

## **COTTONWOOD ISLAND INSPECTION OF COMPLETED WORKS 2017**

### **I. PROJECT**

Cottonwood Island Habitat Rehabilitation and Enhancement Project (HREP)

### **II. AUTHORITY**

Upper Mississippi River Restoration (UMRR) Program

### **III. LOCATION**

Pool 21, Upper Mississippi River, Miles 328.5 - 331.0, Lewis County, Missouri

### **IV. PREVIOUS REPORTS**

*Reports listed below are posted at this website:*

<http://www.mvr.usace.army.mil/Missions/Environmental-Protection-and-Restoration/Upper-Mississippi-River-Restoration/Habitat-Restoration/Rock-Island-District/Banner-Marsh/>

U.S. Army Corps of Engineers, Rock Island District, Upper Mississippi River System, Environmental Management Program, Definite Project Report (R-16F) with Integrated Environmental Assessment, Cottonwood Island Habitat Rehabilitation and Enhancement, June 1996.

U.S. Army Corps of Engineers, Rock Island District, Operation and Maintenance Manual, Cottonwood Island Rehabilitation and Enhancement, March 2001.

U.S. Army Corps of Engineers, Rock Island District, Upper Mississippi River System, Environmental Management Program, Post-Construction Performance Evaluation Report - Year 3, Cottonwood Island Habitat Rehabilitation and Enhancement, June 2001.

U.S. Army Corps of Engineers, Rock Island District, Upper Mississippi River System, Environmental Management Program, Post-Construction Performance Evaluation Report – Year 4, Cottonwood Island Habitat Rehabilitation and Enhancement, April 2002.

U.S. Army Corps of Engineers, Rock Island District, Upper Mississippi River System, Environmental Management Program, Post-Construction Performance Evaluation Report – Year 10, Cottonwood Island Habitat Rehabilitation and Enhancement, January 2007.

U.S. Army Corps of Engineers, Rock Island District, Upper Mississippi River System, Environmental Management Program, Post-Construction Initial Performance Evaluation, Cottonwood Island Habitat Rehabilitation and Enhancement, 2012.

**V. PROJECT GOAL & OBJECTIVES:**

The project goals and objectives were outlined in the original Definite Project Report and are summarized in Table 1 below.

**Table 1: Project Goals and Objectives**

Project Goals and Objectives		
Goals	Objectives	Project Features
<b>Restore wetland, main channel border, and aquatic overwintering habitat</b>	Increase food, shelter and breeding habitat for wildlife	Potholes
	Increase bottomland hardwood diversity and quality	Mast tree planting
	Improve water quality for fish	Wing damnotching
	Provide flowing water habitat for fish	Dredging
	Provide additional habitat and substrate for benthic invertebrate and aquatic organisms	
	Provide overwintering habitat for fish	

**VI. MONITORING PLAN EVALUATION CRITERIA:**

Table 2 was copied from the following report: U.S. Army Corps of Engineers, Rock Island District, Upper Mississippi River System, Environmental Management Program, Post-Construction Initial Performance Evaluation, Cottonwood Island Habitat Rehabilitation and Enhancement, 2012.

No changes or discussion of this table was made during this site assessment.

**Table 2 Performance Evaluation and Monitoring Schedule**

Goal	Objective	Enhancement Measure	Units	Monitoring Target Values	Monitoring Schedule
				Year 50 Target with Project	
<b>Restore and Enhance Wetland Habitat</b>	Improve water quality for fish	Chute restoration and enhancement	Dissolved oxygen	>5mg/l	USACE annual monitoring
	Provide overwintering water habitat for fish	Create deep holes	Acre/hole	4.5 acres	USACE annual monitoring
	Provide flowing water habitat for fish	Notch wing dams	Feet/sec	0.5 ft/sec at notch	USACE post construction inspection
	Provide additional habitat and substrate for benthic and aquatic organisms	Rock rubble below dikes	Organisms	--	
	Increase food, shelter, and breeding habitat for wildlife	Excavated potholes	Square feet	--	Sponsor annual site inspection
	Increase bottomland hardwood diversity and quality	Hardwood planting	Percent survival	20	Sponsor annual site inspection

**VII. SIGNIFICANT EVENTS SINCE LAST INSPECTION**

Recent significant high water events since 2008 are compiled in Table 3 below. The flood stage levels expressed in Table 3 are in reference to the Mississippi River gage at Quincy, IL. Flat pool elevation at this location is 17 ft. Years not listed from 2008 to 2017 only experienced minor flooding.

**Table 3: Recent Significant Events at the Site**

2008	Above flood stage for over a month from 4/11 to 5/22 and again from 6/4 to 7/7. Highest peak reaching 30.79 ft.
2010	Above flood stage for approximately a month from 3/14 to 4/15 and two months from 6/20 to 8/25. Highest peak for the year reaching 21.54 ft.
2011	Above flood stage from 4/3 to 5/13. Highest peak reaching 22.83 ft.
2013	Dipping below flood stage twice in just under a three month period from mid-April to mid-July. Highest peak reaching 27.74 ft.
2014	Above flood stage from 6/25 to 7/20. Highest peak reaching 26.74 ft.

**VIII. PROJECT SPONSOR UPDATES**

There are no project sponsor updates at this time.

**IX. DATE OF FIELD VISIT:** July 24, 2017, Warm, sunny, mid 80°F

**X. ATTENDEES**

Table 4 outlines the list of personnel who visited the site in 2017.

**Table 4: 2017 Site Visit Attendees**

<b>Name</b>	<b>Office</b>	<b>Title</b>	<b>Number</b>
Kara Mitvalsky	USACE – Rock Island	Environmental Engineer	(309) 794-5623
Steve Gustafson	USACE – Rock Island	Environmental Protection Specialist	(309) 794-5202
Tara Gambon	USACE – Rock Island	Pathways Intern	
Anton Stork	USACE – Rock Island	Civil Engineer	(309) 794-5470
Sara Schmuecker	USFWS	Fish and Wildlife Biologist	(309) 757-5800
Ryan Anthony	USFWS	Migratory Birds and Eagle Biologist	(309) 757-5800
Mike Flaspohler	Missouri Department of Conservation	Wildlife Management Biologist	(573) 248-2530
Ben Vandermyde	USACE – Rock Island	Forester	(309) 794-4522
Kjetil Henderson	USACE – Rock Island	Biologist	(309) 794-5709
Laramie Wieseman	USACE – Rock Island	STEM Extern	(309) 794-4522
Nicole Manasco	USACE – Rock Island	Supervisory Hydrologist	(309) 794-5558

## XI. OBSERVATIONS

**Wing Dam Notches:** Six wing dams are located within the project boundaries. The purpose of this feature is to create deeper pockets and flowing water which result in habitats that support benthic invertebrate and aquatic organisms. These notches produce areas of differing flow which are favorable to the production of midges and mayflies. This habitat also provides food for large age-0 sturgeon and reduces percent sand in the substrate, which benefits invertebrate taxa such as Oligochaete, Hexagenia, and Chironomidae. During the site visit depths were recorded ranging from 3-5 feet in the general low areas between the wing dams and up to 30.4 feet in one of the deep pockets resulting from the wing dam notching. The pool stage during the inspection was 12.88' (471.14' MSL 1912) which is 1.14 feet higher than flat pool. Although the wing dams are not visible due to their location below water, their locations were made apparent by the variations in the river water surface.

To restore the main channel border habitat, the Year 50 Target is to maintain the velocities of 0.35 ft/sec at 100 feet upstream of the notch, 0.5 ft/sec at the notch, and 0.4 ft/sec at 100 feet downstream of the notch. During the 2017 site visit velocities were not measured, but previous measurements indicate that velocities downstream of the wing dams are greater than those upstream of the wing dams. This trend is expected; however, these velocities are higher than the target velocities.

The SEAS Multi-beam data was also used to determine the depths downstream of the notches. The depths 100 feet upstream of the notch, at the notch and 100 feet downstream of the notch from the 2014 survey can be seen in Figure 1. On the day of the inspection, the depths were found using a depth finder on a boat. The pool stage during the inspection was 12.88' (471.14' MSL 1912) which is 1.14 feet higher than flat pool. A comparison between the 2014 and 2017 depths downstream of the notch are shown in Table 5. The locations of the channel depths may not be in the exact same location since there were not specific coordinates.

Table 5: Depths 100 feet downstream of wing dam notch

Wing Dam No.	Depth below flat pool (470.0' MSL 1912) (ft)	
	2014 SEAS Multi-Beam Survey	2017 Inspection
8	13.0	21.7
5	27.5	17.2
6	24.6	29.3
29	17.3	15.6
30	11.6	10.9
15	13.2	15.6

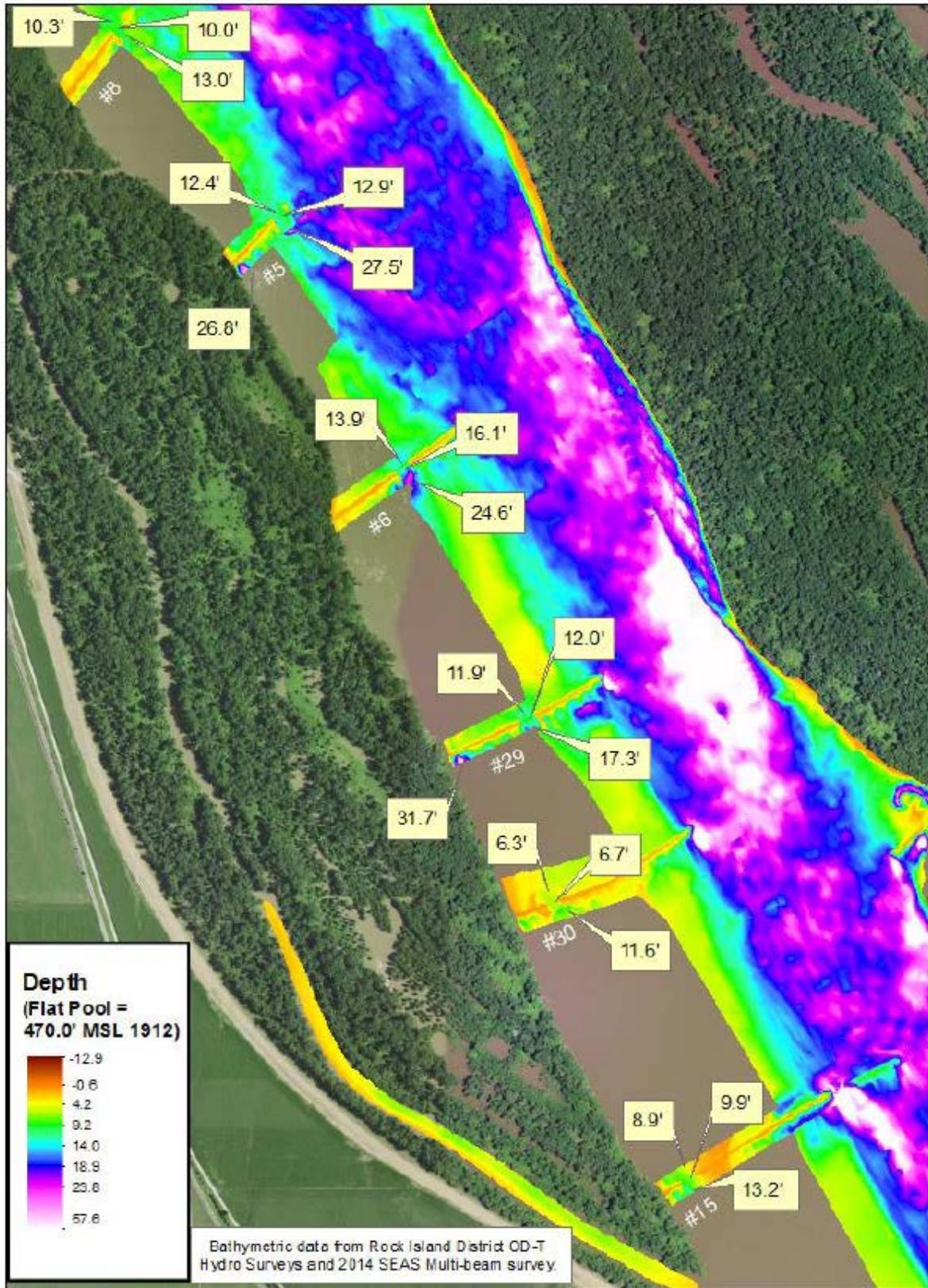


Figure 1: Depths near wing dams from SEAS Multi-beam survey

**Potholes:** Several potholes are located on site and one was viewed during the site visit. The purpose of this project feature is to provide habitat for wildlife. These have also restored the area to include sloughs and depressions within the landscape that were impacted by sedimentation. The potholes provide secluded habitat for migratory bird nesting and feeding and have thus far maintained their structure well. Many small minnows, insects, crawdads, and other creatures were noted at the site. These were being consumed by larger creatures as noted by the waterfowl and small mammal footprints around the pond.

**Causeway:** The causeway has experienced some scour damage just past the channel on the east side. Water is redirecting around the impervious material of the causeway and washing away the material gravel placed there for vehicle access. It has been filled in by the sponsor in the past with gravel but continues to remain an issue after high water events. There is a small amount of riprap at the northeast portion of the causeway, but to avoid erosion this would need to extend farther up the bank and tie into high ground.

**Mast Tree Plantings:** The tree plantings have developed well. During implementation of the project, weed protection mats were placed around the base of all of the planted trees. These mats were supposed to break down within 5 years but have survived to the present and are choking out many of the trees observed during the site visit. Tree cages were placed around trees in another portion of the site. These cages fill with sediment and in some instances cause rotting and restrict growth. This project also designed tree plantings to be done on berms. These raised portions have been known to cause issues with the way tree roots develop, but at Cottonwood this does not appear to have limited tree growth. Many healthy mast-producing trees were observed, including pin oak, bur oak, swamp white oak, pecan, and sycamore. These have been successfully established and some have grown to over 40 feet tall. Other trees noted on site, both planted and volunteer, were silver maple, American elm, Green ash, honey locus, hackberry, black willow, boxelder, and red mulberry.

**Vegetation:** Several large buttonbushes were observed on site near one of the large potholes and next to the causeway which create beneficial habitat. Other plants identified within the project boundaries were bur cucumber, curly dock, wild grape, mulberry, giant ragweed, and morning glory.

**Chute Restoration:** The dredged channel has successfully been providing overwintering habitat for fish. However, it has filled in from its designed depth of 9 feet to between approximately 7 and 8 feet at the upstream area and 4 feet at the entrance to the chute (based upon depthfinder readings and pool stage on the day of the site visit).

**Wildlife:** Many animals were observed during the site visit. Animals such as bald eagles, Asian carp, heron, turtles, burrowing crayfish, yellow billed cuckoo, cardinal, eastern wood-pewee, and Carolina wren were seen or heard during the site visit. Many Asian Carp were observed on site. There were many within the dredged channel and in some areas along the island between the wing dams. The skeleton of a bowfin was also noted along the bank of one of the potholes.

## **XII. SUMMARY**

Overall the Cottonwood Island HREP appears to be generally meeting its goals and objectives through continued operation and maintenance by the Missouri Department of Conservation.

## **XIII. RECOMMENDATIONS**

- Removing weed barrier mat from around base of trees
- Remove tree cages from around trees in planting area
- Repair scour damage on causeway and add riprap to channel to avoid future erosion

## **XIV. LESSONS LEARNED**

Weed barrier mat has the potential to last much longer than expected and can choke and effectively girdle trees if left in place too long. In wet areas tree cages tend to fill with sediment which can result in rotting of the roots and base of the tree.

# **Attachment A**

## **2017 Site Inspection Photos**

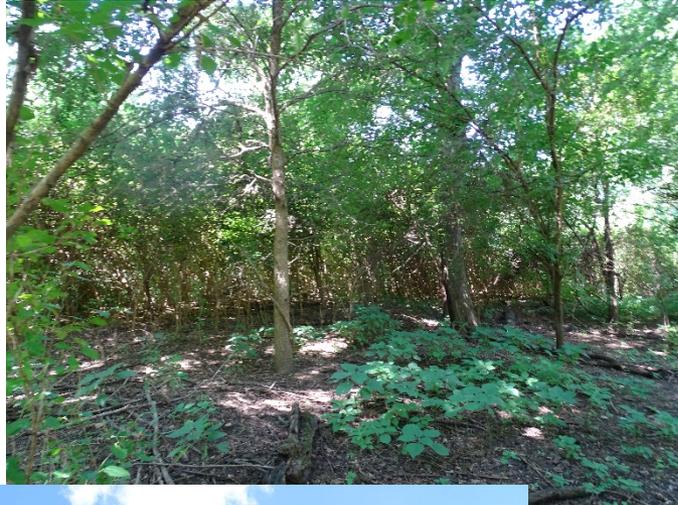


2017 site visit attendees from USACE, USFWS, and Missouri DNR

# Dredged Material Placement



Embankment on the east side of excavated channel



Placement site from interior of island, looking west across placement site towards dredge cut



Placement site with tree plantings

# Excavated Channel

Cottonwood Island HREP  
2017 Inspection of Completed Works

Excavated channel downstream entrance



Downstream entrance to dredge cut



Upstream channel inlet,  
located upstream of the  
causeway, connecting the  
main channel was silted in

# Dredge Cut



Asian carp being thrown from boat

# Tree Plantings



Trees planted on dredged material placement site

# Tree Plantings



Interior field, near dredged material placement site

# Tree Plantings



Berms and trees, sponsor mowing  
between rows



Trees planted with no active mowing  
between rows

# Tree Plantings



# Weed Barrier Mat



Weed barrier mats were expected to break down in 5 years but have survived to the present. In some cases these are girdling trees.

# Tree cages



Tree cages were implemented on portions of the tree plantings. These often fill with sediment and sometimes restrict growth as seen in the above images.

# Wingdams



Water surface indicating  
wing dam notches



# Wingdams



Tree sitting on  
wingdam

# Access Road



Recently mowed access to portions of project area

# Causeway



View looking south from causeway



View looking north from causeway

# Causeway



Scour damage is occurring just east of the causeway as water is redirecting to that area during high water events.



# Causeway



South riprap

# Causeway



Riprap on the north side of the causeway does not tie into existing high ground currently.



# Potholes



Five potholes were constructed onsite to provide varying habitat. To the right, animal tracks surrounding the pothole can be viewed. Above are several fish bones that were near a pothole.

# Vegetation



Buttonbush

# Vegetation

Snail



Morning glory and giant ragweed

# Wildlife

Eastern wood-pewee



Caterpillar

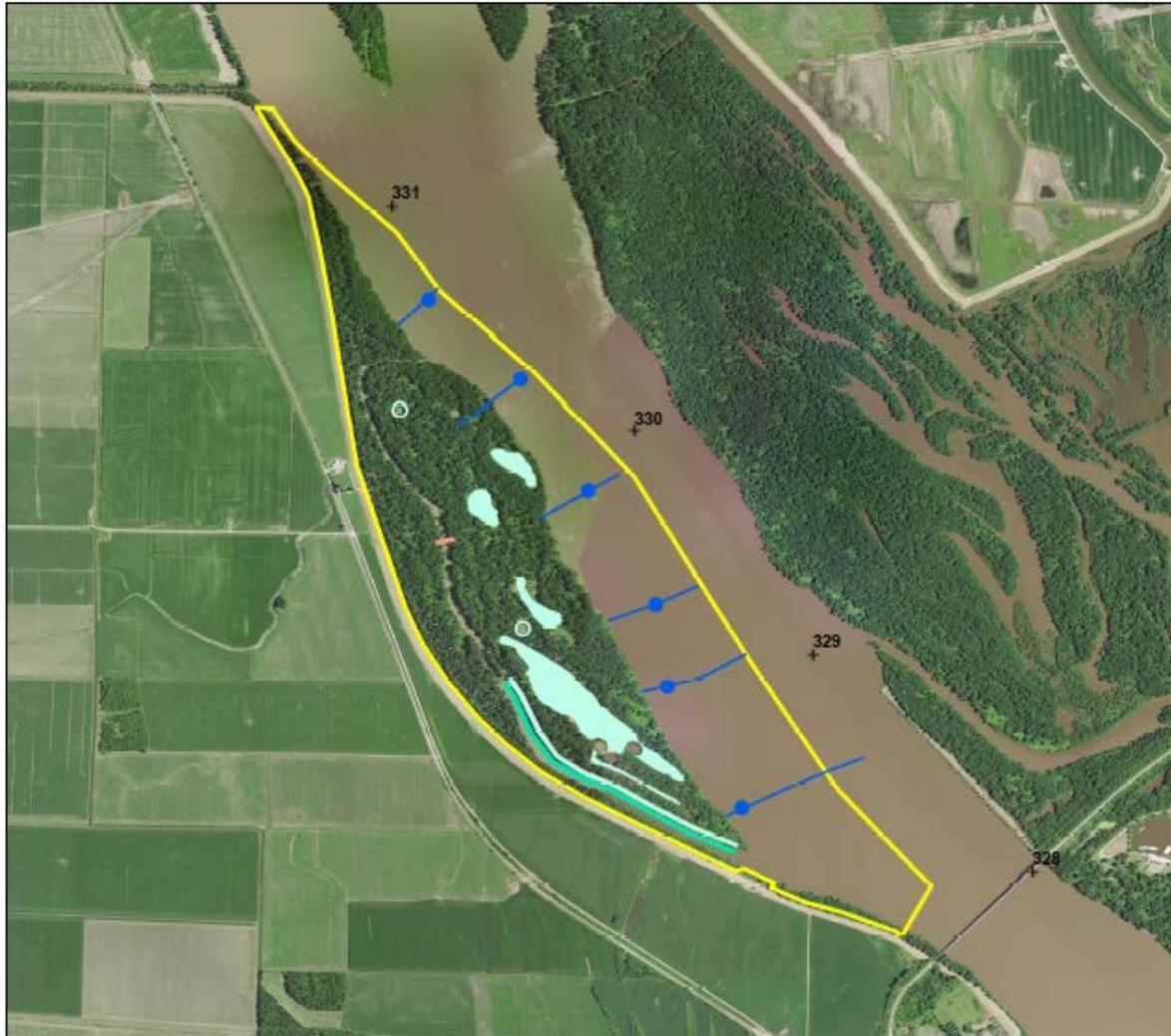


Crawfish nest

# **Attachment B**

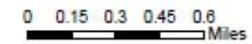
## **Site Plan and Monitoring Plan Plates**

Cottonwood Island

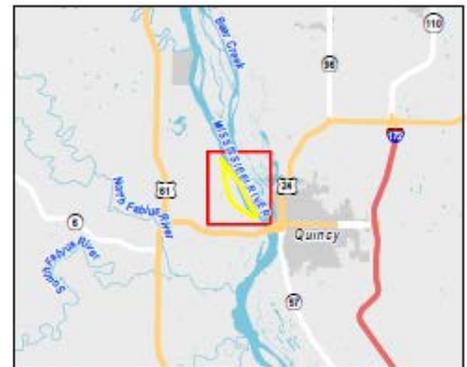


Legend

- Wingdam Notch
- Wingdam
- Dredging Event
- Flora Planting or Seeding
- Revetment
- Project Boundary
- + River Miles



-- Location Map --



Cottonwood Island HREP  
2017 Inspection of Completed Works

