

**UPPER MISSISSIPPI RIVER RESTORATION FEASIBILITY REPORT
WITH INTEGRATED ENVIRONMENTAL ASSESSMENT**

**GREEN ISLAND
HABITAT REHABILITATION AND ENHANCEMENT PROJECT**

**POOL 13, UPPER MISSISSIPPI RIVER
RIVER MILES 545.9 THROUGH 548.7
JACKSON COUNTY, IOWA**

**APPENDIX E
ENGINEERING**

**ATTACHMENT F
OPERATIONS AND MAINTENANCE**

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1. OPERATION AND MAINTENANCE

Operation and maintenance of UMRR HREPs is similar to that undertaken by the partner agencies in day-to-day management of parks, boat ramps, wildlife management areas and other such public use areas. The purpose of assigning O&M costs to the Federal or non-Federal partner is to ensure commitment and accountability by the Project Sponsors. HREPs are designed and constructed to operate for 50 years with proper maintenance. This Project was designed to reduce overall operation costs. In general, operation is limited to routine inspections annually, every 5 years, and every 10 years to ensure the measures are performing as designed (Table F-2). Other O&M costs and considerations for the project are pump operation and maintenance costs (Table F-2), annual operation and maintenance costs for all project features (Table F-3) and repair, rehabilitation and replacement considerations (Table F-4). A complete list of operation needs will be provided in an Operation and Maintenance Manual following construction completion.

Table F-2. Operation and Maintenance Inspection Costs

O&M Component	Frequency	Costs
Inspection of All Features	Yearly	\$4,000
Water Quality Survey	Yearly	\$7,500
5 Year Bathymetric Survey	Every 5 Years	\$10,000
5 Year Reporting	Every 5 Years	\$3,000
10 Year Forestry Survey	Every 10 Years	\$1,500
Annualized Total Costs		\$26,000

Table F-2. Pump Operation and Maintenance Costs

Frequency	Maintain	Cost Estimate
Submersible Pump		
Every 3 Months	Exercise Pump for 3 Minutes (If Water Available)	\$500
	Perform Visual Condition Assessment	
Annually	Check Ground Conductor	\$1,000
	Check Insulation Resistance	
	Exercise Pump for 3 Minutes (If Water Available)	
	Perform Visual Condition Assessment	
Every 3 Years	Check Ground Conductor	\$2,500
	Check Insulation Resistance	
	Exercise Pump for 3 Minutes (If Water Available)	
	Perform Visual Condition Assessment	
	Cable Inspection	
	Sensor Inspection	
	Mechanical Seal Check	
	Change Lubricant	
Flow Test		
Every 5 Years	General Overhaul and Lube	\$10,000-40,000
Annualized Total Cost		\$5,833 to \$11,833

Upper Mississippi River Restoration
Green Island Habitat Restoration and Enhancement Project
Appendix A, Environmental
Attachment F, Operations and Maintenance

Table F-3. Annual Operation and Maintenance Costs

Name	Code	Size	Unit	Unit Price	Feature Price
Water Level Management					
Pump Station	PS-01	1	EA	\$14,000	\$14,000
Pump Station	WCS-01	1	EA	\$3,480	\$3,480
4 th Ditch Road Densmore North	WCS-02	1	EA	\$3,480	\$3,480
4 th Ditch Road Densmore Upper	WCS-03	1	EA	\$3,480	\$3,480
Brown's Lake Outlet	WCS-06	1	EA	\$3,480	\$3,480
4 th Ditch Structure Replacement Parking Lot	WCS-07	1	EA	\$3,480	\$3,480
Murphy's Cell	WCS-08	1	EA	\$3,480	\$3,480
Murphy's Cell	WCS-09	1	EA	\$3,480	\$3,480
Topographic Diversity					
Blake's Lake to Browns Berm DNR	BRM-B-06 DNR	2573	LF	\$0.24	\$617.52
Blake's Lake Lower Berm	BRM-B-07	3641	LF	\$0.24	\$873.89
5 th Ditch Berm	BRM-B-08	6302	LF	\$0.24	\$1,512.52
Southeast Berm DNR	BRM-B-09 DNR	1557	LF	\$0.24	\$373.68
4 th Ditch Berm	BRM-B-10	9385	LF	\$0.24	\$2,252.41
McGann's to Miss Berm	BRM-B-11	2081	LF	\$0.24	\$499.37
Fish Lake Berm DNR	BRM-A-01 DNR	5486	LF	\$0.24	\$1,316.64
Murphy's Cell	BRM-A-02	3634	LF	\$0.24	\$872.25
Sawmill Berm	BRM-B-01	2475	LF	\$0.24	\$594.07
McGann's Berm	BRM-B-02	2356	LF	\$0.24	\$565.39
Densmore Upper Berm DNR	BRM-B-03 DNR	1677	LF	\$0.24	\$402.48
Densmore Lower Berm DNR	BRM-B-04 DNR	2239	LF	\$0.24	\$537.36
Densmore Horseshoe	BRM-B-12	1508	LF	\$0.24	\$361.92
3 rd Ditch Berm	BRM-A-13	5384	LF	\$0.24	\$1,292.17
Forestry					
Snider Lake DNR Thinning and Planting	TSI-01	34	Acres	\$3.24	\$110.16
Snider Lake USFWS Thinning and Planting	TSI-02	27	Acres	\$3.24	\$87.48
Sawmill Lake Upper Thinning and Planting	TSI-03	25	Acres	\$3.24	\$81
Sawmill Lake Lower Thinning and Planting	TSI-04	26	Acres	\$3.24	\$84.24
McGann's lake Lower Thinning and Planting	TSI-06	36	Acres	\$3.24	\$116.64
Fish Lake East Thinning and Planting	TSI-08	4	Acres	\$3.24	\$12.96
Fish Lake East Thinning and Planting	TSI-08	20	Acres	\$3.24	\$64.80
North Central Thinning and Planting	TSI-09	40	Acres	\$3.24	\$129.60
North Central Lower Thinning and Planting	TSI-09 Lower	20	Acres	\$3.24	\$64.80
All Berms	TSI for Berms	62	Acres	\$3.24	\$200.88
All R&S	TSI for Berms	25	Acres	\$3.24	\$81
Sediment Management					
Moony Hollow Inlet by Fish Lake	ST-01	1	EA	\$4,200	\$4,200
				Total	\$53,498.21

EA – Each
LF – Linear Feet

2. REPAIR, REHABILITATION, AND REPLACEMENT CONSIDERATIONS

For analysis purposes, the costs presented for operation and maintenance used the 50-year period of analysis. The IADNR is expected to operate and maintain the Project per the agreed-upon terms in the Project Partnership Agreement (Appendix A, *Environmental*) and should expect to incur costs associated with this responsibility outside of the 50-year period of analysis. Table F-4 lists the major Project components and their associated frequencies of repair, rehabilitation, and replacement. Estimates of these costs will be included in the Operation and Maintenance Manual. The electrical cables and electrical equipment will be maintained by MVEC, the local electric cooperative, post construction at project turnover.

Table F-4. Repair, Rehabilitation, and Replacement Considerations

Component	Frequency
Rehab WCS Structure	Every 60 Years
Rehab Concrete Structures	Every 75 Years
Rehab Electric Cables	Every 60 Years
Rehab Electric Pumps	Every 25 Years
Rehab Pump Motors	Every 25 Years
Replace Electric Pumps	Every 50 Years
Replace Pump Motors	Every 50 Years