UMRR HREP
INSPECTION OF COMPLETED WORKS
2016

I. PROJECT:
Spring Lake Habitat Rehabilitation and Enhancement Project (HREP)

II. AUTHORITY:
Upper Mississippi River Restoration (UMRR) Program

III. LOCATION:
Pool 13, Mississippi River Miles (RM) 532.5 to 536.0, Carroll County, IL

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-12F) with Integrated Environmental Assessment, Spring Lake Rehabilitation and Enhancement, May 1993.

U.S. Army Corps of Engineers, Rock Island District, Operation and Maintenance Manual, Spring Lake Habitat Rehabilitation and Enhancement Program, July 2003.

U.S. Army Corps of Engineers, Rock Island District, Upper Mississippi River System, Environmental Management Program, Post-Construction Initial Performance Evaluation Report, Spring Lake Habitat Rehabilitation and Enhancement, January 2004.

U.S. Army Corp of Engineers, Rock Island District (Bierl), Dye Dispersion and Fish Movement in Response to Increased Winter Inflow at Spring Lake, a Backwater of the Mississippi River Near Savanna, Illinois, February 2006.

U.S. Army Corps of Engineers, Rock Island District, Upper Mississippi River Restoration, Environmental Management Program, Post-Construction Performance Evaluation Report, Spring Lake 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 the following table.

Table 1: Project Goals and Objectives

Project Goals and Objectives		
Goals	**Objectives**	**Project Features**
Enhance Aquatic Habitat	Improve water quality for fish. Maintain backwater lake.	Perimeter Levee Cross Dike Pump Station Interior Levees
Enhance Wetland Habitat	Provide reliable wetland vegetation/food source in Upper Lake for migratory birds. Provide reliable food source in Lower Lake for migratory birds and other wetland species.	Stoplog Structures Gated Inlet Structure Hemi-Marsh Well

VI. MONITORING PLAN EVALUATION CRITERIA:

The following tables were copied from the following report: U.S. Army Corps of Engineers, Rock Island District, Upper Mississippi River Restoration, Environmental Management Program, Post-Construction Performance Evaluation Report, Spring Lake Habitat Rehabilitation and Enhancement, 2012.

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

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Table 2: Monitoring and Performance Evaluation Matrix

Activity	Purpose	Responsible Agency	Implementing Agency	Funding Source	Remarks
Sedimentation Problem Analysis	System-wide problem definition. Evaluates planning assumptions	USFWS	USFWS (EMTC)	LTRMP	Leads into pre-project monitoring; defines desired conditions for plan formulation
Pre-project monitoring	Identifies and defines problems at HREP site. Established need for proposed project feature	Sponsor	Sponsor	Sponsor	Attempts to begin defining baseline. See DPR.
Baseline monitoring	Establishes baselines for performance evaluation	USACE	Field station or sponsor thru Cooperative Agreements or Corps	LTRMP	See DPR for location and sites for data collection and baseline information. Actual data collection will be accomplished during Plans & Specification phase.
Data Collection for Design	Includes identification of project objectives, design of project, and development of performance evaluation plan	USACE	USACE	HREP	Comes after fact sheet. This data aids in defining the baseline
Construction Monitoring	Assesses construction impacts; assess permit conditions are met	USACE	USACE	HREP	Environmental protection specifications to be included in construction contract documents. Inter-agency field inspections will be accomplished during project construction phase
Performance Evaluation Monitoring	Determine success of project as related to objectives	USACE (quantitative), sponsor (field observations)	Field station or sponsor thru Cooperative Agreements or Corps	LTRMP Cooperative	Comes after construction phase of project
Analysis of Biological Responses to Project	Evaluates predictions and assumptions of habitat unit analysis. Determine critical impact levels, cause-effect relationships, and effect on long-term losses of significant habitat	USFWS	USFWS (EMTC)	LTRMP	Problem Analysis and Trend Analysis studies of habitat projects

Table 3: Performance Evaluation and Monitoring Schedule

Goal	Objective	Enhancement Measure	Units	Monitoring Target Values			Monitoring Schedule
				Year 0 without project	Year 13 with project	Year 50 target with project	
Enhance Aquatic Habitat	Improve water quality for fish	Levee & Dike restoration Water control structures	Dissolved Oxygen (mg/L)	<5.0 during critical periods	>5.0 at all times	>5.0 at all times	April-September every 2 weeks, October-March every month
	Maintain backwater lake	Gated inlet structure Excavated channel Upper/Lower Lake water control	Lineal Feet of Eroded Levee	44,800	0	0	Every 5 years
Enhance Wetland Habitat	Provide reliable food source in Upper Lake for migratory birds	Levee restoration Upper Lake water control	Acres of Vegetation	0	500	500	Every 5 years
	Provide reliable food source in Lower Lake for migratory birds	Hemi-Marsh Lower Lake water control	Acres of Vegetation	0	108	108	Every 5 years

VII. SIGNIFICANT EVENTS SINCE LAST INSPECTION

The U.S. Fish and Wildlife Service has listed significant events which have impacted the site since construction. A drought year was observed in 2012. High water was observed in 2013.

Table 4: Significant Events at the Refuge (Provided by USFWS)

Spring 1997	Significant flood
Spring 2001	Second largest flood event on record. Damage to project.
FY 2003	Rerouted entrance road and added west Cross Dike spillway due to 2001 flood
November 2004	Repaired damaged Sloan Marsh pump. Added grounding rods which should reduce future lightening damage to pump. Approximate cost $22,500.
July – November 2007	Reshaped and added riprap to Dike B, Cell B side. MAT crew used for reshaping effort. Total cost $217,200
April – June 2008	High spring flows, two peaks above flood stage. Damage to Perimeter Levee STA 230+00 and entrance road spillway.
July – October 2009	Perimeter Levee repairs STA 234+00 from 2008 flood damage. 120' damage by flood was repaired, another 780' protected. Refuge cleared and grubbed area. Corps of Engineers place 750 tons of fill and 3,300 tons of riprap.
FY 2012	Repairs to Dike A and Sloan Marsh Dike. Regrading and riprap placement.

VIII. PROJECT SPONSOR UPDATES

Project Sponsor contacts are unchanged since the 2012 report and are listed in the following table.

Table 5: Project Sponsors

U.S. Fish and Wildlife Service, Upper Mississippi River Refuge				
Name	Position	Address	Phone	Email
Ed Britton	Wildlife Refuge Manager	7071 Riverview Thomson, IL 61285	815-273-2732	ed_britton@fws.gov
Sharonne Baylor, P.E.	Environmental Engineer	51 East Fourth St. Winona, MN 55987	507-494-6207	sharonne_baylor@fws.gov

IX. ONGOING MONITORING AND/OR REPORTS

U.S. Fish and Wildlife Service, Upper Mississippi River National Wildlife and Fish Refuge, Spring Lake HREP, 2013 Annual Inspection Report, December 2014.

US Fish and Wildlife Service Annual Fall Flight Surveys

X. DATE OF FIELD VISIT: July 21, 2016, Hot, sunny, mid 90's °F

XI. ATTENDEES:

The following table outlines the list of personnel who visited the site in 2016.

Table 6: 2016 Site Visit Attendees

Name	Office	Title	Number
Kara Mitvalsky	USACE – Rock Island	Environmental Engineer	309-794-5623
Ben Vandermyde	USACE – Rock Island	Lead Forester	309-794-4522
Chuck Theiling	USACE – Rock Island	Biologist	309-794-5636
Tom Kirkeeng	USACE – Rock Island	Civil Engineer	309-794-5433
Rebecca Laugen	USACE – Rock Island	Civil Engineer	309-794-5411
Ed Britton	U.S. Fish & Wildlife	District Manager	815-273-2732 Ext 111
Russell Engelke	U.S. Fish & Wildlife	Assistant District Manager	815-273-2732 Ext 113
Sharonne Baylor	U.S. Fish & Wildlife	Environmental Engineer	507-494-6207
Bill Davison	U.S. Fish & Wildlife	Maintenance Mechanic	815-273-3153
Mike Griffin	Iowa DNR	Wildlife Biologist	563-872-5700

XII. OBSERVATIONS:

Pump Station: The pump station continues to be operable and it well maintained by the FWS. The pump records and electrical costs are available. The upstream inlet structure to the pump station originally did not have a top cover to the trash rack. During high water, the small opening would occasionally overtop, and fish would get caught and enter the pump house and be ground up by the pump. This would create a thick material which would eventually shut down the pump. The FWS would be required to manually remove the debris from inside the pump house, a time consuming and odorous task. The FWS constructed a top grate to the trash rack to keep fish out. This has greatly reduced maintenance.

Cross Dike: The FWS previously constructed two additional spillways in the cross dike (total now of 4) at a slightly lower elevation to better manage the upper units during flood events. With the additional spillways, the upstream unit will fill more quickly, allowing it to be better protected in overtopping events. The spillways are generally constructed of riprap. The original design included fabric, however the fabric was placed longitudinally along the spillway, and was not well tied in, causing it to roll during overtopping events. Placing the fabric perpendicular to the flow of traffic, or parallel to the proposed flow could help prevent similar future issues. Also, it is important to anchor the upstream and downstream ends. This can be done by excavating a ditch on either side of the dike, burying the ends of the fabric, and covering them with a layer of riprap in addition to the anchors typically provided with the fabric.

I**nterior A, B, and C Levees:** The FWS has flattened the interior levee slopes on the upper to approximately a 5H:1V slope. Additionally, significant amounts of armoring have been added to

these interiors. There had been issues at the site with rodents burrowing into the levees, as well as wind induced wave wash on the levees. These changes should help reduce future damage to the levees.

Perimeter Levee Water Control Structure: The furthest upstream structure was constructed several decades ago by the FWS, and was enhanced by the HREP project. This structure appears to remain in good condition and continues to work.

The central structure was constructed as part of the HREP and is well maintained and functioning. The channel on the interior of this structure remains present as noted by the change in vegetation, however it is unknown what depths remain in that channel. Refer to the Dye Study conducted in the mid-2000s for more details on the operation of this structure.

The furthest downstream structure is maintained by the FWS, but is seldom operated other than for maintenance. The intent of this structure was to add oxygenated water into the lower site, however, the need for this operation has not frequently occurred.

Perimeter Levee: This levee is mowed to reduce the amount of woody vegetation. Removal of trees on the river side in an ongoing maintenance issue. Hand removal and mowing of the riverside continues at the site.

Near the southwest corner of the levee, ongoing erosion is occurring, and a deep hole continues to develop, causing some of the downstream riprap to roll into the hole. A few options discussed included additional riprap, relocating the levee (set back), rock deflection structures to deflect erosion based on river flow, or offshore islands or mounds to reduce wind wave induced erosion.

Marsh vegetation: The interior marsh has diverse vegetation. The FWS drains the marsh to ensure that appropriate vegetation is grown, then starts a slow inundation in the fall to provide feeding and resting grounds for waterfall.

Hemi Marsh: The water level is controlled with a well pump. This pump was frequently struck by lightning. The FWS installed long copper lines underground to divert damage from the pump which has to date been successful. The pump casing has also been replaced. This marsh continues to provide diverse species and habitat for waterfowl feeding.

XIII. SUMMARY

Overall the Spring Lake HREP appears to be generally meeting its goals and objectives through continued operation and maintenance by the US FWS.

XIV. RECOMMENDATIONS

Continued monitoring at this site.

XV. LESSONS LEARNED

Good trash racks will prevent trash, debris, and fish from entering the pump station. This helps with overall operation and maintenance of pumps.
Ensure spillways are appropriately sized for water control methods.

Attachment A
2016 Photos

Photo 1: Pump Station

Photo 2: Pump Station

Photo 3: Pump station electrical equipment

Photo 4: Pump station electrical equipment

Photo 5: Pump station, interior side headwall

Photo 6: Pump Station, interior side headwall and interior Cell C

Photo 7: Interior Cell C, looking north from cross dike

Photo 8: Stoplog structure C

Photo 9: Cross dike roadway

Photo 10: Cross dike spillway

Photo 11: Interior cell B, looking north from cross dike

Photo 12: Perimeter levee and cross dike intersection, looking north

Photo 13: Inlet structure channel

Photo 14: Inlet structure channel

Photo 15: Gated inlet structure, interior side headwall grate

Photo 16: Perimeter levee roadway, looking south

Photo 17: Setback levee on perimeter levee

Photo 18: Setback levee on perimeter levee

Photo 19: Perimeter levee vegetation

Photo 20: 24” Gatewell Structure

Photo 21: Spring Lake vegetation

Photo 22: Perimeter levee looking upstream, riprap missing

Photo 23: Perimeter levee looking downstream, riprap missing

Photo 24: 24” Gatewell structure, exterior side headwall

Photo 25: Interior Lower Spring Lake vegetation

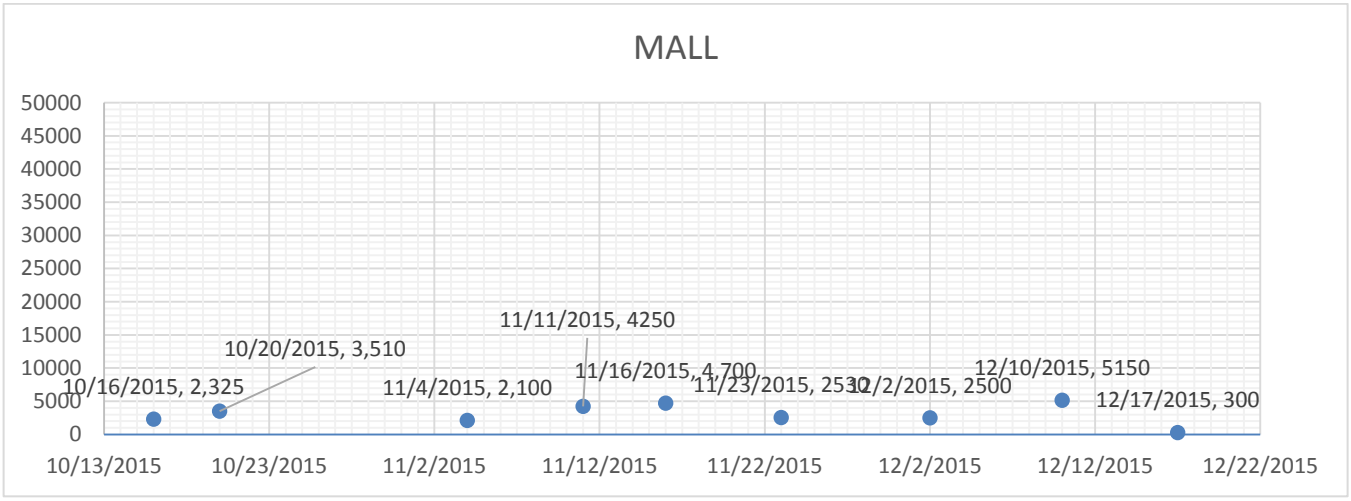
Photo 26: Hemi Marsh well

Photo 27: Hemi Marsh well electrical equipment

Photo 28: Lower Spring Lake from Hemi Marsh levee

Attachment B
Waterfowl Migration Survey

	Date	12/17/2015	12/10/2015	12/2/2015	11/23/2015	11/16/2015	11/11/2015	11/4/2015	10/20/2015	10/16/2015
Mallard	MALL	300	5150	2500	2530	4,700	4250	2,100	3,510	2,325
American Black Duck	ABDU	5	10	25	0	100	100	0	0	0
Northern Pintail	NOPI	0	300	0	0	470	620	8200	14,875	3,100
Blue-winged Teal	BWTE	0	0	0	0	0	0	0	0	0
American Green-winged Teal	AGWT	0	700	0	0	1175	2,125	1950	3,500	350
American Wigeon	AMWI	0	0	0	0	200	435	295	700	740
Gadwall	GADW	150	400	450	1700	13900	21030	19,735	7,050	4,450
Northern Shoveler	NSHO	300	400	25	700	705	955	6000	2,000	520
Lesser Scaup	LESC	100	10	100	0	1175	500	390	0	0
Ring-necked Duck	RNDU	100	1500	0	0	1375	300	195	225	0
Canvasback	CANV	0	0	0	500	6000	8000	1950	0	0
Redhead	REDH	50	100	0	50	0	115	195	0	25
Ruddy Duck	RUDU	400	0	0	0	470	470	390	700	0
Canada Goose	COGO	10	0	0	0	0	0	0	0	0
Bufflehead	BUFF	0	0	0	0	0	100	0	0	0
Common Merganser	COME	5	0	0	0	0	0	0	0	0
Hooded Merganser	HOME	0	0	25	0	50	0	0	0	0
	TOTAL DUCKS	1420	8570	3125	5,480	30,320	39,000	41,400	32,560	11,240
Common Gallinule	CAGO	2290	3835	2465	3000	4600	3200	4000	780	990
Greater White-fronted Goose	GWFG	0	0	0	0	100	0	300	0	0
Lesser Snow Goose	LSGO	0	0	0	0	0	0	0	0	0
American White Pelican	AWPE	0	0	0	0	10	5	150	130	45
American Coot	AMCO	300	100	800	200	2575	5850	26300	24,700	8,400
Bald Eagle	BAEA	38	5	17	80	6	5	7	6	7
Double-crested Cormorant	DCCO	0	0	0	0	0	0	0	100	210
Swan	SWAN	2242	3630	3002	1425	755	180	95	10	8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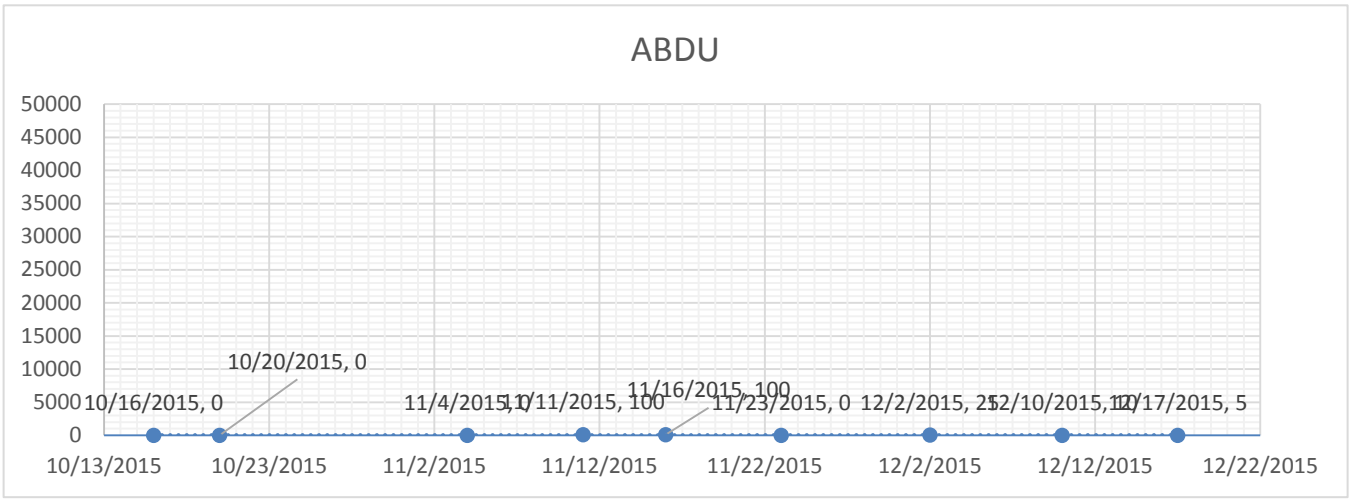
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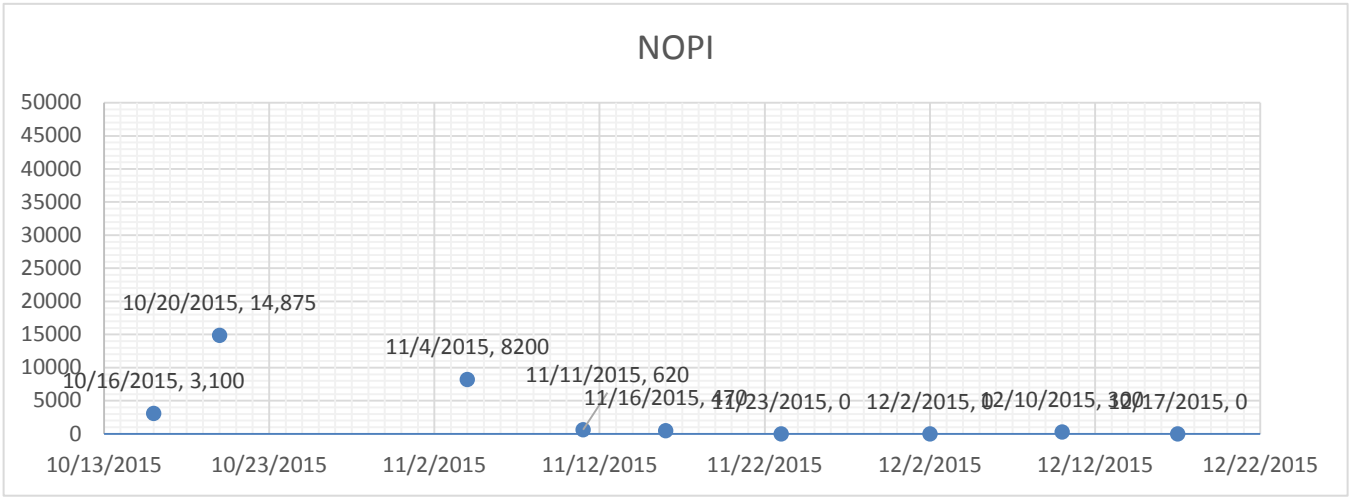
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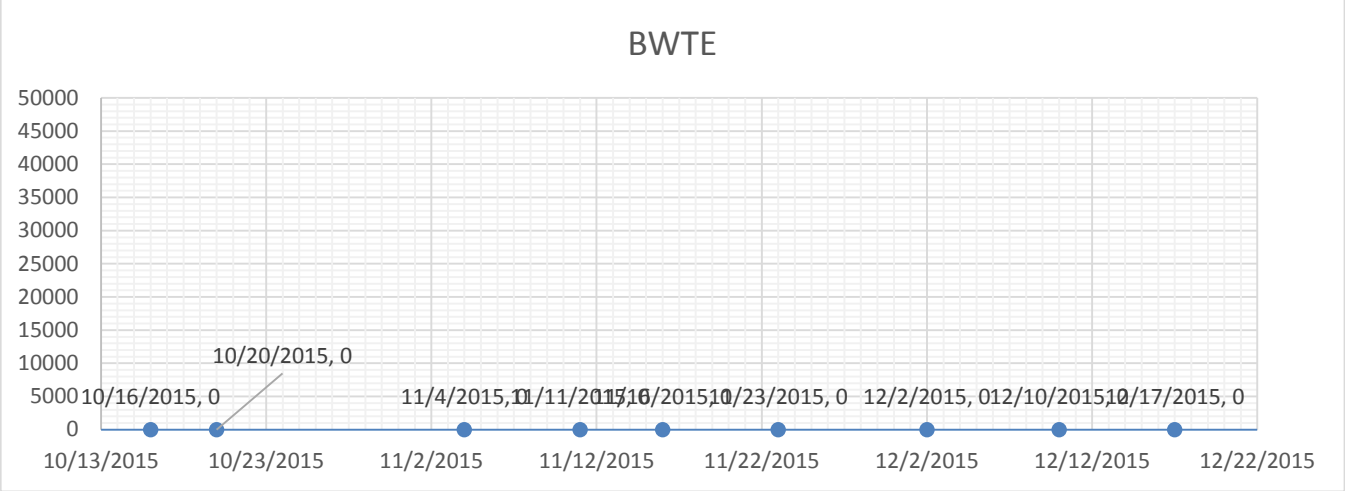
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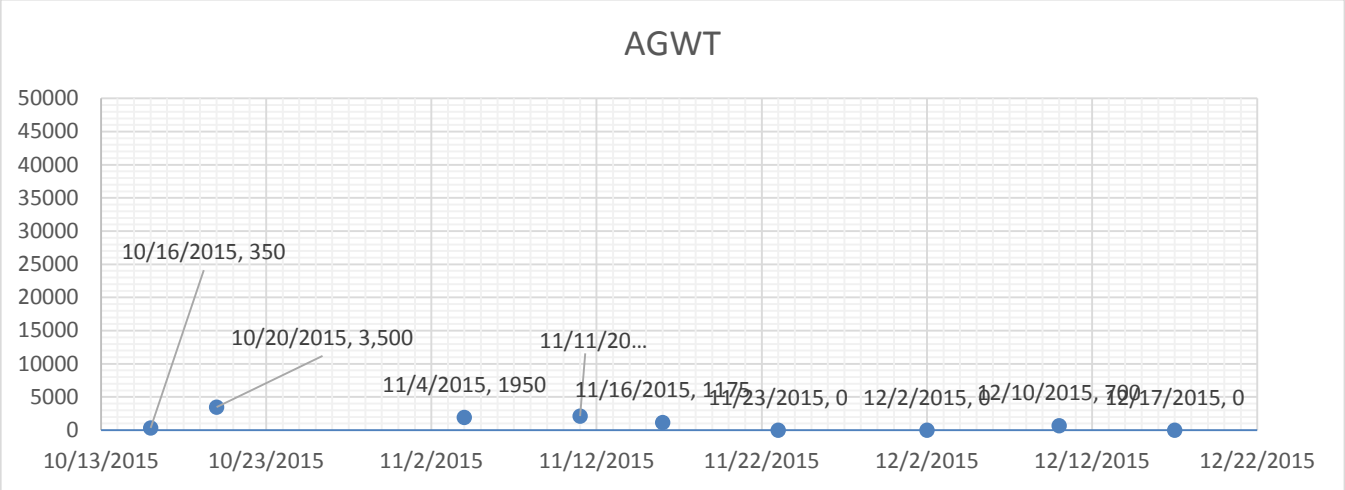
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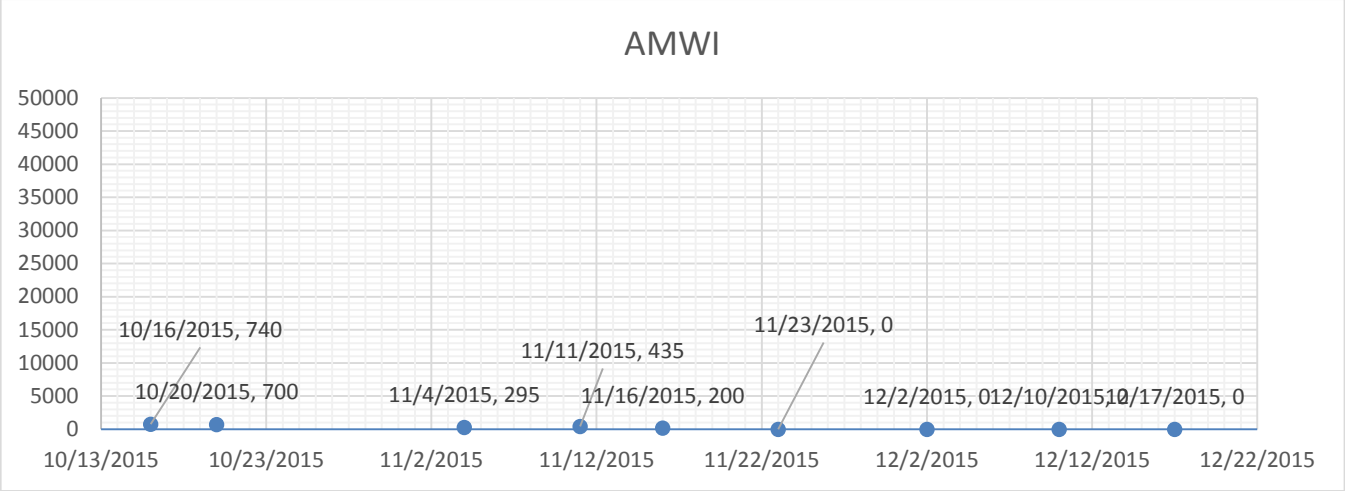
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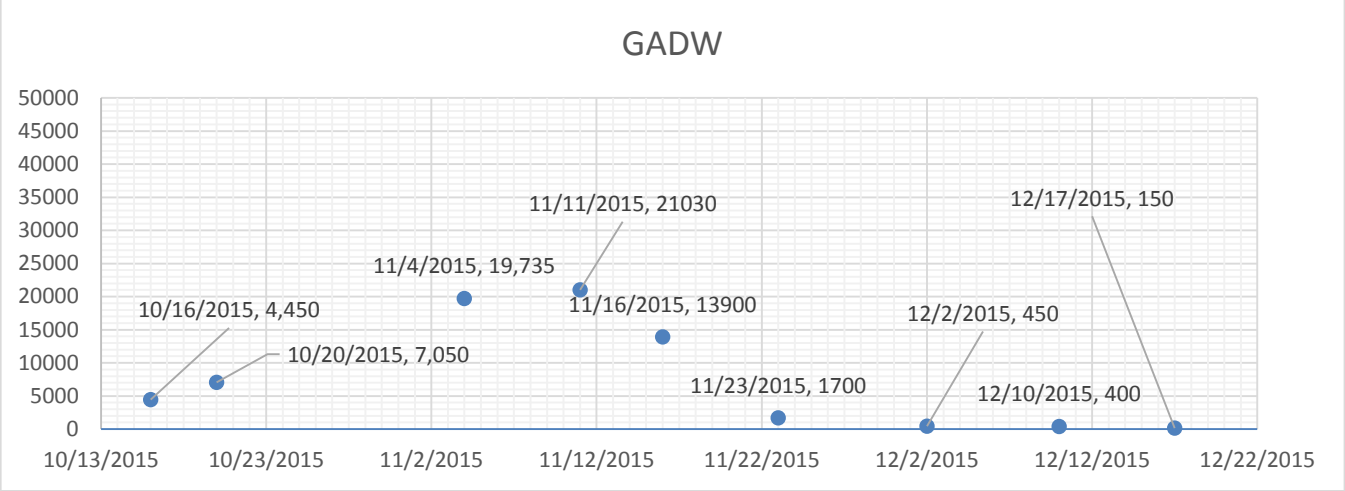
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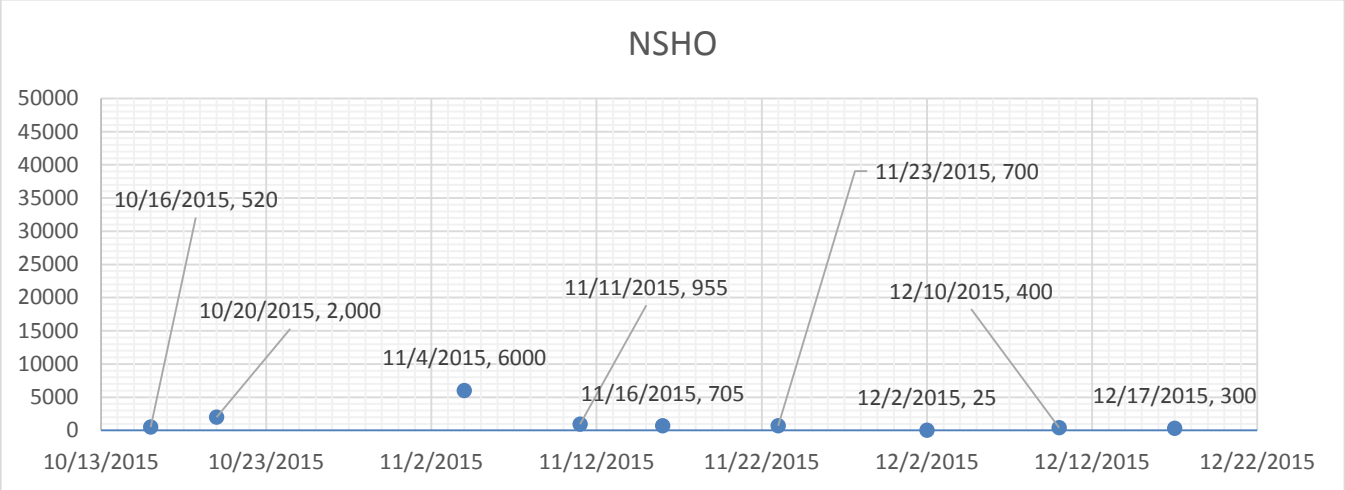
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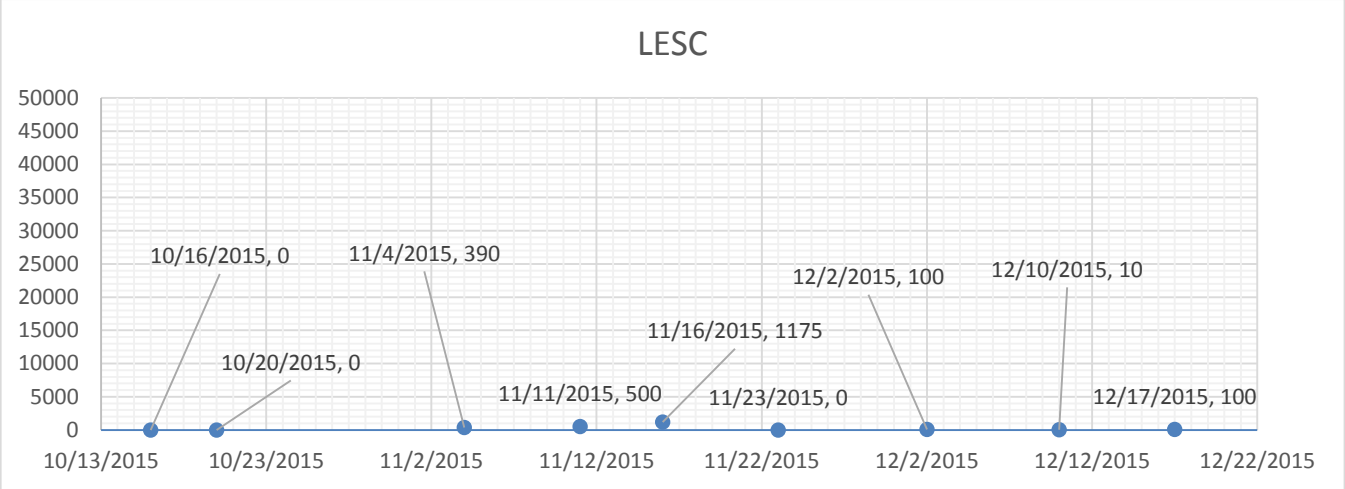
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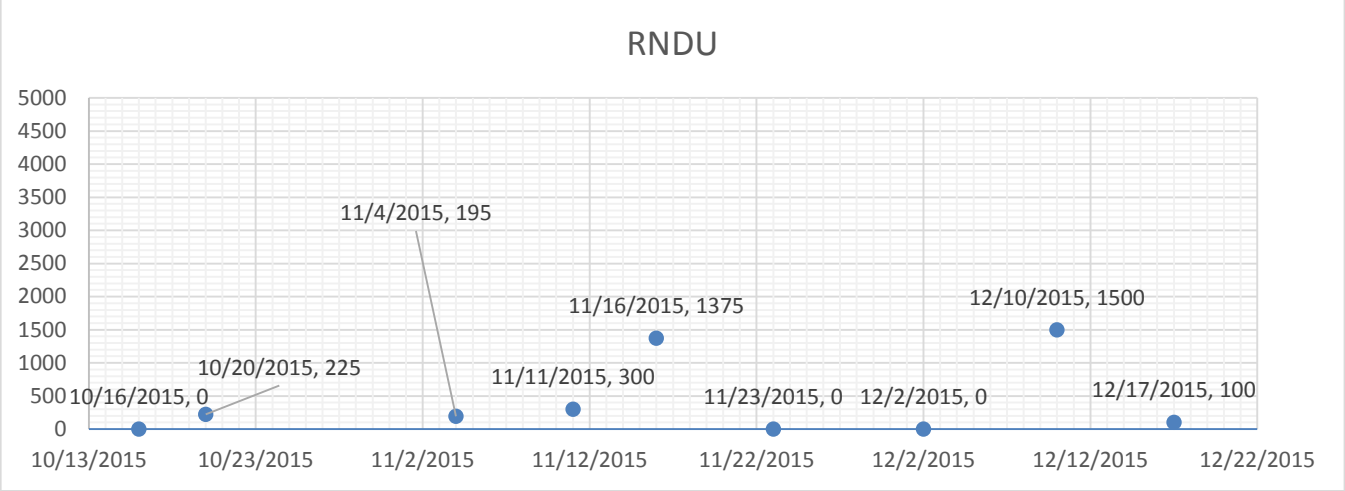
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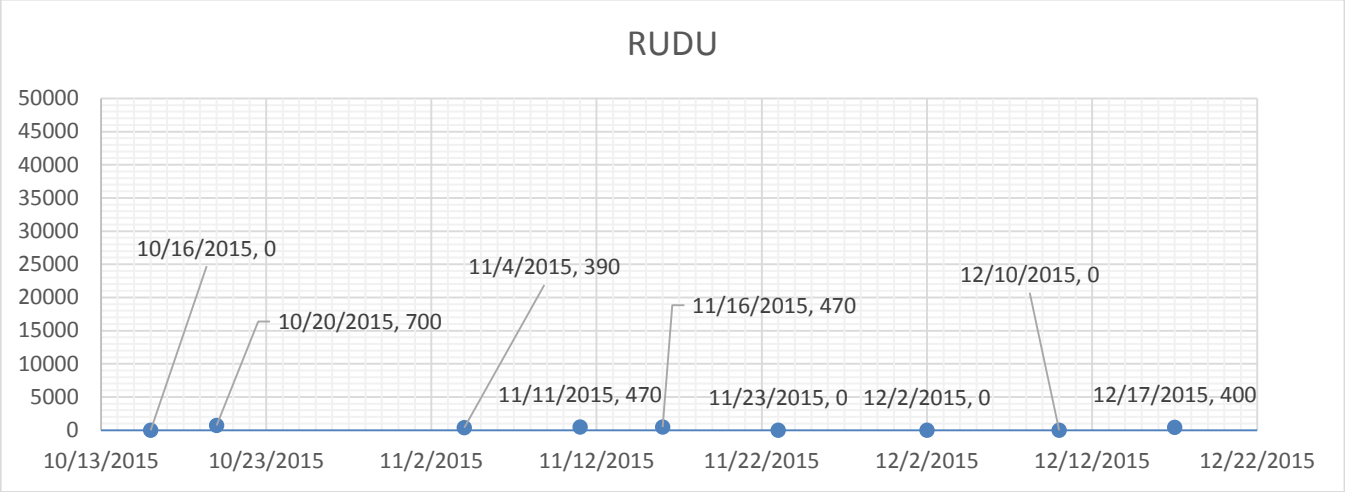
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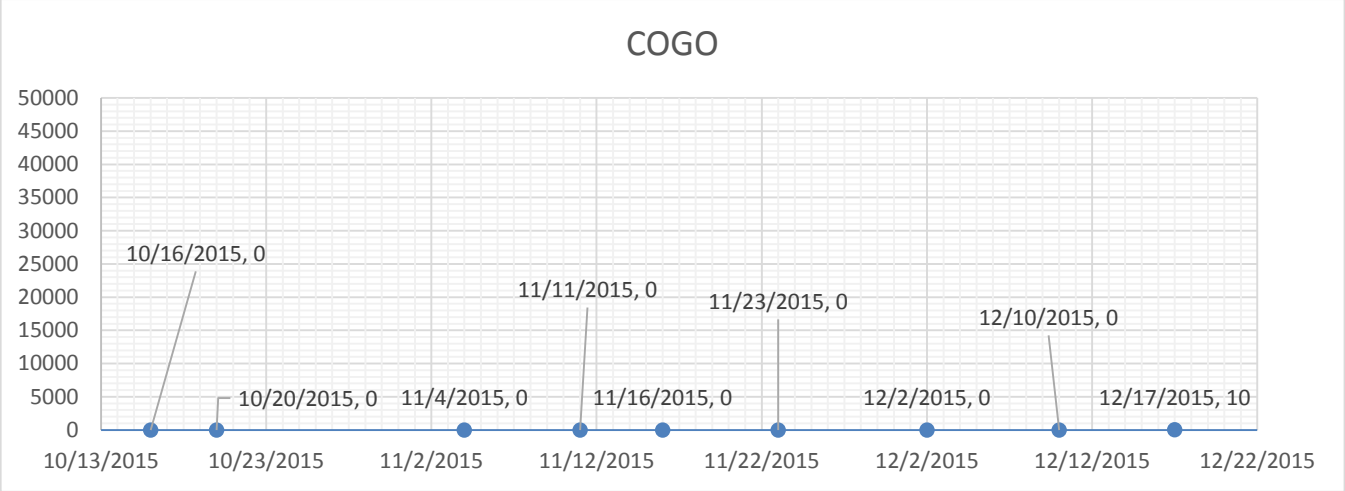
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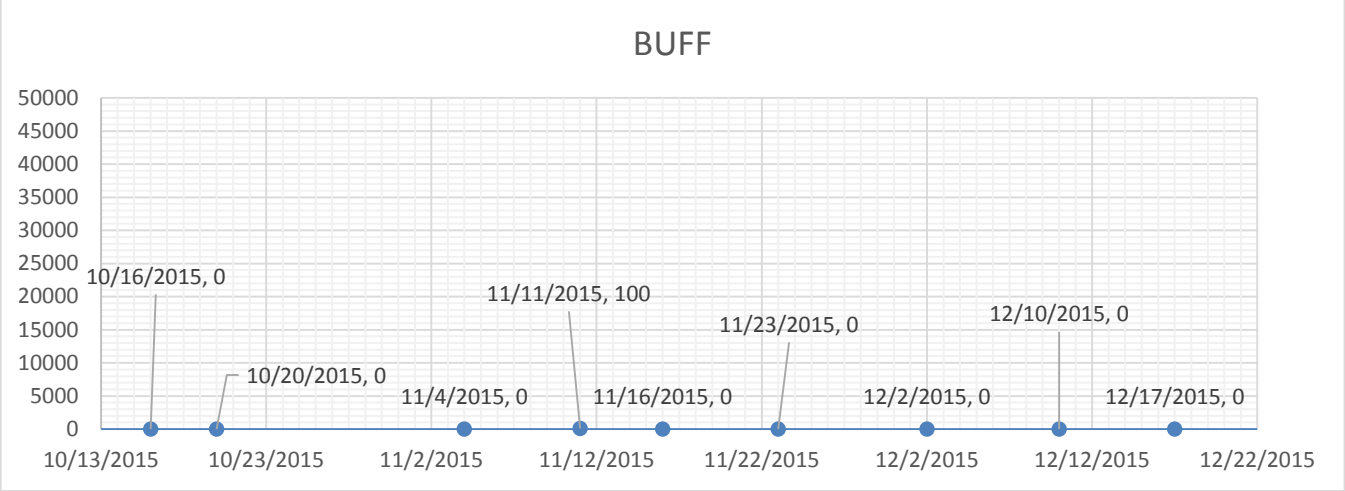
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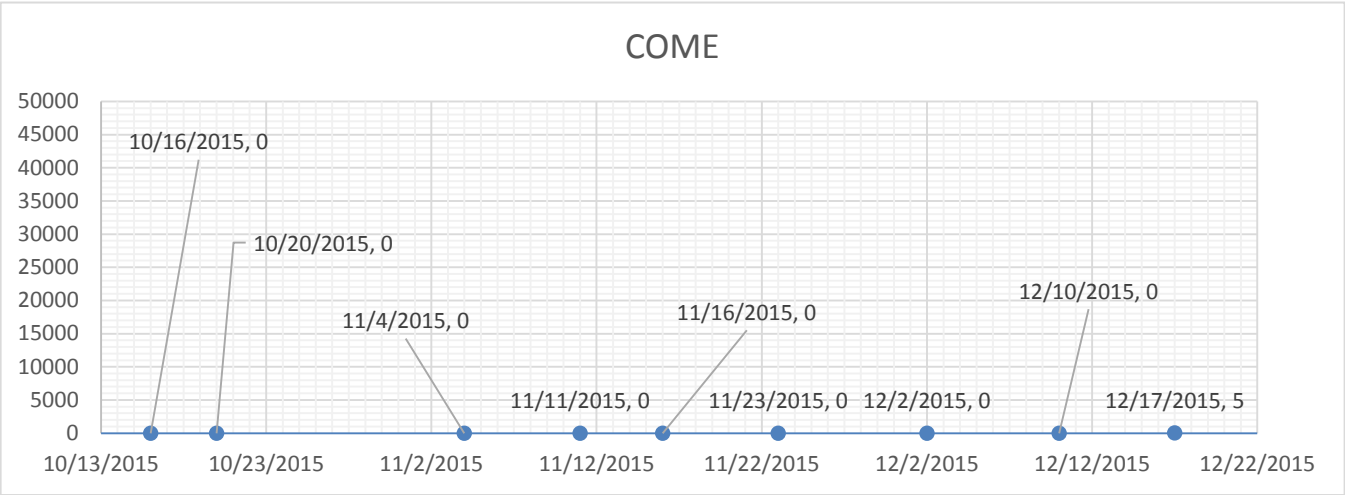
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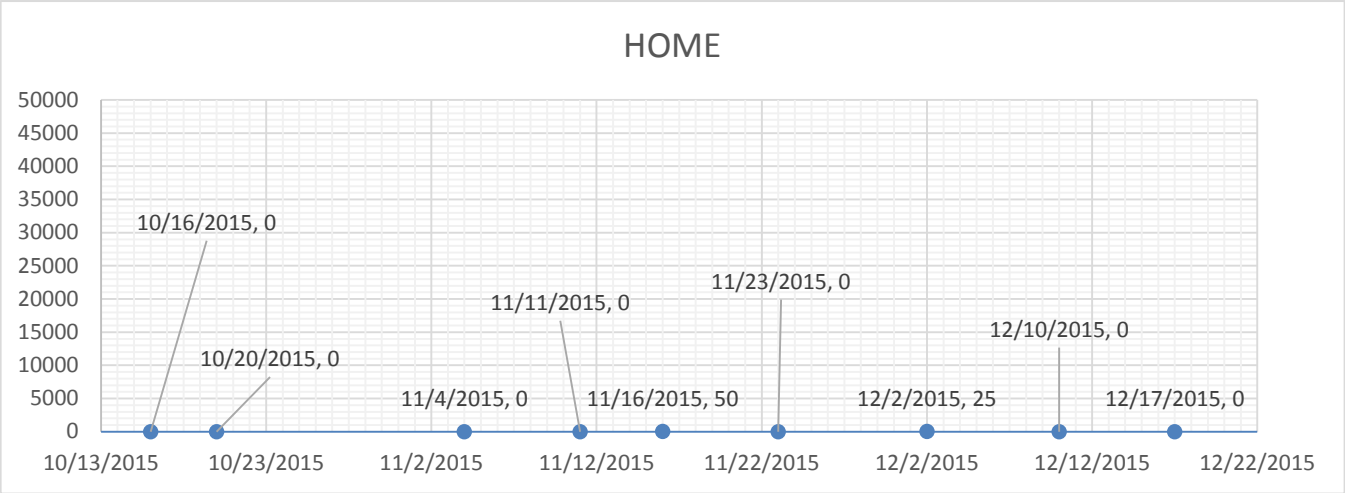
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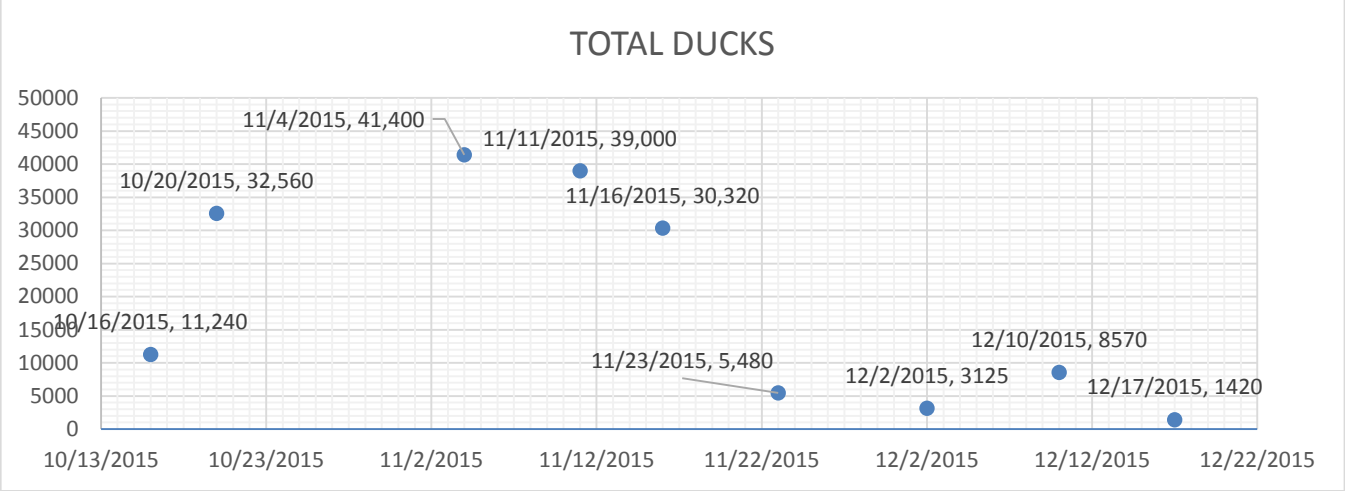
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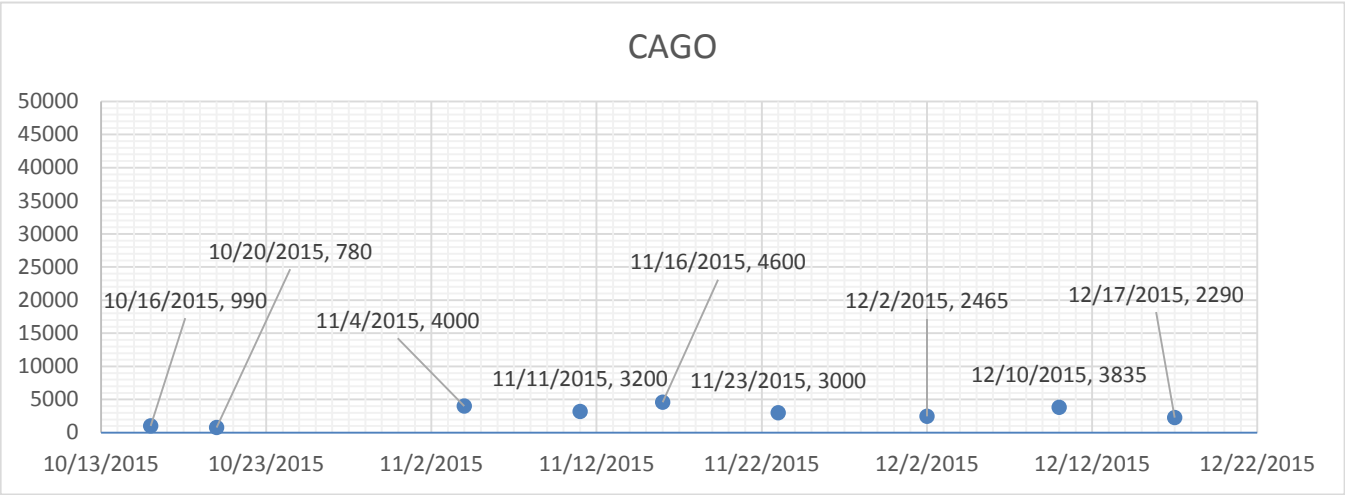
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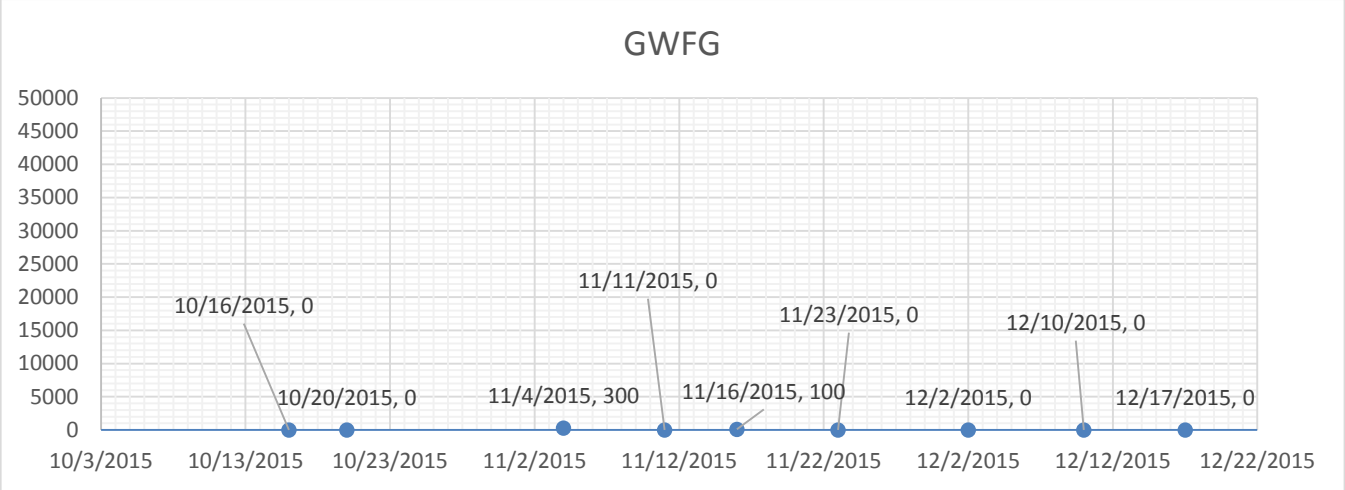
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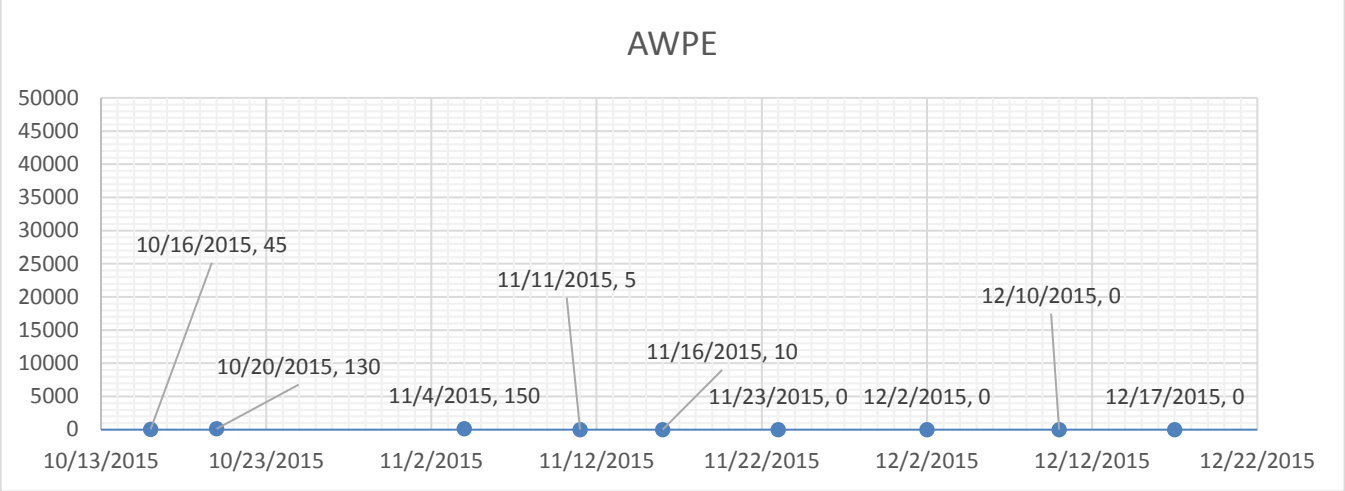
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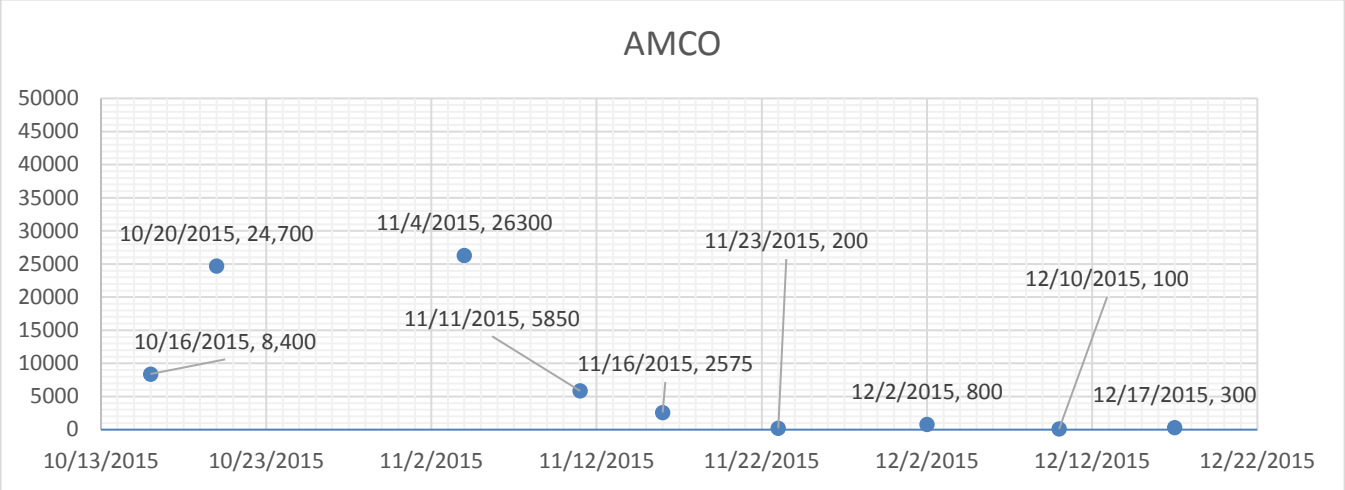
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12/22/2015

Attachment C
US FWS Annual Inspection Reports

Upper Mississippi River National Wildlife and Fish Refuge

Spring Lake HREP

2013 Annual Inspection Report

Two boys fishing at stoplog structure B, August 2013.

Prepared by
Sharonne Baylor, Environmental Engineer
Upper Mississippi River National Wildlife and Fish Refuge
51 E Fourth St., Room 101
Winona, Minnesota 55987
December 2014

TABLE OF CONTENTS

INSPECTION DAY

Dates of Inspection	August 14, 2013
Inspector(s)	Sharonne Baylor, Environmental Engineer
Others Present	None
Project Location	Pool 13, RM 532-536, left descending side of navigation channel
Weather	Warm, cloudy, nice, upper 70s ^{o}F
River Level	• Lock and Dam 13 flow: 33,613 cfs • Lock and Dam 12 tailwater at RM 556.7: 585.21 • Lock and Dam 13 pool at RM 522.4: 583.09 • Approximate elevation at project location RM 534: 583.8 (approximately 0.8' foot above flat pool)

RECOMMENDATIONS

Recommended Actions to Take Immediately

1. Repair Perimeter Levee exterior minor erosion at STA 207+00 (north end of setback levee riprap tie-in).
2. Repair minor erosion around the 24" Gatewell Structure exterior headwall. Unplug interior inlet if necessary.
3. Add and grade aggregate surfacing to stoplog structure grating-dike interfaces.
4. Inspect inside of structures and stoplogs in fall when repositioning stoplogs.

Recommended Actions to Prolong Life of Project

1. Repair south end where damaged by erosion.
2. Repair any Perimeter Levee damage when large trees fall over and leave large holes.
3. Remove beaver dams when they affect project operation.
4. Continue to keep woody vegetation off dikes and spillways.
5. Continue to repair muskrat holes.
6. Continue to monitor for erosion around the pump station structure, especially under the exterior side slab.
7. Protect barrier islands so they do not erode away and leave the exterior perimeter levee unprotected.
8. Continue to monitor project.

INSPECTION RESULTS

Item	Observations/Condition	Remarks/Recommendations
Entrance Area Spillway	Previously repaired area ok. Some aggregate moves off road into river during flood events. Photos 9-10.	Continue to keep woody vegetation off spillway.

Item	Observations/Condition	Remarks/Recommendations
Perimeter Levee	Damage to exterior STA 207+00, north end of Setback Levee riprap tie-in.	Repair exterior damage at STA 207+00.
	Still some erosion at south end.	Repair interior damage along south end interior area.
	Several interior slopes are benched due to erosion.	The benching does not affect the structural integrity. Use caution during for mowing and clearing operations.
	Many areas damaged by muskrats. Well vegetated.	Muskrat damage a continuous problem. Continue to repair large muskrat holes.
	Mature trees on outside slope of levee.	Woody vegetation is usually not desired on levees. However, according to the as-builts, it appears the existing trees were to be left on the outside of the perimeter levee. Repair any damage to the levee when trees fall over. Also continue to keep woody vegetation from the top and insides of the levee.
	Aggregate surface in good shape and appears to drain well, though some areas affected by muskrat damage. Photos 1-8.	Continue to properly grade the aggregate surface.
Cross Dike	Previous repairs of muskrat damaged areas holding up well. Well vegetated.	Muskrat damage a continuous problem. Continue to repair large muskrat holes as they appear.
	Aggregate surface in good shape and appears to drain well, though some areas affected by muskrat damage. Photos 9-13.	Continue to properly grade the aggregate surface.

Item	Observations/Condition	Remarks/Recommendations
Cross Dike Spillways	Good condition. Photos 9-12.	Continue to keep spillways clear of woody vegetation.
Interior Dike A	2012 repair in good condition. Refuge staff adding new aggregate surfacing. Photos 14-16.	Continue to monitor.
Interior Dike B	2008 repair work in good condition.	Continue to monitor.
Interior Dike C	Muskrat damage throughout. Photo 25.	Muskrat damage a continuous problem. Continue to repair large muskrat holes. *Note: Dike C repairs began in September 2014.*
Pump Station	Did not inspect the interior or test operation during this site visit. The structure itself appears to be in good condition. May be some erosion under the exterior side slab. Photos 18-23.	Continue to follow manufacturer's recommendations for operation and maintenance of pump station. Continue to consult with professional electrician and mechanic if problems with well or electrical. Continue to monitor for erosion around the structure, especially under the exterior side slab.
Stoplog Structure A	Concrete, grating, and guardrail in good condition. Stoplogs installed on Cell A side. Photo 24.	Continue to monitor. Inspect stoplogs next time resetting stoplogs.
Stoplog Structure B	Concrete, grating, and guardrail in good condition. No stoplogs installed.	Continue to monitor. Inspect stoplogs next time resetting stoplogs.
Stoplog Structure C	Aggregate surfacing at grating interface is low. Concrete, grating, and guardrail in good condition. Photo 25.	Regrade aggregate surfacing at grating. Continue to monitor. Inspect stoplogs next time resetting stoplogs.
Existing Gatewell Structure STA 122+84	Good condition. Did not check operation.	Continue to monitor.

Item	Observations/Condition	Remarks/Recommendations
Gated Inlet Structure STA 150+21	Structure in good condition. Did not check operation. Gates down. Minor critter damage around headwalls. Photos 26-29.	Continue to operate and maintain in accordance with manufacturer's recommendations. Repair minor damage at interior headwall. If animals burrow too far in or through the levee, it could lead to piping and damage the levee.
24" Gatewell Structure STA 220+00	Structure in good condition. Did not check operation. Minor erosion around exterior headwall. Interior end underwater and may be plugged. Critter damage around outlet (interior side). Photos 30-33.	Continue to operate and maintain in accordance with manufacturer's instructions. Repair erosion around exterior headwall. Unplug interior end if necessary. Repair area around outlet.
Hemi Marsh Levee	Previous repairs of muskrat damage holding up well. Photos 34-36.	Continue to repair large muskrat holes as they occur.
Hemi Marsh Well Station	Pump and well area in good condition. Did not operate. Photos 37-40.	Continue to follow manufacturer's instructions for operation and maintenance. Continue to consult with professional electrician and mechanic if problems with well or electrical.
Hemi Marsh Stoplog Structure	Aggregate surfacing at grating interface is low. Structure in good condition. Photo 35-36.	Regrade aggregate surfacing at grating. Continue to monitor.

OPERATION AND MAINTENANCE

Operation and Maintenance Responsibilities
See O&M manual pages 15-22.

Operation and Maintenance Cost History and Activities
Costs before FY03 not all documented.

Year	Years in O&M	Estimated Annual Cost w/ Inflation	Actual FWS Costs	Activities
1999	1	$39,297		
FY 2003	5	$43,416	$83,600	Operate WCSs, inspect, mow, grade, clear trees, repairs due to 2001 flood, prescribed burn
FY 2004	6	$44,488	$8,700	Operate WCSs, inspect, mow, grade, clear trees, repair damaged electrical cable and transformer on Spring Lake pump, replace fuses and float in #1 pit.
FY 2005	7	$46,104	$38,100	Operate WCSs, inspect, mow, grade, clear trees, repair and replace Sloan Marsh pump
FY 2006	8	$47,579	$17,400	Operate WCSs, inspect, mow, grade, clear trees
FY 2007	9	$49,006	$227,300	Operate WCS, inspect, prescribed burn, mow, grade, regrade Dike B. Cells A and B dewatered (pumping) for summer Dike B repair. Beaver dams removed from Stoplog Structure C. Sloane Marsh pumped fall 2006.
FY 2008	10	$50,917	$9,600	Operate WCS, inspect, mow, apply herbicide, burn levees, place riprap on Dike B. Sloane Marsh pumped fall 2007.
FY 2009	11	$50,616	$308,400	Prescribed burn, inspections, mow. Entrance spillway repairs. Perimeter Levee repairs STA 234-225.
FY 2010	12	$51,426	$59,600	Pump station operation, operate stoplog structures, inspect, mow, prescribed burn. Sloan Marsh dike maintenance. RR3 riprap for repairs. Pumping. Fence replacement.
FY 2011	13	$53,072	$10,200	Pump station operation, operate stoplog structures, mowing, inspection, clear trees, flood debris cleanup.
FY 2012	14	$54,186	$119,200	Pump station operation, operate stoplog structures, mowing, inspection, clear trees, weed control, Sloan Marsh pumping. Dike A repairs. Sloan Marsh dike repairs.
FY 2013	15	$54,999	$16,100	Pump station operation, operate stoplog structures, mowing, inspection, clear trees, weed control, Sloan Marsh pumping. Dike A repairs.

PROJECT HISTORY AND DOCUMENTS

Significant Past Project Events and Activities

Spring 1997	Significant flood.
Spring 2001	Second largest flood event on record. Damage to project.
FY 2003	Rerouted entrance road and added west Cross Dike spillway due to 2001 flood.
November 2004	Repaired damaged Sloan Marsh pump. Added grounding rods which should reduce future lightening damage to pump. Approximate cost $22,500.
July – November 2007	Reshaped and added riprap to Dike B, Cell B side. MAT crew used for reshaping effort. Total cost $217,200.
April – June 2008	High spring flows, two peaks above flood stage. Damage to Perimeter Levee STA 230+00 and entrance road spillway.
July – October 2009	Perimeter Levee repairs STA 234+00 from 2008 flood damage. 120' damage by flood was repaired, another 780' protected. Refuge cleared and grubbed area. Corps of Engineers placed 750 tons of fill and 3,300 tons of riprap. $298,200 FWS costs (clear and grub; geotextile; inspections; and $178,300 MIPR for COE labor, equipment, and materials); $136,000 COE contributions; $434,200 total repair costs.
FY 2012	Repairs to Dike A and Sloan Marsh Dike. Regrading and riprap placement.

Construction History and Costs

Main Contract	
Construction Complete	July 1999
Construction Contractor	Illinois Constructors Corp.
Construction Cost	$4,153,000
Stage 2 Contract (Hemi-Marsh Well)	
Construction Complete	May 2000
Construction Contractor	Langman Construction, Inc.
Contract Construction Cost	$270,000
Stage 3 Contract (Structural Modifications)	
Construction Complete	June 2002
Construction Contractor	Del-Jen, Inc.
Contract Construction Cost	$45,300
Total Project Cost	$6,646,000

Project Documents

Definite Project Report/ Environmental Assessment	May 1993
Operation and Maintenance document	July 2003

INSPECTION PHOTOS

Project inspection photos below taken by Sharonne Baylor on August 14, 2013, unless otherwise noted. Refer to the photo reference map for photo locations.

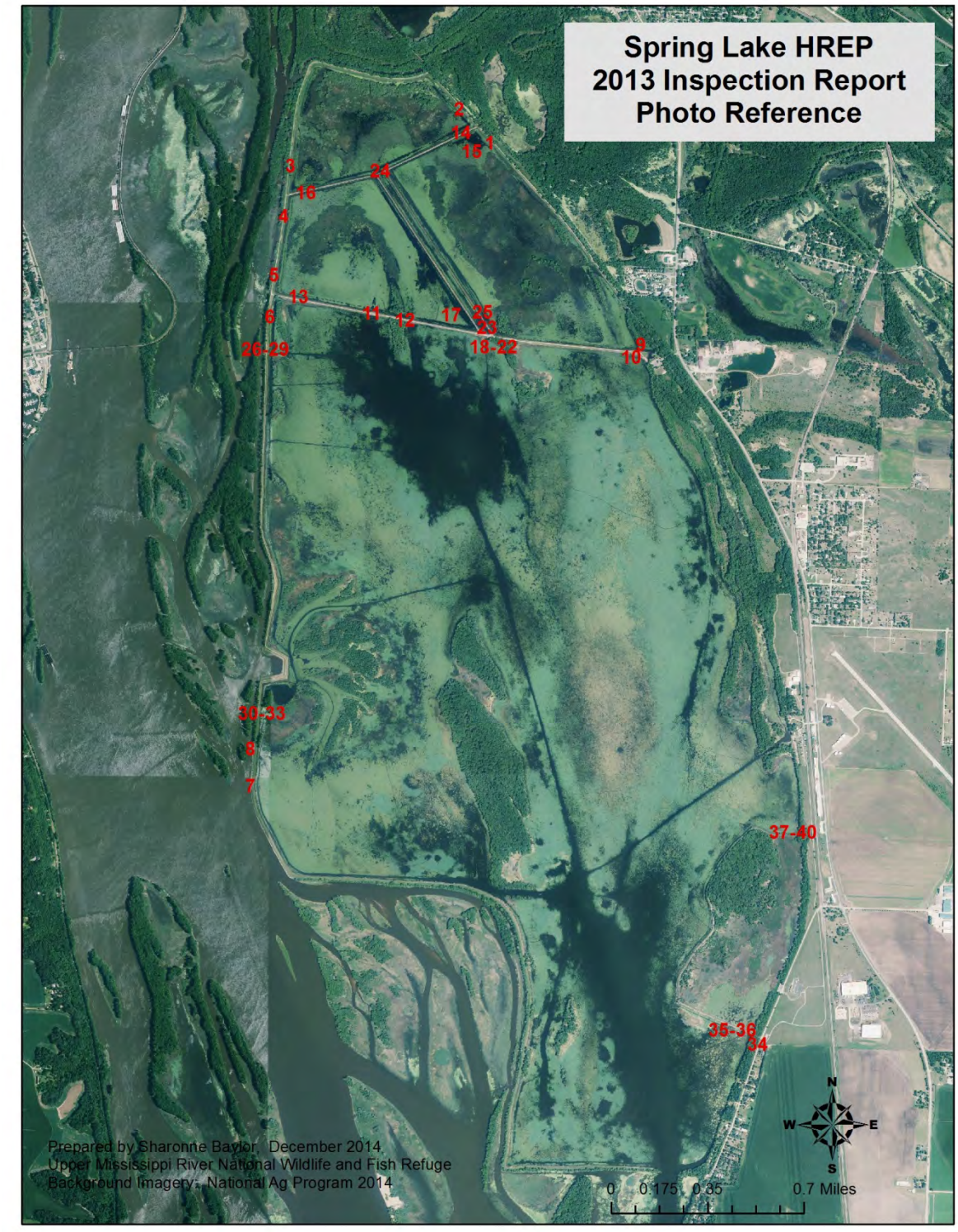


Photo 1: Perimeter Levee, east side at Interior Dike A, looking southeast.

Photo 2: Perimeter Levee, east side at Interior Dike A, looking northwest.

Photo 3: Perimeter Levee, west side at Interior Dike A, looking north.

Photo 4: Perimeter Levee, west side at Interior Dike A, looking south.

Photo 5: Perimeter Levee, west side at Cross Dike, looking north.

Photo 6: Perimeter Levee, west side at Cross Dike, looking south.

Photo 7: Perimeter Levee, 2009 erosion repair, upper end looking south.

Photo 8: Perimeter Levee, 2009 erosion repair upper end tie-in.

Photo 9: Cross Dike entrance spillway.

Photo 10: Cross Dike entrance spillway, east side looking west.

Photo 11: Cross Dike, west spillway, looking east.

Photo 12: Cross Dike, middle spillway, looking east.

Photo 13: Cross Dike, west side at Perimeter Levee, looking east.

Photo 14: Interior Dike A, east end looking west.

Photo 15: Interior Dike A, east end looking west. Example of riprap repair on south (left side) slope.

Photo 16: Interior Dike A, west side looking east. Riprap repair on south (right side). Aggregate surfacing being placed on dike.

Photo 17: Interior Dike B, looking north from Cross Dike.

Photo 18: Pump station.

Photo 19: Pump station.

Photo 20: Pump station, exterior side outlet.

Photo 21: Pump station.

Photo 22: Pump station, exterior side outlet.

Photo 23: Pump station, interior side headwall.

Photo 24: Stoplog Structure A, stoplogs in place on Cell A side.

Photo 25: Stoplog Structure C, looking northwest. Regrade aggregate surfacing around the structure.

Photo 26: Gated inlet structure.

Photo 27: Gated inlet structure.

Photo 28: Gated inlet structure, exterior side headwall.

Photo 29: Gated Inlet Structure, interior side headwall.

Photo 30: 24” Gatewell Structure.

Photo 31: 24” Gatewell Structure, exterior side headwall. Minor erosion around headwall.

Photo 32: 24” Gatewell Structure, exterior headwall grating.

Photo 33: 24” Gatewell Structure, interior outlet. Outlet under water. Critter damage around outlet area.

Photo 34: Hemi Marsh Levee, south gate looking west.

Photo 35: Hemi Marsh Levee stoplog structure, looking west. Regrade aggregate surfacing around structure.

Photo 36: Hemi Marsh Levee stoplog structure, looking west. Flooding on April 23, 2013 (USFWS Engelke photo).

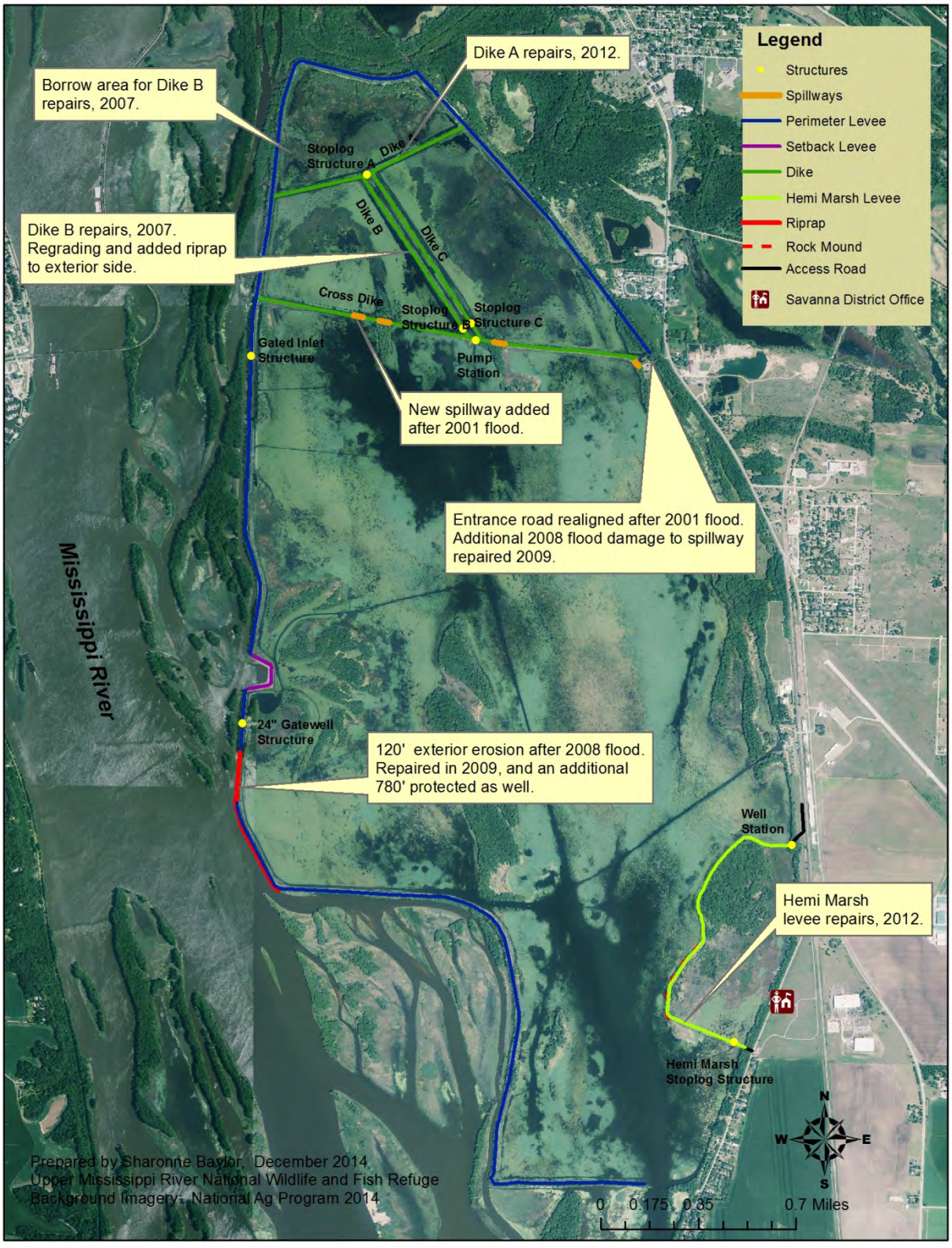
Photo 37: Hemi Marsh well area, looking west.

Photo 38: Hemi Marsh well area.

Photo 39: Hemi Marsh well outlet area, looking west.

Photo 40: Hemi Marsh well outlet pipe.

AERIAL PHOTO AND PROJECT FEATURES


Legend
Structures
Spillways
Perimeter Levee
Setback Levee
Dike
Hemi Marsh Levee
Riprap
Rock Mound
Access Road
Savanna District Office
Borrow area for Dike B repairs, 2007.
Dike A repairs, 2012.
Stoplog Structure A
Dike A
Dike B
Dike C
Dike B repairs, 2007. Regrading and added riprap to exterior side.
Cross Dike
Stoplog Structure B
Stoplog Structure C
Gated Inlet Structure
Pump Station
New spillway added after 2001 flood.
Entrance road realigned after 2001 flood. Additional 2008 flood damage to spillway repaired 2009.
Mississippi River
24" Gatewell Structure
120' exterior erosion after 2008 flood. Repaired in 2009, and an additional 780' protected as well.
Well Station
Hemi Marsh levee repairs, 2012.
Hemi Marsh Stoplog Structure
N
W
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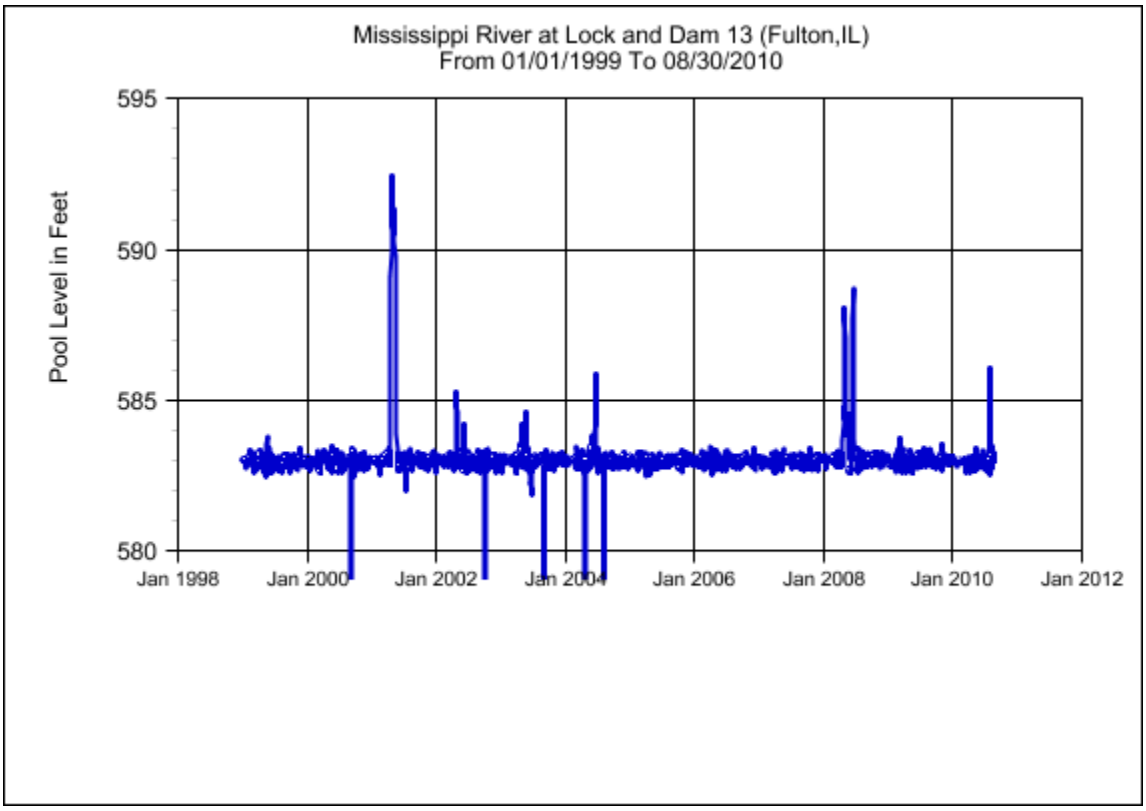
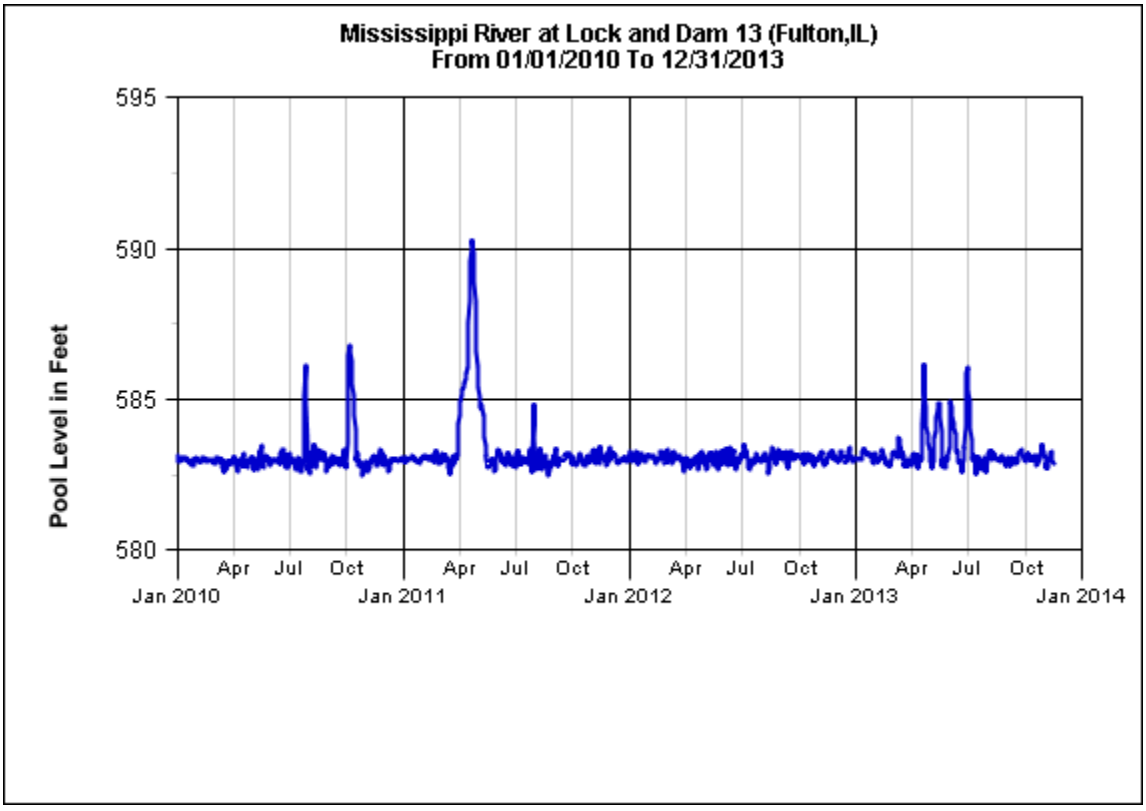
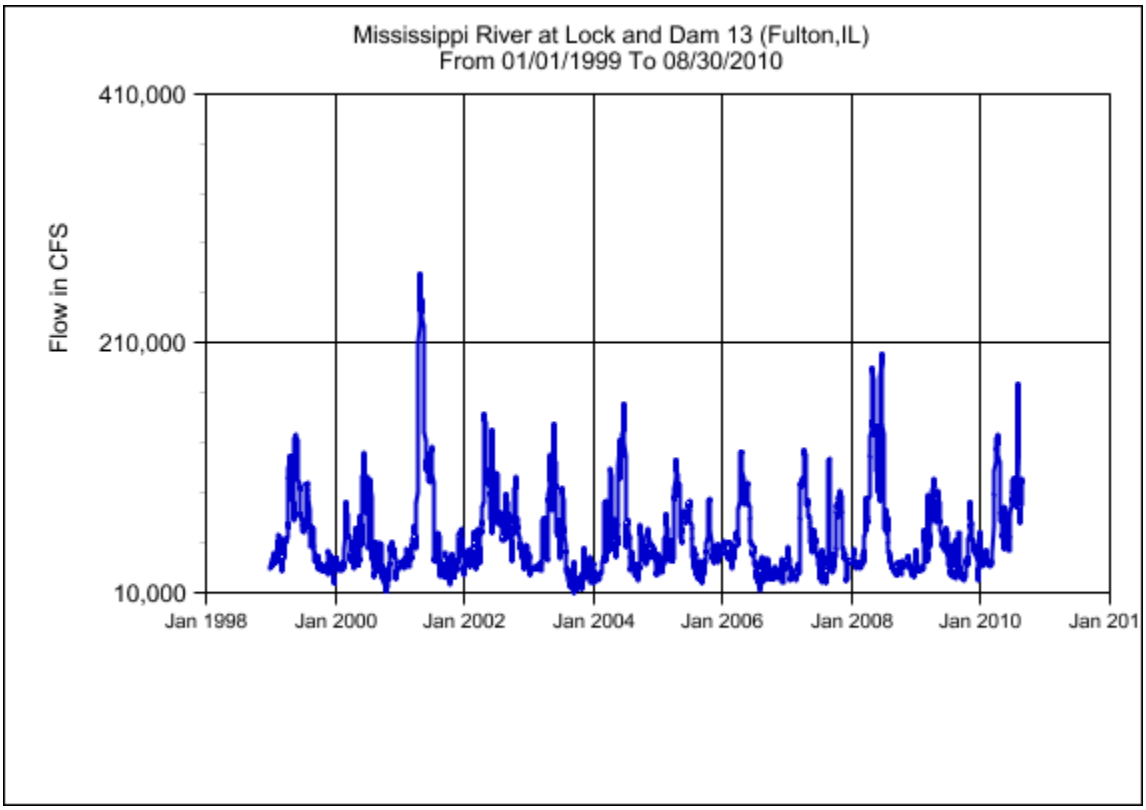
S
Prepared by Sharonne Baylor, December 2014
Upper Mississippi River National Wildlife and Fish Refuge
Background Imagery: National Ag Program 2014
0 0.175 0.35 0.7 Miles

HYDROGRAPHS






Mississippi River at Lock and Dam 13 (Fulton,IL)
From 01/01/1999 To 08/30/2010
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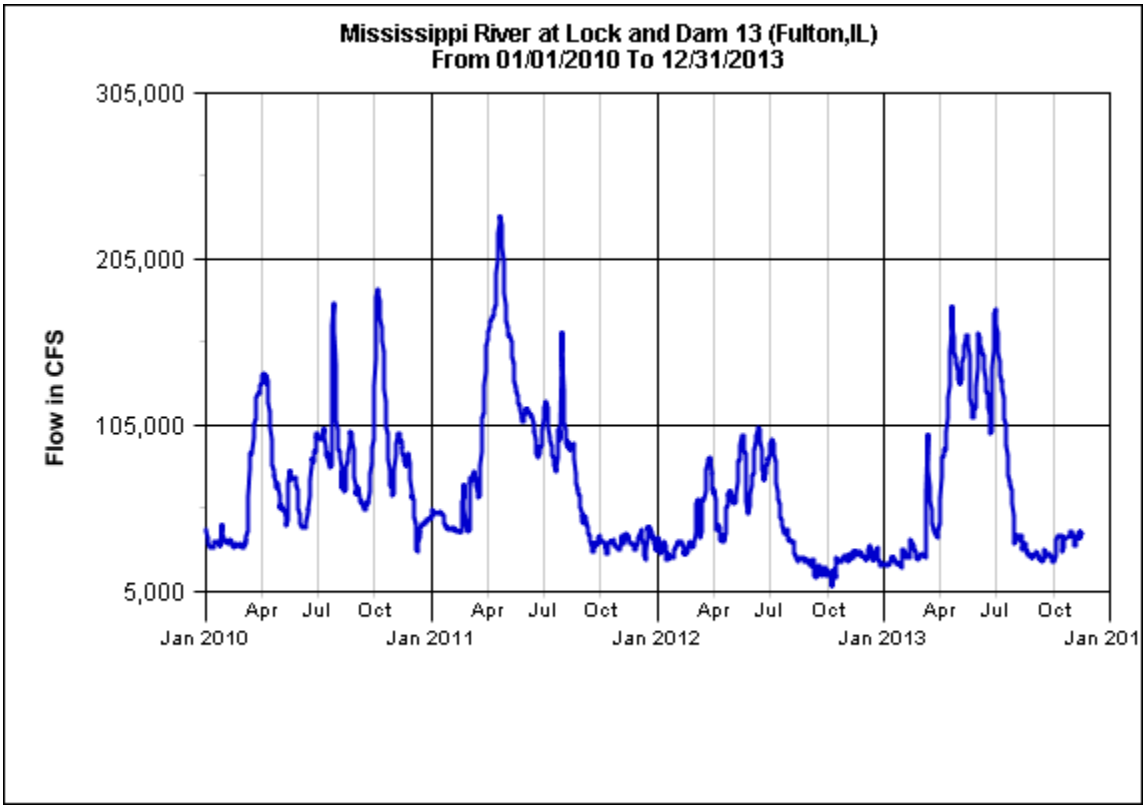
Jan 2002
Jan 2004
Jan 2006
Jan 2008
Jan 2010
Jan 201


Mississippi River at Lock and Dam 13 (Fulton,IL)
From 01/01/2010 To 12/31/2013
Flow in CFS
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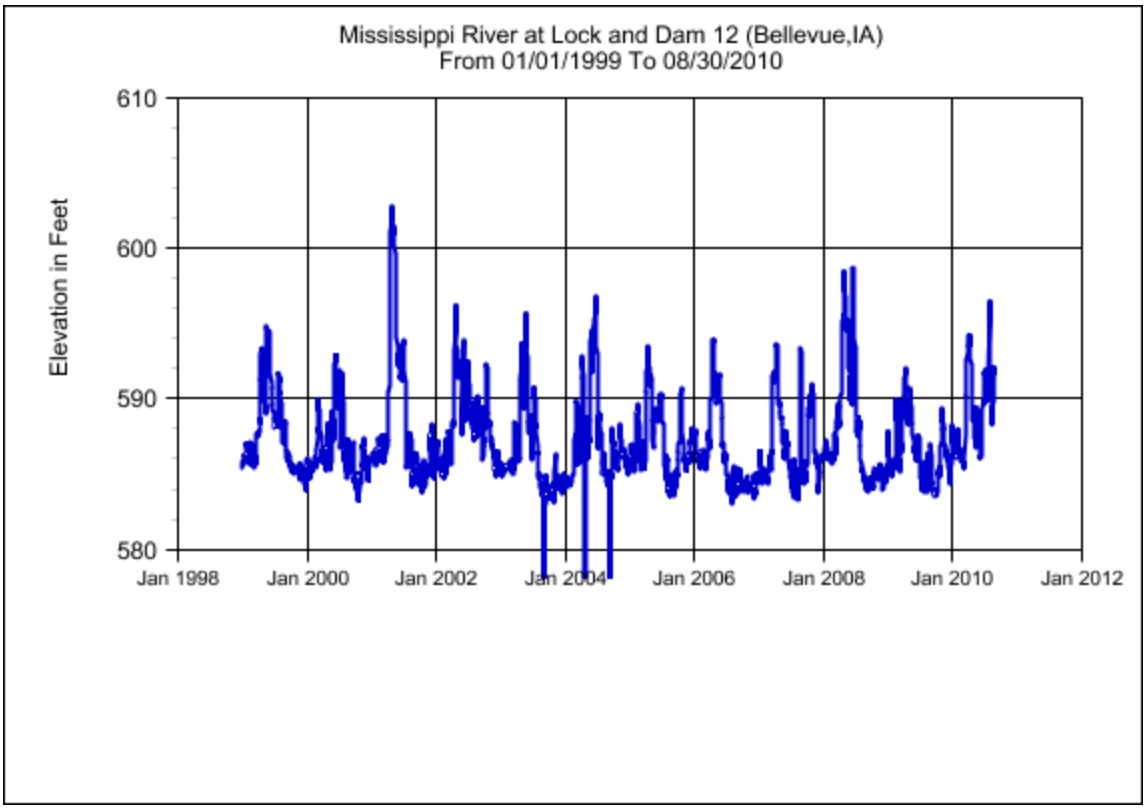
205,000
105,000
5,000
Apr
Jul
Oct
Jan 2010
Jan 2011
Jan 2012
Jan 2013
Jan 201


Mississippi River at Lock and Dam 12 (Bellevue,IA)
From 01/01/1999 To 08/30/2010
Elevation in Feet
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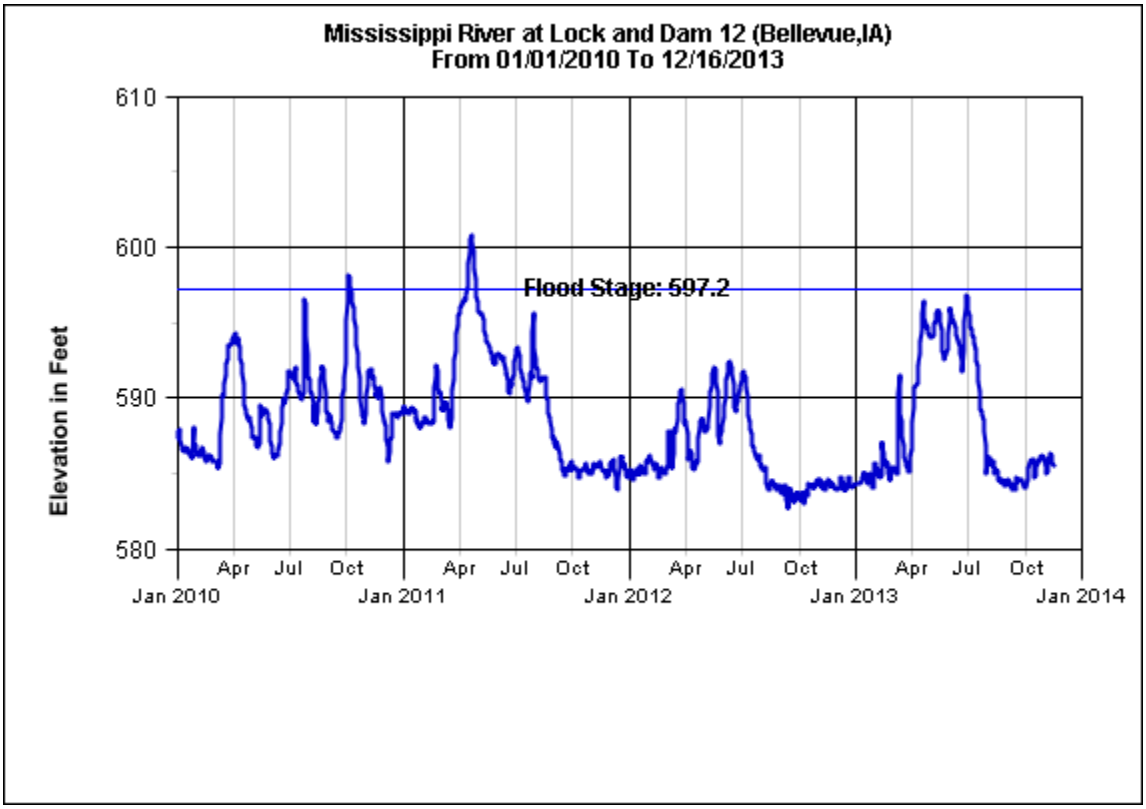
590
580
Jan 1998
Jan 2000
Jan 2002
Jan 2004
Jan 2006
Jan 2008
Jan 2010
Jan 2012


Mississippi River at Lock and Dam 12 (Bellevue,IA)
From 01/01/2010 To 12/16/2013
Elevation in Feet
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580
Flood Stage: 597.2
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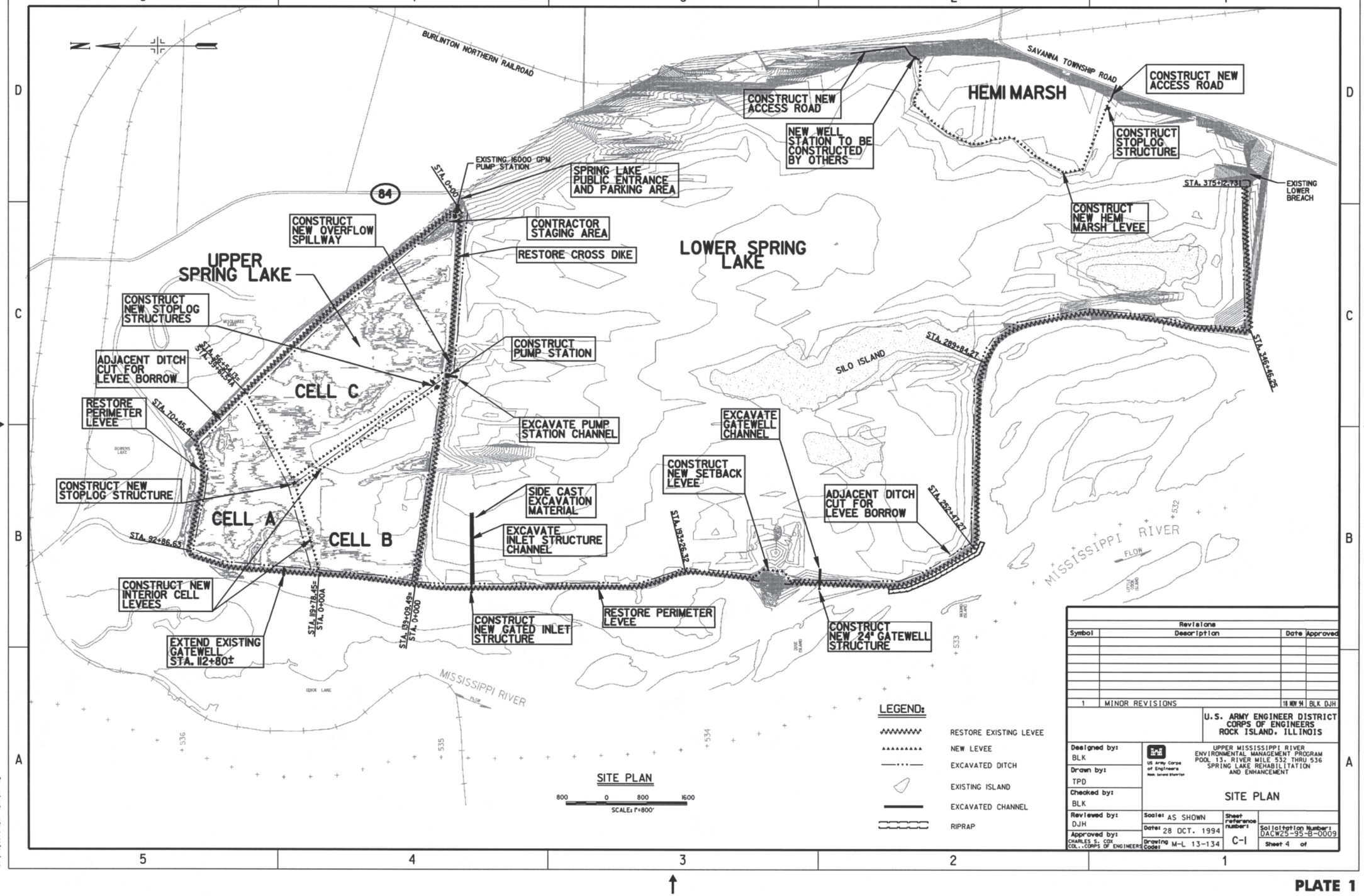
Jan 2010
Jan 2011
Jan 2012
Jan 2013
Jan 2014

Attachment D
Site Plan and Monitoring Plan Plates



Revisions			
Symbol	Description	Date	Approved
1	MINOR REVISIONS	18 NOV 94	BLK DJH

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

Designed by: BLK
Drawn by: TPD
Checked by: BLK
Reviewed by: DJH
Approved by: CHARLES S. CDX COL., CORPS OF ENGINEERS

US Army Corps of Engineers
Rock Island District

UPPER MISSISSIPPI RIVER ENVIRONMENTAL MANAGEMENT PROGRAM
POOL 13, RIVER MILE 532 THRU 536
SPRING LAKE REHABILITATION AND ENHANCEMENT

SITE PLAN

Scale: AS SHOWN
Date: 28 OCT. 1994
Drawing Code: M-L 13-134
Sheet reference number: C-1
Solicitation Number: DACW25-95-B-0009
Sheet 4 of

18-JUN-2002 15:07
e:\epro\docs\eap346\eap346d01.dgn

PLATE 1

Notes taken on 2016 Site Visit.

Stone protection added along interior cell embankments by US FWS.

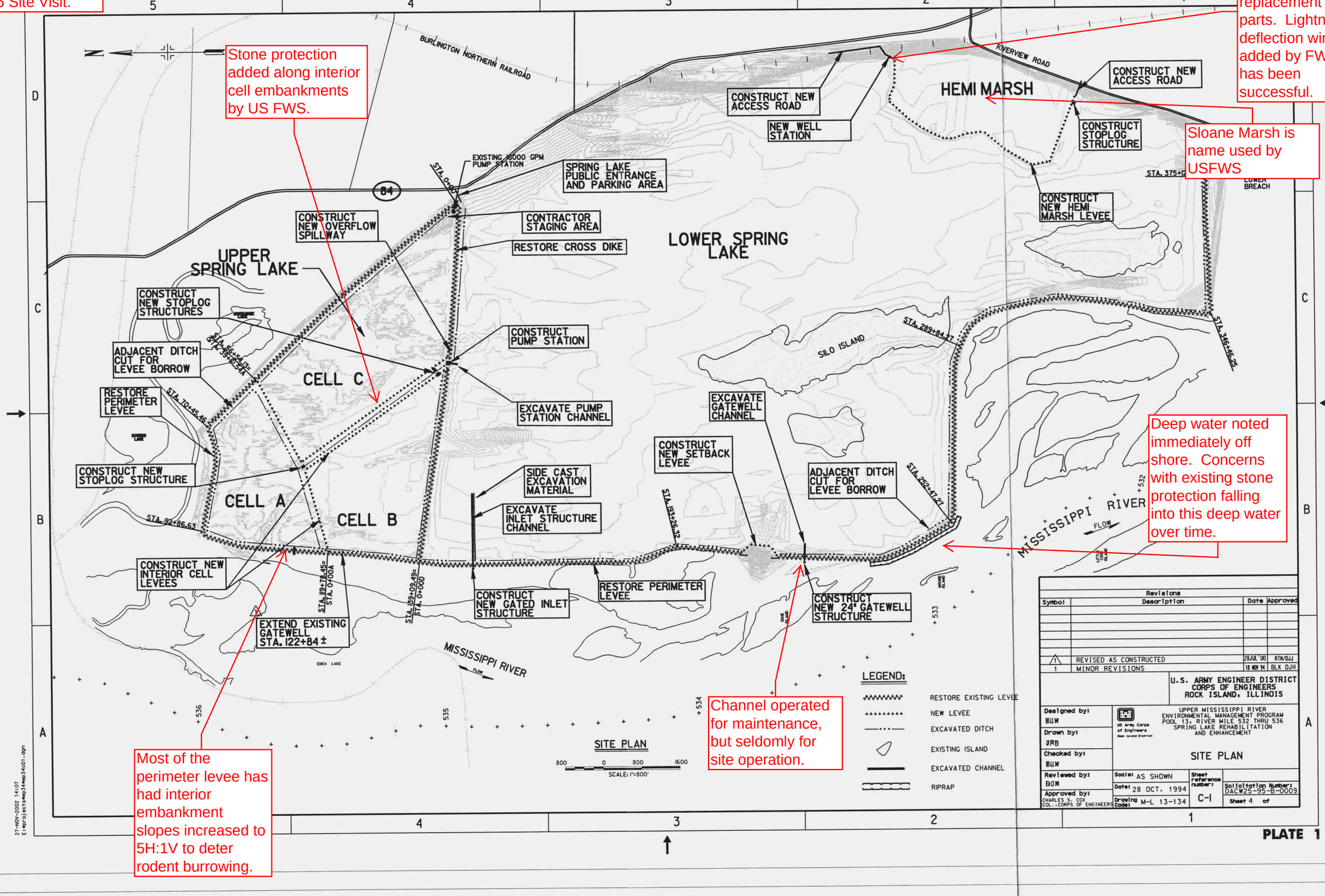
Well pump had frequently been struck by lighting, and required replacement of parts. Lightning deflection wire added by FWS and has been successful.

Sloane Marsh is name used by USFWS

Deep water noted immediately off shore. Concerns with existing stone protection falling into this deep water over time.

Channel operated for maintenance, but seldomly for site operation.

Most of the perimeter levee has had interior embankment slopes increased to 5H:1V to deter rodent burrowing.



Revisions			
Symbol	Description	Date	Approved
1	REVISED AS CONSTRUCTED	28JUL'00	RTW/DJJ
1	MINOR REVISIONS	18 NOV 94	BLK DJH

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

Designed by: BLW
Drawn by: JRB
Checked by: BLW
Reviewed by: BOM
Approved by: CHARLES S. COX COL., CORPS OF ENGINEERS

US Army Corps of Engineers Rock Island District

UPPER MISSISSIPPI RIVER ENVIRONMENTAL MANAGEMENT PROGRAM
POOL 13, RIVER MILE 532 THRU 536
SPRING LAKE REHABILITATION AND ENHANCEMENT

SITE PLAN

Scale: AS SHOWN
Date: 28 OCT. 1994
Drawing Code: M-L 13-134
Sheet reference number: C-1
Solicitation Number: DACW25-95-B-0009
Sheet 4 of

27-NOV-2002 14:07
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PLATE 1

SAVANNA TOWNSHIP ROAD

GOOSE POINT OVERLOOK

CONSTRUCT NORTH ACCESS ROAD SEE SHEET C-17

NEW WELL STATION TO BE CONSTRUCTED BY OTHERS

BEGIN HEMI MARSH LEVEE STA. 14+60H

HEMI MARSH

CONSTRUCT SOUTH ACCESS ROAD SEE SHEET C-18

KEY PLAN

C-16

END HEMI MARSH LEVEE STA. 76+25H

NEW STOPLOG STRUCTURE HM STA. 76+00H SEE SHEET S302

LOWER SPRING LAKE

HEMI MARSH LEVEE TRAVERSE H

BORROW DITCH EXCAVATION

PLAN

SCALE: 1"= 200'

LEGEND:

BORROW DITCH EXCAVATION

APPROXIMATE TREE LINE

NOTE:

FOR TYPICAL SECTIONS SEE SHEET C-21

+00 BEGIN HEMI MARSH LEVEE

HEMI MARSH LEVEE DESIGN GRADE

STA. 15+00H EL 586.0

STA. 46+00H EL 586.0

SLOPE = 0 %

EXISTING GROUND LINE ALONG TRAVERSE H

ELEVATION

DISTANCE IN STATIONS

PROFILE

+00 END HEMI MARSH LEVEE

STA. 77+00H EL 586.0

STOPLOG STRUCTURE HM STA. 76+00

Revisions			
Symbol	Description	Date	Approved
2	AMD. #1 MOVE BORROW EXCAVATION DITCH TO EXTERIOR	15 DEC 94	BLK DJH
1	MINOR REVISIONS	18 NOV 94	BLK DJH

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

Designed by: BLK
Drawn by: TPD
Checked by: BLK
Reviewed by: DJH
Approved by: CHARLES S. COX COL., CORPS OF ENGINEERS

US Army Corps of Engineers Rock Island District

UPPER MISSISSIPPI RIVER ENVIRONMENTAL MANAGEMENT PROGRAM
POOL 13, RIVER MILE 532 THRU 536
SPRING LAKE REHABILITATION AND ENHANCEMENT

HEMI MARSH LEVEE PLAN AND PROFILE

Scale: AS SHOWN
Date: 28 OCT. 1994
Drawing Code: M-L 13-134
Sheet reference number: C-16
Solicitation Number: DACW25-95-B-0009
Sheet 19 of

18-JUN-2002 15:18
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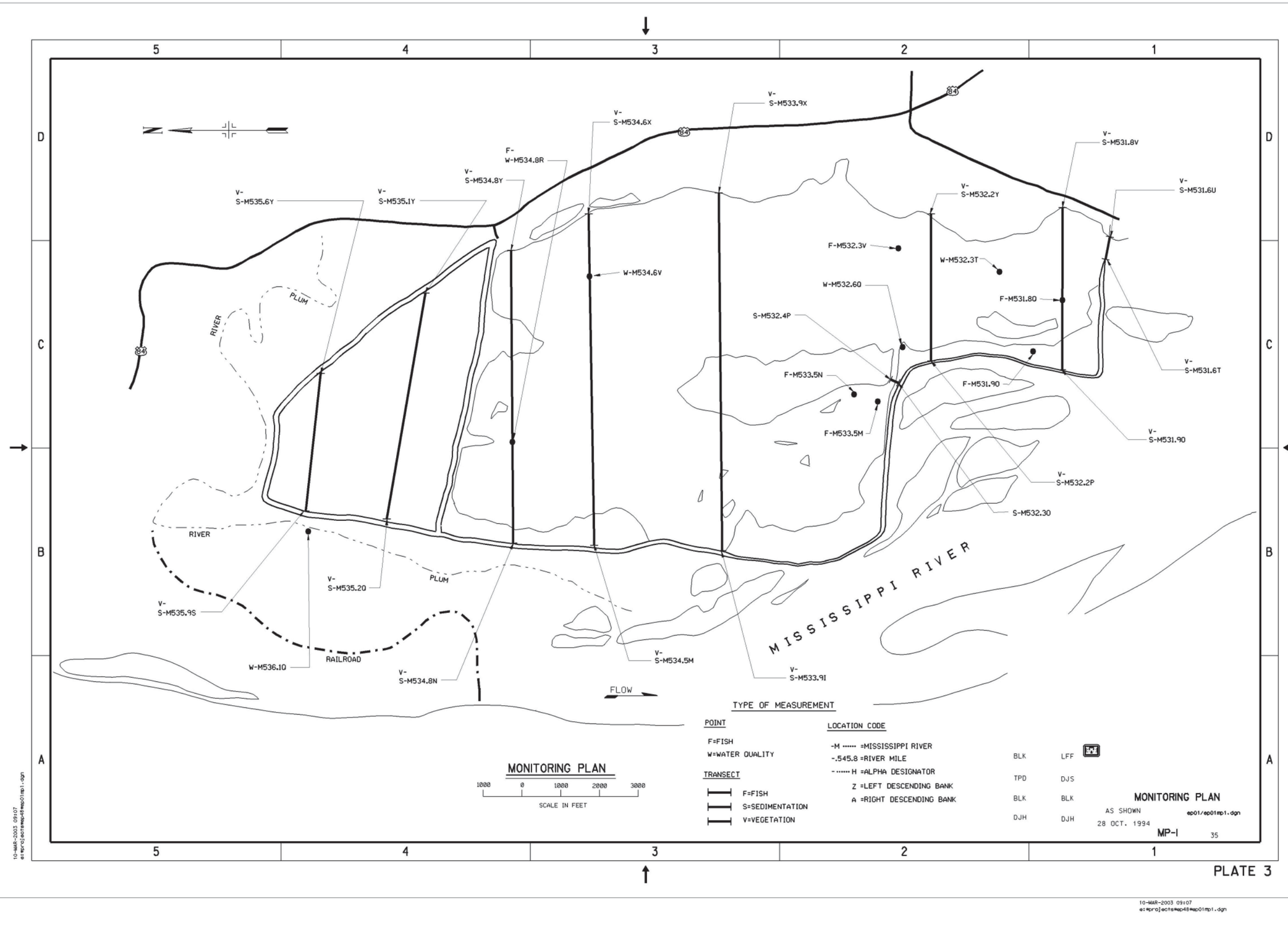
PLATE 2


5
4
3
2
1
D
C
B
A
N
84
V-
S-M533.9X
V-
S-M534.6X
F-
W-M534.8R
V-
S-M534.8Y
V-
S-M535.6Y
V-
S-M535.1Y
V-
S-M531.8V
V-
S-M532.2Y
V-
S-M531.6U
F-M532.3V
W-M532.3T
W-M534.6V
W-M532.60
F-M531.80
S-M532.4P
V-
S-M531.6T
F-M533.5N
F-M531.90
F-M533.5M
V-
S-M531.90
V-
S-M532.2P
S-M532.30
RIVER
PLUM
RIVER
V-
S-M535.20
PLUM
V-
S-M535.9S
MISSISSIPPI RIVER
W-M536.10
RAILROAD
V-
S-M534.8N
V-
S-M534.5M
V-
S-M533.9I
FLOW
TYPE OF MEASUREMENT
POINT
F=FISH
W=WATER QUALITY
TRANSECT
F=FISH
S=SEDIMENTATION
V=VEGETATION
LOCATION CODE
-M ····· =MISSISSIPPI RIVER
-.545.8 =RIVER MILE
- ····· H =ALPHA DESIGNATOR
Z =LEFT DESCENDING BANK
A =RIGHT DESCENDING BANK
MONITORING PLAN
1000 0 1000 2000 3000
SCALE IN FEET
BLK LFF
TPD DJS
BLK BLK
DJH DJH
MONITORING PLAN
AS SHOWN
28 OCT. 1994
ep01/ep01mp1.dgn
MP-I
35
PLATE 3
10-MAR-2003 09:07
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