississippi Pool 14	4631301/731532	*Truncilla Donaciformis*	1	3	13.0		Quadrate
20150820182	2015	Mississippi Pool 14	4631196/731322		0				Quadrate

SurveyID	Year	River or Stream	Location	Scientific Name	No Ind /FD/ WD/SF	Age	Length	Length Converted to mm	Comments
20150820183	2015	Mississippi Pool 14	4631316/731532	*Truncilla Donaciformis*	1	2	17.0		Quadrate
20150820184	2015	Mississippi Pool 14	4630896/731082	*Leptodea fragilis*	1	3	40.0		Quadrate
20150820185	2015	Mississippi Pool 14	4631226/731382	*Taxolasma parvum*	1	3	20.0		Quadrate
20150820185	2015	Mississippi Pool 14	4631316/731574	*Truncilla Donaciformis*	1	2	13.0		Quadrate
20150820186	2015	Mississippi Pool 14	4630881/730872	*Amblema plicata*	1	9	63.0		Quadrate
20150820187	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820188	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820189	2015	Mississippi Pool 14	4631151/731247	*Pyganodon grandis*	1	2	14.0		Quadrate
20150820190	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820191	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820192	2015	Mississippi Pool 14	4631016/731037	*Lampsilis teres*	1	7			Quadrate
20150820193	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820194	2015	Mississippi Pool 14	4631241/731412	*Toxolasma parvum*	1	3			Quadrate
20150820195	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820196	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820197	2015	Mississippi Pool 14	4631196/731322		0				Quadrate
20150820198	2015	Mississippi Pool 14	4630809/730737		0				Quadrate
20150820199	2015	Mississippi Pool 14	4630809/730737		0				Quadrate
20150820200	2015	Mississippi Pool 14	4630809/730737		0				Quadrate
20150820201	2015	Mississippi Pool 14	4630809/730737		0				Quadrate
20150820202	2015	Mississippi Pool 14	4630809/730737		0				Quadrate
20150820203	2015	Mississippi Pool 14	4630809/730737		0				Quadrate
20150820204	2015	Mississippi Pool 14	4630809/730737		0				Quadrate
20150820205	2015	Mississippi Pool 14	4630809/730737		0				Quadrate
20150820206	2015	Mississippi Pool 14	4630809/730737		0				Quadrate
20150820207	2015	Mississippi Pool 14	4630809/730737		0				Quadrate
20150820208	2015	Mississippi Pool 14	4630809/730737		0				Quadrate
20150820209	2015	Mississippi Pool 14	4630796/730729		0				Quadrate
20150820210	2015	Mississippi Pool 14	4630796/730729		0				Quadrate
20150820211	2015	Mississippi Pool 14	4630796/730729		0				Quadrate
20150820212	2015	Mississippi Pool 14	4630796/730729		0				Quadrate
20150820213	2015	Mississippi Pool 14	4630956/730932	*Fusconaia flava*	1	12	54.0		Quadrate
20150820214	2015	Mississippi Pool 14	4630796/730729		0				Quadrate
20150820215	2015	Mississippi Pool 14	4630796/730729		0				Quadrate
20150820216	2015	Mississippi Pool 14	4630796/730729		0				Quadrate
20150820217	2015	Mississippi Pool 14	4630796/730729		0				Quadrate
20150820218	2015	Mississippi Pool 14	4630796/730729		0				Quadrate
20150820219	2015	Mississippi Pool 14	4630796/730729		0				Quadrate
20150820220	2015	Mississippi Pool 14	4630796/730730		0				Quadrate
20150820221	2015	Mississippi Pool 14	4630796/730730		0				Quadrate
20150820222	2015	Mississippi Pool 14	4630796/730730		0				Quadrate

SurveyID	Year	River or Stream	Location	Scientific Name	No Ind /FD/ WD/SF	Age	Length	Length Converted to mm	Comments
20150820223	2015	Mississippi Pool 14	4630911/730917	*Quadrula pustulosa*	1	5	47.0		Quadrate
20150820224	2015	Mississippi Pool 14	4631316/731562	*Truncilla Donaciformis*	1	3			Quadrate
20150820225	2015	Mississippi Pool 14	4630796/730730		0				Quadrate
20150820226	2015	Mississippi Pool 14	4631106/731172	*Obliquaria reflexa*	1	7	40.0		Quadrate
20150820227	2015	Mississippi Pool 14	4631001/731022	*Lampsilis cardium*	1	8	112.0		Quadrate
20150820228	2015	Mississippi Pool 14	4630796/730730		0				Quadrate
20150820229	2015	Mississippi Pool 14	4630796/730730		0				Quadrate
20150820230	2015	Mississippi Pool 14	4630796/730730		0				Quadrate
20150820231	2015	Mississippi Pool 14	4630796/730730		0				Quadrate
20150820232	2015	Mississippi Pool 14	4630796/730730		0				Quadrate
20150820233	2015	Mississippi Pool 14	4630796/730730		0				Quadrate
20150820234	2015	Mississippi Pool 14	4630796/730730		0				Quadrate
20150820235	2015	Mississippi Pool 14	4631376/731727		0				Quadrate
20150820236	2015	Mississippi Pool 14	4631391/731727		0				Quadrate
20150820237	2015	Mississippi Pool 14	4631406/731727		0				Quadrate
20150820238	2015	Mississippi Pool 14	4631376/731742		0				Quadrate
20150820239	2015	Mississippi Pool 14	4630896/730872	*Amblema plicata*	123				Time search only
20150820239	2015	Mississippi Pool 14	4631001/731022	*Lampsilis cardium*	20				Time search only
20150820239	2015	Mississippi Pool 14	4631031/731052	*Lasmigona complanata*	1				Time search only
20150820239	2015	Mississippi Pool 14	4631046/731082	*Obliquaria reflexa*	11				Time search only
20150820239	2015	Mississippi Pool 14	4631106/731172	*Obovaria olivaria*	1				Time search only
20150820239	2015	Mississippi Pool 14	4631121/731202	*Potamilus alatus*	3				Time search only
20150820239	2015	Mississippi Pool 14	4631136/731232	*Potamilus ohiensis*	1				Time search only
20150820239	2015	Mississippi Pool 14	4631136/731262	*Pyganodon grandis*	1				Time search only
20150820239	2015	Mississippi Pool 14	4630836/730917	*Quadrula nodulata*	3				Time search only
20150820239	2015	Mississippi Pool 14	4631166/731262	*Quadrula pustulosa*	5				Time search only
20150820239	2015	Mississippi Pool 14	4631196/731322	*Quadrula quadrula*	3				Time search only
20150820240	2015	Mississippi Pool 14	4630911/730872	*Amblema Plicata*	112				Time search only
20150820240	2015	Mississippi Pool 14	4630926/730947	*Fusconaia flava*	40				Time search only
20150820240	2015	Mississippi Pool 14	4631001/731022	*Lampsilis cardium*	58				Time search only
20150820240	2015	Mississippi Pool 14	4630866/731052	*Lampsilis teres*	1				Time search only
20150820240	2015	Mississippi Pool 14	4630881/731067	*Leptodae fragilis*	3				Time search only
20150820240	2015	Mississippi Pool 14	4631046/731082	*Obliquaria reflexa*	5				Time search only
20150820240	2015	Mississippi Pool 14	4631106/731172	*Potamilis alatus*	1				Time search only
20150820240	2015	Mississippi Pool 14	4631151/731277	*Quadrula pustulosa*	7				Time search only
20150820240	2015	Mississippi Pool 14	4631211/731337	*Quadrula quadrula*	1				Time search only
20150820241	2015	Mississippi Pool 14	4630911/730872	*Amblema plicata*	1	5	49.0		Time search only
20150820241	2015	Mississippi Pool 14	4630911/730872	*Amblema plicata*	1	8	72.0		Time search only
20150820241	2015	Mississippi Pool 14	4630911/730872	*Amblema plicata*	1	12	91.0		Time search only
20150820241	2015	Mississippi Pool 14	4630911/730872	*Amblema plicata*	1	11	90.0		Time search only
20150820241	2015	Mississippi Pool 14	4630911/730872	*Amblema plicata*	1	10	79.0		Time search only

SurveyID	Year	River or Stream	Location	Scientific Name	No Ind /FD/ WD/SF	Age	Length	Length Converted to mm	Comments
20150820241	2015	Mississippi Pool 14	4630926/730872	*Amblema plicata*	1	7	69.0		Time search only
20150820241	2015	Mississippi Pool 14	4630806/730887	*Amblema plicata*	1	10	74.0		Time search only
20150820241	2015	Mississippi Pool 14	4630821/730887	*Amblema plicata*	1	8	67.0		Time search only
20150820241	2015	Mississippi Pool 14	4630836/730887	*Amblema plicata*	1	12	88.0		Time search only
20150820241	2015	Mississippi Pool 14	4630851/730887	*Amblema plicata*	1	15	98.0		Time search only
20150820241	2015	Mississippi Pool 14	4630866/730887	*Amblema plicata*	1	13	93.0		Time search only
20150820241	2015	Mississippi Pool 14	4630881/730887	*Amblema plicata*	1	9	82.0		Time search only
20150820241	2015	Mississippi Pool 14	4630896/730887	*Amblema plicata*	1	16	97.0		Time search only
20150820241	2015	Mississippi Pool 14	4630911/730887	*Amblema plicata*	1	7	68.0		Time search only
20150820241	2015	Mississippi Pool 14	4630911/730887	*Amblema plicata*	1	8	68.0		Time search only
20150820241	2015	Mississippi Pool 14	4630911/730887	*Amblema plicata*	1	6	64.0		Time search only
20150820241	2015	Mississippi Pool 14	4630926/730887	*Amblema plicata*	1	5	58.0		Time search only
20150820241	2015	Mississippi Pool 14	4630806/730902	*Amblema plicata*	1	8	61.0		Time search only
20150820241	2015	Mississippi Pool 14	4630821/730902	*Amblema plicata*	1	7	61.0		Time search only
20150820241	2015	Mississippi Pool 14	4630836/730902	*Amblema plicata*	1	6	64.0	84	Time search only
20150820241	2015	Mississippi Pool 14	4630851/730902	*Amblema plicata*	1	11	84.0		Time search only
20150820241	2015	Mississippi Pool 14	4630866/730902	*Amblema plicata*	1	13	88.0		Time search only
20150820241	2015	Mississippi Pool 14	4630881/730902	*Amblema plicata*	1	6	63.0		Time search only
20150820241	2015	Mississippi Pool 14	4630896/730902	*Amblema plicata*	1	9	73.0		Time search only
20150820241	2015	Mississippi Pool 14	4630911/730902	*Amblema plicata*	1	8	71.0		Time search only
20150820241	2015	Mississippi Pool 14	4630926/730902	*Amblema plicata*	1	8	70.0		Time search only
20150820241	2015	Mississippi Pool 14	4630926/730902	*Amblema plicata*	1	4	32.0		Time search only
20150820241	2015	Mississippi Pool 14	4630926/730902	*Amblema plicata*	1	5	50.0		Time search only
20150820241	2015	Mississippi Pool 14	4630941/730947	*Fusconaia flava*	1	5	39.0		Time search only
20150820241	2015	Mississippi Pool 14	4630956/730947	*Fusconaia flava*	1	4	38.0		Time search only
20150820241	2015	Mississippi Pool 14	4630956/730947	*Fusconaia flava*	1	4	34.0		Time search only
20150820241	2015	Mississippi Pool 14	4631001/731022	*Lampsilis cardium*	1	7	114.0		Time search only
20150820241	2015	Mississippi Pool 14	4630866/731052	*Lampsilis teres*	1	3	82.0		Time search only
20150820241	2015	Mississippi Pool 14	4630866/731052	*Lampsilis teres*	1	4	75.0		Time search only
20150820241	2015	Mississippi Pool 14	4630866/731052	*Lampsilis teres*	1	5	95.0		Time search only
20150820241	2015	Mississippi Pool 14	4631016/731052	*Lampsilis teres*	1	6	92.0		Time search only
20150820241	2015	Mississippi Pool 14	4631016/731052	*Lampsilis teres*	1	7	110.0		Time search only
20150820241	2015	Mississippi Pool 14	4631016/731052	*Lampsilis teres*	1	7	110.0		Time search only
20150820241	2015	Mississippi Pool 14	4631016/731052	*Lampsilis teres*	1	2	57.0		Time search only
20150820241	2015	Mississippi Pool 14	4630896/731097	*Obliquaria reflexa*	1	4	32.0		Time search only
20150820241	2015	Mississippi Pool 14	4630911/731097	*Obliquaria reflexa*	1	4	32.0		Time search only
20150820241	2015	Mississippi Pool 14	4630911/731097	*Obliquaria reflexa*	1	3	32.0		Time search only
20150820241	2015	Mississippi Pool 14	4630911/731097	*Obliquaria reflexa*	1	4	33.0		Time search only
20150820241	2015	Mississippi Pool 14	4631046/731097	*Obliquaria reflexa*	1	5	40.0		Time search only
20150820241	2015	Mississippi Pool 14	4631046/731097	*Obliquaria reflexa*	1	6	45.0		Time search only
20150820241	2015	Mississippi Pool 14	4631046/731097	*Obliquaria reflexa*	1	4	38.0		Time search only

SurveyID	Year	River or Stream	Location	Scientific Name	No Ind /FD/ WD/SF	Age	Length	Length Converted to mm	Comments
20150820241	2015	Mississippi Pool 14	4631046/731097	*Obliquaria reflexa*	1	5	42.0		Time search only
20150820241	2015	Mississippi Pool 14	4631061/731097	*Obliquaria reflexa*	1	5	42.0		Time search only
20150820241	2015	Mississippi Pool 14	4630896/731112	*Obliquaria reflexa*	1	5	43.0		Time search only
20150820241	2015	Mississippi Pool 14	4630911/731112	*Obliquaria reflexa*	1	5	40.0		Time search only
20150820241	2015	Mississippi Pool 14	4631136/731232	*Potamilus ohiensis*	1	3	84.0		Time search only
20150820241	2015	Mississippi Pool 14	4631136/731232	*Potamilus ohiensis*	1	4	101.0		Time search only
20150820241	2015	Mississippi Pool 14	4631331/731562	*Truncilla Donaciformis*	1	2	22.0		Time search only
20150820242	2015	Mississippi Pool 14	4630941/730902	*Amblema plicata*	171				Time search only
20150820242	2015	Mississippi Pool 14	4630971/730947	*Fusconaia flava*	3				Time search only
20150820242	2015	Mississippi Pool 14	4631001/731022	*Lampsilis cardium*	25				Time search only
20150820242	2015	Mississippi Pool 14	4631016/731052	*Lampsilis teres*	2				Time search only
20150820242	2015	Mississippi Pool 14	4631031/731052	*Lasmigona complanata*	1				Time search only
20150820242	2015	Mississippi Pool 14	4630896/731082	*Leptodea fragilis*	1				Time search only
20150820242	2015	Mississippi Pool 14	4630926/731112	*Obliquaria reflexa*	3				Time search only
20150820242	2015	Mississippi Pool 14	4631106/731172	*Obovaria olivaria*	1				Time search only
20150820242	2015	Mississippi Pool 14	4631151/731262	*Pyganodon grandis*	1				Time search only
20150820242	2015	Mississippi Pool 14	4631166/731277	*Quadrula pustulosa*	14				Time search only
20150820242	2015	Mississippi Pool 14	4631316/731577	*Truncilla Donaciformis*	1				Time search only
20150820243	2015	Mississippi Pool 14	4630941/730902	*Amblema plicata*	114				Time search only
20150820243	2015	Mississippi Pool 14	4630926/730917	*Arcidens confragous*	1				Time search only
20150820243	2015	Mississippi Pool 14	4630941/730962	*Fusconaia flava*	28				Time search only
20150820243	2015	Mississippi Pool 14	4631001/731022	*Lampsilis cardium*	57				Time search only
20150820243	2015	Mississippi Pool 14	4631016/731052	*Lampsilis teres*	3				Time search only
20150820243	2015	Mississippi Pool 14	4630896/731082	*Leptodea fragilis*	2				Time search only
20150820243	2015	Mississippi Pool 14	4631061/731112	*Obliquaria reflexa*	2				Time search only
20150820243	2015	Mississippi Pool 14	4631121/731217	*Potamilus alatus*	1				Time search only
20150820243	2015	Mississippi Pool 14	4631166/731292	*Quadrula pustulosa*	28				Time search only
20150820243	2015	Mississippi Pool 14	4631331/731577	*Truncilla Donaciformis*	1				Time search only
20150820244	2015	Mississippi Pool 14	4630821/730917	*Amblema Plicata*	205				Time search only
20150820244	2015	Mississippi Pool 14	4630926/730917	*Ellipsuria lineolata*	1				Time search only
20150820244	2015	Mississippi Pool 14	4630956/730962	*Fusconaia flava*	90				Time search only
20150820244	2015	Mississippi Pool 14	4631016/731022	*Lampsilis cardium*	91				Time search only
20150820244	2015	Mississippi Pool 14	4631031/731082	*Leptodea fragilis*	1				Time search only
20150820244	2015	Mississippi Pool 14	4631046/731082	*Ligumia recta*	4				Time search only
20150820244	2015	Mississippi Pool 14	4631061/731112	*Obliquaria reflexa*	1				Time search only
20150820244	2015	Mississippi Pool 14	4632221/731217	*Potamilus alatus*	6				Time search only
20150820244	2015	Mississippi Pool 14	4631181/731292	*Quadrula pustulosa*	31				Time search only
20150820244	2015	Mississippi Pool 14	4631211/731352	*Quadrula quadrula*	2				Time search only
20150820244	2015	Mississippi Pool 14	4631316/731592	*Truncilla Donaciformis*	1				Time search only
20150820245	2015	Mississippi Pool 14	4630694/730639	*Amblema plicata*	194				
20150820245	2015	Mississippi Pool 14	4630694/730639	*Lampsilis cardium*	39				

SurveyID	Year	River or Stream	Location	Scientific Name	No Ind /FD/ WD/SF	Age	Length	Length Converted to mm	Comments
20150820245	2015	Mississippi Pool 14	4630694/730639	*Lampsilis teres*	8				
20150820245	2015	Mississippi Pool 14	4630694/730639	*Potamilis alatus*	2				
20150820245	2015	Mississippi Pool 14	4630694/730639	*Fusconaia flava*	59				
20150820245	2015	Mississippi Pool 14	4630694/730639	*Obliquaria reflexa*	45				
20150820245	2015	Mississippi Pool 14	4630694/730639	*Pyganodon grandis*	2				
20150820245	2015	Mississippi Pool 14	4630694/730639	*Truncilla Donaciformis*	2				
20150820245	2015	Mississippi Pool 14	4630694/730639	*Quadrula pustulosa*	20				
20150820245	2015	Mississippi Pool 14	4630694/730639	*Quadrula nodulata*	2				
20150820245	2015	Mississippi Pool 14	4630694/730639	*Lasmigona complanata*	1				

Version 1.0.2

Value Management Plan

(PMBP REF8023G)

Civil Works: = ☑ Military: = ☐ | Project/Procurement Amount Cost = $9,000,000 | Agency: USACE | District: MVR

P2#: 134034 | **Date:** 1/28/2015

PN: 0 | **Filled Out By:** Monique Savage

Project Title: Beaver Island HREP | **Project Manager:** Karla Sparks

Goal: (Statement of overall goal of VM/E effort)

The effort will consist of a scan of five recent VE studies conducted on very similar projects to find applicable proposals that can be applied to the current project

Objective: (Specific items of accomplishment that the VM/E effort will achieve as specific to the project)

The effort will identify previous proposals that may enhance the value of the current project, as well as incoroporate lessons learned from the previous design processes.

Execution - VE Strategy & Level of Effort (Document Decisions from Section I, II & III):

LO - VMP Only	☐	No Further Action (Not Federally Funded)	☐	Design Agent VE Compliance	☐
LO - Bridge	☐			Date of Compliance	
LO - Scan	☑	Single Effort	☐		
Level of Effort:		Multiple efforts	☐		
Value Planning (Level 1)	☐	Independent Team	☐		
Abbreviated Study (Level 2)	☐	Integrated	☐		
Standard Study (level 3)	☐	Blended	☐		
Problem Resolution (Level 4)	☐				
Programmatic (Level 5)	☐				
Enterprise (Level 6)	☐				

Preliminary Schedule	
Overall VE Start (ML285, CW285, CW192)	
VE Activity Start	15-Jan
VE Activity Finish	15-Feb
Est. Value Activity Duration	1 mos

Note: Requires strict QA/QC by one USACE Organizational element higher then executing VEO.

Brief **Narrative:** (Summarize Narrative from Page 3)

The Beaver Island Project is a Habitat Restoration and Enhancement Project under the Upper Mississippi River Restoration Program (UMRR). The project is located in Pool 14 adjacent to Clinton, Iowa at River Miles 513-515.5. Numerous VE studies with similar features to include topographic diveristy, bathymetric diversity, forest diversity, overwintering habitat and ephemeral wetlands have been conducted within the past several years. The current cost estimate for Beaver Island is $9,000,000. The UMRR program habitat rehabilitation and enhancement projects (HREP) have been constructed in the Upper Mississippi River since 1986 across three districts. There are two design handbooks, the most current one was completed in 2012, to document the array of restoration tools and lessons learned to aid in the design of future projects.

Preliminary Team & Budget Info

Name	Role/ Discipline	Org Code	Approx Bill Rate	Hrs	USACE- Dist/ AE Firm	Total
	Team Leader		$100	5		$500
	VEO		$100	3		$300
	Admin Assistant		$100	0		$0
	Contracting		$100	0		$0
	Tech Team #1		$100	10		$1,000
	Tech Team #2		$100	0		$0
	Tech Team #3		$100	0		$0
	Tech Team #4		$100	0		$0
	Tech Team #5		$100	0		$0
	Tech Team #6		$100	0		$0
	Cost Estimator		$100	0		$0
					Expenses Total (from worksheet) =	$0

Estimated Cost of Value Activity = $1,800

SPARKS.KARLA.K.1383386647 Digitally signed by SPARKS.KARLA.K.1383386647 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=SPARKS.KARLA.K.1383386647 Date: 2015.02.06 13:07:35 -06'00'

Signature & Date of Project Manager (Required)

DENGLER.JOHN.E.1369337765 Digitally signed by DENGLER.JOHN.E.1369337765 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=DENGLER.JOHN.E.1369337765 Date: 2016.01.05 08:06:39 -06'00'

Signature & Date of VEO (Required)

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MSC VPM Signature & Date (Required)

Screening Tool

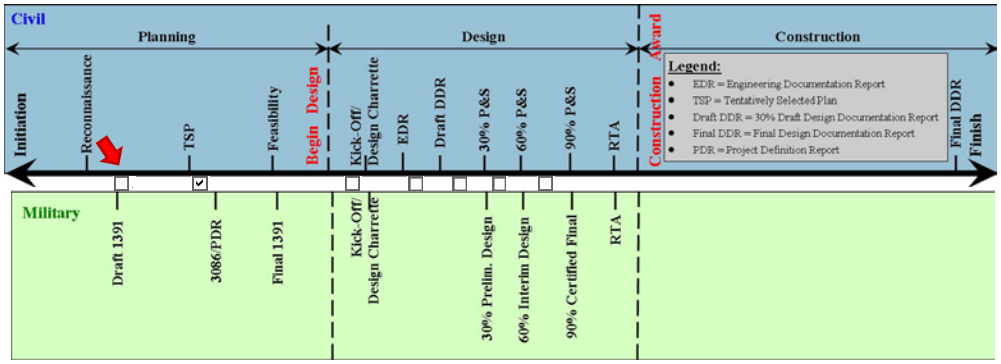
P2#:	134034	**Date:**	1/28/2015
PN:		**Filled Out By:**	Monique Savage
Project Title:	Beaver Island HREP	**Project Manager:**	Karla Sparks

I. Initial Screening Process

Project/Program/Procurement Amount Cost (Ex: PA, Total Authorized Cost, etc...) $ **$9,000,000**

Choose where you plan to do VE

☑ Civil



☐ Military

A) Is the Project/Procurement federally funded?	Yes ☐	No ☐	If No, Check No Further Action, create VMP
B) Is the Corps the design agent?	Yes ☐	No ☐	If No, document design agent compliance with VE requirement on VMP
C) Has a programmatic study been previously executed within the last 3 years? Allowed before 35% Design only. (Determines if a Bridge Strategy is an option)	Yes ☐		If Yes, bridge strategy automatically selected on section III of strategy tab.
D) Could this be a part of a programmatic study? (Automatically determines Programmatic Strategy)	Yes ☐		If Yes, programmatic strategy automatically selected on section III of strategy tab
E) Are there at least 5 similar studies within the last 3-5 years in the same region? Allowed before 35% Design. Applicable to projects in the $2-$10M range with MSC approval; projects over $10M require HQ Ch. OVE approval (Determines if Scan Strategy is an option)	Yes ☑		If Yes, scan strategy automatically selected on section III of strategy tab as long as design is below 15%. If opportunity to change exists outside of past studies do not toggle yes.
~~F) Is the project/program/procurement over $10M?~~	~~Yes~~ ☐	~~No~~ ☐	~~If Yes, proceed to level II or program specific screen~~
~~G) Is there a program specific screening tool?~~	~~Yes~~ ☐	~~No~~ ☐	~~If yes and not pre-flagged as low opportunity, proceed to program specific screen~~
~~H) Is the project/procurement/program Unique or Standard?~~	~~Standard~~ ☐	~~Unique~~ ☐	
~~I) Is there an opportunity for beneficial change?~~	~~Limited~~ ☐ ~~Moderate~~ ☐	~~High~~ ☐	

Decision: **Proceed to Strategy Screening Process** ☐ **LO (VMP Only) / LO (Scan) / LO (Bridge)** ☐ **No Further Action** ☐

~~II. Strategy Screening Process~~ ~~(work with PDT)~~

~~A) Project Specific~~				
~~1) Disciplines Involved~~	~~Couple (≤2)~~ ☐	~~Few (2-4)~~ ☐	~~Several (>4)~~ ☐	
~~2) Scope – Simple/Complex~~	~~Simple~~ ☐	~~Moderate~~ ☐	~~Complex~~ ☐	
~~3) New/Renovate/Addition~~	~~New~~ ☐	~~Addition~~ ☐	~~Renovation~~ ☐	
~~4) Based on Standard Design~~	~~Yes~~ ☐	~~No~~ ☐		
~~5) Based on Standards~~	~~Yes~~ ☐	~~No~~ ☐		
~~6) Unique or repetitive Type~~	Unique (one of a kind or few like it) ☐	~~Repetitive~~ ☐		
~~7) Constraints~~	~~Minimal~~ ☐	~~Moderate~~ ☐	~~Significant~~ ☐	
~~8) Single phase/multi-phase~~	~~Single~~ ☐	~~Multiple~~ ☐		
~~9) Single facility/Multiple~~	~~Single~~ ☐	~~Multiple~~ ☐		
~~10) Status of Design~~	~~Early~~ ☐	~~35%~~ ☐	~~65% or later~~ ☐	
~~B) Stakeholders~~				
~~1) Level of PDT Experience~~	~~Limited~~ ☐	~~Substantial~~ ☐	~~Unknown~~ ☐	
~~2) Applicability of Team Experience~~	~~Applicable~~ ☐	~~Not Applicable~~ ☐	~~Unknown~~ ☐	
~~3) Design Provided by Others~~	~~Yes~~ ☐	~~No~~ ☐		
~~C) Risk/Opportunity~~				
~~1) Confidence in Budget Estimate~~	~~Low~~ ☐	~~Moderate~~ ☐	~~High~~ ☐	~~Unknown~~ ☐
~~2) Adequacy of Schedule – Design & Construction~~	~~Adequate~~ ☐	~~Moderate~~ ☐	~~Tight~~ ☐	
~~3) Technical Risk – Design & Construction~~	~~Low~~ ☐	~~Moderate~~ ☐	~~High~~ ☐	
~~4) Opportunity for Beneficial Change~~	~~Low~~ ☐	~~Moderate~~ ☐	~~High~~ ☐	
~~**Complexity Judgement** – Assess complexity of overall circumstances (A-C)~~	~~Low~~ ○	~~Moderate~~ ○	~~High~~ ◉	

Narrative:

Document rationale on selected complexity on page 3

Screening Tool - Narrative

P2#: 134034	**Date:** 1/28/2015
PN: 0	**Filled Out By:** Monique Savage
Project Title: Beaver Island HREP	**Project Manager:** Karla Sparks

Narrative: (Low Opportunity / Complexity Narrative)

Upper Mississippi River Restoration (UMRR) program formally Environmental Management Plan (EMP) habitat rehabilitation and enhancement projects (HREP) have been constructed in the Upper Mississippi River since 1986 across three districts. There are two design handbooks, the most current one was completed in 2012, to document the array of restoration tools and lessons learned to aid in the design of future projects.

The Beaver Island Project is a Habitat Restoration and Enhancement Project under the Upper Mississippi River Restoration Program. The project is located in Pool 14 adjacent to Clinton, Iowa at River Miles 513-515.5. Numerous VE studies with similar features have been conducted, to include topographic diveristy, bathymetric diversity, forest diversity, overwintering habitat and ephemeral wetlands, within the past several years. These reports are as follows:

a. Lake Odessa Habitat Rehabilitation and Enhancement Project Repair Value Engineering Study Report Number CEMVR-VE-FY14-02, December 2013.

b. Huron Island Habitat Rehabilitation and Enhancement Project Value Engineering Study Report Number CEMVR-VE-FY14-01, December 2013.

c. Huron Island Habitat Rehabilitation and Enhancement Project Value Engineering Study Report Number CEMVR-VE-FY12-01, June 2012, Appendix N - Value Engineering.

d. Pool 12 Overwintering HREP Stage I Value Engineering Study Report Number CEMVR-VE-FY13-03, February 2013. VE-MVR-13-03_Pool 12 MS River.docx

e. Pool 12 Overwintering HREP DPR Value Engineering Study, March 2005.

f. Pool 12 Overwintering HREP Stage II: Stone Lake Value Engineering Study Report Number CEMVR-VE-FY14-05, October 2014.

The previous VE studies will be scanned and studied in detail and those VE ideas applicable to the Beaver Island Habitat Restoration and Enhancement Project will be considered for inclusion in the project. The current cost estimate for Beaver Island is $9,000,000.

Strategy Selection Tool

III. Suggested Strategy

Default Strategy **Scan**

Optional Strategy **None**

Strategy Definition:

Scan CONSTRAINTS: For $2-$10M, this level of effort requires MSC VE VPgM approval (and strict QA/QC) or approval one USACE Organizational element higher than the executing VEO (ie., District/MSC/HQ). For $10M+, this level of effort requires approval of both MSC VPgM and HQ CVO. This level of effort is considered to be LOW OPPORTUNITY since a workshop is not performed and should be reported as Low Opportunity in P2.

This effort involves the VEO and Key PDT members assessing the utilization of previously performed value studies/alternatives. The VEO would query the value alternatives database collecting those alternatives that are most applicable to the current project (this should be done at the beginning of a VE study as part of the Information Gathering phase anyway). It would be appropriate to supplement the previous value alternatives with a brief discussion to understand what might be different with this project. A scan may be appropriate for repetitive small projects or those projects that have had multiple value studies with similar results.

Possible Examples where Scan is most appropriate: small re-roofing job, paving, or small O&M/SRM type project that is restrictive by time/dollars; same value study performed within the last two years (COF, TEMF, Barracks, etc…)

Default Team **None**

Default Team Definition:

None

Optional Team **None**

Optional Team Definition:

N/A

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Rock Island Field Office
1511 47th Avenue
Moline, Illinois 61265
Phone: (309) 757-5800 Fax: (309) 757-5807

IN REPLY REFER TO:
FWS/RIFO

February 29, 2016

Colonel Craig Baumgartner
District Engineer
U.S. Army Corps of Engineers
Rock Island District
Attn: Nathan Richards
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61201-2004

Dear Colonel Baumgartner:

This responds to your request for Fish and Wildlife Service (Service) concurrence with the Biological Assessment (BA) prepared for the Beaver Island Habitat Rehabilitation and Enhancement Project, dated February 1, 2016. The BA provided a determination of **may affect, not likely to adversely affect** for the federally endangered Indiana bat (*Myotis sodalis*) and Higgin's eye pearly mussel (*Lampsilis higginsii*), and the federally threatened northern long-eared bat (*Myotis septentrionalis*). We have reviewed the BA and the supporting information and have the following comments.

The BA is largely based on the Indiana bat and Northern long-eared bat (NLEB) surveys conducted by Stantec during August of 2015 (Stantec, 2015). The acoustic survey was conducted in accordance with the Service's 2015 Range-wide Indiana Bat Summer Survey Guidelines (USFWS, 2015). The acoustic survey results were analyzed using two different call detection programs, resulting in a total of 217 Indiana bat and 44 NLEB calls being identified by each species respectively. This information strongly indicates the presence of both species within the project area.

Mist netting efforts resulted in the capture of 14 NLEBs and no Indiana bats. Three NLEBs were telemetered resulting in the identification of five roost trees. Acoustic detectors that were located at the capture locations collected 333 Indiana bat and 31 NLEB calls. This data suggests use of the mist netting sites by Indiana bats for foraging, with maternity colony roost trees likely located within a 3-km radius of the mist net sites (USFWS, 2007).

The proposed tree removal area is estimated to be 81 acres, which is approximately 5.4 percent of the total forested habitat available on Beaver and Albany Islands. The tree removal, as proposed, will expand existing forest clearings surrounding water bodies and will not result in further fragmentation of bat roosting or foraging habitat. A recent habitat survey completed by the Corps identified additional alternative roosting habitat throughout the remaining forested sections of the Beaver/Albany Island complex including trees that likely serve as secondary and/or primary maternity roosts. Provided that tree clearing occurs outside the bat active period (April 1st-September 30th) removal of unidentified maternity roost trees is unlikely to result in the incidental take of Indiana bats.

The proposed project involves the removal of forested habitat that could potentially provide summer roosting habitat for the NLEB. Certain incidental take resulting from tree removal is identified in the final 4(d) Rule for the NLEB (50 CFR 17) as exempted from prohibition under the Endangered Species Act. It is our understanding that NLEB roost trees identified during telemetry surveys at Beaver Island will not be felled and all tree clearing will be conducted outside of the maternity season of April 1 through September 30. Therefore, incidental take of individual Northern long-eared bats is also unlikely.

Proposed conservation measures, as identified in the BA, include timber stand improvement activities for over 100 acres of Beaver Island. Timber stand improvement will include girdling trees for increased snag habitat, canopy openings, mast tree plantings, and vegetation maintenance. An additional planting of more than 800 mast trees, including species which produce exfoliating bark, will be completed in the cleared areas. Collectively, these activities should result in positive long-term benefits for potential roost tree production, foraging habitat, and habitat diversity.

For the reasons stated above, **we concur with your determination of may affect, not likely to adversely affect** Indiana bats or NLEBs.

Erosion control and bank stabilization structures have been proposed in Albany Slough, a side channel situated between Beaver and Albany Islands. This action includes construction of a stone chevron structure upstream of Albany Island, stone protection along the sides of the island, and substrate improvement within the sand substrate of Albany Slough for improved mussel habitat.

Freshwater mussel surveys were conducted by staff from the Corps, U.S. Fish and Wildlife Service, Iowa Department of Natural Resources, Illinois Department of Natural Resources, and U.S. Geological Survey throughout Albany Slough during the summers of 2014 and 2015. Survey techniques included dive searches, polywog searches, and various timed surveys. A single Higgin's eye pearly mussel individual was identified near the lower end of Albany Slough during an August 2014 survey. However, no Higgin's eye pearly mussels were identified during the subsequent extensive survey efforts in 2015.

Classification and regression tree (CART) modeling (Steuer et al., 2008) was used to evaluate potential hydraulic changes to Albany Slough from the proposed chevron construction and to evaluate potential impacts to Higgin's eye pearly mussel. The model identified near constant values for velocity, shear stress, substrate composition, and channel slope with and without the structure. Furthermore, the model indicated a high probability of mussels resulting from the chevron construction 'build' scenario.

In addition to the chevron, the project proposes to disturb aquatic habitat through mechanical dredging of three finger lakes, the dredging of the southern entrance within the interior of Beaver Island, and through the installation of a rock closure structure along the right descending bank of Beaver Island (near the confluence of Beaver Slough and Deep Cut). Suitable substrate does not occur in these backwater areas for Higgin's eye pearly mussel habitat.

For the reasons stated above, **we concur with your determination of may affect, not likely to adversely affect** Higgins eye pearly mussel.

A newly-occupied heron rookery exists on the southwest portion of Beaver Island. We appreciate the project's consideration of that important resource and the avoidance of clearing trees in the vicinity of the rookery. We recommend that the proposed clearing on Beaver Island be conducted prior to spring nesting to reduce potential impacts to nesting birds.

The above comments are provided in accordance with the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and the Migratory Bird Treaty Act (40 Stat, 755, as amended; 16 U.S.C. 703 et seq.).

Thank you for the coordination of this project and for the opportunity to provide comments. If you have any additional questions or concerns, please contact Sara Schmuecker of my staff at 309-757-5800 x 203.

Sincerely,

Kraig McPeek
Field Supervisor

References

Kiser, J. D., Stoffs, H., Karczewske, B., & Dunn, H. 2015. Indiana bat and northern long-eared bat survey – Beaver Island habitat rehabilitation and enhancement project, Mississippi River (RDB, RM 513.0-515.5), Clinton County, Iowa. Stantec. Pp. 1-48, Contract No. W912EK-1-D-0002.

Steuer, J. J., T. J. Newton, and S. J. Zigler. 2008. Use of complex hydraulic variables to predict the distribution and density of unionids in a side channel of the Upper Mississippi River. Hydrobiologia 610: 67-82.

USFWS. 2007. Indiana Bat (*Myotis sodalis*) draft recover plan: first revision. U.S. Fish and Wildlife Service, Fort Snelling, MN. 260 pp.

USFWS. 2015. 2015 Rangewide Indiana Bat summer survey guidance. U.S. Fish and Wildlife Service, Bloomington, Indiana. 44 pp.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Upper Mississippi River National Wildlife and Fish Refuge
51 E. Fourth Street - Room 100
Winona, Minnesota 55987

IN REPLY REFER TO:

August 3, 2016

Julie Millhollin
Project Manager
U.S. Army Corps of Engineers
Rock Island District
Clock Tower Building, PO Box 2004
Rock Island, IL 61204-2004

Dear Ms. Millhollin:

U.S. Fish and Wildlife Service (USFWS) has reviewed the draft Feasibility Report and Tentatively Selected Plan for the Beaver Island Habitat Rehabilitation and Enhancement Project (HREP) and provides the following statements in support of the project.

This project meets the goals and objectives of the Upper Mississippi River National Wildlife and Fish Refuge (Refuge). The Refuge was established by Congress in 1924 to provide a refuge and breeding ground for migratory birds, fish, other wildlife, and plants. There have been many changes in environmental conditions on the Upper Mississippi River since the Refuge was established that have resulted in substantial ecosystem degradation. Beaver Island represents the largest and single most important habitat restoration project in Pool 14 to restore degraded environmental conditions within the backwater and floodplain forest habitats that will benefit migratory birds, fish, other wildlife, and plants.

The Beaver Island HREP will benefit a large area of Pool 14. This is especially important because Pool 14 begins the transition of the Upper Mississippi River ecosystem, and Beaver Island is a key element of environmental integrity before the transition. As you proceed downriver from Beaver Island, the river abruptly changes to a narrow channel with relatively fast flowing current. Shoreline areas are in private and commercial ownership with high demand for residential, industrial and community development.

The existence of numerous backwater lakes and extensive flowing side channels within Beaver Island's interior provides the best opportunity to restore optimum habitats for fish and wildlife within this forested floodplain ecosystem. Beaver Island is one of the largest islands on the Upper Mississippi River and its extensive acreage of both land and water provides a unique opportunity to restore a relatively large ecosystem in a section of river that is critically degraded.

The project will increase aquatic diversity and provide important environmental benefits for many species of fish and wildlife. The deepening of backwater lakes will improve water quality, increase oxygen content, and provide optimum habitat for a variety of aquatic species. It will

provide year round fish habitat, but more importantly, will restore critical overwintering habitat that is nearly non-existent within the Beaver Island interior and adjacent areas in Pool 14.

The narrow linear outline of the backwater lakes and their close proximity to each other provides a challenge for efficient mechanical excavation and placement of material. Double handling of excavated material, which is more costly, will be required in some areas so that water surface within individual lakes is not significantly reduced and the material is placed where it provides the greatest environmental benefit.

Increasing topographic diversity will complement the areas of floodplain forest, while minimizing impacts to threatened, endangered, and protected species. Currently, most of the amphibians and reptiles that inhabit Beaver Island are flooded out during annually re-occurring high water events. High water events that cover the island are occurring more often and for longer periods, often extending through the summer. The proposed elevated berm alignments will provide a land sanctuary that allows for the seasonal survival of reptiles and amphibians.

Improving forest diversity and quality is an important part of this HREP project. The forest has areas where there is a high diversity of tree species and areas where there is a low diversity of tree species. The high diversity forest is located in the higher elevation areas and the low diversity in the lower elevations. The low diversity forest is dominated by an even-aged stand of maple trees. Removal of these maples will allow open areas for the placement of excavated material. Raising the elevation by a few feet will allow the planting of floodplain tolerant hardwood trees. In addition, wetland shrubs are to be inter-planted within the trees. Timber stand improvement to include selective tree harvest, crop tree release and girdling will occur in other low diversity forest areas where excavated material will not be placed. Timber stand improvement practices and increased tree diversity will provide additional long-term benefits to migratory birds and federally-listed bat species, furthering the mission of the USFWS.

The placement of a closure structure on Beaver Slough to deflect sediment and reduce silt laden flows from entering the Upper Cut of Beaver Island will provide optimum protection for longevity of the Beaver Island HREP project. Water flows entering the Upper Cut are the primary source of sedimentation and potential pollution from Beaver Slough. A river training structure to eliminate this primary source of silt and pollution is a critical component of the project.

The project includes bank line protection for Albany Island. Albany Island is situated between Beaver Island and the main Mississippi River channel and provides a barrier that protects Beaver Island from wind and wave action, especially from passing towboats, and protects Albany Slough, an important mussel area. Erosion at the head of Albany Island and along its east shoreline is substantial. Stabilization of Albany Island to prevent future shoreline erosion will provide long term protection to Beaver Island. The placement of river stone sized to optimize mussel habitat along Albany Slough should enhance mussel populations.

In summary, U.S. Fish and Wildlife Service supports the Beaver Island HREP project and considers it to be the most important habitat restoration and enhancement project that can be completed in Pool 14. The island's large size, extensive forestry component, numerous backwater lakes, and flowing side channels make it a vital HREP project.

We appreciate our continued partnership with the Corps and state agencies on this Beaver Island project and the Upper Mississippi River Restoration program. Should you have questions regarding this letter, please contact Mr. Ed Britton, Savanna District Manager, at ed_britton@fws.gov or 815-273-2732; or Ms. Sharonne Baylor, Environmental Engineer, at sharonne_baylor@fws.gov or 507-494-6207.

Sincerely,

Tim Yager
Deputy Refuge Manager

cc: Ed Britton, Upper Mississippi River NW&FR
Russ Engelke, Upper Mississippi River NW&FR
Kraig McPeek, Rock Island Field Office
Sara Schmuecker, Rock Island Field Office
Stephen Winter, Upper Mississippi River NW&FR
Mark Steingraeber, La Crosse Fish and Wildlife Conservation Office
Mike Griffin, Iowa Department of Natural Resources

Fields of Opportunities

STATE OF IOWA

TERRY E. BRANSTAD, GOVERNOR
KIM REYNOLDS, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
CHUCK GIPP, DIRECTOR

Julie Millhollin
Project Manager
U. S. Army Corps of Engineers
Rock Island District
Clock Tower BLDG. PO Box 2004
Rock Island IL 61204-2004

August 15, 2016

Dear Ms. Millhollin:

This will serve as the letter of support from the Iowa Department of Natural Resources (IA DNR; non-federal sponsor) for the Beaver Island Habitat Rehabilitation and Enhancement Project (HREP) under the Upper Mississippi River Restoration (UMRR) program. The Beaver Island Project includes critical measures to improve forest composition, fisheries overwintering and deep water refugia, water delivery control, and freshwater mussel habitat.

As you are aware, the IA DNR fully concurs with the draft feasibility report and the Tentatively Selected Plan (TSP). My staff has been intricately involved with the planning of this critical HREP. The TSP is expensive but provides the critical habitat needed to accomplish the goals of the project.

The diverse forest community has changed since the 1930's because of water level changes along the impounded area of the River as a result of the 9-foot navigation project. Currently, the islands of the UMR are dominated by Silver Maple and Cottonwood. These soft mast trees are important to the islands of the Mississippi because they provide nesting sites for many species of birds, including bald eagles, colony nesting birds, cavity nesting birds and migratory neo-tropical passerines. These soft mast trees have colonized many of the islands on the Mississippi River, but are not long lived. Most stands are relatively even aged and near the end of their life span. There has been little regeneration on these low areas on the River. This HREP will provide large areas for a diversity of bottomland hardwood forest species, which are directly related to migratory birds and resident wildlife species. Providing higher elevations for forest regeneration will encourage and promote a sustainable, healthy and resilient forest for many years to come. This is a very important attribute that has disappeared from the River corridor over the past 80 years.

Providing higher areas to enhance forest diversity, along with the Timber Stand Improvement that will be done under the TSP, will enhance the forest on Beaver Island, which is one of the largest islands on the Upper Mississippi River.

Off-channel, overwintering habitat is critical to maintaining the health and resiliency of the fisheries community of the Upper Mississippi River. Over time, the quantity and quality of this

habitat has declined due to sedimentation and island dissection. The project will restore this critically important habitat within Beaver Island where it has been all but lost. Additionally, installation of a water delivery structure in the top cut of Beaver Island is critical with regard to reducing sediment delivery and ensuring project longevity.

As you know, mussels are some of the most imperiled animals throughout the world. As a State we are committed to keeping mussels on our landscape. Our State Wildlife Action Plan lists 53% of our native mussel species as Species of Conservation Concern. We commend the Corps of Engineers for partnering with us and developing innovative tools that help us maintain the River's biodiversity. We have not used many tools like chevrons and substrate placement in this reach of river, but are excited about the potential benefits to local mussel populations.

The Department agrees with the Corps assessment that a rock chevron, bank protection measures and substrate placement are needed for Albany Island. A well inventoried mussel bed exists on the downstream side of Albany Slough. The presence of this mussel bed is a direct result of quality habitat afforded by Albany Island and by fish populations (mussel hosts) that are utilizing the area. The Island provides flow and depth diversity that allow fish and mussels to thrive there. We are concerned that the further degradation of Albany Island will impact these habitats and the animals that inhabit them unless actions are taken.

The Iowa DNR is very supportive and proud to be the non-federal sponsor of the Beaver Island HREP. We look forward to the timely completion of this environmental restoration project. We are fully committed to the partnership developed under UMRR and pledge to help with project execution and evaluation. The fish and wildlife along the Mississippi River will benefit immensely from this project.

Sincerely,

Chuck Gipp

Director Iowa Department of Natural Resources

FWS/RIFO

August 24, 2016

Colonel Craig S. Baumgartner
District Engineer
U.S. Army Engineer Rock Island District
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Baumgartner:

This letter constitutes our ***Draft*** Final Fish and Wildlife Coordination Act Report (FWCAR) for the Beaver Island Habitat Rehabilitation and Enhancement Project (Beaver Island HREP). The Beaver Island HREP is located in Mississippi River Pool 14, River Miles 513.0 through 517.0, Clinton County, Iowa. The U.S. Army Corps of Engineers (USACE), Rock Island District proposes to rehabilitate and enhance the Beaver Island complex through implementations that will improve the quality of over-wintering habitat for the local fish community, increase floodplain forest vegetation diversity, and improve the overall ecological structure and function of the complex. The Beaver Island complex consists of 1,678 acres of interconnected backwaters, secondary channels, wetlands, and floodplain habitat, and is completely in Federal ownership and managed by the U.S. Fish and Wildlife Service (USFWS) as part of the Upper Mississippi River (UMR) National Wildlife and Fish Refuge. The project encompasses Beaver Island and Albany Island, which borders Beaver Island along the left descending bank, in addition to Albany Slough, separating the two islands.

The Beaver Island HREP is a component of the Upper Mississippi River Restoration Program (UMRR) authorized in Section 1103 of the Water Resources Development Act of 1986. The goal of the UMRR is to implement "...numerous enhancement efforts...to preserve, protect, and restore habitat that is deteriorating due to natural and man-induced activities."

STATE AGENCY COORDINATION

This report has been prepared by the USFWS, in cooperation with the Iowa Department of Natural Resources (IA DNR), and provides comments and recommendations regarding the construction of the Beaver Island HREP. Significant coordination between the USFWS, IA DNR, and the USACE resulted in a thoroughly reviewed and critiqued project with design

providing optimum benefits to fish and wildlife resources, while protecting and enhancing unique and diverse resources within the Project boundaries. The multi-agency coordination effort has demonstrated the value of this project towards maintaining a high quality UMR ecosystem while avoiding adverse impacts.

DESCRIPTION OF THE PROJECT AREA

Pool 14 is the 29.2 mile segment of the Mississippi River extending upstream from Lock and Dam 14 (river mile 493.3) at Princeton, Iowa to Lock and Dam 13 (river mile 522.5) at Fulton, Illinois. The Pool 14 floodplain is natural, without levees, with the exception of the northern one-third of the pool. Sections of levees extend downstream of Lock and Dam 13 from approximate river mile 510.5 to 522.5, bordering Fulton, Illinois and Clinton, Iowa, in addition to a small approximately two mile-long segment immediately below Albany, Illinois. Pool 14 has a surface area of approximately 10,580 acres. The majority of the riparian environment within Pool 14 consists of agricultural, residential, urban, and industrial development with interspersed undeveloped areas. The upper and middle portion of the pool consist of braided islands, side channels, and backwaters, extending downstream to the head of the former Rock Island rapids at the Fulton-Rock Island gorge. The lower portion of the pool, downstream of the gorge, lacks side channels and backwater habitats. The largest tributary to the pool is the Wapsipinicon River (Iowa) which enters the pool downstream of the project area at approximate river mile 506.8. Smaller tributary streams include Bud Creek (Iowa), Spring Creek (Illinois) and the Cedar Creek (Illinois). The Mississippi River in the vicinity of the Beaver Island HREP site has a drainage area of approximately 85,000 square miles.

The majority of publically held lands and waters within Pool 14 floodplain are primarily held by the USFWS and managed as part of the Upper Mississippi River Wildlife and Fish Refuge. Additional lands are held by the USACE under the Nine-Foot Navigation Project, and lands and waters owned by the States of Iowa and Illinois. The Princeton Refuge HREP is located downstream of the mouth of the Wapsipinicon River (river miles 504.0R through 506.5R), and was completed in 1995 under the UMRR Program and continues to be managed by the IA DNR.

A distinguishing characteristic of Pool 14 is the presence of the Exelon Generation Co. nuclear plant (Exelon) located in Cordova, Illinois, approximately six river miles downstream of Beaver Island, along the left descending bank. Exelon operates under a Section 10(a)(1)(B) incidental take permit for the federally endangered Higgin's-eye pearlymussel (*Lampsilis higginsii*) and sheepnose mussel (*Plethobasus cyphyus*), due to the generation of a thermal plume discharge into the Mississippi River at river mile 506.4. Increased thermal conditions have been documented to negatively impact the feeding, growth, and burrowing behavior in freshwater mussels. As part of the Habitat Conservation Plan and incidental take permit, monitoring was completed at three mussel beds over multiple years, both before and after the installation of the warm water discharge. One of the monitoring sites is located upstream of Exelon at river mile 507.0 on the Iowa bank, between Exelon and Beaver Island. This monitoring site has maintained a species richness of approximately 20 to 25 species of moderate density (average $9.3/m^2$), indicating the effects of the of the Exelon warm water discharge are unlikely to extend to the Project area

(Exelon Generation, 2009).

Human activity over the past two centuries within the UMR basin floodplain and channel, including the construction of the lock and dam system, has contributed to the alteration of the hydrology and topography historically present throughout the Upper Mississippi River valley (USACE, 2012). Such conditions have adversely impacted the biological resources of the river through reduction of habitat diversity.

Over time, the impacts of channel modification have contributed to a decrease in habitat structure diversity, bottomland hardwood tree regeneration, aquatic backwater and secondary channel habitats, and the biota dependent on these habitats. Specific to the Beaver Island area, the construction of Lock and Dam 13 (L/D 13) and L/D 14 in 1939 and other anthropogenic influences have resulted in altered flood regimes, including high flood pulses and the reduction of historically common low flow periods. Furthermore, navigation infrastructure and agriculture have collectively resulted in increased water levels and sedimentation leading to reduced diversity, quality, and acreage of aquatic habitat, native floodplain forest, and ephemeral wetlands through succession. Sedimentation has prevented access to and connectivity between many backwater areas, further reducing their functionality. These types of backwater areas provide habitat for multiple life-stages of various fish species, but are particularly ideal over-wintering habitat for certain fishes, including centrarchid species such as bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*), black crappie (*Pomoxis nigromaculatus*), and white crappie (*P. annularis*).

The altered flood pulse has resulted in year-round flooding of floodplain forests adjacent to the navigation channel, supporting the proliferation of flood-tolerant tree species, such as silver maple (*Acer saccharinum*), and invasive herbaceous plants, such as reed canary grass (*Phalaris arundinacea*). Such conditions result in a loss of flood intolerant hardwood mast tree species diversity and recruitment, with a migration towards a monotypic forest. Consequently, a loss of nut producing hardwood trees has been observed, which are a critical food source for many species of floodplain wildlife.

Furthermore, the altered channel and flow velocities have led to the erosion and loss of islands throughout Pool 14. Island loss results in increased wind fetch further eroding and exposing previously protected habitats, such as mussel beds and overwintering areas for fish. These stressors are likely to continue system wide, as will the decline of the quality of aquatic, wetland, and floodplain habitat. This project provides an opportunity to improve the quality and diversity of critical habitats within the Beaver Island complex.

PROJECT OBJECTIVES

The objectives of the Beaver Island HREP are to restore, enhance, and protect off-channel aquatic, wetland, and floodplain forest habitats, and to enhance overall resource values. These objectives were developed in accordance with the Upper Mississippi River Wildlife and Fish Refuge management plan, with input provided by State and Federal Biologists. Action items, as presented in the *draft* Feasibility Report with Integrated Environmental Assessment for the

Beaver Island HREP (*draft* Feasibility Report here after), dated May 2016, to meet these objects include:

1) Increase year-round aquatic habitat diversity, as measured by acres and native fish use of spawning, rearing and overwintering habitat;
2) Increase the abundance of isolated seasonally flooded wetlands, as measured in acres and use by amphibians and reptiles;
3) Diversify floodplain forest and scrub-shrub habitat on Beaver Island, as measured in acres; and
4) Increase structure and function of side channel habitat, as measured by native freshwater mussel use.

Several alternatives were considered and evaluated to determine the most efficient way to meet the project objectives. Full details and evaluations of these alternatives can be reviewed in the *draft* Feasibility Report (USACE, 2016).

THREATENED AND ENDANGERED SPECIES

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

The following is a list of federally listed species which may be present within the area of concern.

Classification	Common Name	Scientific Name	Habitat
Endangered	Higgin's-eye pearlymussel	*Lampsilis higginsii*	Mississippi River north of Lock and Dam 19 at Keokuk, Iowa and in three tributaries of the Mississippi River: the St. Croix River, Wisconsin River, and the Iowa Rock River. Usually found in deep water with moderate currents and gravel substrate.

Classification	Common Name	Scientific Name	Habitat
Endangered	Indiana bat	*Myotis sodalis*	Winter: hibernate in caves and mines. Summer: roost under loose tree bark on dead or dying trees.
Threatened	Northern long-eared bat	*Myotis septentrionalis*	Winter: hibernate in caves and mines. Summer: found in wooded habitat; roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags. Males and non-reproductive females may also roost in cooler places, such as caves and mines.
Threatened	Prairie bush clover	*Lespedeza leptostachya*	Found throughout tallgrass prairie region of the Upper Mississippi River valley.
Threatened	Western prairie fringed orchid	*Platanthera praeclara*	Found in mesic to wet unplowed tallgrass prairies and meadows, but have also been found in old fields and roadside ditches.
Endangered	Iowa Pleistocene snail	*Discus macclintocki*	Found in approximately 30 sites in Iowa and Illinois in leaf litter of cool and moist algific talus slope hillsides.

Higgin's-eye pearlymussel (*Lampsilis higginsii)*

The federally endangered Higgin's-eye pearlymussel has been documented to have widespread presence throughout Pool 14 of the Upper Mississippi River. One Essential Habitat Area is located approximately six river miles downstream of the project area along the Cordova, Illinois bankline. Freshwater mussel surveys were conducted by staff from the USACE, USFWS, IA DNR, IL DNR, and U.S. Geological Survey (USGS) throughout Albany Slough during the summers of 2014 and 2015. A single Higgin's-eye pearlymussel individual was identified near the lower end of Albany Slough during an August 2014 survey. However, no Higgin's eye pearly mussels were identified during the subsequent extensive survey efforts in 2015. The USACE prepared a Biological Assessment (BA), dated February 2016, which concluded that the project *may affect, but is not likely to adversely affect* the Higgin's-eye pearlymussel. The USFWS provided concurrence with this determination through formal correspondence dated February 29, 2016.

Indiana bat *(Myotis sodalis)* and northern long-eared bat (*Myotis septentrionalis*)

The federally endangered Indiana bat *(Myotis sodalis)* and the threatened northern long-eared bat (*Myotis septentrionalis*) are listed as potentially occurring in Clinton County, Iowa. Surveys were conducted by Stantec Inc. during August 2015 (Kiser et al., 2015) to determine the probable presence or absence of these two species in the forested habitats on Beaver Island. Surveys included evaluation of potential habitat, acoustic data collection, mist netting, and telemetry, and were conducted in accordance with the USFWS's 2015 Range-wide Indiana Bat Summer Survey Guidelines (USFWS, 2015). Acoustic results indicated the presence of both listed bat species within the Beaver Island HREP area; however, mist netting efforts resulted in the capture of 14 northern long-eared bats, and no Indiana bat individuals. Three NLEBs were telemetered resulting in the identification of five roost trees outside of the Beaver Island HREP boundaries.

Timber stand improvement practices and dredged material placement (including tree removal and clearing) are proposed as components of the Beaver Island HREP. The total proposed tree removal area is approximately 5.4 percent of the total forested habitat available on Beaver and Albany Islands. The tree removal, as proposed, will expand existing forest clearings surrounding water bodies and will not result in further fragmentation of bat roosting or foraging habitat. A recent habitat survey completed by the USACE identified additional potential roosting habitat throughout the remaining forested sections of the Beaver/Albany Island complex including trees that likely serve as secondary and/or primary maternity roosts. The USACE's BA concluded that the project *may affect, but is not likely to adversely affect* the Indiana bat and northern long-eared bat. The USFWS provided concurrence with these determinations in formal correspondence dated February 29, 2016.

Three other federally listed species, the prairie bush clover (*Lespedeza leptostachya)*, the Western prairie fringed orchid (*Platanthera praeclara*), and the Iowa Pleistocene snail (*Discus macclintockii*) are known to occur in counties throughout Iowa and Illinois bordering Pool 14; however, suitable habitat for these species is not found within the project area.

The Eastern massasauga rattlesnake (*Sistrurus catenatus*) has been proposed as federally threatened within Clinton County, Iowa. Habitat for the Eastern massasauga consists of wet areas including wet prairies, marshes and low areas along rivers and lakes. In many areas massasaugas also use adjacent uplands during part of the year. Eastern massassauga presence has not been documented within the Beaver Island HREP vicinity.

Although no longer a listed species, bald eagles (*Haliaeetus leucocephalus)* continue to be protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Bald eagles winter along the Mississippi River, including Pool 14. Suitable perch trees where eagles can loaf and perch are numerous. Two bald eagle nest sites are known to occur on Beaver Island within the project vicinity; however, due to their distance from proposed construction activities (approximate distance) and the timing of construction, potential disturbance during construction is unlikely. Furthermore, project features will not affect known nest sites.

A newly-occupied heron rookery exists on the southwest portion of Beaver Island. The Beaver Island HREP features were reconfigured to provide a buffer between active nest sites and construction activities. We appreciate the interagency planning team's consideration of that important resource and the avoidance of clearing trees in the vicinity of the rookery. We recommend that the proposed clearing on Beaver Island be conducted prior to spring nesting to reduce potential impacts to nesting birds protected under the Migratory Bird Treaty Act.

State of Iowa threatened and endangered species that may occur within Clinton County, Iowa include the following.

Common Name	Scientific Name	Listing Status	Classification
Butterfly	*Ellipsaria lineolata*	Threatened	
Creeper	*Strophitus undulates*	Threatened	Freshwater
Higgin's-eye Pearlymussel	*Lampsilis higginsii*	Endangered	Mussel
Round Pigtoe	*Pleurobema sintoxia*	Endangered	

Yellow Sandshell	*Lampsilis teres*	Endangered	
Blacknose shiner	*Notropis heterolepis*	Threatened	
Bluntnose Darter	*Etheostoma chlorosoma*	Endangered	
Chestnut Lamprey	*Icthyomyzon castaneus*	Threatened	
Freckled Madtom	*Notorus nocturnus*	Endangered	Fish
Grass Pickerel	*Esox americanus*	Threatened	
Lake Sturgeon	*Acipenser fluvescens*	Endangered	
Western Sand Darter	*Ammocrypta clara*	Threatened	
Central Newt	*Notophthalmus viridescens*	Threatened	Amphibian
Blanding's Turtle	*Blanding's Turtle*	Threatened	
Eastern Massasauga Rattlesnake	*Sistrurus catenatus*	Endangered	Reptile
Ornate Box Turtle	*Terrapene ornate*	Threatened	
Iowa Pleistocene Snail	*Discus macclintocki*	Endangered	Snail
Barn Owl	*Tyto alba*	Endangered	
King Rail	*Rallus elegans*	Endangered	Bird
Red-Shouldered Hawk	*Buteo lineatus*	Endangered	
Byssus Skipper	*Problema byssus*	Threatened	Insect
Black Hucklebery	*Gaylussacia baccata*	Threatened	
Dwarf Dandelion	*Krigia virginica*	Endangered	
Eastern Jointweed	*Polygonella articulate*	Endangered	
Flax-Leaved Aster	*Aster linariifolius*	Threatened	
Mead's Milkweed	*Asclepias meadii*	Endangered	
Meadow Beauty	*Rhexia virginica*	Threatened	
Orange Grass St. Jon's Wart	*Hypericum gentianoides*	Endangered	Plant
Poppy Mallow	*Callirhoe triangulate*	Endangered	
Racemed Milkwort	*Polyhala polygama*	Endangered	
Pale Green Orchid	*Platanthera flava*	Endangered	
Black-footed Quillwort	*Isoetes melanopoda*	Endangered	
Daisy-leaved Moonwort	*Botrychium matricariifolium*	Endangered	
Royal Fern	*Osmunda regalis*	Threatened	

The proposed Beaver Island HREP will not adversely affect federally endangered species or their habitats. This precludes the need for further action on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. Should this project be modified or new information indicate endangered species may be affected, consultation should be initiated.

DISCUSSION OF SELECTED PROJECT FEATURES

A total of 11 potential project features were considered including lake dredging locations, areas of topographic diversity, river training structures, river control structures, bankline protection structures, constructed soil units, areas of mussel habitat, and non-structural improvements (best management practices, timber stand improvements, and education and outreach). All potential project features were combined into potential project measures, with instances of several features combined into a single measure if the features were reliant on each other. Project measures were further combined into alternatives. A total of 209 project alternatives, including the No Federal Action alternative, were generated from these proposed project features, from which 29

alternatives were determined to be cost effective. The No Federal Action alternative is considered the future without project condition allowing the area to continue as is.

Habitat Evaluation Procedures (HEP) and Hydraulic Engineering Center Ecosystem Functions Model (HEC-EFM) were utilized to quantify aquatic and floodplain benefits, respectively. The models calculated habitat units (HUs) per unit cost for pre-dam (pre-1939), existing, future with project, and future without project conditions. A discussion of these evaluation procedures is provided in Section V (B) of the *draft* Feasibility Report. Eighteen of the cost effective alternatives met the project objectives and Sponsor needs, and were therefore further considered by the interagency team. The coordinating team recommended the following alternative and project features within the Beaver Island HREP complex to best meet the project goals, the sponsors stated objectives and other agency identified goals and objectives:

Project Feature	Description	Feature Location
Lower Cut Stewart Lake Blue Bell Lake Sand Burr Lake	Backwater dredging and addition of fisheries substrate to increase aquatic diversity and provide year-round fisheries habitat, and increasing existing elevations and planting trees, shrubs, and understory plants to increase topographic and forest species diversity, including hard mast tree species.	Beaver Island interior: Lower Cut, Stewart Lake, Blue Bell Lake, and Sand Burr Lake
Closure Structure	Closing structure installation to reduce sediment influx through Beaver Island and maintain aquatic diversity.	Upstream end of Upper Cut
Chevron Structure Mussel Substrate	Chevron and substrate structure installations for stabilization of Albany Island bankline and to increase aquatic and mussel habitat.	Upstream end of Albany Island and Albany Slough
Timber Stand Improvement (TSI)	Timberstand improvement to increase floodplain forest age, structure, and species diversity.	Throughout Beaver Island (approx. 350 acres)

This alternative was selected over more cost effective alternatives in an effort to reduce impacts to existing high quality resources and to fulfill all project objectives. The interagency planning team decided that all eight of the project features and corresponding locations considered should be included in the plan. Therefore, the project area includes four backwater lakes and adjacent banklines within Beaver Island, in addition to Albany Slough, Albany Island, and timber stand improvement throughout Beaver Island. Additional project provisions agreed upon by the interagency planning team include extra handling and re-configuration of dredged material placement to avoid impacting floodplain forest resources.

DISCUSSION OF FUTURE WITHOUT AND WITH PROJECT

For all project alternatives, future with-project and future without-project conditions were modeled over a 50-year planning horizon. The primary factors identified to affect future conditions of the project area include sedimentation, backwater lake water quality, flood

inundation and duration, and island erosion. Physical habitat conditions within the Project area were collected at identified points in time to model and quantify corresponding habitat conditions.

The without project analysis indicated long-term continuation of sedimentation and successional changes in aquatic habitat. These changes are anticipated to result in the continued degradation of off-channel lacustrine fisheries habitat and succession of aquatic areas to flood tolerant herbaceous species, such as reed canary grass. Sedimentation rates within Beaver Island were monitored at two locations between 1984 and 2000 by the IA DNR. As provided in Section II(K) of the *draft* Feasibility Report, sedimentation rates were observed to be dynamic, ranging from -0.8 inches/year (erosion) to 1.9 inches/year (deposition). Overall, sedimentation trended towards deposition, with an estimated overall rate of 1 cm/year within the Beaver Island interior.

Changes in water quality and temperature would occur with additional sedimentation. Key factors influencing overwintering habitat and water quality conditions include dissolved oxygen, temperature, and water velocities. The existing aquatic habitat lacks adequate overwintering conditions (i.e., depth and flows) important for year-round habitat functioning. Baseline water quality monitoring of Beaver Island interior lakes was initiated in 2008. Two sample locations were monitored over a seven-year period. Monitoring efforts documented extended periods of snow and ice resulting in low dissolved oxygen conditions within the Beaver Island interior, with periodic winter supersaturation conditions. Additionally, the interior Beaver Island lakes exhibited significant bedload movement during periods of high flow. Installation of the closing structure at the upstream end of Beaver Island and dredging of the interior backwater lakes will result in reduced water velocity and sediment bedload moving through the Beaver Island complex and restore ecosystem function. The Bluegill Habitat Suitability Index (HSI) model (Stuber et al., 1982) was selected to assess the existing, future without project, and future with project backwater aquatic habitat conditions on the overwintering centrarchid community. Dredging of the backwater lakes and access channels is expected to benefit local fish communities by providing access to backwater overwintering habitats with depths conducive to supporting ideal dissolved oxygen and temperature profiles.

Albany Slough, the existing secondary channel habitat located between Beaver Island and Albany Island, has degraded geomorphologic features, structure, and function. It is projected in the future without scenario that the Island will continue to erode and degrade, which would result in major detrimental effects on the existing mussel community inhabiting the side channel and the fish species which serve as hosts. Installation of the chevron structure and mussel habitat substrate will provide stability to Albany Island and reduce the effects of wind fetch and erosion. Classification and regression tree (CART) modeling (Steuer et al., 2008) was used to evaluate potential hydraulic changes to Albany Slough from the proposed chevron construction and to evaluate potential impacts to Higgin's eye pearly mussel. The model identified near constant values for velocity, shear stress, substrate composition, and channel slope with and without the structure. Furthermore, the model indicated a high probability of mussels resulting from the chevron construction 'build' scenario.

The Walleye HSI model (McMahon et al., 1984) was selected by the interagency planning team

to assess the existing, future without project, and future with project backwater aquatic habitat conditions of riverine components. This model was selected in the absence of an approved mussel model to predict the Beaver Island HREP effects on the potential occupation of the riverine project features by the federally endangered Higgin's-eye pearlymussel and common generalist mussel species through occupation by walleye host individuals. Providing enhanced habitat in an area where a moderately diverse and dense mussel bed is known to exist is likely to result in benefits to the mussel community, and promote occupancy by the federally endangered Higgin's-eye pearlymussel.

River flood stages, and the resulting inundation of floodplain forest areas lacking topographic diversity, have increased since installation of the Upper Mississippi River lock and dam system. Specifically, average flood stage elevations increased approximately 0.5 feet between the 30-year monitoring periods of 1954-1983 and 1984-2013. Increased flood height, frequency, and duration have resulted in the displacement of tree stands of diverse species and age towards flood tolerant tree species and invasive herbaceous plants. The approximately 1,500 acres of Beaver Island HREP floodplain area consists of 95 percent broad-leaved deciduous forest habitat and approximately 5 percent open canopy habitat, a significant portion of which is occupied by reed canary grass. A 2015 forest inventory of mast tree species conducted by the USACE recorded a total of 10 different species in the overstory. Forest patches of such diverse and unique tree species are not typically found within the Upper Mississippi River floodplain due to flood intolerance. The identified mast trees were, on average, over 88 years old and contained little recruitment in the understory, which is directly related to increased water inundation and duration.

A key component of the Beaver Island HREP includes preserving these unique and diverse patches of forest while restoring and increasing the surrounding monotypic flood-tolerant forest. Dredged material placement throughout the Beaver Island and Albany Island interiors is designed to increase topographic diversity and allow for the planting and regeneration of hardwood mast trees. Thus, changes in floodplain forest species and age structure composition under future with-project conditions are projected to improve as existing diverse patches of hardwood mast tree species are allowed to regenerate in response to the raised elevation of adjacent areas above that of frequent and prolonged inundation. Proposed conservation measures, as identified in the BA, include timber stand improvement activities for over 100 acres of Beaver Island. Timber stand improvement will include girdling trees for increased snag habitat, canopy openings, mast tree plantings, and vegetation maintenance. An additional planting of more than 800 mast trees, including species which produce exfoliating bark, will be completed in the cleared areas. Collectively, these activities should result in positive long-term benefits for potential roost tree production, foraging habitat, and overall habitat diversity.

Refer to the *draft* Feasibility Report, for a comprehensive list and discussion of prior studies and reports conduct at Beaver Island and surrounding areas.

CONCLUSIONS AND RECOMMENDATIONS

The Beaver Island HREP offers a unique opportunity to restore and enhance a fish and wildlife

resources in this section of Pool 14. The multi-agency coordination effort has demonstrated the value of this project towards maintaining a high quality UMR ecosystem while avoiding adverse impacts. Beaver Island represents the largest and single most important habitat restoration project in Pool 14 to restore degraded environmental conditions within the backwater and floodplain forest habitats that will benefit migratory birds, fish, other wildlife, and plants.

This ecosystem restoration project will result in improved overwintering conditions for a variety of species. Increasing backwater depths with the resulting improvement in water quality and fish habitat structures should promote and improve seasonal refugia with resulting benefits to the warm-water fisheries communities. Placement of mussel substrate should promote and improve mussel habitat quality with resulting benefits to many mussel species, including the federally and state-listed Higgin's-eye pearlymussel. Additional habitat gains will result for floodplain forest quality through increasing hardwood forest stand species diversity, age, and structure. This will provide long-term benefits to resident migratory bird and bat species, providing increased foraging and shelter habitat diversity and other species relying on hardwood mast trees as a source of food and shelter. Improvements would occur at each individual site. However, these improvements would extend beyond each individual site and are expected to benefit the entire fish and wildlife communities within adjacent areas.

Further, the Beaver Island HREP meets the goals and objectives of the Upper Mississippi River National Wildlife and Fish Refuge, which was established by Congress in 1924 to provide a refuge and breeding ground for migratory birds, fish, other wildlife, and plants.

Therefore we recommend the preferred alternative which includes:

> Backwater restoration of Stewart Lake, Blue Bell, Sand Burr, and Lower Cut through the means of mechanical dredging with placement of dredged material in an effort to improve island site suitability for mixed bottomland tree species by raising ground and providing topographic diversity; construction of a closing dam at the opening of upper cut to protect Beaver Island backwater habitats from further sedimentation; and the construction of a chevron rock structure and placement of mussel habitat substrate at the upstream end of Albany Island and Albany Slough to prevent future erosion and provide improved freshwater mussel habitat.

This letter has been prepared under the authority of and in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat.401, as amended; 16 U.S.C. 661 et seq.); the Endangered Species Act of 1973, as amended; and the Migratory Bird Treaty Act (40 Stat, 755, as amended; 16 U.S.C. 703 et seq.). We appreciate the opportunity to provide these comments and look forward to continued coordination on this project. If you have any questions, please contact Sara Schmuecker of my staff at (309) 757-5800, ext. 203.

Sincerely,

Kraig McPeek
Field Supervisor

Cc:
U.S. Fish and Wildlife Service (Tim Yager, Ed Britton, Sharonne Baylor)
Iowa DNR (Mike Griffin, Scott Gritters)

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REFERENCES

Exelon Generation. 2009. Habitat Conservation Plan (HCP) to support issuance of an Incidental Take Permit (ITP) for the federally endangered *Lampsilis higginsii* mussel and the candidate mussel species *Plethobasus cyphyus* related to the operations of the Quad Cities Station (QCS). 294pp.

Kiser, J. D., Stoffs, H., Karczewske, B., & Dunn, H. 2015. Indiana bat and northern long-eared bat survey – Beaver Island habitat rehabilitation and enhancement project, Mississippi River (RDB, RM 513.0-515.5), Clinton County, Iowa, Contract No. W912EK-1-D-0002. Prepared by Stantec for the U.S. Army Corps of Engineers. Pp174.

Steuer, J. J., T. J. Newton, and S. J. Zigler. 2008. Use of complex hydraulic variables to predict the distribution and density of unionids in a side channel of the Upper Mississippi River. Hydrobiologia 610: 67-82.

Stuber, R.J., G. Gebhart, and O.E. Maughan. 1982. Habitat suitability index models: Bluegill. U.S.D.I. Fish and Wildlife Service. FWS/OBS-82/10.8. 26pp.

U.S. Army Corps of Engineers (USACE), 2012. Upper Mississippi River systemic forest stewardship plan. 124pp.

U.S. Army Corps of Engineers (USACE), 2016. Draft Upper Mississippi River Restoration Feasibility Report with Integrated Environmental Assessment, Beaver Island Habitat Rehabilitation and Enhancement Project, Pool 14, Upper Mississippi River Miles 513.0-517.0, Clinton County, Iowa. Rock Island District.

U.S. Fish and Wildlife Service (USFWS). 2015. 2015 Rangewide Indiana Bat summer survey guidance. U.S. Fish and Wildlife Service, Bloomington, Indiana. 44 pp.

U.S. Fish and Wildlife Service (USFWS). 29 February 2016. Beaver Island habitat rehabilitation and enhancement project, biological assessment concurrence letter.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS - ROCK ISLAND DISTRICT
CLOCK TOWER BUILDING - PO BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

September 7, 2016

Regional Planning and Environmental
Division North (RPEDN)

SEE DISTRIBUTION LIST

The U.S. Army Corps of Engineers, Rock Island District (District), is currently proposing the Beaver Island Complex Habitat Rehabilitation and Enhancement Project (Project) in the Upper Mississippi River System, Pool 14, between river miles 613 and 617.5, across from Clinton, Iowa in Clinton County Iowa. Beaver Island is approximately 1,678 acres in size and is located within Sections 13 and 23-26 of T81N, R6E and Sections 18-19 of T81N, R7E (Enclosure 1). The Project area includes both USFWS and District fee title lands and will impact approximately 541 acres as identified in Enclosure 2.

The Tentatively Selected Plan (TSP) includes the following goals:

- Increasing aquatic diversity in the Beaver Island backwater, specifically in Lower Cut, Stewart Lake, Blue Bell, Sand Burr, as well as two unnamed connections through excavation and additions of fisheries structure.
- Increasing forest diversity in select areas of Beaver Island to include increasing existing elevations and planting trees, shrubs, understory plants, and buffer species.
- Maintaining aquatic diversity in the Beaver Island backwater by constructing a closure structure at the upstream end of Upper Cut, which will help reduce sediment influx into the complex.
- Constructing a chevron, bankline protection, and adding substrate to preserve and enhance Albany Island and Albany Slough for aquatic and mussel habitat.

The enhancement features will be accomplished by dredging of existing channels, excavating channels in backwater areas, clearing areas for dredged material placement, construction of elevated berms with the dredged material, planting mast trees on the elevated berms, constructing a water control structure at the upper end of the island and using timber stand improvement (TSI) techniques. These techniques include a combination girdling, selective planting, and crop tree release. All feature footprints are identified in Enclosures 1 through 10.

Impacts associated with project features include ground disturbance from tree clearing, dredging, dredged material placement, construction, bankline protection, and selective tree plantings. Tree girdling will impact only individual trees, and they will be allowed to stand to provide habitat. Crop tree release involves cutting smaller trees in proximity to mast producing trees to improve survivability. No ground disturbance will result from either of these actions. All staging and access to these areas will be from the water.

Federal Undertaking

Pursuant to the National Historic Preservation Act (NHPA) of 1966, as amended, and its implementing regulations, 36 CFR Part 800, the District has determined that dredging of existing channels, the development of water control structures, channel excavation, placement of dredge material, and river control structures in the proposed locations has potential to cause effects to archeological historic properties [36 CFR 800.3(a)(1)] and as a consequence will require a determination of effect within the Area of Potential Effect.

Area of Potential Effect

The Area of Potential Effect (APE) is the footprint of proposed project features and totals approximately 541 acres. The main impacts will be ground disturbance from dredging (32.8 acres), tree clearing, dredge placement and associated landscaping and tree plantings to create topographic diversity (81.0 acres); timber stand improvement (420 acres); water control structure construction (0.3 acre) chevron construction (717 linear feet, approximately 0.5 acre); bankline protection and associated tree clearing (1300 linear feet, approximately 5.7 acres); and placement of material to enhance aquatic diversity and mussel bed substrate (300 linear feet, approximately 0.4 acre). These features with individual footprints are provided in Enclosures 1-10.

Consulting Parties

The District finds the organizations identified on the Distribution List are entitled to be consulting parties, as set out in 36 CFR 800.2, and invites them by copy of this letter to participate in the Section 106 process.

State Historic Preservation Officer (SHPO) Invitation

The District invites the SHPO to:

- identify any other consulting parties as per 36 CFR 800.3(f);
- comment as per 36 CFR 800.2(d)(3) on the District' plan to involve the public by utilizing the District' normal procedures for public involvement under the National Environmental Policy Act (NEPA); and,
- comment on or contribute to identification efforts including definition of the APE, all as per 36 CFR 800.4(a-b).

Identification of Historic Properties

Review of Existing Information and Level of Future Identification Efforts: The District conducted an archival search for historic properties following the Policy and Procedures for the Conduct of Underwater Historic Resource Surveys for Maintenance Dredging and Corps Activities (DGL-89-01, March 1989). The District queried the most updated Iowa Geographic

Information Systems site file database and reviewed the report entitled *An Investigation of the Submerged Historic Properties in the Upper Mississippi River and Illinois Waterway,* dated October 1997 (Contract Number DACW25-93-D-0-012, Order No. 27) for historic properties potentially affected by this project.

The District contracted with Bear Creek Archaeology (BCA) of Cresco, Iowa under terms of Contract W912EK-12-D-0001, Task Order 12. BCA conducted geomorphological survey of the island and archeological investigation of moderate-to-high potential areas and prepared the report entitled *Phase I Archeological and Geomorphological Survey for the Beaver Island Complex Habitat Rehabilitation and Enhancement Project, Camanche and Clinton Townships, Clinton County, Iowa* dated December 2014. Messrs. David Benn, Lowell Blikre, and Jared Langseth prepared the report for the District under terms of Contract W912EK-12-D-0001, Task Order 12.

The geomorphological investigation defined low archeological potential across much of the APE. Beaver Island consists of a complex pattern of sloughs, abandoned channels, and river scrolls with ridge-and-swale topography formed by meandering of the Mississippi River during Middle-Late Holocene eras. Moderate archeological potential is restricted to the Middle-Late Holocene alluvium associated with higher ground, such as natural levees and crevasse splays. Archeological survey was restricted to these landforms as identified in Enclosure 11 and amounted to a total of 17.7 acres.

BCA pre-field research identified four portions of Beaver Island that had been surveyed previously; the surveys found that the four portions were outside of the current APE. The BCA research identified five previously-recorded sites on Beaver Island and 14 additional sites within a one-mile radius of the APE. None of the sites were recorded within the current APE, although BCA reviewed historic maps and aerial photographs of the Project area and identified one potential historic site within the general Project area that had not been previously recorded (Enclosure 12).

The pedestrian survey identified one newly recorded historic site, 13CN176 (Enclosure 13). Site 13CN176 was initially identified on historic maps and appears to date to the early/mid 20th century. BCA did not conduct subsurface testing at this site but recommended additional work should the Project plans be changed. The TSI portion of the APE has been modified to avoid impacts at this location. This site is located on District fee title land.

Intensive subsurface archeological survey resulted in the documentation of two previously unrecorded prehistoric archeological sites. Site 13CN177 is interpreted to be a Middle-Late Woodland bivouac with undisturbed portions of the site and high probability for intact features. The site is considered potentially eligible for inclusion for the National Register of Historic Places (NRHP). The Contractor has recommended either avoidance of site 13CN177 or, if avoidance is not possible, Phase II testing to determine NRHP eligibility.

Site 13CN178 is interpreted to be a Late Archaic bivouac with undisturbed deposits and potential for intact features. BCA recommended avoidance of the site or Phase II testing to determine NRHP eligibility (Enclosure 13). Both sites are also located within or near TSI segments of the APE. The TSI APE was modified to avoid these sites. Both sites are located on USFWS fee title land.

The State Historical Society of Iowa was provided a copy of the BCA report by letter dated December 24, 2014. The SHSI responded by e-mails dated January 14, 2015 with a minor editorial comment and the observation that the BCA investigation appeared to meet the District Scope of Work but that the District should resume formal consultation once the APE was fully defined (R&C# 140723069).

Determination of Effect

The three archeological sites are confined to higher elevations as predicted by the geomorphological assessment and outside of any proposed project features. The District refined the TSI APE in order to avoid impacting these sites (Enclosure 14). The remainder of the APE as defined herein, has been evaluated as having low potential for intact cultural resources on the basis of the BCA geomorphological investigation. Therefore, it is the District's opinion that the present undertaking will have No Effect on historic properties within the APE due to the low archeological potential as demonstrated by the geomorphological investigation in accordance with 36 CFR 800.4(d)(1). The District further has determined that this undertaking will have No Adverse Effect on sites 13CN176, 177, and 178 as this undertaking will have no direct or indirect effects on these sites in accordance with 36 CFR 800.5(b).

Request for Information from Consulting Parties

The District is seeking information from all consulting parties regarding their concerns with issues relating to the potential effects of this undertaking on historic properties and, particularly, the tribes' concerns with identifying properties that may be of religious and cultural significance to them and may be eligible for the NRHP [36 CFR 800.4(a)(3-4)]. Concerns about confidentiality [36 CFR 800.11(c)] regarding locations of properties can be addressed under Section 304 of the NHPA which provides withholding from public disclosure the location of properties under several circumstances, including in cases where it would cause a significant invasion of privacy, impede the use of a traditional religious site by practitioners, endanger the site, etc.

The District requests your written comments on this project within 30 days, pursuant to 36 CFR 800.3(c)(4). Results of all consultation and determination shall be included in the Environmental Assessment for additional public review this year.

If you have any questions regarding this matter, please call Mr. Jim Ross of our Environmental Compliance Branch, (309) 794-5540, or write to our address above, ATTN: Environmental Compliance Branch (Jim Ross).

Sincerely,

for Kenneth A. Barr
Chief, Environmental Planning Branch RPEDN

Enclosure

DISTRIBUTION LIST

Historic Preservation Coordinator
Sac and Fox Nation of Mississippi in Iowa
349 Meskwaki Road
Tama IA 52339-9629

Iowa Tribe of Kansas and Nebraska
Native American Heritage Museum
RR1 Box 152 C
Highland KS 66035

Tribal Chairperson
Iowa Tribe of Kansas and Nebraska
3345 Thrasher Road #8
White Cloud KS 66094-4028

R&C Coordinator
State Historical Society of Iowa
600 East Locust
Des Moines IA 50319-0290

Cultural Preservationist
Iowa Tribe of Oklahoma
Route 1, Box 721
Perkins OK 74059

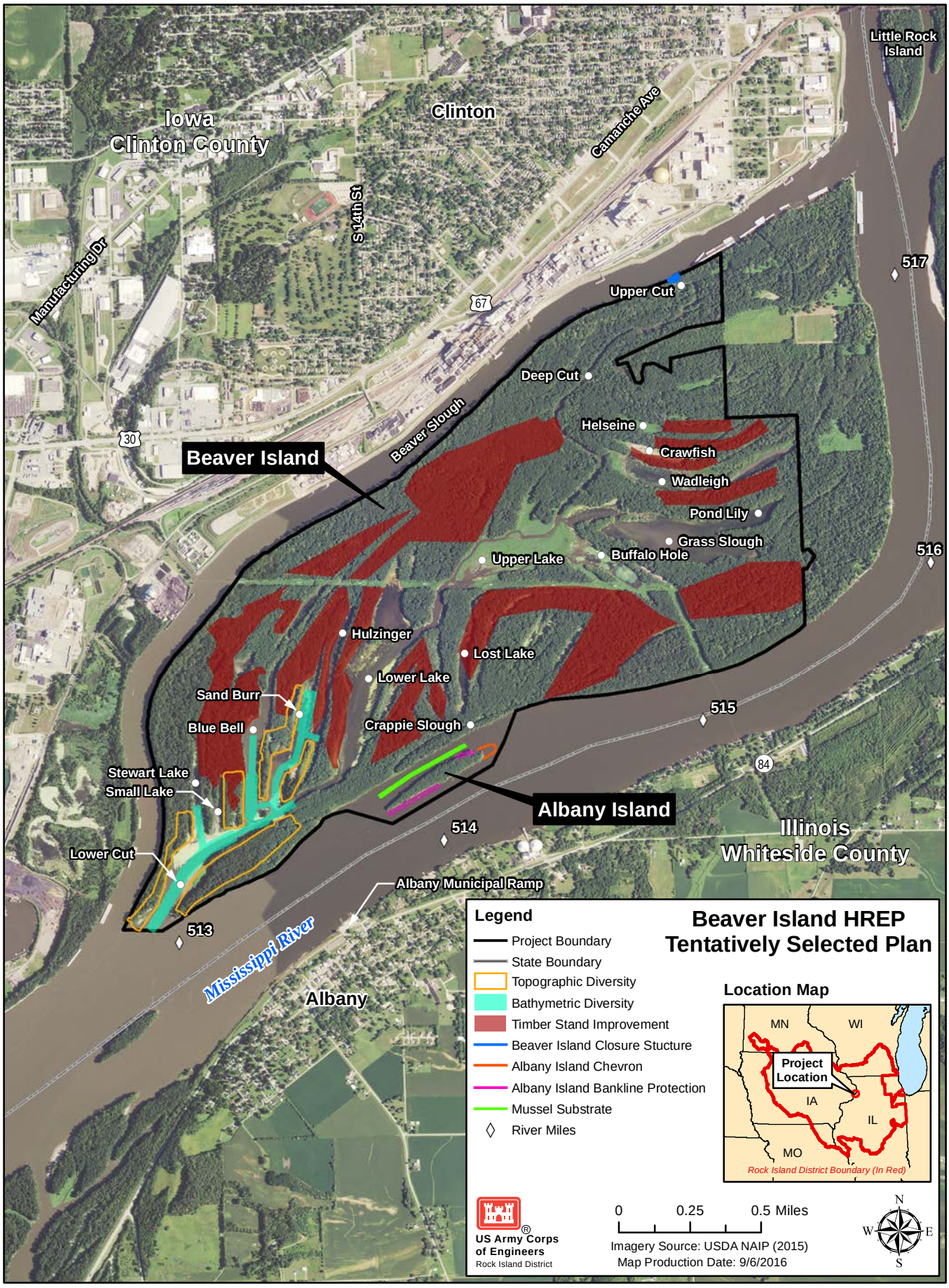
NAGPRA Coordinator
Sac and Fox Nation of Oklahoma
Route 2, Box 246
Stroud OK 74079

Clinton County Historical Society & Museum
601 South First Street
Clinton IA 52732

Assiniboine and Sioux Tribes of the
Fort Peck Indian Reservation
P.O. Box 1027
Poplar MT

NAGPRA Coordinator
Sac & Fox Nation of Missouri in
Kansas and Nebraska
305 North Main
Reserve KS 66434-9723

James E. Myster
Regional Historic Preservation Officer
Midwest Region (Region 3)
U.S. Fish and Wildlife Service
5600 American Boulevard West, Suite 1049
Bloomington MN 55437



Enclosure 1. Project Area of Potential Effect.

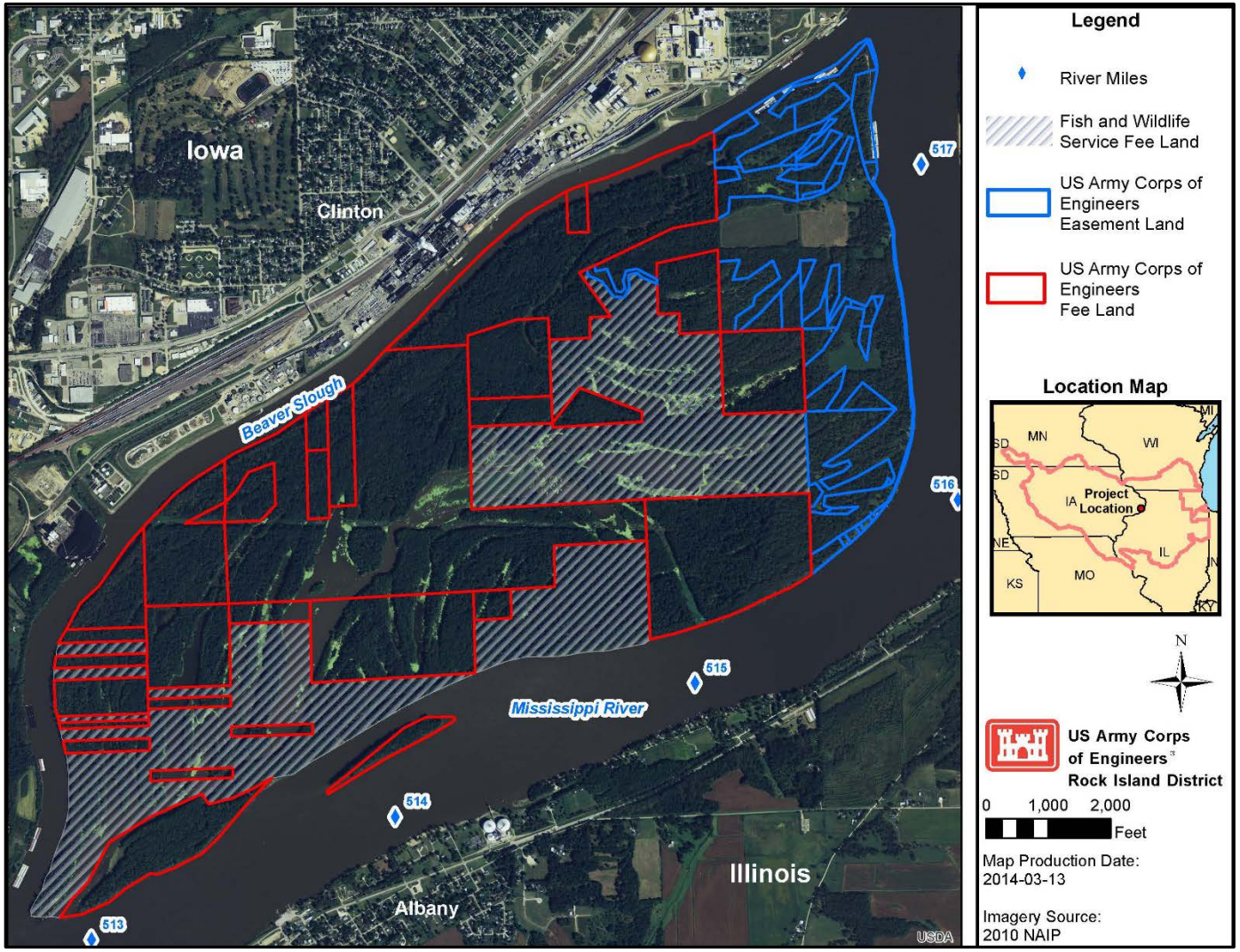
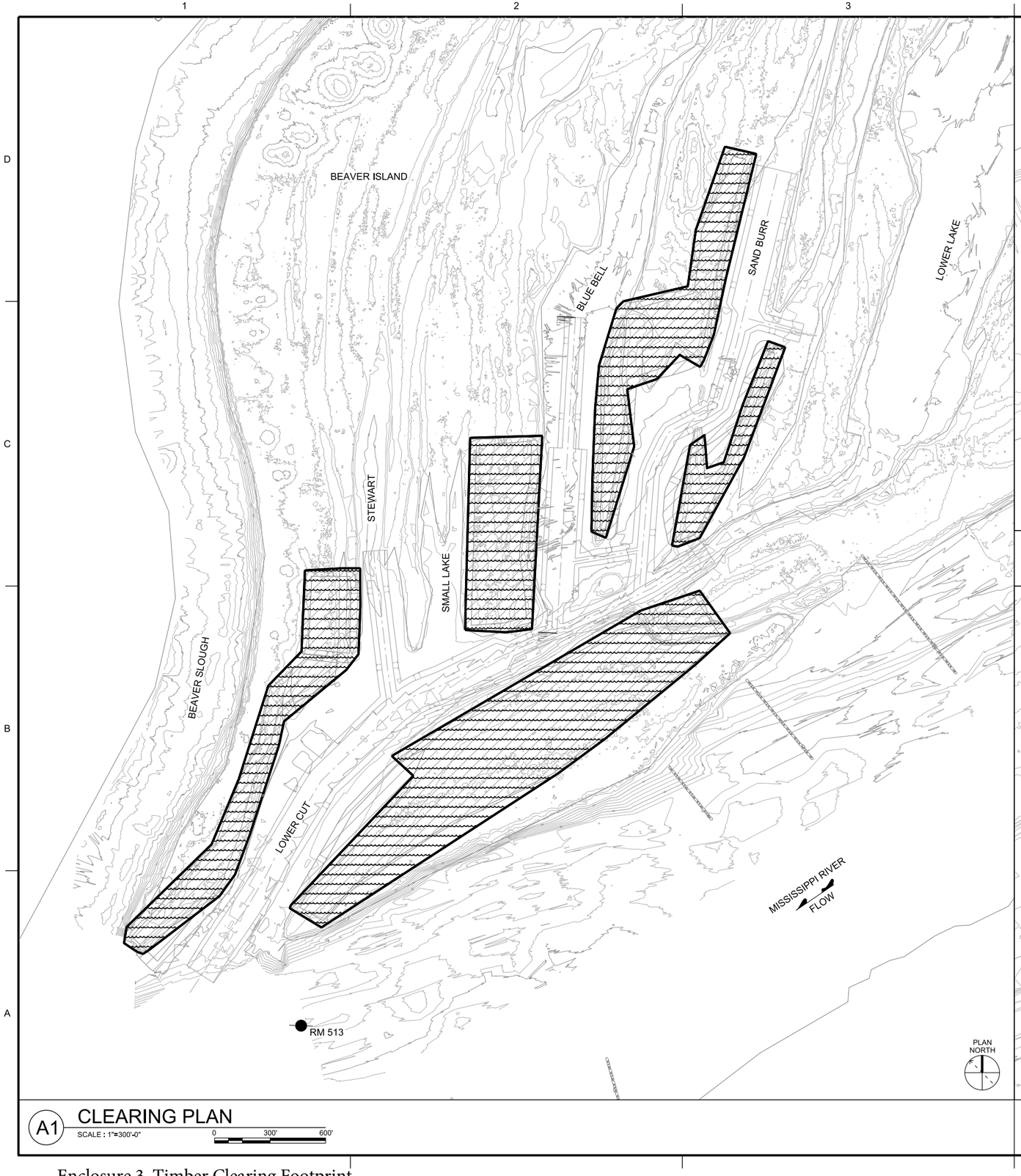
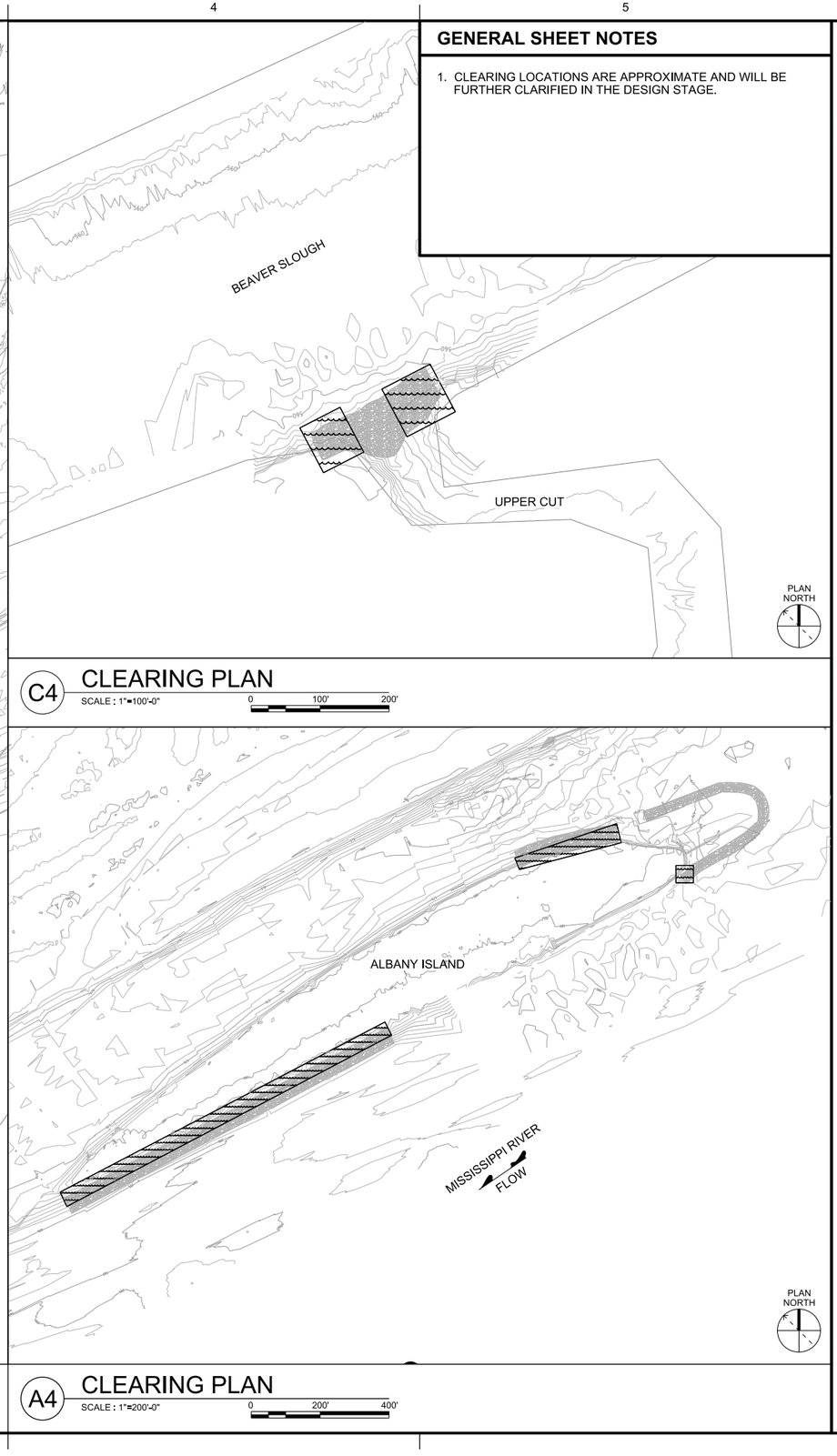


Figure J-1: Beaver Island Real Estate Map

Enclosure 2. Tracts of District and USFWS Fee Title Ownership on Beaver Island.



A1 CLEARING PLAN
SCALE : 1"=300'-0" 0 300' 600'



C4 CLEARING PLAN
SCALE : 1"=100'-0" 0 100' 200'

A4 CLEARING PLAN
SCALE : 1"=200'-0" 0 200' 400'

GENERAL SHEET NOTES

1. CLEARING LOCATIONS ARE APPROXIMATE AND WILL BE FURTHER CLARIFIED IN THE DESIGN STAGE.

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MISSISSIPPI RIVER
RIVER MILES 513.0-517.0
CLINTON COUNTY, IA
BEAVER ISLAND COMPLEX HREP
FEASIBILITY REPORT
CLEARING PLAN

PLATE 23

Sheet ID
L-101

Enclosure 3. Timber Clearing Footprint.

Dredge Cut Location	Length (LF)	Depth Below Flat Pool (FT)	Width (FT)
Lower Dredge Entrance	3,800.00	8	
(Area 1)	0+00 to 25+50	8	150.00
(Area 2)	25+50 to end	8	50.00
(Deep Hole)	100.00	12	60.00
Stewart Lake Dredge Cut	800.00	8	60.00
Blue Bell Dredge Cut	1,708.00	8	
(Area 1)	Width station 0+00 to 2+00 and 10+00 to end	8	60.00
(Area 2)	Width at station 2+00 to 10+00	8	150.00
(Deep Hole)	100.00	12	60.00
Sand Burr Dredge Cut	2,466.00	8	
(Area 1)	Width station 0+00 to 17+00	8	60.00
(Area 2)	Statio 17+00 to end	8	150.00
(Deep Hole)	100.00	12	60.00
Blue Bell to Sand Burr	361.00	8	30.00
Sand Burr to Hulziger	298.00	8	30.00

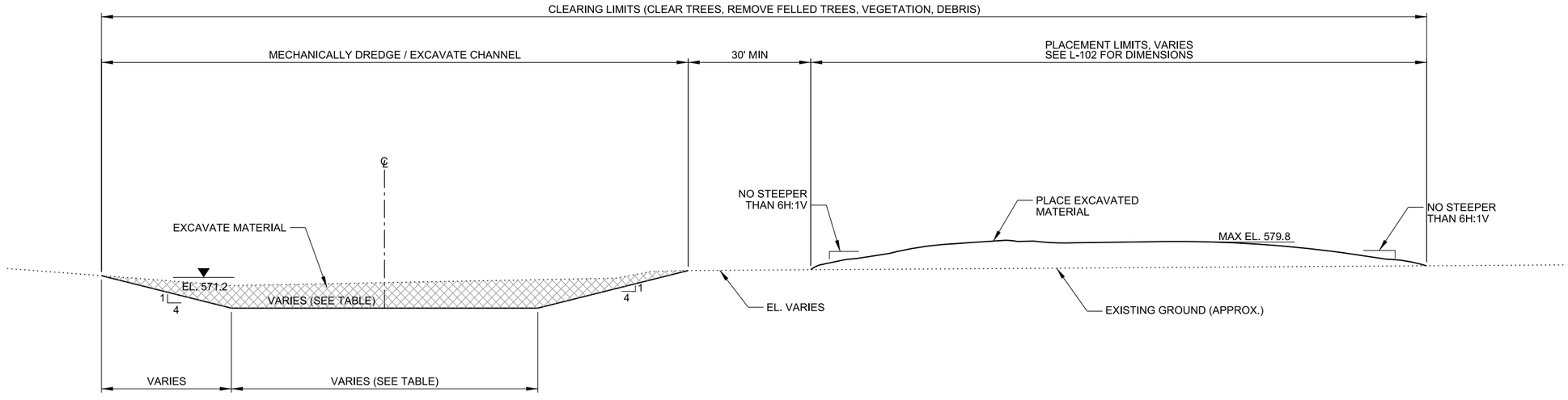
DWG REF(s) : _____

C1 DREDGE CUT TABLE

SCALE : 1"=15'-0" 0 15' 30'

GENERAL SHEET NOTES

1. CLEARING SHALL BE PERFORMED.
2. CHANNELS ARE TO BE MECHANICALLY EXCAVATED/DREDGED.
3. DEEP HOLE LOCATIONS WILL BE IDENTIFIED DURING THE DESIGN PHASE.
4. EXPECT TO ENCOUNTER MATERIAL SUCH AS GRAVEL, BOULDERS, TREES, ROOTBALLS, STUMPS, TRASH, ETC. IN THE EXCAVATED MATERIALS. SUCH MATERIALS, IF ENCOUNTERED SHALL BE REMOVED OFFSITE AT THE CONTRACTORS EXPENSE.
5. PLACEMENT CANNOT EXCEED THE ELEVATION AND WIDTHS SHOWN. OPTIMIZING THE TOP ELEVATION OF THE PLACEMENT SITE WILL OCCUR TO IMPROVE TREE SURVIVABILITY DURING THE DESIGN PHASE.
6. AREAS WITHOUT ADJACENT PLACEMENT SITES SHALL HAVE THE MATERIAL TRANSPORTED TO A TOPOGRAPHIC DIVERSITY SITE.



DWG REF(s) : _____

A1 DREDGE CUT SHAPING

SCALE : 1"=15'-0" 0 15' 30'

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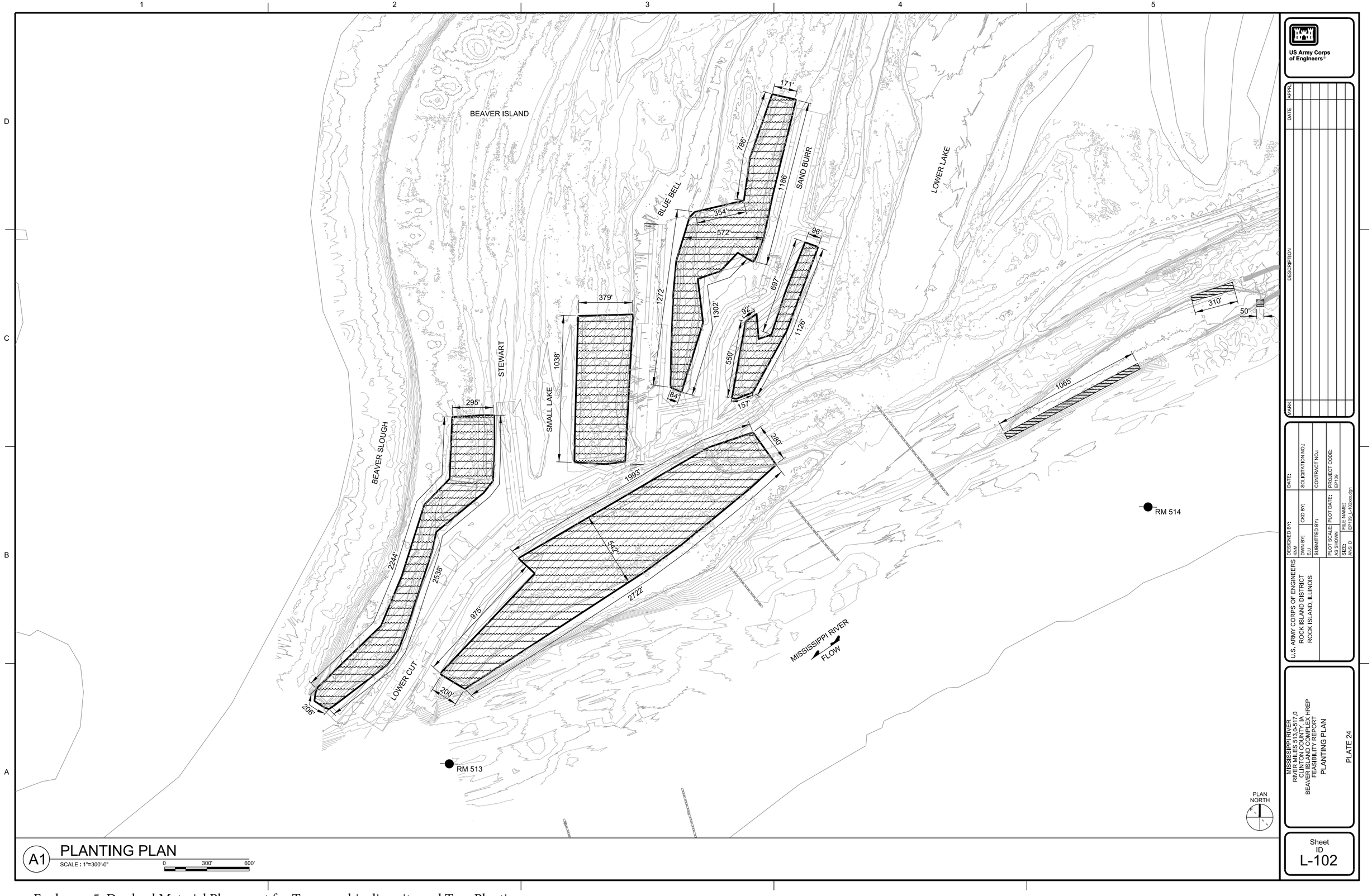
FEASIBILITY REPORT

TYPICAL DREDGE CUTS

PLATE 19

Sheet ID
C-301

Enclosure 4. Dredging Profile and Quantities.



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MISSISSIPPI RIVER
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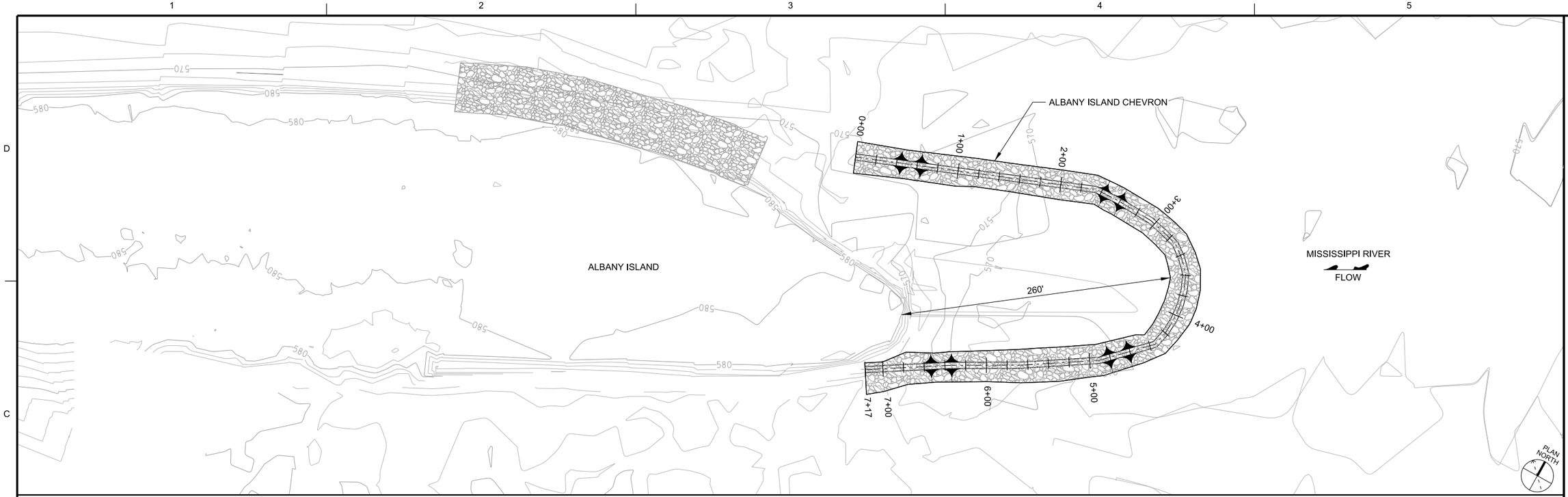
BEAVER ISLAND COMPLEX HREP
FEASIBILITY REPORT
PLANTING PLAN

PLATE 24

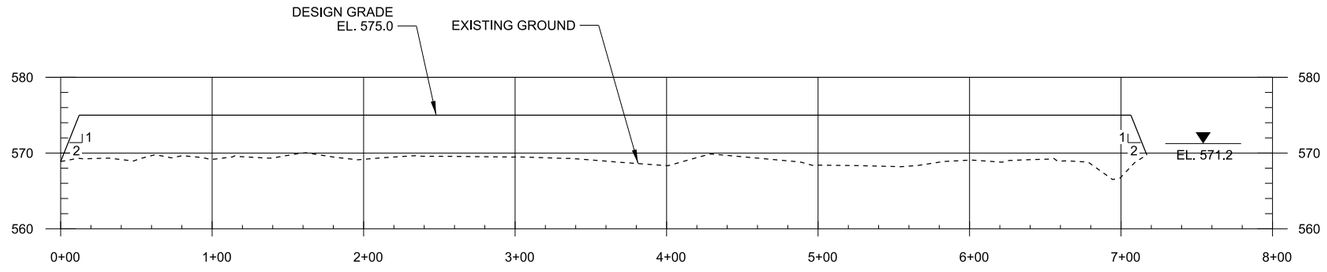
Sheet ID
L-102

Enclosure 5. Dredged Material Placement for Topographic diversity and Tree Planting.



C1 ALBANY ISLAND CHEVRON PLAN

SCALE : 1"=50'-0" 0 50' 100'



A1 ALBANY ISLAND CHEVRON PROFILE

HORIZONTAL SCALE : 1"=50'-0" 0 50' 100' VERTICAL SCALE : 1"=10'-0" 0 10' 20'

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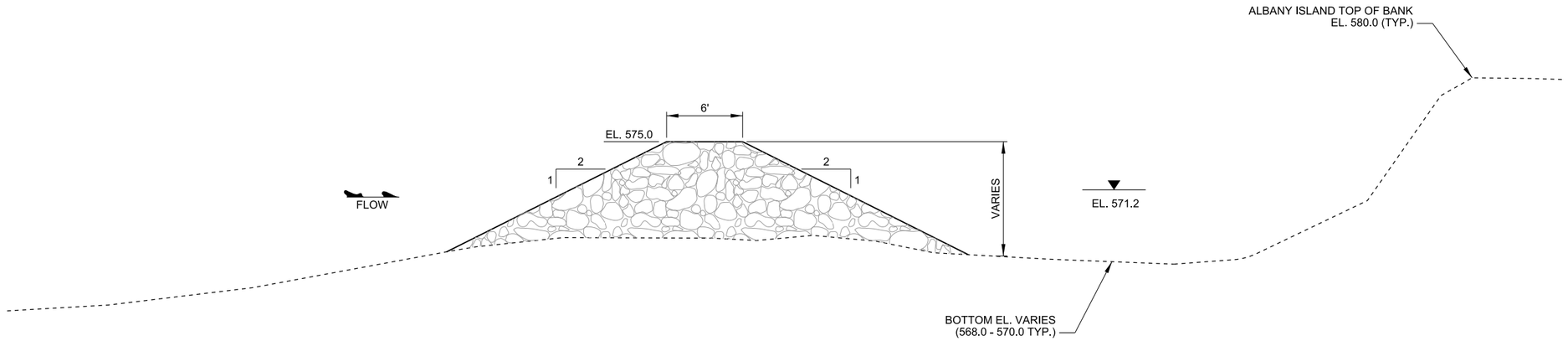
FEASIBILITY REPORT

ALBANY ISLAND CHEVRON
PLAN AND PROFILE

PLATE 17

Sheet ID
C-112

Enclosure 6. Albany Island Chevron Plan and Profile.



A1 ALBANY ISLAND CHEVRON TYPICAL SECTION

SCALE : 1"=5'-0"

0 5' 10'

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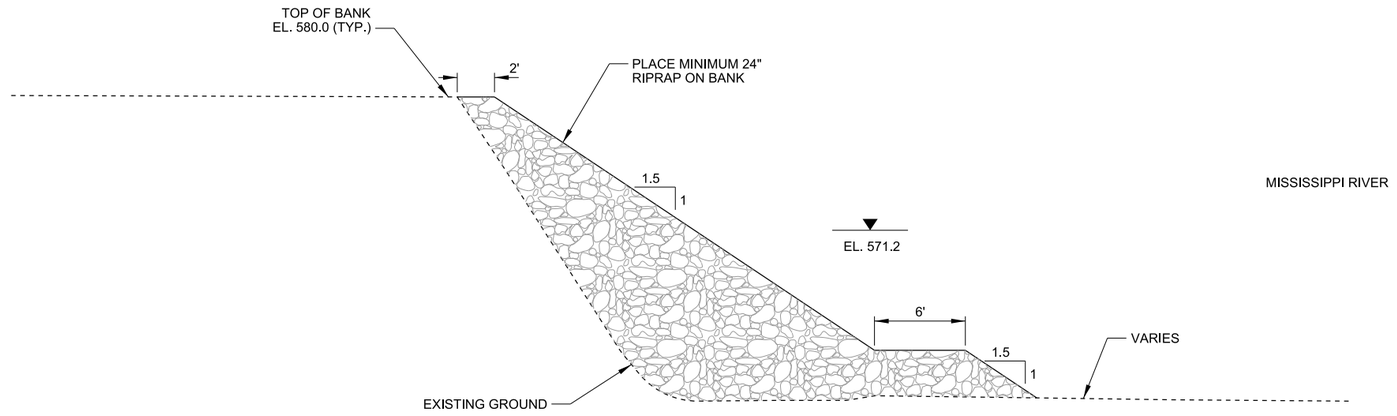
BEAVER ISLAND COMPLEX HREP
FEASIBILITY REPORT

ALBANY ISLAND CHEVRON
TYPICAL SECTION

PLATE 22

Sheet ID
C-304

Enclosure 7. Typical Chevron Cross Section.

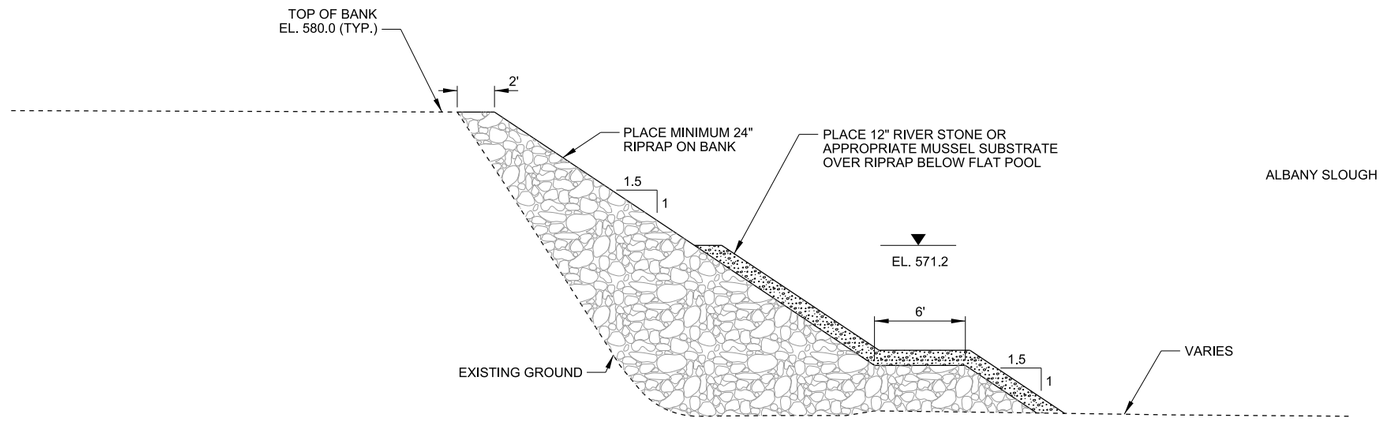


RIVER SIDE

C1 ALBANY ISLAND BANKLINE PROTECTION TYPICAL SECTION

SCALE : 1"=5'-0"

0 5' 10'



ALBANY SLOUGH SIDE

A1 ALBANY ISLAND PROTECTION AND MUSSEL SUBSTRATE TYPICAL SECTION

SCALE : 1"=10'-0"

0 10' 20'

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FILE NAME: EP109_C-303xxx.dgn

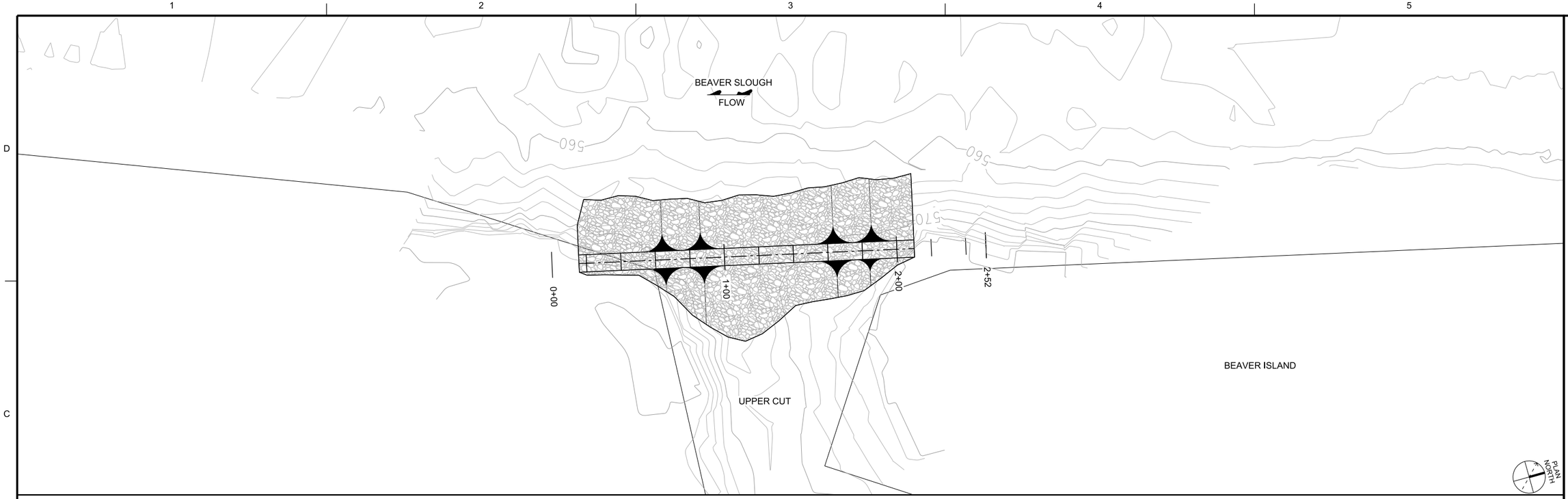
MISSISSIPPI RIVER
RIVER MILES 513.0-517.0
CLINTON COUNTY, IA
BEAVER ISLAND COMPLEX HREP
FEASIBILITY REPORT

BANKLINE PROTECTION
TYPICAL SECTIONS

PLATE 21

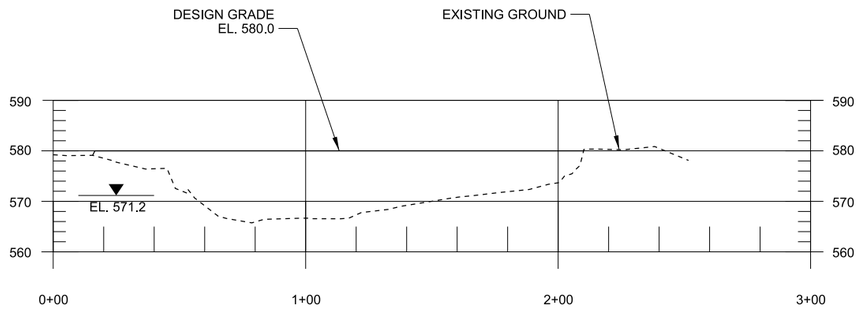
Sheet ID
C-303

Enclosure 8. Typical Albany Island Bankline Protection and Mussel Substrate Cross Section.



C1 BEAVER ISLAND CLOSURE STRUCTURE PLAN

SCALE : 1"=30'-0" 0 30' 60'



A1 BEAVER ISLAND CLOSURE STRUCTURE PROFILE

HORIZONTAL SCALE : 1"=30'-0" 0 30' 60' VERTICAL SCALE : 1"=15'-0" 0 15' 30'

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PROJECT CODE: EP169
SIZE: ANSI D
FILE NAME: EP169_C-113xx.dgn

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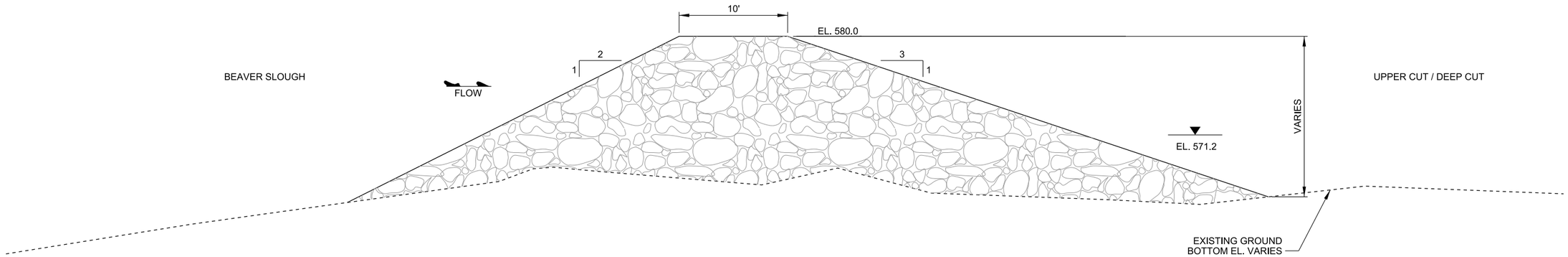
BEAVER ISLAND COMPLEX HREP
FEASIBILITY REPORT

BEAVER ISLAND CLOSURE STRUCTURE
PLAN AND PROFILE

PLATE 18

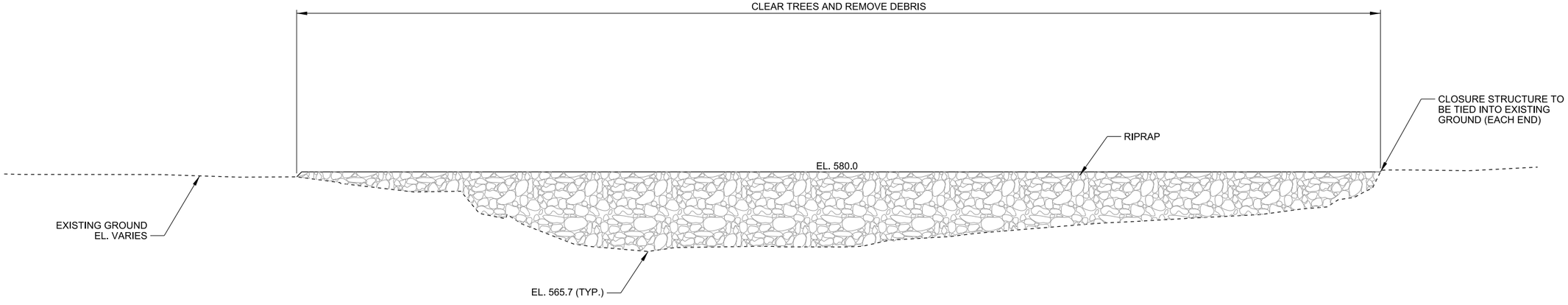
Sheet ID
C-113

Enclosure 9. Plan and Profile of Closure Structure.



C1 BEAVER ISLAND CLOSURE STRUCTURE TYPICAL SECTION

SCALE : 1"=5'-0"



A1 BEAVER ISLAND CLOSURE STRUCTURE PROFILE

SCALE : 1"=10'-0"

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SIZE: ANSI D

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CLINTON COUNTY, IA
BEAVER ISLAND COMPLEX HREP
FEASIBILITY REPORT

BEAVER ISLAND CLOSURE STRUCTURE SECTIONS

PLATE 20

Sheet ID
C-302

Enclosure 10. Typical Cross Section and Profile of Closure Structure.

From: Myster, James
To: Ross, James S MVP @ MVR
Subject: [EXTERNAL] Beaver Island Rehab Project
Date: Tuesday, September 13, 2016 11:57:20 AM

Hi Jim:

Got your TSP plan for Beaver Island. I see you're avoiding 13CN177 and 178 plus staying in low potential areas. This looks good to me. Let me know if SHPO or the tribes have a problem with your determination.

James

--

James E. Myster
Regional Historic Preservation Officer / Archaeologist
Midwest Region (Region 3)
U.S. Fish and Wildlife Service
5600 American Boulevard West, Suite 1049
Bloomington, Minnesota 55437
612-713-5439 (phone)
612-713-5287 (fax)

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS - ROCK ISLAND DISTRICT
CLOCK TOWER BUILDING - PO BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

September 7, 2016

COE
140723069

Regional Planning and Environmental
Division North (RPEDN)

SEE DISTRIBUTION LIST

The U.S. Army Corps of Engineers, Rock Island District (District), is currently proposing the Beaver Island Complex Habitat Rehabilitation and Enhancement Project (Project) in the Upper Mississippi River System, Pool 14, between river miles 613 and 617.5, across from Clinton, Iowa in Clinton County Iowa. Beaver Island is approximately 1,678 acres in size and is located within Sections 13 and 23-26 of T81N, R6E and Sections 18-19 of T81N, R7E (Enclosure 1). The Project area includes both USFWS and District fee title lands and will impact approximately 541 acres as identified in Enclosure 2.

The Tentatively Selected Plan (TSP) includes the following goals:

- Increasing aquatic diversity in the Beaver Island backwater, specifically in Lower Cut, Stewart Lake, Blue Bell, Sand Burr, as well as two unnamed connections through excavation and additions of fisheries structure.
- Increasing forest diversity in select areas of Beaver Island to include increasing existing elevations and planting trees, shrubs, understory plants, and buffer species.
- Maintaining aquatic diversity in the Beaver Island backwater by constructing a closure structure at the upstream end of Upper Cut, which will help reduce sediment influx into the complex.
- Constructing a chevron, bankline protection, and adding substrate to preserve and enhance Albany Island and Albany Slough for aquatic and mussel habitat.

The enhancement features will be accomplished by dredging of existing channels, excavating channels in backwater areas, clearing areas for dredged material placement, construction of elevated berms with the dredged material, planting mast trees on the elevated berms, constructing a water control structure at the upper end of the island and using timber stand improvement (TSI) techniques. These techniques include a combination girdling, selective planting, and crop tree release. All feature footprints are identified in Enclosures 1 through 10.

Impacts associated with project features include ground disturbance from tree clearing, dredging, dredged material placement, construction, bankline protection, and selective tree plantings. Tree girdling will impact only individual trees, and they will be allowed to stand to provide habitat. Crop tree release involves cutting smaller trees in proximity to mast producing trees to improve survivability. No ground disturbance will result from either of these actions. All staging and access to these areas will be from the water.

Federal Undertaking

Pursuant to the National Historic Preservation Act (NHPA) of 1966, as amended, and its implementing regulations, 36 CFR Part 800, the District has determined that dredging of existing channels, the development of water control structures, channel excavation, placement of dredge material, and river control structures in the proposed locations has potential to cause effects to archeological historic properties [36 CFR 800.3(a)(1)] and as a consequence will require a determination of effect within the Area of Potential Effect.

Area of Potential Effect

The Area of Potential Effect (APE) is the footprint of proposed project features and totals approximately 541 acres. The main impacts will be ground disturbance from dredging (32.8 acres), tree clearing, dredge placement and associated landscaping and tree plantings to create topographic diversity (81.0 acres); timber stand improvement (420 acres); water control structure construction (0.3 acre) chevron construction (717 linear feet, approximately 0.5 acre); bankline protection and associated tree clearing (1300 linear feet, approximately 5.7 acres); and placement of material to enhance aquatic diversity and mussel bed substrate (300 linear feet, approximately 0.4 acre). These features with individual footprints are provided in Enclosures 1-10.

Consulting Parties

The District finds the organizations identified on the Distribution List are entitled to be consulting parties, as set out in 36 CFR 800.2, and invites them by copy of this letter to participate in the Section 106 process.

State Historic Preservation Officer (SHPO) Invitation

The District invites the SHPO to:

- identify any other consulting parties as per 36 CFR 800.3(f);
- comment as per 36 CFR 800.2(d)(3) on the District' plan to involve the public by utilizing the District' normal procedures for public involvement under the National Environmental Policy Act (NEPA); and,
- comment on or contribute to identification efforts including definition of the APE, all as per 36 CFR 800.4(a-b).

Identification of Historic Properties

Review of Existing Information and Level of Future Identification Efforts: The District conducted an archival search for historic properties following the Policy and Procedures for the Conduct of Underwater Historic Resource Surveys for Maintenance Dredging and Corps Activities (DGL-89-01, March 1989). The District queried the most updated Iowa Geographic

Information Systems site file database and reviewed the report entitled *An Investigation of the Submerged Historic Properties in the Upper Mississippi River and Illinois Waterway,* dated October 1997 (Contract Number DACW25-93-D-0-012, Order No. 27) for historic properties potentially affected by this project.

The District contracted with Bear Creek Archaeology (BCA) of Cresco, Iowa under terms of Contract W912EK-12-D-0001, Task Order 12. BCA conducted geomorphological survey of the island and archeological investigation of moderate-to-high potential areas and prepared the report entitled *Phase I Archeological and Geomorphological Survey for the Beaver Island Complex Habitat Rehabilitation and Enhancement Project, Camanche and Clinton Townships, Clinton County, Iowa* dated December 2014. Messrs. David Benn, Lowell Blikre, and Jared Langseth prepared the report for the District under terms of Contract W912EK-12-D-0001, Task Order 12.

The geomorphological investigation defined low archeological potential across much of the APE. Beaver Island consists of a complex pattern of sloughs, abandoned channels, and river scrolls with ridge-and-swale topography formed by meandering of the Mississippi River during Middle-Late Holocene eras. Moderate archeological potential is restricted to the Middle-Late Holocene alluvium associated with higher ground, such as natural levees and crevasse splays. Archeological survey was restricted to these landforms as identified in Enclosure 11 and amounted to a total of 17.7 acres.

BCA pre-field research identified four portions of Beaver Island that had been surveyed previously; the surveys found that the four portions were outside of the current APE. The BCA research identified five previously-recorded sites on Beaver Island and 14 additional sites within a one-mile radius of the APE. None of the sites were recorded within the current APE, although BCA reviewed historic maps and aerial photographs of the Project area and identified one potential historic site within the general Project area that had not been previously recorded (Enclosure 12).

The pedestrian survey identified one newly recorded historic site, 13CN176 (Enclosure 13). Site 13CN176 was initially identified on historic maps and appears to date to the early/mid 20th century. BCA did not conduct subsurface testing at this site but recommended additional work should the Project plans be changed. The TSI portion of the APE has been modified to avoid impacts at this location. This site is located on District fee title land.

Intensive subsurface archeological survey resulted in the documentation of two previously unrecorded prehistoric archeological sites. Site 13CN177 is interpreted to be a Middle-Late Woodland bivouac with undisturbed portions of the site and high probability for intact features. The site is considered potentially eligible for inclusion for the National Register of Historic Places (NRHP). The Contractor has recommended either avoidance of site 13CN177 or, if avoidance is not possible, Phase II testing to determine NRHP eligibility.

Site 13CN178 is interpreted to be a Late Archaic bivouac with undisturbed deposits and potential for intact features. BCA recommended avoidance of the site or Phase II testing to determine NRHP eligibility (Enclosure 13). Both sites are also located within or near TSI segments of the APE. The TSI APE was modified to avoid these sites. Both sites are located on USFWS fee title land.

The State Historical Society of Iowa was provided a copy of the BCA report by letter dated December 24, 2014. The SHSI responded by e-mails dated January 14, 2015 with a minor editorial comment and the observation that the BCA investigation appeared to meet the District Scope of Work but that the District should resume formal consultation once the APE was fully defined (R&C# 140723069).

Determination of Effect

The three archeological sites are confined to higher elevations as predicted by the geomorphological assessment and outside of any proposed project features. The District refined the TSI APE in order to avoid impacting these sites (Enclosure 14). The remainder of the APE as defined herein, has been evaluated as having low potential for intact cultural resources on the basis of the BCA geomorphological investigation. Therefore, it is the District's opinion that the present undertaking will have No Effect on historic properties within the APE due to the low archeological potential as demonstrated by the geomorphological investigation in accordance with 36 CFR 800.4(d)(1). The District further has determined that this undertaking will have No Adverse Effect on sites 13CN176, 177, and 178 as this undertaking will have no direct or indirect effects on these sites in accordance with 36 CFR 800.5(b).

Request for Information from Consulting Parties

The District is seeking information from all consulting parties regarding their concerns with issues relating to the potential effects of this undertaking on historic properties and, particularly, the tribes' concerns with identifying properties that may be of religious and cultural significance to them and may be eligible for the NRHP [36 CFR 800.4(a)(3-4)]. Concerns about confidentiality [36 CFR 800.11(c)] regarding locations of properties can be addressed under Section 304 of the NHPA which provides withholding from public disclosure the location of properties under several circumstances, including in cases where it would cause a significant invasion of privacy, impede the use of a traditional religious site by practitioners, endanger the site, etc.

The District requests your written comments on this project within 30 days, pursuant to 36 CFR 800.3(c)(4). Results of all consultation and determination shall be included in the Environmental Assessment for additional public review this year.

If you have any questions regarding this matter, please call Mr. Jim Ross of our Environmental Compliance Branch, (309) 794-5540, or write to our address above, ATTN: Environmental Compliance Branch (Jim Ross).

Sincerely,

J S Ross

for Kenneth A. Barr
Chief, Environmental Planning Branch RPEDN

Enclosure

*CONCUR

NAME [signature]

DATE 9/28/16

* No adverse effects. Provided there are no objections from the tribes.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS - ROCK ISLAND DISTRICT
CLOCK TOWER BUILDING - PO BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

January 12, 2017

Regional Planning and Environmental
Division North (RPEDN)

SEE DISTRIBUTION LIST

The U.S. Army Corps of Engineers, Rock Island District (District), is currently proposing the Beaver Island Complex Habitat Rehabilitation and Enhancement Project (Project) in the Upper Mississippi River System, Pool 14, between river miles 613 and 617.5, across from Clinton, Iowa in Clinton County Iowa. Beaver Island is approximately 1,678 acres in size and is located within Sections 13 and 23-26 of T81N, R6E and Sections 18-19 of T81N, R7E (Enclosure 1). The Project area includes both USFWS and District fee title lands and will impact approximately 541 acres as identified in Enclosure 2.

The Tentatively Selected Plan (TSP) includes the following goals:

- Increasing aquatic diversity in the Beaver Island backwater, specifically in Lower Cut, Stewart Lake, Blue Bell, Sand Burr, as well as two unnamed connections through excavation and additions of fisheries structure.
- Increasing forest diversity in select areas of Beaver Island to include increasing existing elevations and planting trees, shrubs, understory plants, and buffer species.
- Maintaining aquatic diversity in the Beaver Island backwater by constructing a closure structure at the upstream end of Upper Cut, which will help reduce sediment influx into the complex.
- Constructing a chevron, bankline protection, and adding substrate to preserve and enhance Albany Island and Albany Slough for aquatic and mussel habitat.

The enhancement features will be accomplished by dredging of existing channels, excavating channels in backwater areas, clearing areas for dredged material placement, construction of elevated berms with the dredged material, planting mast trees on the elevated berms, constructing a water control structure at the upper end of the island and using timber stand improvement (TSI) techniques. These techniques include a combination girdling, selective planting, and crop tree release. All feature footprints are identified in Enclosures 1 through 10.

Impacts associated with project features include ground disturbance from tree clearing, dredging, dredged material placement, construction, bankline protection, and selective tree plantings. Tree girdling will impact only individual trees, and they will be allowed to stand to provide habitat. Crop tree release involves cutting smaller trees in proximity to mast producing trees to improve survivability. No ground disturbance will result from either of these actions. All staging and access to these areas will be from the water.

Federal Undertaking

Pursuant to the National Historic Preservation Act (NHPA) of 1966, as amended, and its implementing regulations, 36 CFR Part 800, the District has determined that dredging of existing channels, the development of water control structures, channel excavation, placement of dredge material, and river control structures in the proposed locations has potential to cause effects to archeological historic properties [36 CFR 800.3(a)(1)] and as a consequence will require a determination of effect within the Area of Potential Effect.

Area of Potential Effect

The Area of Potential Effect (APE) is the footprint of proposed project features and totals approximately 541 acres. The main impacts will be ground disturbance from dredging (32.8 acres), tree clearing, dredge placement and associated landscaping and tree plantings to create topographic diversity (81.0 acres); timber stand improvement (420 acres); water control structure construction (0.3 acre) chevron construction (717 linear feet, approximately 0.5 acre); bankline protection and associated tree clearing (1300 linear feet, approximately 5.7 acres); and placement of material to enhance aquatic diversity and mussel bed substrate (300 linear feet, approximately 0.4 acre). These features with individual footprints are provided in Enclosures 1-10.

Consulting Parties

The District finds the organizations identified on the Distribution List are entitled to be consulting parties, as set out in 36 CFR 800.2, and invites them by copy of this letter to participate in the Section 106 process.

State Historic Preservation Officer (SHPO) Invitation

The District invites the SHPO to:

- identify any other consulting parties as per 36 CFR 800.3(f);
- comment as per 36 CFR 800.2(d)(3) on the District' plan to involve the public by utilizing the District' normal procedures for public involvement under the National Environmental Policy Act (NEPA); and,
- comment on or contribute to identification efforts including definition of the APE, all as per 36 CFR 800.4(a-b).

Identification of Historic Properties

Review of Existing Information and Level of Future Identification Efforts: The District conducted an archival search for historic properties following the Policy and Procedures for the Conduct of Underwater Historic Resource Surveys for Maintenance Dredging and Corps Activities (DGL-89-01, March 1989). The District queried the most updated Iowa Geographic

Information Systems site file database and reviewed the report entitled *An Investigation of the Submerged Historic Properties in the Upper Mississippi River and Illinois Waterway,* dated October 1997 (Contract Number DACW25-93-D-0-012, Order No. 27) for historic properties potentially affected by this project.

The District contracted with Bear Creek Archaeology (BCA) of Cresco, Iowa under terms of Contract W912EK-12-D-0001, Task Order 12. BCA conducted geomorphological survey of the island and archeological investigation of moderate-to-high potential areas and prepared the report entitled *Phase I Archeological and Geomorphological Survey for the Beaver Island Complex Habitat Rehabilitation and Enhancement Project, Camanche and Clinton Townships, Clinton County, Iowa* dated December 2014. Messrs. David Benn, Lowell Blikre, and Jared Langseth prepared the report for the District under terms of Contract W912EK-12-D-0001, Task Order 12.

The geomorphological investigation defined low archeological potential across much of the APE. Beaver Island consists of a complex pattern of sloughs, abandoned channels, and river scrolls with ridge-and-swale topography formed by meandering of the Mississippi River during Middle-Late Holocene eras. Moderate archeological potential is restricted to the Middle-Late Holocene alluvium associated with higher ground, such as natural levees and crevasse splays. Archeological survey was restricted to these landforms as identified in Enclosure 11 and amounted to a total of 17.7 acres.

BCA pre-field research identified four portions of Beaver Island that had been surveyed previously; the surveys found that the four portions were outside of the current APE. The BCA research identified five previously-recorded sites on Beaver Island and 14 additional sites within a one-mile radius of the APE. None of the sites were recorded within the current APE, although BCA reviewed historic maps and aerial photographs of the Project area and identified one potential historic site within the general Project area that had not been previously recorded (Enclosure 12).

The pedestrian survey identified one newly recorded historic site, 13CN176 (Enclosure 13). Site 13CN176 was initially identified on historic maps and appears to date to the early/mid 20th century. BCA did not conduct subsurface testing at this site but recommended additional work should the Project plans be changed. The TSI portion of the APE has been modified to avoid impacts at this location. This site is located on District fee title land.

Intensive subsurface archeological survey resulted in the documentation of two previously unrecorded prehistoric archeological sites. Site 13CN177 is interpreted to be a Middle-Late Woodland bivouac with undisturbed portions of the site and high probability for intact features. The site is considered potentially eligible for inclusion for the National Register of Historic Places (NRHP). The Contractor has recommended either avoidance of site 13CN177 or, if avoidance is not possible, Phase II testing to determine NRHP eligibility.

Site 13CN178 is interpreted to be a Late Archaic bivouac with undisturbed deposits and potential for intact features. BCA recommended avoidance of the site or Phase II testing to determine NRHP eligibility (Enclosure 13). Both sites are also located within or near TSI segments of the APE. The TSI APE was modified to avoid these sites. Both sites are located on USFWS fee title land.

The State Historical Society of Iowa was provided a copy of the BCA report by letter dated December 24, 2014. The SHSI responded by e-mails dated January 14, 2015 with a minor editorial comment and the observation that the BCA investigation appeared to meet the District Scope of Work but that the District should resume formal consultation once the APE was fully defined (R&C# 140723069).

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If you have any questions regarding this matter, please call Mr. Jim Ross of our Environmental Compliance Branch, (309) 794-5540, or write to our address above, ATTN: Environmental Compliance Branch (Jim Ross).

Sincerely,

Kenneth A. Barr
Chief, Environmental Planning Branch RPEDN

Enclosures (14)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Rock Island Field Office
1511 47th Avenue
Moline, Illinois 61265
Phone: (309) 757-5800 Fax: (309) 757-5807

IN REPLY REFER TO:
FWS/RIFO

March 24, 2017

Colonel Craig S. Baumgartner
District Engineer
U.S. Army Corps of Engineers
Rock Island District
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Colonel Baumgartner:

This letter constitutes our Final Fish and Wildlife Coordination Act Report (FWCAR) for the Beaver Island Habitat Rehabilitation and Enhancement Project (Beaver Island HREP). The Beaver Island HREP is located in Mississippi River Pool 14, River Miles 513.0 through 517.0, Clinton County, Iowa. The U.S. Army Corps of Engineers (USACE), Rock Island District proposes to rehabilitate and enhance the Beaver Island complex through implementations that will improve the quality of over-wintering habitat for the local fish community, increase floodplain forest vegetation diversity, and improve the overall ecological structure and function of the complex. The Beaver Island project boundary consists of 1,678 acres of interconnected backwaters, secondary channels, wetlands, and floodplain habitat, and is completely in Federal ownership and managed by the U.S. Fish and Wildlife Service (USFWS) as part of the Upper Mississippi River (UMR) National Wildlife and Fish Refuge. The project encompasses Beaver Island and Albany Island, which borders Beaver Island along the left descending bank, in addition to Albany Slough, separating the two islands.

The Beaver Island HREP is a component of the Upper Mississippi River Restoration Program (UMRR) authorized in Section 1103 of the Water Resources Development Act of 1986. The goal of the UMRR is to implement "...numerous enhancement efforts...to preserve, protect, and restore habitat that is deteriorating due to natural and man-induced activities."

STATE AGENCY COORDINATION

This report has been prepared by the USFWS, in cooperation with the Iowa Department of Natural Resources (IA DNR), and provides comments and recommendations regarding the construction of the Beaver Island HREP. Significant coordination between the USFWS, IA DNR, and the USACE resulted in a thoroughly reviewed and critiqued project with design providing optimum benefits to fish and wildlife resources, while protecting and enhancing

unique and diverse resources within the project boundaries. The multi-agency coordination effort has demonstrated the value of this project towards maintaining a high quality UMR ecosystem while avoiding adverse impacts.

DESCRIPTION OF THE PROJECT AREA

Pool 14 is the 29.2 mile segment of the Mississippi River extending upstream from Lock and Dam 14 (river mile 493.3) at Le Claire, Iowa to Lock and Dam 13 (river mile 522.5) at Fulton, Illinois. The Pool 14 floodplain is natural, without levees, with the exception of the northern one-third of the pool. Sections of levees extend downstream of Lock and Dam 13 from approximate river mile 510.5 to 522.5, bordering Fulton, Illinois and Clinton, Iowa, in addition to a small approximately two mile-long segment immediately below Albany, Illinois. Pool 14 has a surface area of approximately 10,580 acres. The majority of the riparian environment within Pool 14 consists of agricultural, residential, urban, and industrial development with interspersed undeveloped areas. The upper and middle portion of the pool consist of braided islands, side channels, and backwaters, extending downstream to the head of the former Rock Island rapids at the Fulton-Rock Island gorge. The lower portion of the pool, downstream of the gorge, lacks side channels and backwater habitats. The largest tributary to the pool is the Wapsipinicon River (Iowa) which enters the pool downstream of the project area at approximate river mile 506.8. Smaller tributary streams include Bud Creek (Iowa), Spring Creek (Illinois) and the Cedar Creek (Illinois). The Mississippi River in the vicinity of the Beaver Island HREP site has a drainage area of approximately 85,000 square miles.

The majority of publicly held lands and waters within Pool 14 floodplain are primarily held by the USFWS and managed as part of the Upper Mississippi River National Wildlife and Fish Refuge. Additional lands are held by the USACE under the Nine-Foot Navigation Project, and lands and waters owned by the States of Iowa and Illinois. The Princeton Refuge HREP is located downstream of the mouth of the Wapsipinicon River (river miles 504.0R through 506.5R), and was completed in 1995 under the UMRR Program and continues to be managed by the IA DNR.

A distinguishing characteristic of Pool 14 is the presence of the Exelon Generation Co. nuclear plant (Exelon) located in Cordova, Illinois, approximately six river miles downstream of Beaver Island, along the left descending bank. Exelon operates under a Section 10(a)(1)(B) incidental take permit for the federally endangered Higgin's-eye pearlymussel (*Lampsilis higginsii*) and sheepnose mussel (*Plethobasus cyphyus*), due to the generation of a thermal plume discharge into the Mississippi River at river mile 506.4. Increased thermal conditions have been documented to negatively impact the feeding, growth, and burrowing behavior in freshwater mussels. As part of the Habitat Conservation Plan and incidental take permit, monitoring was completed at three mussel beds over multiple years, both before and after the installation of the warm water discharge. One of the monitoring sites is located upstream of Exelon at river mile 507.0 on the Iowa bank, between Exelon and Beaver Island. This monitoring site has maintained a species richness of approximately 20 to 25 species of moderate density (average 9.3/m^2), indicating the effects of the of the Exelon warm water discharge are unlikely to extend to the Project area (Exelon Generation, 2009).

Human activity over the past two centuries within the UMR basin floodplain and channel, including the construction of the lock and dam system, has contributed to the alteration of the hydrology and topography historically present throughout the Upper Mississippi River valley (USACE, 2012). Such conditions have adversely impacted the biological resources of the river through reduction of habitat diversity.

Over time, the impacts of channel modification have contributed to a decrease in habitat structure diversity, bottomland hardwood tree regeneration, aquatic backwater and secondary channel habitats, and the biota dependent on these habitats. Specific to the Beaver Island area, the construction of Lock and Dam 13 (L/D 13) and L/D 14 in 1939 and other anthropogenic influences have resulted in altered flood regimes, including high flood pulses and the reduction of historically common low flow periods. Furthermore, navigation infrastructure and agriculture have collectively resulted in increased water levels and sedimentation leading to reduced diversity, quality, and acreage of aquatic habitat, native floodplain forest, and ephemeral wetlands through succession. Sedimentation has prevented access to and connectivity between many backwater areas, further reducing their functionality. These types of backwater areas provide habitat for multiple life-stages of various fish species, but are particularly ideal over-wintering habitat for certain fishes, including centrarchid species such as bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*), black crappie (*Pomoxis nigromaculatus*), and white crappie (*P. annularis*).

The altered flood pulse has resulted in year-round flooding of floodplain forests adjacent to the navigation channel, supporting the proliferation of flood-tolerant tree species, such as silver maple (*Acer saccharinum*), and invasive herbaceous plants, such as reed canary grass (*Phalaris arundinacea*). Such conditions result in a loss of flood intolerant hardwood mast tree species diversity and recruitment, with a migration towards a monotypic forest. Consequently, a loss of nut producing hardwood trees has been observed, which are a critical food source for many species of floodplain wildlife.

Furthermore, the altered channel and flow velocities have led to the erosion and loss of islands throughout Pool 14. Island loss results in increased wind fetch further eroding and exposing previously protected habitats, such as mussel beds and overwintering areas for fish. These stressors are likely to continue system wide, as will the decline of the quality of aquatic, wetland, and floodplain habitat. This project provides an opportunity to improve the quality and diversity of critical habitats within the Beaver Island complex.

PROJECT OBJECTIVES

The objectives of the Beaver Island HREP are to restore, enhance, and protect off-channel aquatic, wetland, and floodplain forest habitats, and to enhance overall resource values. These objectives were developed in accordance with the Upper Mississippi River National Wildlife and Fish Refuge management plan, with input provided by State and Federal Biologists. Action items, as presented in the *draft* Feasibility Report with Integrated Environmental Assessment for the Beaver Island HREP (*draft* Feasibility Report here after), dated May 2016, to meet these

objectives include:

1) Increase year-round aquatic habitat diversity, as measured by acres and native fish use of spawning, rearing and overwintering habitat;
2) Diversify floodplain forest and scrub-shrub habitat on Beaver Island, as measured in acres; and
3) Increase structure and function of side channel habitat, as measured by native freshwater mussel use.

Several alternatives were considered and evaluated to determine the most efficient way to meet the project objectives. Full details and evaluations of these alternatives can be reviewed in the *draft* Feasibility Report (USACE, 2016).

THREATENED AND ENDANGERED SPECIES

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

The following is a list of federally listed species which may be present within the area of concern.

Classification	Common Name	Scientific Name	Habitat
Endangered	Higgin's-eye pearlymussel	*Lampsilis higginsii*	Mississippi River north of Lock and Dam 19 at Keokuk, Iowa and in three tributaries of the Mississippi River: the St. Croix River, Wisconsin River, and the Iowa Rock River. Usually found in deep water with moderate currents and gravel substrate.
Endangered	Indiana bat	*Myotis sodalis*	Winter: hibernate in caves and mines. Summer: roost under loose tree bark on dead or dying trees.
Threatened	Northern long-eared bat	*Myotis septentrionalis*	Winter: hibernate in caves and mines. Summer: found in wooded habitat; roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags. Males and non-reproductive females may also roost in cooler places, such as caves and mines.
Threatened	Prairie bush clover	*Lespedeza leptostachya*	Found throughout tallgrass prairie region of the Upper Mississippi River valley.
Threatened	Western prairie fringed orchid	*Platanthera praeclara*	Found in mesic to wet unplowed tallgrass prairies and meadows, but have also been found in old fields and roadside ditches.
Endangered	Iowa Pleistocene snail	*Discus macclintocki*	Found in approximately 30 sites in Iowa and Illinois in leaf litter of cool and moist algific talus slope hillsides.

Higgin's-eye pearlymussel (*Lampsilis higginsii)*
The federally endangered Higgin's-eye pearlymussel has been documented to have widespread presence throughout Pool 14 of the Upper Mississippi River. One Essential Habitat Area is located approximately six river miles downstream of the project area along the Cordova, Illinois bankline. Freshwater mussel surveys were conducted by staff from the USACE, USFWS, IA DNR, IL DNR, and U.S. Geological Survey (USGS) throughout Albany Slough during the summers of 2014 and 2015. A single Higgin's-eye pearlymussel individual was identified near the lower end of Albany Slough during an August 2014 survey. However, no Higgin's eye pearly mussels were identified during the subsequent extensive survey efforts in 2015. The USACE prepared a Biological Assessment (BA), dated February 2016, which concluded that the project *may affect, but is not likely to adversely affect* the Higgin's-eye pearlymussel. The USFWS provided concurrence with this determination through formal correspondence dated February 29, 2016.

Indiana bat *(Myotis sodalis)* and northern long-eared bat (*Myotis septentrionalis*)
The federally endangered Indiana bat *(Myotis sodalis)* and the threatened northern long-eared bat (*Myotis septentrionalis*) are listed as potentially occurring in Clinton County, Iowa. Surveys were conducted by Stantec Inc. during August 2015 (Kiser et al., 2015) to determine the probable presence or absence of these two species in the forested habitats on Beaver Island. Surveys included evaluation of potential habitat, acoustic data collection, mist netting, and telemetry, and were conducted in accordance with the USFWS's 2015 Range-wide Indiana Bat Summer Survey Guidelines (USFWS, 2015). Acoustic results indicated the presence of both listed bat species within the Beaver Island HREP area; however, mist netting efforts resulted in the capture of 14 northern long-eared bats, and no Indiana bat individuals. Three NLEBs were telemetered resulting in the identification of five roost trees outside of the Beaver Island HREP boundaries.

Timber stand improvement practices and dredged material placement (including tree removal and clearing) are proposed as components of the Beaver Island HREP. The total proposed tree removal area is approximately 5.4 percent of the total forested habitat available on Beaver and Albany Islands. The tree removal, as proposed, will expand existing forest clearings surrounding water bodies and will not result in further fragmentation of bat roosting or foraging habitat. A recent habitat survey completed by the USACE identified additional potential roosting habitat throughout the remaining forested sections of the Beaver/Albany Island complex including trees that likely serve as secondary and/or primary maternity roosts. The USACE's BA concluded that the project *may affect, but is not likely to adversely affect* the Indiana bat and northern long-eared bat. The USFWS provided concurrence with these determinations in formal correspondence dated February 29, 2016.

Three other federally listed species, the prairie bush clover (*Lespedeza leptostachya)*, the Western prairie fringed orchid (*Platanthera praeclara*), and the Iowa Pleistocene snail (*Discus macclintockii*) are known to occur in counties throughout Iowa and Illinois bordering Pool 14; however, suitable habitat for these species is not found within the project area.

The Eastern massasauga rattlesnake (*Sistrurus catenatus*) has been proposed as federally threatened within Clinton County, Iowa. Habitat for the Eastern massasauga consists of wet

areas including wet prairies, marshes and low areas along rivers and lakes. In many areas massasaugas also use adjacent uplands during part of the year. Eastern massassauga presence has not been documented within the Beaver Island HREP vicinity.

Although no longer a listed species, bald eagles (*Haliaeetus leucocephalus)* continue to be protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Bald eagles winter along the Mississippi River, including Pool 14. Suitable perch trees where eagles can loaf and perch are numerous. Two bald eagle nest sites are known to occur on Beaver Island within the project vicinity; however, due to their distance from proposed construction activities (approximate distance) and the timing of construction, potential disturbance during construction is unlikely. Furthermore, project features will not affect known nest sites.

A newly-occupied heron rookery exists on the southwest portion of Beaver Island. The Beaver Island HREP features were reconfigured to provide a buffer between active nest sites and construction activities. We appreciate the interagency planning team's consideration of that important resource and the avoidance of clearing trees in the vicinity of the rookery. We recommend that the proposed clearing on Beaver Island be conducted prior to spring nesting to reduce potential impacts to nesting birds protected under the Migratory Bird Treaty Act.

State of Iowa threatened and endangered species that may occur within Clinton County, Iowa include the following.

Common Name	Scientific Name	Listing Status	Classification
Butterfly	*Ellipsaria lineolata*	Threatened	Freshwater Mussel
Creeper	*Strophitus undulates*	Threatened	
Higgin's-eye Pearlymussel	*Lampsilis higginsii*	Endangered	
Round Pigtoe	*Pleurobema sintoxia*	Endangered	
Yellow Sandshell	*Lampsilis teres*	Endangered	
Blacknose shiner	*Notropis heterolepis*	Threatened	Fish
Bluntnose Darter	*Etheostoma chlorosoma*	Endangered	
Chestnut Lamprey	*Icthyomyzon castaneus*	Threatened	
Freckled Madtom	*Notorus nocturnus*	Endangered	
Grass Pickerel	*Esox americanus*	Threatened	
Lake Sturgeon	*Acipenser fluvescens*	Endangered	
Western Sand Darter	*Ammocrypta clara*	Threatened	
Central Newt	*Notophthalmus viridescens*	Threatened	Amphibian
Blanding's Turtle	*Blanding's Turtle*	Threatened	Reptile
Eastern Massasauga Rattlesnake	*Sistrurus catenatus*	Endangered	
Ornate Box Turtle	*Terrapene ornate*	Threatened	
Iowa Pleistocene Snail	*Discus macclintocki*	Endangered	Snail
Barn Owl	*Tyto alba*	Endangered	Bird
King Rail	*Rallus elegans*	Endangered	
Red-Shouldered Hawk	*Buteo lineatus*	Endangered	
Byssus Skipper	*Problema byssus*	Threatened	Insect

Common Name	Scientific Name	Listing Status	Classification
Black Hucklebery	*Gaylussacia baccata*	Threatened	Plant
Dwarf Dandelion	*Krigia virginica*	Endangered	
Eastern Jointweed	*Polygonella articulate*	Endangered	
Flax-Leaved Aster	*Aster linariifolius*	Threatened	
Mead's Milkweed	*Asclepias meadii*	Endangered	
Meadow Beauty	*Rhexia virginica*	Threatened	
Orange Grass St. Jon's Wart	*Hypericum gentianoides*	Endangered	
Poppy Mallow	*Callirhoe triangulate*	Endangered	
Racemed Milkwort	*Polyhala polygama*	Endangered	
Pale Green Orchid	*Platanthera flava*	Endangered	
Black-footed Quillwort	*Isoetes melanopoda*	Endangered	
Daisy-leaved Moonwort	*Botrychium matricariifolium*	Endangered	
Royal Fern	*Osmunda regalis*	Threatened	

The proposed Beaver Island HREP will not adversely affect federally endangered species or their habitats. This precludes the need for further action on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. Should this project be modified or new information indicate endangered species may be affected, consultation should be initiated.

DISCUSSION OF SELECTED PROJECT FEATURES

A total of 11 potential project features were considered including lake dredging locations, areas of topographic diversity, river training structures, river control structures, bankline protection structures, areas of mussel habitat, and non-structural improvements (best management practices, timber stand improvements, and education and outreach). All potential project features were combined into potential project measures, with instances of several features combined into a single measure if the features were reliant on each other. Project measures were further combined into alternatives. Over 100 project alternatives, including the No Federal Action alternative, were generated from these proposed project features, from which 19 alternatives were determined to be cost effective. The No Federal Action alternative is considered the future without project condition allowing the area to continue as is.

Habitat Evaluation Procedures (HEP) and Hydraulic Engineering Center Ecosystem Functions Model (HEC-EFM) were utilized to quantify aquatic and floodplain benefits, respectively. The models calculated habitat units (HUs) per unit cost for pre-dam (pre-1939), existing, future with project, and future without project conditions. A discussion of these evaluation procedures is provided in Section V (B) of the *draft* Feasibility Report. Eighteen of the cost effective alternatives met the project objectives and Sponsor needs, and were therefore further considered by the interagency team. The coordinating team recommended the following alternative and project features within the Beaver Island HREP complex to best meet the project goals, the sponsors stated objectives and other agency identified goals and objectives:

Project Feature	Description	Feature Location
Lower Cut Stewart Lake Blue Bell Lake Sand Burr Lake	Backwater dredging and addition of fisheries substrate to increase aquatic diversity and provide year-round fisheries habitat, and increasing existing elevations and planting trees, shrubs, and understory plants to increase topographic and forest species diversity, including hard mast tree species.	Beaver Island interior: Lower Cut, Stewart Lake, Blue Bell Lake, and Sand Burr Lake
Closure Structure	Closing structure installation to reduce sediment influx through Beaver Island and maintain aquatic diversity.	Upstream end of Upper Cut
Chevron Structure Mussel Substrate	Chevron and substrate structure installations for stabilization of Albany Island bankline and to increase aquatic and mussel habitat.	Upstream end of Albany Island and Albany Slough
Timber Stand Improvement (TSI)	Timberstand improvement to increase floodplain forest age, structure, and species diversity.	Throughout Beaver Island (approx. 350 acres)

This alternative was selected over more cost effective alternatives in an effort to reduce impacts to existing high quality resources and to fulfill all project objectives. The interagency planning team recommended that all eight of the project features and corresponding locations considered should be included in the plan. Therefore, the project area includes four backwater lakes and adjacent banklines within Beaver Island, in addition to Albany Slough, Albany Island, and timber stand improvement throughout Beaver Island. Additional project provisions agreed upon by the interagency planning team include extra handling and re-configuration of dredged material placement to avoid impacting floodplain forest resources.

DISCUSSION OF FUTURE WITHOUT AND WITH PROJECT

For all project alternatives, future with-project and future without-project conditions were modeled over a 50-year planning horizon. The primary factors identified to affect future conditions of the project area include sedimentation, backwater lake water quality, flood inundation and duration, and island erosion. Physical habitat conditions within the Project area were collected at identified points in time to model and quantify corresponding habitat conditions.

The without project analysis indicated long-term continuation of sedimentation and successional changes in aquatic habitat. These changes are anticipated to result in the continued degradation of off-channel lacustrine fisheries habitat and succession of aquatic areas to flood tolerant herbaceous species, such as reed canary grass. Sedimentation rates within Beaver Island were monitored at two locations between 1984 and 2000 by the IA DNR. As provided in Section II(K) of the *draft* Feasibility Report, sedimentation rates were observed to be dynamic, ranging from -0.8 inches/year (erosion) to 1.9 inches/year (deposition). Overall, sedimentation trended towards deposition, with an estimated overall rate of 1 cm/year within the Beaver Island interior.

Changes in water quality and temperature would occur with additional sedimentation. Key factors influencing overwintering habitat and water quality conditions include dissolved oxygen, temperature, and water velocities. The existing aquatic habitat lacks adequate overwintering conditions (i.e., depth and flows) important for year-round habitat functioning. Baseline water quality monitoring of Beaver Island interior lakes was initiated in 2008. Two sample locations were monitored over a seven-year period. Monitoring efforts documented extended periods of snow and ice resulting in low dissolved oxygen conditions within the Beaver Island interior, with periodic winter supersaturation conditions. Additionally, the interior Beaver Island lakes exhibited significant bedload movement during periods of high flow. Installation of the closing structure at Upper Cut adjacent to Beaver Slough and dredging of the interior backwater lakes will result in reduced water velocity and sediment bedload moving through the Beaver Island complex and restore ecosystem function. The Bluegill Habitat Suitability Index (HSI) model (Stuber et al., 1982) was selected to assess the existing, future without project, and future with project backwater aquatic habitat conditions on the overwintering centrarchid community. Dredging of the backwater lakes and access channels is expected to benefit local fish communities by providing access to backwater overwintering habitats with depths conducive to supporting ideal dissolved oxygen and temperature profiles.

Albany Slough, the existing secondary channel habitat located between Beaver Island and Albany Island, has degraded geomorphologic features, structure, and function. It is projected in the future without scenario that the Island will continue to erode and degrade, which would result in major detrimental effects on the existing mussel community inhabiting the side channel and the fish species which serve as hosts. Installation of the chevron structure and mussel habitat substrate will provide stability to Albany Island and reduce the effects of wind fetch and erosion. Classification and regression tree (CART) modeling (Steuer et al., 2008) was used to evaluate potential hydraulic changes to Albany Slough from the proposed chevron construction and to evaluate potential impacts to Higgin's eye pearly mussel. The model identified near constant values for velocity, shear stress, substrate composition, and channel slope with and without the structure. Furthermore, the model indicated a high probability of mussels resulting from the chevron construction 'build' scenario.

The Walleye HSI model (McMahon et al., 1984) was selected by the interagency planning team to assess the existing, future without project, and future with project backwater aquatic habitat conditions of riverine components. This model was selected in the absence of an approved mussel model to predict the Beaver Island HREP effects on the potential occupation of the riverine project features by the federally endangered Higgin's-eye pearlymussel and common generalist mussel species through occupation by walleye host individuals. Providing enhanced habitat in an area where a moderately diverse and dense mussel bed is known to exist is likely to result in benefits to the mussel community, and promote occupancy by the federally endangered Higgin's-eye pearlymussel.

River flood stages, and the resulting inundation of floodplain forest areas lacking topographic diversity, have increased since installation of the Upper Mississippi River lock and dam system. Specifically, average flood stage elevations increased approximately 0.5 feet between the 30-year monitoring periods of 1954-1983 and 1984-2013. Increased flood height, frequency, and

duration have resulted in the displacement of tree stands of diverse species and age towards flood tolerant tree species and invasive herbaceous plants. The approximately 1,500 acres of Beaver Island HREP floodplain area consists of 95 percent broad-leaved deciduous forest habitat and approximately 5 percent open canopy habitat, a significant portion of which is occupied by reed canary grass. A 2015 forest inventory of mast tree species conducted by the USACE recorded a total of 10 different species in the overstory. Forest patches of such diverse and unique tree species are not typically found within the Upper Mississippi River floodplain due to flood intolerance. The identified mast trees were, on average, over 88 years old and contained little recruitment in the understory, which is directly related to increased water inundation and duration.

A key component of the Beaver Island HREP includes preserving these unique and diverse patches of forest while restoring and increasing the surrounding monotypic flood-tolerant forest. Dredged material placement throughout the Beaver Island and Albany Island interiors is designed to increase topographic diversity and allow for the planting and regeneration of hardwood mast trees. Thus, changes in floodplain forest species and age structure composition under future with-project conditions are projected to improve as existing diverse patches of hardwood mast tree species are allowed to regenerate in response to the raised elevation of adjacent areas above that of frequent and prolonged inundation. Proposed conservation measures, as identified in the BA, include timber stand improvement activities for over 350 acres of Beaver Island. Timber stand improvement will include girdling trees for increased snag habitat, canopy openings, and mast tree plantings. An additional planting of more than 800 mast trees, including species which produce exfoliating bark, will be completed in the cleared areas. Collectively, these activities should result in positive long-term benefits for potential roost tree production, foraging habitat, and overall habitat diversity.

Refer to the *draft* Feasibility Report, for a comprehensive list and discussion of prior studies and reports conducted at Beaver Island and surrounding areas.

CONCLUSIONS AND RECOMMENDATIONS

The Beaver Island HREP offers a unique opportunity to restore and enhance fish and wildlife resources in this section of Pool 14. The multi-agency coordination effort has demonstrated the value of this project towards maintaining a high quality UMR ecosystem while avoiding adverse impacts. Beaver Island represents the largest and single most important habitat restoration project in Pool 14 to restore degraded environmental conditions within the backwater and floodplain forest habitats that will benefit migratory birds, fish, other wildlife, and plants.

This ecosystem restoration project will result in improved overwintering conditions for a variety of species. Increasing backwater depths with the resulting improvement in water quality and fish habitat structures should promote and improve seasonal refugia with resulting benefits to the warm-water fisheries communities. Placement of mussel substrate should promote and improve mussel habitat quality with resulting benefits to many mussel species, including the federally and state-listed Higgin's-eye pearlymussel. Additional habitat gains will result for floodplain forest quality through increasing hardwood forest stand species diversity, age, and structure. This will

provide long-term benefits to resident migratory bird and bat species, providing increased foraging and shelter habitat diversity and other species relying on hardwood mast trees as a source of food and shelter. Improvements would occur at each individual site. However, these improvements would extend beyond each individual site and are expected to benefit the entire fish and wildlife communities within adjacent areas.

Further, the Beaver Island HREP meets the goals and objectives of the Upper Mississippi River National Wildlife and Fish Refuge, which was established by Congress in 1924 to provide a refuge and breeding ground for migratory birds, fish, other wildlife, and plants.

Therefore we recommend the preferred alternative which includes:

> Backwater restoration of Stewart Lake, Blue Bell, Sand Burr, and Lower Cut through the means of mechanical dredging with placement of dredged material in an effort to improve island site suitability for mixed bottomland tree species by raising ground elevation and providing topographic diversity; construction of a closing dam at the opening of Upper Cut to protect Beaver Island backwater habitats from further sedimentation; and the construction of a chevron rock structure and placement of mussel habitat substrate at the upstream end of Albany Island and Albany Slough to prevent future erosion and provide improved freshwater mussel habitat.

This letter has been prepared under the authority of and in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat.401, as amended; 16 U.S.C. 661 et seq.); the Endangered Species Act of 1973, as amended; and the Migratory Bird Treaty Act (40 Stat, 755, as amended; 16 U.S.C. 703 et seq.). We appreciate the opportunity to provide these comments and look forward to continued coordination on this project. If you have any questions, please contact Sara Schmuecker of my staff at (309) 757-5800, ext. 203.

Sincerely,

Kraig McPeek
Field Supervisor

Cc:
U.S. Fish and Wildlife Service (Tim Yager, Ed Britton, Sharonne Baylor)
Iowa DNR (Mike Griffin, Scott Gritters)

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REFERENCES

Exelon Generation. 2009. Habitat Conservation Plan (HCP) to support issuance of an Incidental Take Permit (ITP) for the federally endangered *Lampsilis higginsii* mussel and the candidate mussel species *Plethobasus cyphyus* related to the operations of the Quad Cities Station (QCS). 294pp.

Kiser, J. D., Stoffs, H., Karczewske, B., & Dunn, H. 2015. Indiana bat and northern long-eared bat survey – Beaver Island habitat rehabilitation and enhancement project, Mississippi River (RDB, RM 513.0-515.5), Clinton County, Iowa, Contract No. W912EK-1-D-0002. Prepared by Stantec for the U.S. Army Corps of Engineers. Pp174.

Steuer, J. J., T. J. Newton, and S. J. Zigler. 2008. Use of complex hydraulic variables to predict the distribution and density of unionids in a side channel of the Upper Mississippi River. Hydrobiologia 610: 67-82.

Stuber, R.J., G. Gebhart, and O.E. Maughan. 1982. Habitat suitability index models: Bluegill. U.S.D.I. Fish and Wildlife Service. FWS/OBS-82/10.8. 26pp.

U.S. Army Corps of Engineers (USACE), 2012. Upper Mississippi River systemic forest stewardship plan. 124pp.

U.S. Army Corps of Engineers (USACE), 2016. Draft Upper Mississippi River Restoration Feasibility Report with Integrated Environmental Assessment, Beaver Island Habitat Rehabilitation and Enhancement Project, Pool 14, Upper Mississippi River Miles 513.0-517.0, Clinton County, Iowa. Rock Island District.

U.S. Fish and Wildlife Service (USFWS). 2015. 2015 Rangewide Indiana Bat summer survey guidance. U.S. Fish and Wildlife Service, Bloomington, Indiana. 44 pp.

U.S. Fish and Wildlife Service (USFWS). 29 February 2016. Beaver Island habitat rehabilitation and enhancement project, biological assessment concurrence letter.

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

IN REPLY REFER TO:

March 30, 2017

Darron Niles
Study Manager
U.S. Army Corps of Engineers, Rock Island District
Clock Tower Building
PO Box 2004
Rock Island, IL 61204-2004

Dear Mr. Niles:

Thank you for the opportunity to review and comment on the Beaver Island Habitat Rehabilitation and Enhancement Project public review draft Feasibility Report with Integrated Environmental Assessment dated February 2017. This project will benefit the biological resources of the Upper Mississippi River National Wildlife and Fish Refuge (Refuge). The U.S. Fish and Wildlife Service (Service) supports the Tentatively Selected Plan as described in the report, which includes the following measures.

- Increasing aquatic diversity in Lower Cut, Stewart Lake, Blue Bell Lake, and Sand Burr Lake by dredging.
- Restoring forest diversity by increasing existing elevations; planting trees, shrubs, and understory plants; and timber stand improvements.
- Maintaining aquatic diversity within the area by constructing a closure at the upstream end of Upper Cut.
- Preserving and enhancing Albany Island and Albany Slough for aquatic and mussel habitat by constructing a chevron, bank stabilization, and mussel substrate.

Service staff has reviewed the report and offer the following comments.

1. By letter dated July 1, 2016, we provided the Corps comments to the previous draft report dated May 2016. Unless noted below, the Corps appropriately addressed those comments in this public review draft Feasibility Report.

2. The final Feasibility Report shall include a copy of the draft Memorandum of Agreement (MOA) for the operation, maintenance, repair, and rehabilitation of the project. The

Regional Director's letter on the final Feasibility Report will include the certification of support for operation and maintenance.

3. This work will be accomplished under the authority of WRDA 1986 (Section 1103), as amended. The annual operation and maintenance (O&M) costs are estimated at $9,600. As the project sponsor, the Service would be responsible for 100% of the project O&M. The Services' financial support would be dependent, of course, on total cost, appropriations authority, O&M responsibility, and benefits to the natural resources.

4. Our Rock Island Field Office staff has completed the Fish & Wildlife Coordination Act Report, and has provided it to the Corps under separate correspondence.

5. Timber stand improvements are a significant part of this project, but there is no clear plan for implementation at this time. We would like to ensure that this feature is implemented in a timely fashion.

6. Regarding Indiana bats, the acoustic survey was conducted in accordance with the Service's 2015 Range-wide Indiana Bat Summer Survey Guidelines (USFWS, 2015). The acoustic survey results were analyzed using two different call detection programs, resulting in a total of 217 Indiana bat calls detected by both programs. Per the Service's 2015 Range-wide Indiana Bat Summer Survey Guidelines and as discussed in our February 29, 2016 coordination letter, this information documents the presence of Indiana bats within the project area. Although no Indiana bats were captured during the mist netting efforts, it is likely the project area is used as foraging grounds for Indiana bats.

7. In the Memorandum of Agreement, please add a statement that the Corps will provide the USFWS an Operation and Maintenance Manual at project completion and turnover. Refer to the Harper's Slough HREP MOA as an example.

8. Please note that for the Memorandum of Agreement, the USFWS address has not been updated. The address is 5600 American Blvd. West, Suite 990, Bloomington, MN 55437-1458

9. Table III-2 "Beaver Island UMR Significance" was added to this document. We will provide a recommended list of Institutional Recognition USFWS-relevant components under separate correspondence.

These and previous comments have been prepared under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.), the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347), the Endangered Species Act of 1973, (16 U.S.C. 1531-1544), as amended, and the U.S. Fish and Wildlife Service's Mitigation Policy.

We are pleased to see this project moving forward, and look forward to our continued partnership with the Corps and state agencies on this beneficial project. Should you have questions regarding our comments, please contact Mr. Ed Britton, Savanna District Manager, at Ed_Britton@fws.gov or 85-273-2732; or Ms. Sharonne Baylor, Environmental Engineer, at Sharonne_Baylor@fws.gov or 507-494-6207.

Sincerely,

Tim Yager, acting

Sabrina Chandler
Refuge Manager

cc: Ed Britton, Savanna District Manager
Russ Engelke, Assistant Savanna District Manager
Sara Schmuecker, Rock Island Field Office
Sam Finney, La Crosse Fish and Wildlife Conservation Office
Mike Griffin, Iowa Department of Natural Resources

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7
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Lenexa, Kansas 66219

MAR 3 1 2017

Darron Niles
U.S. Army Corps of Engineers, Rock Island District
ATTN: Planning Division
P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Mr. Niles:

This letter responds to your correspondence of March 6, 2017, providing notification of the availability of the Draft Feasibility Report and Integrated Environmental Assessment for the Beaver Island Habitat Rehabilitation and Enhancement project, Upper Mississippi River Miles 513-517, Clinton County, Ohio. The goals of the proposed project are to restore and protect off-channel aquatic and wetland habitat and restore floodplain forest habitat.

The objectives outlined to meet these goals are:

1. Increase year-round aquatic habitat diversity, as measured by acres and native fish use of spawning, rearing and overwintering habitat

2. Increase structure and function of side channel habitat, as measured by native freshwater mussel use

3. Diversify floodplain forest habitat on Beaver Island, as measured in acres of elevated topography and number of hard mast tree species present in the Project area

The Feasibility Report/EA is thorough and comprehensive, and covers in depth various potential impact and mitigation measures. We commend your coordination efforts with various other agencies and entities throughout the development of this project. We would encourage continued coordination with local, state, and federal agencies to ensure that all laws, ordinances, and regulations are followed and all necessary permits acquired. While we have no objection to the project itself, or the recommendation of a Finding of No Significant Impact, we would like to offer the suggestion that all feasible mitigation and monitoring measures outlined in the EA are followed to minimize potential impacts to human health and the environment.

Thank you for the opportunity to review and provide comments on this project. If you have any other questions, you can contact Amber Tilley, of my staff, at 913-551-7565, or via email at tilley.amber@epa.gov.

Sincerely,

Joshua Tapp
NEPA Program Manager
Environmental Science and Technology Division