

UPPER MISSISSIPPI RIVER RESTORATION
LAKE ODESSA
HABITAT REHABILITATION AND ENHANCEMENT PROJECT

OPERATION AND MAINTENANCE MANUAL

APPENDIX E
PROJECT INSPECTION AND MONITORING RESULTS

**Upper Mississippi River Restoration
Lake Odessa
Habitat Rehabilitation and Enhancement Project
Project Inspection and Monitoring Results**

Inspection Start Date	
Inspection End Date	
Inspection Report Preparer	
Inspectors (Name, Agency, Email and Phone)	
General Comments	

Embankments

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	<p align="center">Unwanted Vegetation Growth</p>		<p>A The levee has little or no unwanted vegetation (trees, bush, or undesirable weeds), except for vegetation that is properly contained and/or situated on overbuilt sections, such that the root-free zone is preserved around the levee profile. The levee has been recently mowed.</p>	
		<p>M Minimal vegetation growth (brush, weeds, or trees 2 inches in diameter or smaller) is present within the zones described above. This vegetation must be removed but does not currently threaten the operation or integrity of the levee.</p>		
		<p>U Significant vegetation growth (brush, weeds, or any trees greater than 2 inches in diameter) is present within the zones described above and must to be removed to reestablish or ascertain levee integrity.</p>		
	<p align="center">Sod Cover</p>		<p>A There is good coverage of sod over the levee.</p>	
		<p>M Approximately 25% of the sod cover is missing or damaged over a significant portion or over significant portions of the levee embankment. This may be the result of over-grazing or feeding on the levee, unauthorized vehicular traffic, chemical or insect problems, or burning during inappropriate seasons.</p>		
		<p>U Over 50% of the sod cover is missing or damaged over a significant portion or portions of the levee embankment.</p>		

Embankments (Continued)

Item	Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
	Encroachments		A	No trash, debris, unauthorized farming activity, structures, excavations, or other obstructions present within the easement area.	
		M	Trash, debris, unauthorized farming activity, structures, excavations, or other obstructions present, or inappropriate activities noted that should be corrected but will not inhibit operations and maintenance.		
		U	Unauthorized encroachments or inappropriate activities noted are likely to inhibit operations and maintenance, or negatively impact the integrity of the levee.		
	Slope Stability		A	No slides, sloughs, tension cracking, slope depressions, or bulges are present.	
		M	Minor slope stability problems that do not pose an immediate threat to the levee embankment.		
		U	Major slope stability problems (ex. deep seated sliding) identified that must be repaired to reestablish the integrity of the levee embankment.		

Embankments (Continued)

Item	Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
	<p align="center">Erosion/ Bank Caving</p>		A	No erosion or bank caving is observed on the landward or riverward sides of the levee that might endanger its stability.	
M		There are areas where minor erosion is occurring or has occurred on or near the levee embankment, but levee integrity is not threatened.			
U		Erosion or caving is occurring or has occurred that threatens the stability and integrity of the levee. The erosion or caving has progressed into the levee section or into the extended footprint of the levee foundation and has compromised the levee foundation stability.			
	<p align="center">Settlement</p>		A	No observed depressions in crown.	
M		Minor irregularities that do not threaten integrity of levee.			
U		Obvious variations in elevation over significant reaches.			

Embankments (Continued)

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	<p align="center">Depressions/ Rutting</p>		<p>A There are scattered, shallow ruts, pot holes, or other depressions on the levee that are unrelated to levee settlement. The levee crown, embankments, and access road crowns are well established and drain properly without any ponded water.</p>	
		<p>M There are some infrequent minor depressions less than 6 inches deep in the levee crown, embankment, or access roads that will pond water.</p>		
		<p>U There are depressions greater than 6 inches deep that will pond water.</p>		
	<p align="center">Cracking</p>		<p>A Minor longitudinal, transverse, or desiccation cracks with no vertical movement along the crack. No cracks extend continuously through the levee crest.</p>	
		<p>M Longitudinal and/or transverse cracks up to 6 inches in depth with no vertical movement along the crack. No cracks extend continuously through the levee crest. Longitudinal cracks are no longer than the height of the levee.</p>		
		<p>U Cracks exceed 6 inches in depth. Longitudinal cracks are longer than the height of the levee and/or exhibit vertical movement along the crack. Transverse cracks extend through the entire levee width.</p>		

Embankments (Continued)

Item	Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
	Animal Control		A	Continuous animal burrow control program in place that includes the elimination of active burrowing and the filling in of existing burrows.	
			M	The existing animal burrow control program needs to be improved. Several burrows are present which may lead to seepage or slope stability problems, and they require immediate attention.	
			U	Animal burrow control program is not effective or is nonexistent. Significant maintenance is required to fill existing burrows, and the levee will not provide reliable flood protection until this maintenance is complete.	

General Comments or Observation:

Channels					
Item	Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
	Swarms Pond/BeBee Pond Dredge Cut		A	Channels maintain depths for aquatic habitat.	
		M	Siltation has occurred which is impacting aquatic habitat.		
		U	Significant siltation has resulted in loss of aquatic habitat.		
	Lake Odessa/Swarms Pond Dredge Cut		A	Channels maintain depths for aquatic habitat.	
		M	Siltation has occurred which is impacting aquatic habitat.		
		U	Significant siltation has resulted in loss of aquatic habitat.		
	Goose Lake Cut		A	Channels maintain depths for aquatic habitat.	
		M	Siltation has occurred which is impacting aquatic habitat.		
		U	Significant siltation has resulted in loss of aquatic habitat.		
	BeBee Pond Dredge Cut		A	Channels maintain depths for aquatic habitat.	
		M	Siltation has occurred which is impacting aquatic habitat.		
		U	Significant siltation has resulted in loss of aquatic habitat.		
	Blackhawk Chute/Yankee Chute Cut		A	Channels maintain depths for aquatic habitat.	
		M	Siltation has occurred which is impacting aquatic habitat.		
		U	Significant siltation has resulted in loss of aquatic habitat.		
	Fish Kill Reports			Observation or reports of any fish kills, location of fish kills, and possible cause of fish kills.	

General Comments or Observation:

Bank Protection/Spillways/Pump Pads

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	<p align="center">Bank Protection Site 446</p>		<p>A No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.</p>	
		<p>M Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.</p>		
		<p>U Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.</p>		
	<p align="center">Bank Protection Sites 98 and 99</p>		<p>A No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.</p>	
		<p>M Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.</p>		
		<p>U Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.</p>		

Bank Protection/Spillways/Pump Pads (Continued)

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	<p align="center">Bank Protection Site 424</p>		<p>A No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.</p>	<p>«</p>
		<p>M Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.</p>		
		<p>U Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.</p>		
	<p align="center">Bank Protection Site 299</p>		<p>A No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.</p>	<p>«</p>
		<p>M Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.</p>		
		<p>U Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.</p>		

Bank Protection/Spillways/Pump Pads (Continued)

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	<p align="center">Bank Protection Site 300</p>		<p>A No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.</p>	
		<p>M Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.</p>		
		<p>U Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.</p>		
	<p align="center">Bank Protection Site 30</p>		<p>A No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.</p>	
		<p>M Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.</p>		
		<p>U Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.</p>		

Bank Protection/Spillways/Pump Pads (Continued)

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	<p align="center">Bank Protection Site 423</p>		<p>A No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.</p>	
		<p>M Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.</p>		
		<p>U Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.</p>		
	<p align="center">Bank Protection Site 27</p>		<p>A No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.</p>	
		<p>M Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.</p>		
		<p>U Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.</p>		

Bank Protection/Spillways/Pump Pads (Continued)

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	<p align="center">Riprap Revetments & Bank Protection Near Inlet Structure Levee Repair</p>		<p>A No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.</p>	
		<p>M Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.</p>		
		<p>U Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.</p>		
	<p align="center">Riprap Revetments & Bank Protection Near Outlet Structure</p>		<p>A No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.</p>	
		<p>M Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.</p>		
		<p>U Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.</p>		

Bank Protection/Spillways/Pump Pads (Continued)

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	<p align="center">Mississippi River Spillway</p>		<p>A Existing revetment protection is properly maintained, undamaged, and clearly visible.</p>	
		<p>M Minor revetment displacement or deterioration that does not pose an immediate threat to the integrity of the levee. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.</p>		
		<p>U Significant revetment displacement, deterioration, or exposure of bedding observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Revetment protection is hidden by dense brush and trees.</p>		
	<p align="center">Downstream Iowa River Spillway</p>		<p>A Existing revetment protection is properly maintained, undamaged, and clearly visible.</p>	
		<p>M Minor revetment displacement or deterioration that does not pose an immediate threat to the integrity of the levee. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.</p>		
		<p>U Significant revetment displacement, deterioration, or exposure of bedding observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Revetment protection is hidden by dense brush and trees.</p>		

Bank Protection/Spillways/Pump Pads (Continued)

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	<p align="center">Upstream Iowa River Spillway</p>		<p>A Existing revetment protection is properly maintained, undamaged, and clearly visible.</p>	
		<p>M Minor revetment displacement or deterioration that does not pose an immediate threat to the integrity of the levee. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.</p>		
		<p>U Significant revetment displacement, deterioration, or exposure of bedding observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Revetment protection is hidden by dense brush and trees.</p>		
	<p align="center">Field 4/5 Pump Pad</p>		<p>A Existing pump pad is properly maintained, undamaged, and clearly visible.</p>	
		<p>M Minor revetment displacement or deterioration. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.</p>		
		<p>U Significant revetment displacement, deterioration, or exposure of bedding observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Revetment protection is hidden by dense brush and trees.</p>		

Bank Protection/Spillways/Pump Pads (Continued)

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	<p align="center">Little Goose Pond Pump Pad</p>		<p>A Existing pump pad is properly maintained, undamaged, and clearly visible.</p>	
		<p>M Minor revetment displacement or deterioration. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.</p>		
		<p>U Significant revetment displacement, deterioration, or exposure of bedding observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Revetment protection is hidden by dense brush and trees.</p>		
	<p align="center">IA DNR MSU Pump Pad</p>		<p>A Existing pump pad is properly maintained, undamaged, and clearly visible.</p>	
		<p>M Minor revetment displacement or deterioration. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.</p>		
		<p>U Significant revetment displacement, deterioration, or exposure of bedding observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Revetment protection is hidden by dense brush and trees.</p>		

General Comments or Observation:

Water Control Structures

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations	
	Muscatine Slough Structure		A	Closure structure in good repair. Placing equipment, stop logs, and other materials are readily available at all times.	
			U	Any of the following issues is cause for this rating: Closure structure in poor condition. Parts missing or corroded. Placing equipment may not be available within the anticipated warning time. The storage vaults cannot be opened during the time of inspection. Components of closure are not clearly marked and installation instructions/ procedures are not readily available. Trial erections have not been accomplished in accordance with the O&M Manual.	
	Fox Pond Water Control Structure		A	Closure structure in good repair. Placing equipment, stop logs, and other materials are readily available at all times.	
			U	Any of the following issues is cause for this rating: Closure structure in poor condition. Parts missing or corroded. Placing equipment may not be available within the anticipated warning time. The storage vaults cannot be opened during the time of inspection. Components of closure are not clearly marked and installation instructions/ procedures are not readily available. Trial erections have not been accomplished in accordance with the O&M Manual.	

Water Control Structures (Continued)

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	<p align="center">Upper Fish Nursery Structure</p>		<p>A Closure structure in good repair. Placing equipment, stop logs, and other materials are readily available at all times.</p>	
			<p>U Any of the following issues is cause for this rating: Closure structure in poor condition. Parts missing or corroded. Placing equipment may not be available within the anticipated warning time. The storage vaults cannot be opened during the time of inspection. Components of closure are not clearly marked and installation instructions/ procedures are not readily available. Trial erections have not been accomplished in accordance with the O&M Manual.</p>	
	<p align="center">IA DNR MSU Water Control Structure</p>		<p>A Closure structure in good repair. Placing equipment, stop logs, and other materials are readily available at all times.</p>	
			<p>U Any of the following issues is cause for this rating: Closure structure in poor condition. Parts missing or corroded. Placing equipment may not be available within the anticipated warning time. The storage vaults cannot be opened during the time of inspection. Components of closure are not clearly marked and installation instructions/ procedures are not readily available. Trial erections have not been accomplished in accordance with the O&M Manual.</p>	

General Comments or Observation:

Pumps

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	<p align="center">Operation and Maintenance Manuals</p>		<p>A Operation and Maintenance Equipment manuals and/or posted operating instructions are present and updated as required.</p>	
		<p>M Operation and Maintenance equipment manuals are present, but updates are required.</p>		
		<p>U Operation and Maintenance Equipment manuals are not available.</p>		
	<p align="center">Pumps</p>		<p>A All pumps are properly maintained and lubricated. Systems are periodically tested and documented for review. No vibration, cavitation noises or unusual sounds are noted when the pump is operated. Bearing temperature sensor records don't indicate any problems.</p>	
		<p>M Minor deficiencies noted that need to be closely monitored or repaired, such as the presence of slight vibrations, leakage of packing gland, bearing temperature sensors are inoperable or no record is present. However, the pumps are operational and are expected to perform through the next period of usage.</p>		
		<p>U Major deficiencies identified that may significantly reduce pumping operations. For example, bearing sensor records indicate problems, excessive vibration noted, impellers are badly corroded, or there are eroded or missing blades.</p>		

General Comments or Observation:

Timber Stand Improvement

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	Wildlife Use		Observation: Describe wildlife Use in the Timber Stand Improvement Locations	
	Mast Tree Survival		Observation: Describe Presence or Absence of Mast Trees in Planting Areas.	
	Tree Stressors		Observation: Indicate any locations where stressors include stress from floods, drought, or invasive species is noted.	

General Comments or Observation:

Migratory Waterfowl Observations

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	Bird Counts		List any bird counts which occurred, to include dates observed, who performed the observations and a location where the data can be obtained.	
	Waterfowl Use of Site		Observation: Discuss waterfowl usage of the site, in particular in areas where features have been constructed.	

Migratory Waterfowl Observations (Continued)

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	<p align="center">Effective Water Level Control: Fox Pond</p>		<p>Observation: Describe any factors regarding the effectiveness of controlling water level for migratory waterfowl. List pump run dates (start/stop) and/or structure manipulation dates (open/close/water level).</p>	
	<p align="center">Effective Water Level Control: Muscatine Slough</p>		<p>Observation: Describe any factors regarding the effectiveness of controlling water level for migratory waterfowl. List pump run dates (start/stop) and/or structure manipulation dates (open/close/water level).</p>	
	<p align="center">Effective Water Level Control: Fields 4&5</p>		<p>Observation: Describe any factors regarding the effectiveness of controlling water level for migratory waterfowl. List pump run dates (start/stop) and/or structure manipulation dates (open/close/water level).</p>	
	<p align="center">Effective Water Level Control: IADNR MSU</p>		<p>Observation: Describe any factors regarding the effectiveness of controlling water level for migratory waterfowl. List pump run dates (start/stop) and/or structure manipulation dates (open/close/water level).</p>	
	<p align="center">Effective Water Level Control: Little Goose Pond</p>		<p>Observation: Describe any factors regarding the effectiveness of controlling water level for migratory waterfowl. List pump run dates (start/stop) and/or structure manipulation dates (open/close/water level).</p>	

Migratory Waterfowl Observations (Continued)

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	Vegetation Response: Unit 2		Describe if vegetation responded as expected based on water level manipulations. Indicate if any specific crops or seed mixes were planted.	
	Vegetation Response: Fields 4&5		Describe if vegetation responded as expected based on water level manipulations. Indicate if any specific crops or seed mixes were planted.	
	Vegetation Response: Fox Pond		Describe if vegetation responded as expected based on water level manipulations. Indicate if any specific crops or seed mixes were planted.	
	Vegetation Response: MSU 20		Describe if vegetation responded as expected based on water level manipulations. Indicate if any specific crops or seed mixes were planted.	
	Vegetation Response: IADNR MSU		Describe if vegetation responded as expected based on water level manipulations. Indicate if any specific crops or seed mixes were planted.	

General Comments or Observation:

Fish Nursery Observations

Item	Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
	Fish Nusery Stocking		Indicate if fish were stocked, indicate dates and species of fish stocked.	
	Fish Nusery Structure		Describe any factors regarding the effecitveness of controlling water levels for the fish nusery. List structure manipulation dates (open/close/level).	
	Fish Survival		Field observations during fish nursery year use include survival, grown rates, and ease of release of the fish into the main lake.	

General Comments or Observations:

