

**U.S. ARMY CORPS OF ENGINEERS  
ROCK ISLAND DISTRICT**

**UPPER MISSISSIPPI RIVER SYSTEM  
ENVIRONMENTAL MANAGEMENT PROGRAM**



**2-YEAR (YR) POST-CONSTRUCTION  
PERFORMANCE EVALUATION REPORT ADDENDUM  
TO THE  
INITIAL POST-CONSTRUCTION  
PERFORMANCE EVALUATION REPORT  
DATED SEPTEMBER 2002**

**FOR**

**BANNER MARSH HABITAT REHABILITATION  
AND ENHANCEMENT PROJECT**

**LAGRANGE POOL, ILLINOIS WATERWAY RIVER MILES 138.5 – 143.9  
FULTON AND PEORIA COUNTIES, ILLINOIS**

**JANUARY 2004**

**Banner Marsh HREP  
Performance Evaluation  
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## **ADDENDUM SUMMARY**

**1. General.** This is a 2-YR Post-Construction Addendum to the Banner Marsh Habitat Rehabilitation and Enhancement Project (HREP), Initial Post-Construction Performance Evaluation Report (PER) dated September 2002. This report is a continuation of the Banner Marsh Initial PER, with additional observations and project feature assessments from May 2002 through September 2003.

The Banner Marsh Habitat Rehabilitation and Enhancement Project (HREP) is also known as the Banner Marsh State Fish and Wildlife Area. The project area is located in LaGrange Pool on the right descending bank of the Illinois River between river miles 138.5 and 143.9 just upstream of Banner, Illinois, in Fulton and Peoria Counties (see Plate 1). The Banner Marsh State Fish and Wildlife Area was operated as an agricultural drainage and levee district from the early 1900s until 1943. From 1958-1974, most of the area was actively strip-mined. Subsequently, the Illinois Department of Natural Resources (ILDNR) purchased the area, approximately 5,524 acres, in fee title. The ILDNR currently manages it as a wetland complex.

Historically, the Illinois River Flyway has been one of the most important waterfowl migration routes throughout the United States. The bottomland lakes and marshes provided aquatic food plants and small animals like the fingernail clam that naturally attracted the migrating waterfowl. Banner Marsh has undergone a series of drastic physical changes, from bottomland lake and marsh to leveed agricultural lands and active mining operations, to a reclaimed strip mine. Valuable habitat important to the declining migratory waterfowl population has been lost.

The Banner Marsh HREP construction was completed in several stages (Stage I, Stage II, Stage IIB, and Stage III). The completion dates of these construction stages are April 1999, July 2001, July 2002, and May 2003 respectively. The performance monitoring was started upon the completion of the second stage of construction. This project is designed to improve habitat for waterfowl, fish, and furbearers. Previous strip-mining activities provide areas with sufficient depth to provide feeding and resting habitat for diving ducks. Such habitat is severely limited in the Illinois River Valley. The project provides diverse water depths to the benefit of dabbling ducks. Species such as the bald eagle, great blue heron, river otter, northern pike, walleye, muskie, largemouth and smallmouth bass benefit from this project. Islands left during littoral zone grading create nesting opportunities for waterfowl. Food production and availability is optimized because of the improved ability to manipulate water levels.

### **a. Previous Performance Evaluation Reports and Project Documents.**

- 1) Initial PER dated September 2002.
- 2) Definite Project Report dated September 1995

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**b. Changes to Sampling and Data Collection.** The Corps and the ILDNR Site Manager decided that water quality sampling efforts would only be completed by the ILDNR since they perform this sampling already as part of their management of the Fish and Wildlife Area. Post-construction sedimentation transects were also removed from the Resource and Monitoring Data Collection Plan because it had been determined prior to construction of the project that sedimentation was not a concern for the project area. This decision was based on the design and function of the pump station that only discharges water from the marsh and does not direct water into the marsh from the Illinois River.

**c. Concerns or Recommendations listed in the Initial PER.**

1) The stoplog structures have been difficult to operate. Personnel involved with operation, maintenance, and monitoring activities at the Banner Marsh project have recommended that stoplog structures have a gate installed to stop flow. This will facilitate placement and removal of stoplogs.

2) The 48" pump controller has failed twice due to condensation in the enclosure. The first failure was due to condensation in the cabinet, which caused a component in the soft start drive to fail. The condensation was caused when the power was turned off to the entire pump station by opening the main breaker (no O&M Manual was available at the time to provide instruction for pump operation). This made it impossible for the pump controller cabinet heater to function, and condensation resulted. The site manager has since been instructed to not turn off the main breaker anymore. The second failure was a different component in the soft start drive, which is believed to have failed due to stress, put on the drive from the initial failure. Both problems were corrected by replacing the faulty components. If further components of the soft start drive fail, the Rock Island District's General Engineering Section has recommended replacing the entire drive (which is only one part of the controller).

3) Flood control reliability has been unsatisfactory due to the 48" pump controller failures that cause the pump station to not operate correctly. As a result, heavy rains in May and June of 2002 caused local flooding around the project site. Currently, this problem is believed to be corrected.

4) The 48" pump cavitates. This does not affect pumping capacity or reliability. It may cause, however, accelerated wear of pump components, thus shortening the expected service life of the pump (or it may have no affect at all; we do not know at this point). The District's recommendation is to continue using the pump as normal. It should be noted that the 48" pump is a backup pump that (when operated in full AUTO mode) only turns on when the 24" service pump is unable to keep up. The service pump can handle about 90% of the annual marsh pumping requirements.

5) Recommendation was made to have the ILDNR perform water quality sampling since they already performed this monitoring based on their requirements. The monitoring plan as changed to reflect the ILDNR as the responsible agency.

**2. Scope.** Observations and information in this addendum report covers the period from May 2002 through September 2003 as mentioned earlier. Future performance evaluation reports will use the calendar year for the evaluation period, so the next PER, which is considered the 3-year post-construction performance evaluation report, will cover

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performance evaluation results through December 2004. The planting of native grasses was completed May, 29, 2003, so the 5-yr post-construction vegetation transects/surveys will be scheduled for FY2008 for the PER report that will be due March 2009.

**3. Purpose.** The purpose of this addendum is to provide a summary of the observations for the performance evaluation monitoring that has been ongoing since July 2001 when the second construction stage was completed and provide information on activities and performance since May 2002.

The three goals for this project are shown in Table 1 below. The monitoring requirements associated with the project objectives and features are shown in Tables 2, 3 and 4 below.

**Table 1. Banner Marsh HREP Goals, Objectives, and Project Features.**

Goals	Objectives	Project Features
Enhance wetland habitat	Increase littoral zone for ducks and fish	Provide reliable water control/source for contiguous channels
	Improve flood control reliability	Clear and stabilize levee
		Pump station rehabilitation
Enhance terrestrial habitat	Increase food and cover for terrestrial birds	Native warm season grasses
Enhance aquatic habitat	Increase diversity in aquatic habitat	Littoral zone grading

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**Table 2. Project Goals and Objectives**

**Enhancement Potential**

<b>Goal</b>	<b>Objective</b>	<b>Enhancement Feature</b>	<b>Unit</b>	<b>Year 0 (1995) Without Alternative</b>	<b>Year 0 (2001) With Alternative (As-Built)</b>	<b>Year 1<sup>1</sup> with Alternative</b>	<b>Year 50 Target with Alternative</b>	<b>Feature Measurement</b>	<b>Annual Field Observations By Site Manager</b>
Enhance aquatic habitat	Increase diversity in aquatic habitat	Littoral zone grading	Acres of aquatic habitat less than 18 inches deep	0	35	35	106	Hydrographic soundings	Observe aquatic life changes
Enhance wetland habitat	Increase littoral zone for ducks and fish	Reliable Water control source for contiguous channels	Acres of aquatic vegetation	200	Estimated between 200 and 350	Estimated between 200 and 350	350	Aerial photography / land cover-land use mapping	Estimate effective acreage and wildlife use
		Littoral zone grading							
	Improve flood control reliability	Levee restoration	Lineal feet of eroded levee	22,900	0	0	0	Levee system transects and profiles	Describe any presence of snags, debris, channel sedimentation or vegetation
Enhance terrestrial habitat	Increase food and cover for terrestrial birds and mammals	Native warm season grasses	Acres of native grass	0	0	0	144 <sup>2</sup>	Aerial photography / land cover-land use mapping	Estimate of area with established / regenerated vegetation

<sup>1</sup> This column is completed for the year the enhancement feature is monitored. Year 1 was the year the last monitoring was completed.

<sup>2</sup> Year 50 Target for Enhance Terrestrial Habitat changed from 208 to 144 acres of native grass.

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**Table 3. Resource Monitoring and Data Collection Frequency.**

Type Measurement	Water Quality Data						Engineering Data			Natural Resource Data			Sampling Agency	Remarks
	Pre-Project Phase		Design Phase		Post-Const. Phase		Pre-Project Phase	Design Phase	Post-Const. Phase	Pre-Project Phase	Design Phase	Post-Const. Phase		
	Apr -Sep	Oct-Mar	Apr -Sep	Oct-Mar	Apr -Sep	Dec-Mar								
<b>POINT MEASUREMENTS</b>														
<u>Water Quality Station W-M443.6G</u>													Corps / ILDNR	ILDNR will perform all post const. monitoring
Turbidity	2W		2W											
Secchi Disk Transparency	2W		2W											
Suspended Solids	2W		2W											
Dissolved Oxygen	2W		2W											
Specific Conductance	2W		2W											
Water Temperature	2W		2W											
pH	2W		2W		2M	M								
Total Alkalinity	---		---		2M	M								
Chlorophyll	2W		2W											
Velocity	---		---											
Water Depth	2W		2W											
Water Elevation	2W		2W											
<u>Sedimentation Test Stations</u>													Corps	
Elutriate														
Bulk Sediment													Corps	
<u>Column Settling Stations</u>														
Column Settling Analysis								1					Corps	
<u>Boring Stations</u>														
Geotechnical Borings								1						

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**Table 3 cont. Resource Monitoring and Data Collection Frequency.**

Type Measurement	Water Quality Data						Engineering Data			Natural Resource Data			Sampling Agency	Remarks
	Pre-Project Phase		Design Phase		Post-Const. Phase		Pre-Project Phase	Design Phase	Post-Const. Phase	Pre-Project Phase	Design Phase	Post-Const. Phase		
	Apr -Sep	Oct-Mar	Apr -Sep	Oct-Mar	Apr -Sep	Oct-Mar								
<b>TRANSECT MEASUREMENTS</b>														
<u>Sedimentation Transects</u>													Corps	
Hydrographic Soundings							1		deleted					Sedimentation transects were eliminated because it was determined that sedimentation would not be a concern
<u>Vegetation Transects</u>													Corps	
Mast Tree/Vegetation Survey												5Y		Native grasses planted in May 2003; first evaluation scheduled for year 2008
<b>AREA MEASUREMENTS</b>														
<u>Mapping</u> <sup>1</sup>													Corps	
Aerial Photography										1		5Y	Corps / UMESC <sup>2</sup>	
<b>LEGEND</b>													W = weekly	nY = n-year interval
													M = monthly	nW = n-week interval
													Y = yearly	1, 2, 3, ... = number of times data is collected within designated project phase

**<sup>1</sup>Mapping (Post-Construction Phase)**

July 12, 1993, Color Aerial Photography (Scale = 1000 ft/in)  
 April 17, 1994, Color Aerial Photography (Scale = 1000 ft/in)

**<sup>2</sup>Upper Mississippi Environmental Sciences Center**

**1994 Color Infrared**

November 21, 1995, Black and White Aerial Photography (low flight - Scale = 1400 ft/in)  
 November 24, 1995, Black and White (high flight - Scale = 2800 ft/in)

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<b>Table 4. Data Collection Transects &amp; Surveys for Project Objectives Evaluation</b>				
Engineering Data				
<b>Type of Transect</b>	<b>Project Feature</b>	<b>Monitoring Site Title</b>	<b>Transect Title &amp; Station</b>	<b>Objectives Evaluated</b>
Vegetation Survey	Littoral zone grading  Native warm season grasses	V-1139.6F – V-1139.5A V-1141.5A – V-1142.5E	Aerial Photo Interpretation/Vegetation Mapping Observations by Site Manager	Enhance Wetland Habitat  Enhance Terrestrial Habitat

#### **4. Observations and Comments.**

For the report period of May 2002 to September 2003, the objectives to meet each goal had the following observations:

##### **Enhance Wetland Habitat:**

*Increase littoral zone for ducks and fish.* The construction contract for this feature did not call for a final survey of the littoral zone. While no monitoring of the littoral zone has been performed since construction, abundant aquatic plant growth was visible in the summer of 2002. The water control structure has not operated as expected so the performance evaluation of this feature has been delayed. Since the planting of native grasses for a different project objective was recently completed in May 2003, the first vegetation surveys for both objectives are currently scheduled for FY2008. The features could further improve duck and fish habitat beyond the habitat's current quality. The duck and fish habitat objectives require continued monitoring to determine their success.

*Improve flood control reliability.* Flood control reliability has been unsatisfactory because the 48-inch pump cavitates periodically that causes the pump station to not operate correctly. As a result, heavy rains in May and June of 2002 caused localized flooding within the project site.

##### **Enhance Terrestrial Habitat:**

*Increase food and cover for terrestrial birds and mammals.* The native grass-planting feature corresponds with this objective. The planting of native warm season grasses was completed on May 29, 2003. No inspections or monitoring of terrestrial habitat have been performed; however the first vegetation surveys are scheduled for FY2008. The Site Manager reported prairie seeding of the borrow areas have been a success. Prairie planting did not take place in borrow areas. All seeding took place at higher elevations (above 439.0). Terrestrial rehabilitation observations will continue and be further evaluated in the next PER.

##### **Enhance Aquatic Habitat:**

*Increase diversity in aquatic habitat.* The post-construction water quality sampling shall be completed by the ILDNR instead of the Corps. Since this project site is a former coal mine there is a concern that the pH of the water could be affected. If the monitoring identifies that the pH is a problem, the Corps plans to place a continuous monitoring station at the project site. For this report, no other observations or comments were provided for this goal. The first full assessment of water quality data is scheduled for FY2006 for the 5-YR PER.

**Comments from Site Manager and Corps Project Team Members:** A joint annual inspection was conducted on February 3, 2003. The following items were noted during the inspection with Corps and ILDNR personnel:

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- Site Manager expressed problem with sapling growth in the riprap of the levee
- The 48-inch pump cavitates almost constantly, but this does not affect pumping performance.
- Erosion noted on the wing walls near the pump station structure
- Pump floatation system freezes up
- Leaking is noted between stoplogs
- Stoplogs and the lifting hooks (water control structure no. 1) should be kept in the pump station structure and not put on the ground
- Water Control Structure #1 is starting to rust
- Stoplogs tend to float in the Water Control Structure #2
- Minor ruts found on the service road, but accessibility not a problem
- Woody vegetation is a problem in the riprap

During the inspection the Site Manager mentioned that drainage is occurring around the PVC drain tile of the Pump Station. The Seepage water is clear and is not carrying any sediment with it. The Site Manager will continue to monitor and let the Corps know if seepage water starts carrying sediment. There is also erosion around the wing walls near the pump station. The problem appears to be caused by the use of clay backfill during construction. The erosion noted at the wing walls may be the result of the soil settling and slope stability that is expected versus actual erosion. Overall, continued monitoring of the drain tiles, the 48-inch pipe and the wings walls is required and follow-up will be provided in the next PER.

The Corps personnel verified that the 48-inch pump has been accepted from the contractor. The pumps float system freezes up and the 24-inch pump is not able to run automatically. The Site Manager has purchased a bubbler system to prevent the floats from freezing. An electric control panel for the 48-inch pump was repaired in July 2002. Continued monitoring of the pump's operation is required to determine if other corrective action is required. Any action taken will be reported in the next PER.

ILDNR personnel wedged objects between the C frame and the end of the logs as a remedial effort to keep the stoplogs for water control structure no. 2 from floating. Essentially, the stoplog structures need locking mechanisms to prevent the stoplogs from floating and to reduce the flow between stoplogs or the procedure for installing the stoplogs needs to be changed. The Corps will follow-up with this issue for both water control structures with the Site Manager and report any actions taken in the next PER.

Woody vegetation in the riprap should be sprayed as much as the maintenance budget allows. If the diameters of the saplings or shrubs become too large, they should be cut and the stumps treated with an appropriate root killing herbicide.

Lifting hooks and extra stoplogs should be stored in the pump station building to prevent them from being thrown into the water or left on the ground. The rust on the water control structure no. 1 needs to be continually monitored. A determination of whether the structure needs to be painted to prevent rusting is still needed.

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The Site Manager provided additional comments for this report:

*Comments from email message sent by the ILDNR, Bill Douglass, Site Manager, 19 February 2003:*

*No snags, debris, channel, or channel sedimentation noted. Observed 200 acres of established vegetation. (Note: only 144 acres were seeded)*

## **5. Conclusions and Recommendations.**

a. Project Goals, Objectives, and Management Plan. The evaluation of the project's goals and objectives are underway. All stages of construction are now complete. A management plan has not been developed for this project. The vegetation surveys still need to be done and are scheduled for FY2008.

b. Post-Construction Evaluation and Monitoring Schedules. In general, most project monitoring efforts have been performed according to the Post-Construction Performance Evaluation Plan in Appendix A and the Resource Monitoring and Data Collection Summary in Appendix B of the Initial PER. The tables for the evaluation and monitoring schedules have been updated to identify changes of responsible agency for the Water Quality monitoring and the deletion of sedimentation transects for this project. A Post-Construction Performance Evaluation Supplement will be prepared annually. The next Post-Construction Performance Evaluation Supplement will be completed through December 2004, 3-years after construction, for distribution in March 2005.

c. Project Operation and Maintenance. The Project O&M Manual is due for completion in February 2004. Project operation and maintenance has been conducted based on general information provided to the Site Manager. Annual site inspections by the Site Manager have resulted in proper and ongoing corrective actions since project completion. Specific concerns are related to the proper operation of the 48-inch pump, the need for lock mechanisms for the stoplogs in the water control structures, and the continued monitoring and maintenance for erosion, seepage, unwanted woody vegetation, and rusting of project features. Observations and inspections by the Site Manager will provide follow-up of the Project's operation and maintenance in the next PER, due in March 2005.

d. Project Monitoring and Evaluation. The littoral zone development has not been formally assessed to date. The Site Manager observed that there has been 200 acres of established vegetation, and abundant aquatic plant growth was visible in the summer of 2002 after construction for littoral zone grading had been completed. Flood control reliability has been unsatisfactory because of two pump controller failures and 1 circuit protection fault. The improper operations of the 48-inch pump and the water control structures may have adversely affected the aquatic and wetland habitat development. Continued monitoring is still required to determine the successful operation of project features and the objectives they support.

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The planting of native grasses was completed in May 2003 so continued observations will provide input to the success of this feature. The vegetation transects are scheduled for FY 2008 based on this completion date, so the Enhance Terrestrial Habitat goal will be evaluated based on field observation for now.

Since the pumps operate by discharging water out of the marsh to the Illinois River, the need for sedimentation transects was eliminated from the monitoring plan.

The ILDNR and not the Corps conducts water quality monitoring and sampling for the aquatic habitat. The 5-year PER that is due in March 2007 will provide the first evaluation of this objective since baseline monitoring was completed. The pH is a concern for the project since the area was a former coal mine. If results show a problem with the pH of the water, the Corps has planned to install continuous monitoring stations at the site as one potential measure.

In general, the project features are constructed and hopefully corrective actions on the 48-inch pump and water control structures will allow the development of habitat objectives as expected. The monitoring plan for water quality and sedimentation transects has been updated. The next PER to assess project features and objectives is due in March 2005, covering 3-Years post-construction. The vegetation surveys are scheduled for completion in FY2008, so many of the evaluations prior to these surveys will be based on Site Manager observations. The Banner Marsh HREP O&M Manual is scheduled for completion in October 2003. Continued monitoring by the Corps, the Site Manger, and other the ILDNR personnel is needed to determine the continued development of the project's habitat areas since at this time the flood control and pump features have not operated properly and the success of project objectives is still undetermined.

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**REFERENCES**

**Project References.** Published reports which relate to the Banner Marsh project or which were used as references in the production of this document are presented below:

- (1) *Banner Marsh State Fish and Wildlife Area, Upper Mississippi River System Environmental Management Program, Definite Project Report (R-11PR) with Integrated Environmental Assessment, La Grange Pool, Illinois Waterway, May 1995.*
- (2) *Banner Marsh State Fish and Wildlife Area, Upper Mississippi River System Environmental Management Program, Post-Construction Initial Performance Evaluation Report (IPER), La Grange Pool, Illinois Waterway, River Miles 138.5 – 143.9, Fulton and Peoria Counties, Illinois.*
- (3) *Project Manual, CDB Project Number 102-203-006, Main Levee Repair, Banner Wildlife Management Area, Fulton & Peoria Counties, Illinois.*
- (4) *Plans and Specifications, Contract No. DACW25-99-C-0039. Environmental Management Program, Banner Wildlife Management Area, Stage II, LaGrange Pool River Mile 138-144, Illinois Waterway, Fulton and Peoria Counties, Illinois.*
- (5) *Plans and Specifications, Contract No. DACW25-02-M-0290. Pump Station Roof Hatch, Banner Marsh Management Area, Illinois Waterway, Peoria Counties, Illinois.*
- (6) *Plans and Specifications, Contract No. DACW25-03-P-0133. Banner Marsh Prairie Reconstruction, Stage III. LaGrange Pool River Mile 138-144, Illinois Waterway, Fulton and Peoria Counties, Illinois.*

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*Banner Marsh Habitat Rehabilitation and Enhancement Project 2-Year (YR) Post-Construction Addendum to the Initial Post Construction Performance Evaluation Report*

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