

**BAY ISLAND
INSPECTION OF COMPLETED WORKS
2022**

I. PROJECT

Bay Island Habitat Rehabilitation and Enhancement Project (HREP)

II. AUTHORITY

Upper Mississippi River Restoration Program

III. LOCATION

Pool 22, Mississippi River Miles 311.0 - 312.0, Marion County, MO

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/>

U.S. Army Corps of Engineers, Rock Island District, Upper Mississippi River System, Environmental Management Program, Definite Project Report (R-8) with Integrated Environmental Assessment, Bay Island, Missouri Rehabilitation and Enhancement, May 1990.

U.S. Army Corps of Engineers, Rock Island District, Operation and Maintenance Manual, Bay Island Habitat Rehabilitation and Enhancement Program, November 1995.

U.S. Army Corps of Engineers, Rock Island District, Upper Mississippi River System, Environmental Management Program, Post-Construction Initial Performance Evaluation Report, Bay Island Habitat Rehabilitation and Enhancement, December 1999.

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

U.S. Army Corps of Engineers, Rock Island District, Upper Mississippi River Restoration, Environmental Management Program, Post-Construction Performance Evaluation Report, Bay Island Habitat Rehabilitation and Enhancement, March 2003.

U.S. Army Corps of Engineers, Rock Island District, Upper Mississippi River Restoration, Environmental Management Program, 10-Year Performance Evaluation Report, Bay Island Habitat Rehabilitation and Enhancement, May 2004.

U.S. Army Corps of Engineers, Rock Island District, Upper Mississippi River Restoration, Environmental Management Program, Inspection of Completed Works: Trip Report, Bay Island Habitat Rehabilitation and Enhancement, August 2012.

U.S. Army Corps of Engineers, Rock Island District, Upper Mississippi River Restoration, Environmental Management Program, Post-Construction Performance Evaluation Report, Bay Island Habitat Rehabilitation and Enhancement, 2015.

U.S. Army Corps of Engineers, Rock Island District, Upper Mississippi River Restoration, Environmental Management Program, Inspection of Completed Works: Trip Report, Bay Island Habitat Rehabilitation and Enhancement, June 2017.

V. DATE OF FIELD VISIT: June 17, 2022, warm, humid, sunny, low 80's °F

VI. ATTENDEES

Table 1 lists the personnel who visited the site in 2022.

Table 1: 2017 Site Visit Attendees

| Name | Office | Title | Number |
|-----------------|-------------------------------------|-------------------------------------|------------|
| Kara Mitvalsky | USACE, Rock Island | Environmental Engineer | [REDACTED] |
| Steve Gustafson | USACE, Rock Island | Environmental Protection Specialist | [REDACTED] |
| Ben Vandermyde | USACE, Rock Island | Lead Forester | [REDACTED] |
| Reilly Dolan | USACE, Rock Island | Forester Intern | [REDACTED] |
| Ryan Kelly | Missouri Department of Conservation | Wildlife Management Biologist | [REDACTED] |
| Ross Domes | Missouri Department of Conservation | Supervisor | [REDACTED] |
| Davi Michl | USACE | Biologist | [REDACTED] |
| Casey Lewis | USACE | Project Manager | [REDACTED] |
| Emma Linde | USACE – Rock Island | Pathways Intern | [REDACTED] |
| Dante Arguello | USACE – Rock Island | Civil Engineer | [REDACTED] |

VII. PROJECT GOAL AND OBJECTIVES

The project goal and objectives are summarized in Table 2.

Table 2: Project Goal and Objectives

| Goal | Objectives | Project Features |
|--|--|---|
| Enhance Wetland Habitat for Migratory Waterfowl | Provide controlled water levels during waterfowl migration – forested and non-forested | Wildlife Mgmt Units – perimeter levee, pump station, and water control structures |
| | Increase mast tree dominance in the forested wetlands | Mast Tree planting |
| | Increase total wetland values for migratory waterfowl | New project access road |

VIII. MONITORING PLAN EVALUATION CRITERIA

No changes or discussion of Tables 3 and 4 were made during this site assessment.

Table 3: Monitoring and Performance Evaluation

| Activity | Purpose | Responsible Agency | Implementing Agency | Funding Source | Remarks |
|---|--|--|----------------------------|-----------------------|--|
| Pre-Project Monitoring | Establish need of proposed project features | MDC | MDC | MDC | Attempts to begin defining baseline. |
| Baseline Monitoring and Data Collection for Design | Establish baseline conditions; meet specific design and data requirements | USACE | USACE | USACE (HREP) | See DPR for location and sites for data collection and baseline information. |
| Construction Monitoring | Assess construction impacts; meet permit requirements | USACE | USACE | USACE (HREP) | Environmental protection specifications included in construction contract documents. Inter-agency field inspections accomplished during project construction phase |
| Performance Evaluation Monitoring | Continue monitoring and assess physical, chemical, and vegetation performance of project relative to design goals and objectives | USACE (quantitative) MDC (field observations) | USACE MDC | USACE (HREP) MDC | Comes after construction phase of project |
| Analysis of Biological Response to Project Features | Evaluate biological response predictions and assumptions | USACE | USACE | USFWS | Intensive biological response monitoring of this Project, as part of the HREP element of the UMRS-EMP, is not scheduled. |

Table 4: Monitoring and Performance Evaluation Schedule

| Goal | Objective | Enhancement Measures | Units | Year 0 w/out Project (1992) | Year 50 Target w/ Project (2042) | Monitoring Schedule |
|--|--|---|----------------------------|-----------------------------|----------------------------------|--|
| Enhance Wetland Habitat for Migratory Waterfowl | Provide controlled water levels during waterfowl migration - forested and non-forested. Increase reliable food production area (moist-soil species) | Earthen Levee, pump station, stoplog structures | Acres | 40 (uncontrolled) | 400 | USFWS and MDC will observe the presence of waterfowl annually. The Corps will perform aerial surveys every 5 years. |
| | Increase mast tree dominance | Mast tree plantings including seedlings and acorns | Acres | 6.9 | 36.9 | MDC will observe the survival of plantings annually. The Corps will take a Timber Inventory every 10 years. |
| | Increase total wetland values for migratory waterfowl | All project features are intended to enhance wetland values | Habitat Units Acres | 0.14 99.1 | 0.62-0.64 420.5-434.0 | USFWS and MDC will observe the presence of waterfowl annually. The Corps will perform WHAG Analysis at 1, 15, and 50-year intervals. |

IX. SIGNIFICANT EVENTS SINCE LAST INSPECTION IN 2018

There were a few weeks off and on from May to November of 2018 where flood stage was breached, however, it was typically no more than 3 feet (ft) above. October was the only month that saw the stage 3-7 ft above flood stage. 2019 had a major flooding event that lasted 4 months from mid-March to mid-July. The flood stage peaked in early June at 30.05 ft (13.05 ft above stage). , As in October 2018, river levels were above flood stage the entire month of October 2019, but, but by less than during (list months) 2019. April of 2020 was above flood stage by 1-4 ft and is the most recent event as of the timing of this report.

X. OBSERVATIONS

Perimeter Levee: This levee is mowed twice a year. Settlement, sloughs, wave wash, and scouring do not appear to be a problem. Rip-rap is in good condition and well maintained. No issues with encroachment or unfavorable vegetation growth were observed. There were minor areas of rutting due to vehicle traffic and wet conditions. Some debris on levee was left over from spring flooding. Minor erosion areas occurred on the levee during the 2019 flood; the sponsor made repairs twice that year.

Intermediate Levee: This levee has a consistent breach southeast of the south water control structure (WCS) on the perimeter levee. Permanent repair is likely required to address frequent breaching issues.

Water Control Structure North Perimeter Levee: The WCS along the North Perimeter levee is in good condition and has not been modified since the 2017 site inspection. The rip-rap is largely still in place. There is no erosion adjacent to the structure, and only minimal concrete structural degradation adjacent to the grate decks above the stoplogs. It is also clogged with woody debris from beaver activity.

The main issue indicated by the sponsor with the WCS is the stoplogs. The structures require two to three people to operate which is difficult given current staffing levels. The low guardrails and the awkward angle for insertion and removal of the lifting hooks also leads to safety concerns. The Missouri Department of Conservation (MDC) plans to change to gates that can be operated by one person pending funding. Images of the stoplogs can be viewed in Attachment A. These give a clearer indication of the difficult angle necessary to manipulate the structure and the safety concerns that may arise.

Water Control Structure South Perimeter Levee: The condition of the WCS South Perimeter Levee is similar to the North Perimeter Levee. Like the North Perimeter Levee, operating the stoplogs is a three-person job. It was open in the spring to let the water out, but there is no funding to replace the structure and make it easier to operate. As mentioned above, there is an area on the intermediate levee that consistently breaches, sending water towards the South Perimeter Levee. No damage to the Soh Permitter Levee has been observed.

Additionally, beavers have in the past filled the WCS requiring them to be cleared out by MDC staff.

Water Control Structure Intermediate Levee: The screw gate on the intermediate levee separating the North and South Wildlife Management Units needs repaired. In addition, protective cages are set up on either side of this WCS to protect from beaver damage. The structure resembles a cage and surrounds the area at risk. The sponsor did not know when it

had been implemented or if it was put in place due to previous issues or as prevention. However, it has worked for this site up to this point.

Pump Station: No concerns were noted in regard to the pump station structure. Regular maintenance is occurring since the pump station is used at least once a year. The only issue the project sponsor brought to USACE representatives' attention was that leaf litter during the fall clogs the pump, causing it to shut down. The sponsor noted the pump is working efficiently to bring water into the project area. However, getting water out of the project area during extended high-water events has been a concern. Routinely long-duration high stages of the Mississippi River prevent adequate drawdown of the HREP, which is leading to tree stress and death. Since the purpose of the pump station is to only bring water in, aside from the water control structures, there is no way to remove water from the HREP.

Spillways: The North Spillway is well maintained. There is no erosion, and unwanted vegetation is managed well in the riprap. Following flood events, sediment needs to be scraped off. The South Spillway is in the same condition as the North Spillway. The condition of both spillways and riprap can be viewed in Attachment A.

Screw Gate: The gate is completely inoperable. The screw turns but the gate will not raise or lower. It is likely stripped and needs repaired, but there is currently no money to do so. As built shows the gate on the edge of the levee. However, it is actually in the center.

Mast Tree Plantings: The Root Production method (RPM) for mast tree plantings have been successful. There were a number of very healthy pin oaks observed. Many of the RPM trees planted at the Northeast end of the project are 7-10 inches in diameter with good canopy cover. Several appeared to have grown from stump growth. Others showed some stress most likely due to crowding or flooding. These conditions can be viewed in Attachment A. Scattered pecans are present and in good condition. Foresters conducted an initial thinning in 2013. There was anticipation of a second thinning effort after the 2017 site visit, however, a second thinning treatment has not occurred. Invasive plants include giant ragweed and reed canary grass. Trees are currently due for a thinning. The southern hard mast planting area; in the South WMU has had the least survival. Most of the hard mast species were out-competed by herbaceous growth and inundation events. This area is now established with natural regeneration consisting mostly of cottonwood and willow. With the protection and size development of early successional species, this area would be well suited for a follow up supplemental planting of higher flood tolerant species. Recommendation to consider minor thinning in dense portions and planting of northern pecan, overcup oak, bald cypress, river birch, and sycamore.

Access Road: The access road was navigable and in good condition.

Ameren Mitigation Plot: Formerly used as a food plot, this area was planted with trees and shrubs in 2015 and has since flooded approximately 5 times. Mowing is done approximately 2-3 times a year. The plot is currently on year six of ten, set to be let alone in 2026. Most plantings have endured to the 2-year critical threshold, after which continued survival of tree species increases. However, the aggressive mowing of the site has negatively impacted some of the trees; many had to be righted and re-set into the soil during the 2017 site inspection. Tree species included northern pecan, swamp white oak, overcup oak, bur oak, pin oak, persimmon, elderberry, swamp privet, gray dogwood, spicebush, silky dogwood, buttonbush, bald cypress, river birch, and hickory. A handful of trees had strong stump sprouts from strong roots even if the main stem were dead. Mowing has eradicated the original plantings of scrub-shrub species; none were observed during the inspection. Monitoring for a period of 10 years is required to

ensure containerized trees and shrubs do not fall below the 60% survival rate; otherwise, supplemental planting will be required to at least 80% of original planting density. As a result, many scrub-shrub species were supplementally planted in 2019.

Additional Comments: Near the south WCS, break through commonly occurs between the borrow pit and the ditch by the levee.

Several species of waterfowl, including six blue heron individuals, were seen using the site during the inspection.,. No waterfowl counts have been completed. However, based on sponsor observations, the project successfully provides enough emergent wetland and forested wetland habitat to continue to support such migratory waterfowl species.

Many dead trees are seen in the interior due to water being too high for too long. Site habitat seems to be transitioning from forested to scrub shrub/wetland habitat.

XI. SUMMARY

Overall, the Bay Island HREP appears to be generally meeting its goals and objectives.

XII. LESSONS LEARNED

Sponsor recommends not using stoplogs in future designs as they are extremely difficult to manage.

XIII. RECOMMENDATIONS

Recommendations for this site include:

1. Thin RPM trees
2. Determine actions to be taken to reduce leaf litter debris at pump station
3. Replace stop log structures with gates
4. Fix screw gate
5. Repair erosion between borrow pit and levee (break through)
6. Supplemental planting effort in South Wetland Management Unit.

**ATTACHMENT A
2022 PHOTOS**



Photograph 1: Dead Interior Trees



Photograph 2: Dead Interior Trees



Photograph 3: South Stoplog Structure



Photograph 4: Broken Screw Gate



Photograph 5: North Stoplog Structure



Photograph 6: Ameren Mitigation Tree And Shrub Planting Area (12 Acres)



Photograph 7: Ameren Shrub Planting Progress



Photograph 8: Ameren Shrub Planting Progress



Photograph 9: Pump Station



Photograph 10: Pump By The River



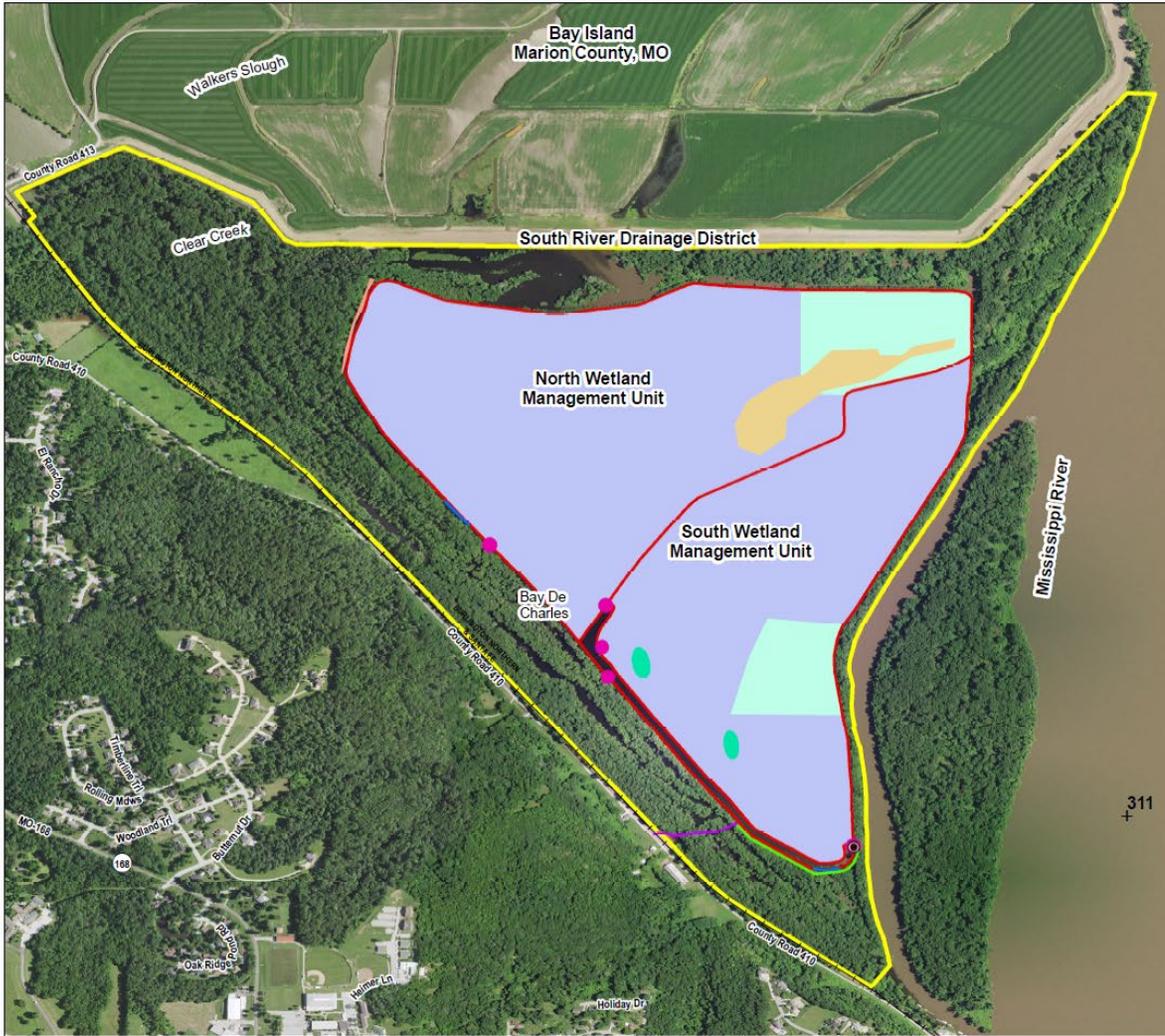
Photograph 11: Group Picture



Photograph 12: Intermediate Levee Stoplogs

**ATTACHMENT B
SITE PLAN AND FEATURES MAP**

Bay Island



Legend

- + River Miles
- ⊙ Pump Station
- Water Control Structure
- Water Control Structure
- Spillway
- Electrical Utility Segment
- Embankment Centerline
- Access Road
- Borrow Site
- Forest Enhancement
- Mitigation Planting Ameren
- Revetment
- Wetland
- ▭ Project Boundary

US Army Corps of Engineers
Rock Island District

-- Location Map --



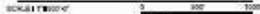
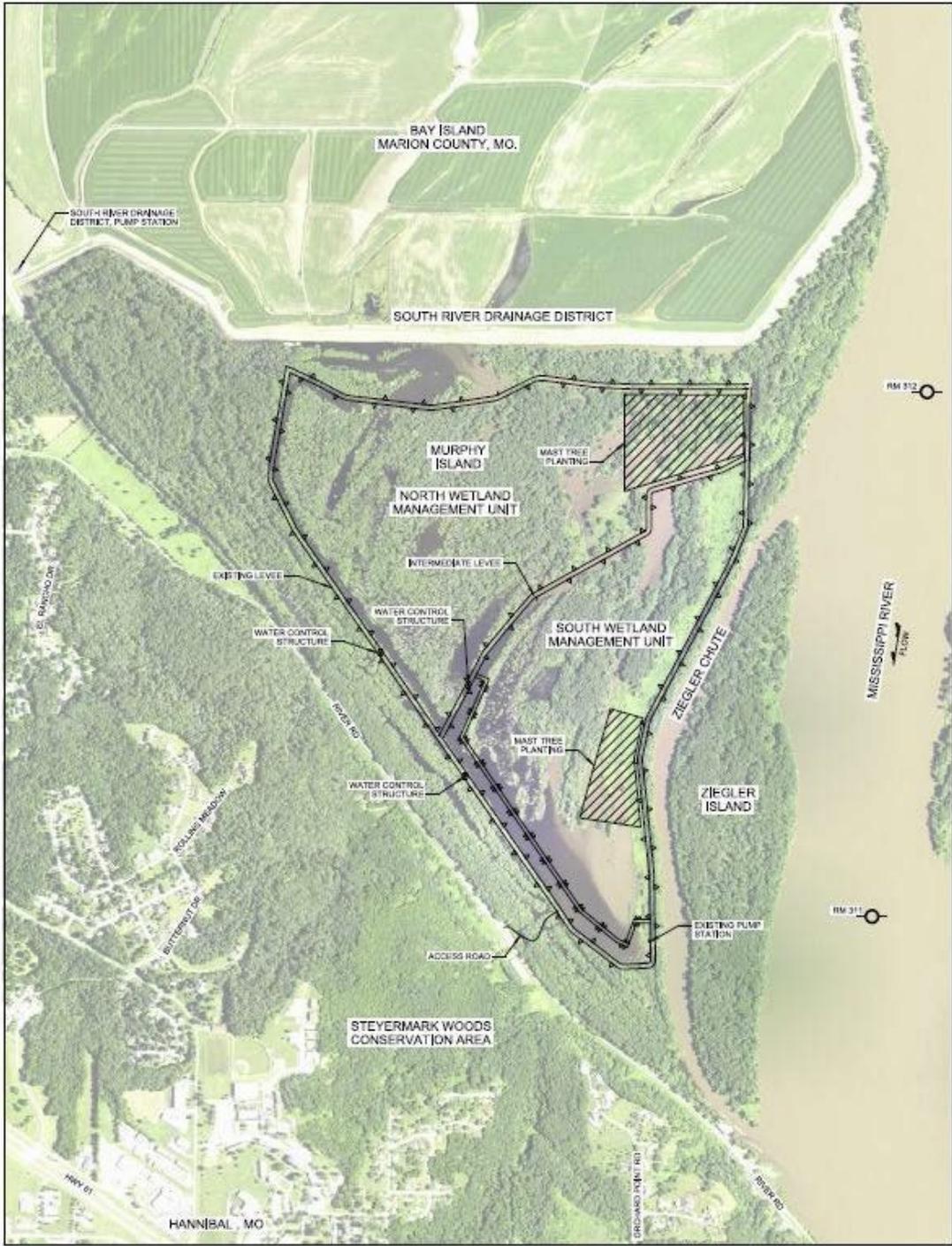


EXHIBIT 1

BAY ISLAND SITE PLAN

