UMRR BERTOM MCCARTNEY LAKES HREP
INSPECTION OF COMPLETED WORKS

I. PROJECT:
Bertom and McCartney Lakes HREP

II. AUTHORITY:
Upper Mississippi River Restoration (UMRR)

III. LOCATION:
Mississippi River
Pool 11
River Miles 599 - 603
Grant County
Wisconsin

IV. PREVIOUS REPORTS:

1. Bertom and McCartney Lakes Rehabilitation and Enhancement, Upper Mississippi River System Environmental Management Program, Definite Project Report (R-3) with Integrated Environmental Assessment, Pool 11, Upper Mississippi River, Grant County, WI; Rock Island District USACE. June 1989.

2. Bertom and McCartney Lakes Rehabilitation and Enhancement, Upper Mississippi River System Environmental Management Program, Post Construction Initial Performance Evaluation Report (PER3F), Pool 11, Upper Mississippi River, Grant County, WI; Rock Island District USACE. May 1995.

3. Bertom and McCartney Lakes Rehabilitation and Enhancement, Upper Mississippi River, Environmental Management Program, Operation and Maintenance Manual, Pool 11, River Miles 599-603, Grant County, WI; Rock Island District USACE. March 1996. Contract DACW90-C-0020, March 1996.

4. Bertom and McCartney Lakes, Upper Mississippi River System, Environmental Management Program, 10 Year Post Construction Performance Evaluation Report, Pool 11, River Miles 599-603, Grant County, WI; Rock Island District USACE. May 2002.

5. Bertom and McCartney Lakes, Upper Mississippi River System, Environmental Management Program, 11-Year Post Construction Addendum to the 10-Year Performance Evaluation Report, Pool 11, River Miles 599-603, Grant County, WI; Rock Island District; September 2003.

6. Bertom and McCartney HREP 2009 Annual Inspection Report, Upper Mississippi River National Wildlife Refuge; USFWS. August 2009.

7. Bertom and McCartney Lakes, Upper Mississippi River System, Environmental Management Program, 22-Year Post Construction Performance Evaluation Report, Pool 11, River Miles 599-603, Grant County, WI; Rock Island District; December 2014.

V. PROJECT GOALS & OBJECTIVES:

Project Goals and Objectives		
Goals	**Objectives**	**Project Features**
Restore Aquatic Habitat	Restore deep (>6') aquatic habitat	Dredging
	Restore lentic-lotic habitat cross-sectional area	Side channel excavation
	Increase rock substrate aquatic habitat	Fish & mussel rock habitat
	Establish mussel bed	Fish & mussel rock habitat
	Reduce sediment bedload movement	Partial closure structure
	Improve DO	Dredging
Enhance Migratory Waterfowl Habitat	Establish aquatic vegetation bed	In-water DMMP site

VI. MONITORING PLAN EVALUATION CRITERIA:

The following table documents the monitoring efforts since the December 2014 PER. Each project feature has a corresponding monitoring metric as to ascertain the performance of the measure. Based on monitoring metrics alone, the only HREP objective target levels being met as of 2014 were improving dissolved oxygen and establishment of an aquatic vegetation bed. No further analysis of monitoring metrics were conducted for the 2016 HREP inspection activities.

Goal	Objective	Enhancement Measure	Units	Monitoring Target Values					Monitoring Schedule
				Year 0 without project (1990)	Year 1 with project (1991)	Year 7 with project (1998)	Year 22 with project (2012)	Year 50 target (2040)	
Enhance Aquatic Habitat	Restore deep (>6') aquatic habitat volume	Hydraulic Dredging	Acre-Feet	0	114	111	35	80	Perform hydrographic soundings
	Restore lentic-lotic habitat access cross sectional area	Hydraulic Dredging	Sq. Feet	300	NM[a]	NM	1,460	1,800	Perform hydrographic soundings
	Increase rock substrate aquatic habitat	Rock habitat channel	Sq. Yard	0	NM	NM	NM	10,000	Perform profile of rock substrate
	Establish mussel bed	Rock habitat channel	# Per Sq. Yard	0	NM	NM	1.6	10	Perform area mussel survey
	Reduce sedimentation Bertom Lake	Partial Closing Structure	In. Per Year	0.7	NM	0.46[b]	0.9[c]	0.55	Perform hydrographic soundings

Goal	Objective	Enhancement Measure	Units	Year 0 without project (1990)	Year 1 with project (1991)	Year 7 with project (1998)	Year 22 with project (2012)	Year 50 target (2040)	Monitoring Schedule
	Improve DO concentration during critical stress periods	Hydraulic dredging	mg/L	<5.0	>5.0	9.7 (mean)	9.9 (mean)	>5.0	Perform water quality tests at 5 stations
Enhance Migratory Waterfowl Habitat	Establish aquatic vegetation bed	Aquatic Bed/Perched Wetland	Acre	0	NM	NM	>10	10	Perform aerial surveys

a: Not measured b: For evaluation period 1988-1998 c: For evaluation period 1988-2013

VII. SIGNIFICANT EVENTS SINCE LAST INSPECTION

Last PER completed 2014.

VIII. PROJECT SPONSOR UPDATES

No Changes.

IX. ONGOING MONITORING AND/OR REPORTS

Kelner, D., Mussel Habitat Enhancement Monitoring, Bertom and McCartney Lakes Upper Mississippi River Restoration, US Army Corps of Engineers, St. Paul District. January 2015.

Summer and winter water quality monitoring performed by USACE at the HREP began again in June 2014. Water quality monitoring results on data collected prior to 2014 are discussed in previous Performance Evaluation Reports.

X. DATE OF FIELD VISIT: August 11, 2016

Weather Conditions: Pouring rain for the first hour. Cloudy the last 3 hours.
Approximate time in the field: 10 am – 2 pm.
Boat Ramp Used: Cassville, WI Riverside Park
Pool 11 elevation 609.92 ft @ LD 11. (Stage 14.72 ft, 0.08 ft below flat pool)
Pool 10 Tail Elevation 609.0 – (this is the 20% duration stage, or historically 20% of the time the stage is higher and 80% of the time the stage is lower)

Field visit photos are included in Attachment A.

ATTENDEES:

Name	Office	Title	Number	Email
Kara Mitvalsky	CEMVR-EC-DN	Environmental Engineer	309-794-5623	kara.s.mitvalsky@usace.army.mil
Sharonne Baylor	USFWS	Environmental Engineer	507-494-9207	sharonne_baylor@fws.gov
Jeff Janvrin	WI DNR	Habitat Specialist	608-785-9005	jeff.janvrin@wisconsin.gov
Mike Griffin	IA DNR	Miss River Coordinator	563-872-5700	michael.griffin@dnr.iowa.gov
Elizabeth Bruns	CEMVR-EC-H	Hydraulic Engineer	309-794-5762	elizabeth.a.bruns@usace.army.mil
Chuck Theiling	CEMVP-PD-P	Large River Ecologist	309-794-5636	charles.h.theiling@usace.army.mil
Steve Gustafson	CEMVR-EC-DN	Env. Protection Specialist	309-794-5202	stephen.j.gustafson@usace.army.mil
Ben Vandermyde	CEMVR-OD-M	Forester	309-794-4522	benjamin.j.vandermyde@usace.army.mil
Tim Yager	USFWS	Deputy UMR Refuge Manager	507-494-6219	tim_yager@fws.gov
Wendy Woyczik	USFWS	Acting McGregor District Refuge Manager	608-326-1515	wendy_woyczik@fws.gov
Sara Schmuecker	USFWS	RIFO Biologist	309-757-5800	sara_schmuecker@fws.gov
Shawn Giblin	WI DNR	Water Quality Specialist	608-785-9995	shawn.giblin@wisconsin.gov


Field visit attendees, west shore of Bertom Island.

XI. OBSERVATIONS:

Submerged Rock Partial Closing Structures

The rock closure structure is always submerged (Photo 1, Attachment A). The tie-ins to the upstream and downstream end of the project were visible. Erosion on the downstream end tie in had been noted on previous inspections, but due to water levels and heavy rain, it could not be observed during the site inspection (Photo 2). In the interior (eastern) side of the structure, one of the boats hit a rock, which likely had come from the structure itself. The purpose of this structure was to limit the amount of bedload entering the project area. There is bed load (sand) evident the in the left (control) channel (Photo 3). One tool to analyze the success of this structure could be to compare pre- and post- aerial photography of the Bertom portion of the project to see if sand entry has lessened post project.

Deep Aquatic Habitat

Channels were traversed by boat. Each channel has been assigned various names by the WI DNR. The WI DNR has also been performing long term fish sampling and water quality sampling of these channels. Backwater fishes responded very favorably to the project and continue to do well. Easternmost backwater dredging sites experienced erosion of geomorphic features which isolated the lake, and which now allows more flow and current velocity into the backwater.

The connecting channels between dredge cut areas are not used by fish during overwintering.

A small sand bar near STA 59+92 has helped prevent additional infilling of the adjacent dredge cut (see photos 4 and 5 Attachment A and Site Plan, in Attachment B). Willows are beginning to establish on the sand bar. This dredge cut has seen channel sloughing; however, infilling around the edges has allowed aquatic vegetation to establish. This littoral zone makes the adjacent deeper water more desirable fish habitat. This dredge cut has a better, more diverse fish population than other parts of the project per conversations with the WI DNR.

The "Spring" dredge cut section (STA 83+92 to STA 95+91) is considered a good fisheries habitat, with groundwater springs from the adjacent bluff helping to stabilize winter temperatures (Photo 6).

Groundwater springs were observed in the "Rock" dredge cut (STA 101+89 to STA 113+86). The adjacent peninsula to the south has been eroded, allowing channel quality to degrade for fish habitat (Photos 7, 8, & 9).

The furthest east dredge cuts (STA 125+84 to STA 143+78, dredged areas I, J, K) are not optimum for fish habitat. Two peninsulas that protected the cuts from the south have eroded, thereby degrading the habitat (Photo 10).

STA 143+78.91 – Eddy exist in this dredged channel pocket, negatively impacts aquatic habitat.

Aquatic Vegetation

Aquatic vegetation was present in many of the backwaters in this area. Water Star Grass, Elodea and Vallisneria were observed. The WI DNR has conducted one percent light penetration studies of Pool 11. The Pool, along with Pools 9 and 10, failed to meet the light threshold of 17 mg/L TSS. A summary of the light investigation is included in Attachment C.

Dredged Material Placement Site

The dredged material placement site (Bertom Island) contains an isolated wetland created by a low central area. Wavewash and erosion is occurring on the upstream side of the placement site and will likely break through to the wetland over time (Photos 11, 12, 13, 14, 15, 16, 17, and 18). The placement site vegetation includes cottonwood, cedar, willows and silver maple, as well as arrowhead, false nettle, monkeyflower, raspberry, wild grape, lilies, and Canadian clearweed. Beaver activity has been observed on the east side of the Island.

Amphibian monitoring on the site has been conducted by the WI DNR at this site, however, a report has not been completed to document the data. The individuals on site during the monitoring efforts noted that the sound of the frogs was so loud that it was difficult to hear their co-workers over the volume of sound.

Fish and Mussel Rock Habitat Channel

This channel was traversed by boat. At the first hard right bend, on the outside edge, some erosion/low areas were noted behind edge of rock. The rock itself remains in place. The WI DNR was concerned that if a channel cuts through beyond the rock, this could cause problems with the rock channel functionality. (Photos 19 and 20).

A large scour hole was noted at the end of the rock channel. Depths of up to 29 feet were read using the depth finder past the rock, as compared to depths of 6 to 7 feet in the rock channel itself.

Fishery structures are submerged and have not been inspected. The "lunker structures" are submerged project features which have been very difficult to monitor, but presumed to be functioning. The WI DNR, who has dived the area, has not dived near the structures since there are safety concerns with being caught up in one of the structures.

The status of the mussel restoration was reported in the January 2015 Mussel Habitat Enhancement Monitoring Report by Dan Kelner, USACE.

The control channel west of the habitat channel has become wider and shallower over time. Erosion noted on the north bank, with treefall. Logjams observed in the control channel entrance (Photos 21, 22, 23, 24 and 25).

Non-HREP feature observations

Locations of the non-HREP observations are included on the Site Plan in Attachment C.

Location 1) Deep erosion was noted on the left descending bank of the main channel (Photo 26) at RM 601.6 (N 42.681322°, W 90.9095°). Rock has been placed here, but erosion continues upstream. Depths of over 25 feet were observed off shore.

Location 2) No erosion protection riprap observed at cut-through channel at RM 601.3 (N 42.680480°, W 90.905088°) (Photos 27 and 28). No significant erosion observed.

Location 3) Control structure present on channel at RM 601.2 (N 42.680294, W 90.901646), appears to be performing as designed (Photos 29 and 30).

US FWS conducted bird counts in 2013 and 2016 in the Bertom area. Some species observed include American Goldfinch, Bald Eagle, Baltimore Oriole, Blue-Gray Gnatcatcher, Common Yellowthroat, Downy Woodpecker, European Starling, Green Heron, House Wren, Killdeer, Prothonatary Warbler, Spotted Sandpiper, Warbling Vireo and Yellow-billed cuckoo.

XII. SUMMARY

Although the HREP constructed aquatic habitat (dredge cuts, lentic-lotic access, rock channel) is experiencing degradation due to sediment deposition and erosion, overall fisheries response is positive, and semi-aquatic vegetation is present.

Biological response to the wetland within the placement site is positive, although concerns remain the lifespan of the wetland. The isolated wetland and placement site were not considered to be a project feature associated with specific goals and objectives within the program, and the temporary benefits have been an unexpected bonus to the ecological habitat in the area.

XIII. RECOMMENDATIONS

Rebuilding peninsulas of berms at entrance to dredge cuts could reduce current velocities in overwintering areas.

XIV. LESSONS LEARNED

- Dredge cuts that were protected by peninsulas or berms seemed to last longer.
- Dredge cuts located further away from the downstream entrance of the site, seemed to last longer.
- Vertical banks in dredging, considered a good option during the design at the beginning of the program, tend to slough in. This sloughed material could fill in the cuts reducing the deep water habitat. Having some littoral zones and shallower areas adjacent to the cut is preferable fisheries habitat. Design cross sections have changed since the time of this project to reflect this.
- Rock structures need to be adequately tied into the adjacent banks. Several factors need to be considered in this types of design to ensure that backcutting of the structure does not occur.
- The rock channel remains stable in depth, as would be expected. Immediately downstream, the channel depth is deeply cut. While this could be used as a design benefit in some situations, it also causes the sediment and materials from the scouring to move downstream, potentially impacting other cuts. Careful consideration should be made to evaluate downstream impacts of a rock channel.
- Monitoring should include wider transects or bathymetry to better evaluate success in future dredge cuts.

Attachment A
Site Visit Photos

Photo 1: Closure Structure.

Photo 2. Closure Structure Downstream End.

Photo 3. Dredge Cut STA 59+92.

Photo 4. Dredge Cut STA 83+92

Photo 5. Dredge Cut STA 101+89 to STA 113+86): "Rock"

Photo 6. Dredge Cut STA 101+89 to STA 113+86): "Rock"

Photo 7. Dredge Cut STA 101+89 to STA 113+86): "Rock" namesake

Photo 8. Dredge Cut STA 125+84 to STA 143+78.

Photo 9. Shoreline of Dredged Material Placement Site

Photo 10. Shore of Dredged Material Placement Site.

Photo 11. Decaying turtle shells on shore of Dredged Material Placement Site.

Photo 12. Upper shore of Dredged Material Placement Site.

Photo 13. Upstream of Dredged Material Placement Site.

Photo 14. Interior wetland in Dredged Material Placement Site.

Photo 15. Interior wetland in Dredged Material Placement Site.

Photo 16. Interior wetland in Dredged Material Placement Site.

Photo 17. End of Rock Habitat Channel.

Photo 18. Erosion at end of Rock Habitat Channel.

Photo 19. Control Channel.

Photo 20. Arrowhead on bank of Control Channel.

Photo 21. Treefall in Control Channel.

Photo 22. Bank of Control Channel.

Photo 23. Logs in Control Channel.

Photo 24. Main channel LDB, erosion area at N 42.681322°, W 90.9095°.

Photo 25. Main channel LDB, erosion area at N 42.680480°, W 90.905088°

Photo 26. Main Channel LDB, side channel at N 42.680480°, W 90.905088°.

Photo 27. Control structure at N 42.680294, W 90.901646.

Photo 28. Control structure present at N 42.680294, W 90.901646.

Attachment B
WDNR Light Penetration Presentation

Let There Be Light: Making the Case for Improved Water Quality and Targeted Restoration

Shawn Giblin
Mississippi River Water Quality Specialist
Wisconsin Department of Natural Resources

WISCONSIN
DEPT. OF NATURAL RESOURCES

Water clarity is a keystone variable in aquatic ecology. For this reason, the role of underwater light tends to be one of the earliest chapters in reputable limnology and aquatic ecology textbooks. The positive relationship between water clarity and aquatic plants is well understood and the prevalence of aquatic plants drives a variety of ecological processes in aquatic ecosystems. Proliferation of aquatic plants has been shown to drive a variety of feedback mechanisms including reduced sediment resuspension, reduced phytoplankton, increased invertebrate biomass, increased refuge for zooplankton, increased denitrification, production of allelopathic substances, and increases in waterfowl abundance.

Water clarity and aquatic plant abundance are among the major factors driving fish community characteristics across the Upper Mississippi River. Widespread landscape disturbance, resulting in increased sediment loading, has been identified as driving declines in aquatic plant abundance. This results in declines of backwater specialists and predators with plant-dependent life cycles. Clear, vegetated systems tend to be dominated by visual predators such as yellow perch (*Perca flavescens*), northern pike (*Esox lucious*), and largemouth bass (*Micropterus salmoides)*. Predatory fishes such as northern pike, bowfin (*Amia calva*), largemouth bass and longnose gar (*Lepisosteus osseus*) are often able to substantially reduce recruitment among planktivorous fishes. This reduction in planktivorous fish can alter food webs and result in further increases in aquatic vegetation and water clarity. Alternatively, benthivorous fish such as common carp (*Cyprinus carpio*) tend to be abundant in turbid systems and can keep these systems in a turbid state due to resuspension during their feeding and spawning activities. Once substantial populations of common carp and other benthivores are high, establishing aquatic plants can become difficult due to poor water transparency.

The depth of one percent of surface light is generally viewed as the delineation between the photic and euphotic zones. Figure 1 provides a fascinating and valuable look into the chronology of the River downstream of Lake Pepin since 1988. A lot of valuable insight can be gained from this dataset: from the collapse of vegetation post-1988, to the nearly ten years it took the Mississippi to reset back to a clearer state, to the extreme transparency we observed in 2009 and 2010.

For now, it appears that the fall 2010 flood was somewhat of a reset event for the River, with 2011-2015 light penetration looking fairly similar following the unusually clear years of 2009 and 2010. The red line indicates the equivalent one percent of surface light value which corresponds to 17 mg/L TSS- a threshold we’ve identified where fundamental shifts in the native and recreational fish community tend to occur (Figures 2 and 3).

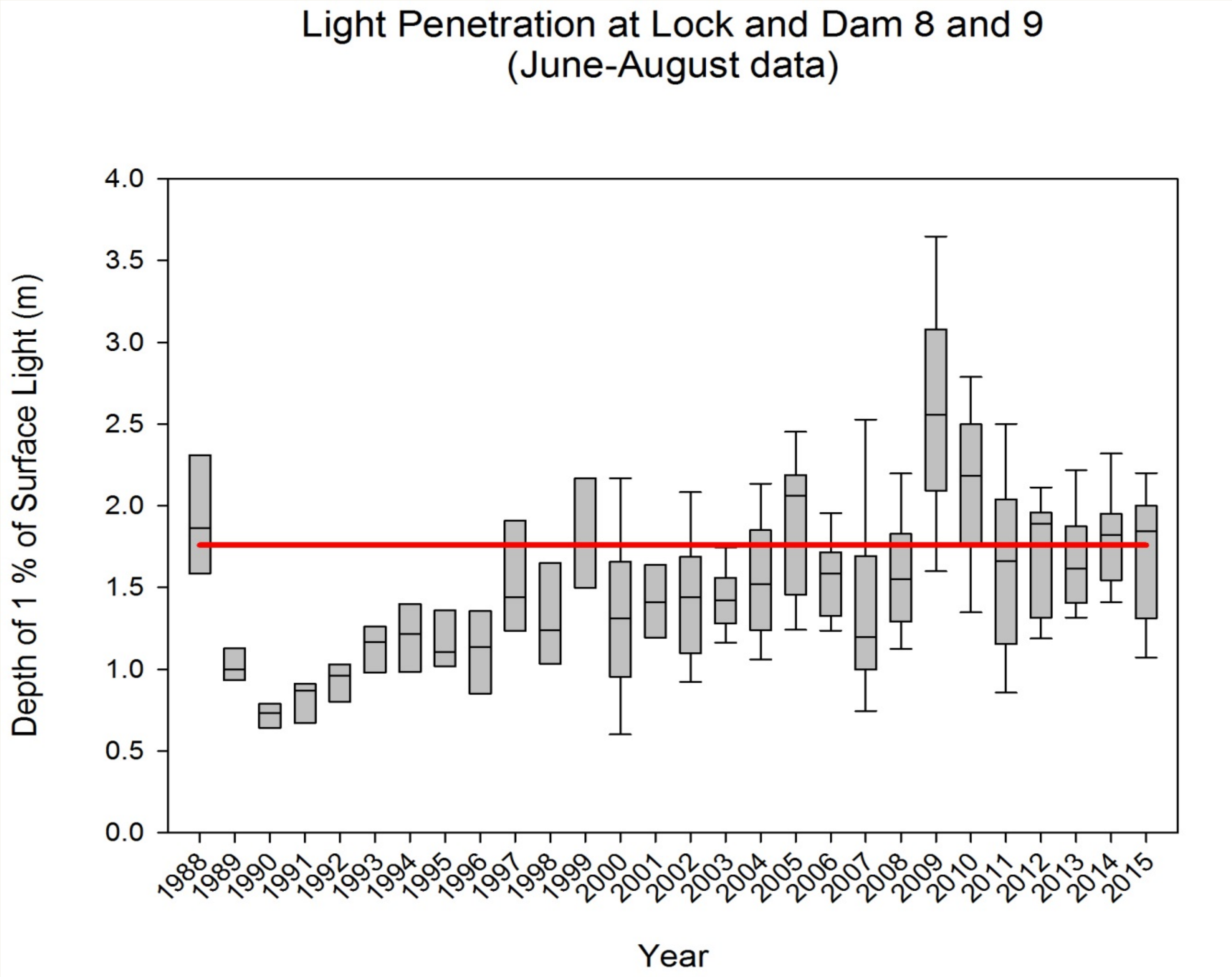


Figure 1. Long term trends in one percent of surface light at Lock and Dam 8 and 9. The red line indicates the one percent of surface light value corresponding to 17 mg/L total suspended solids.

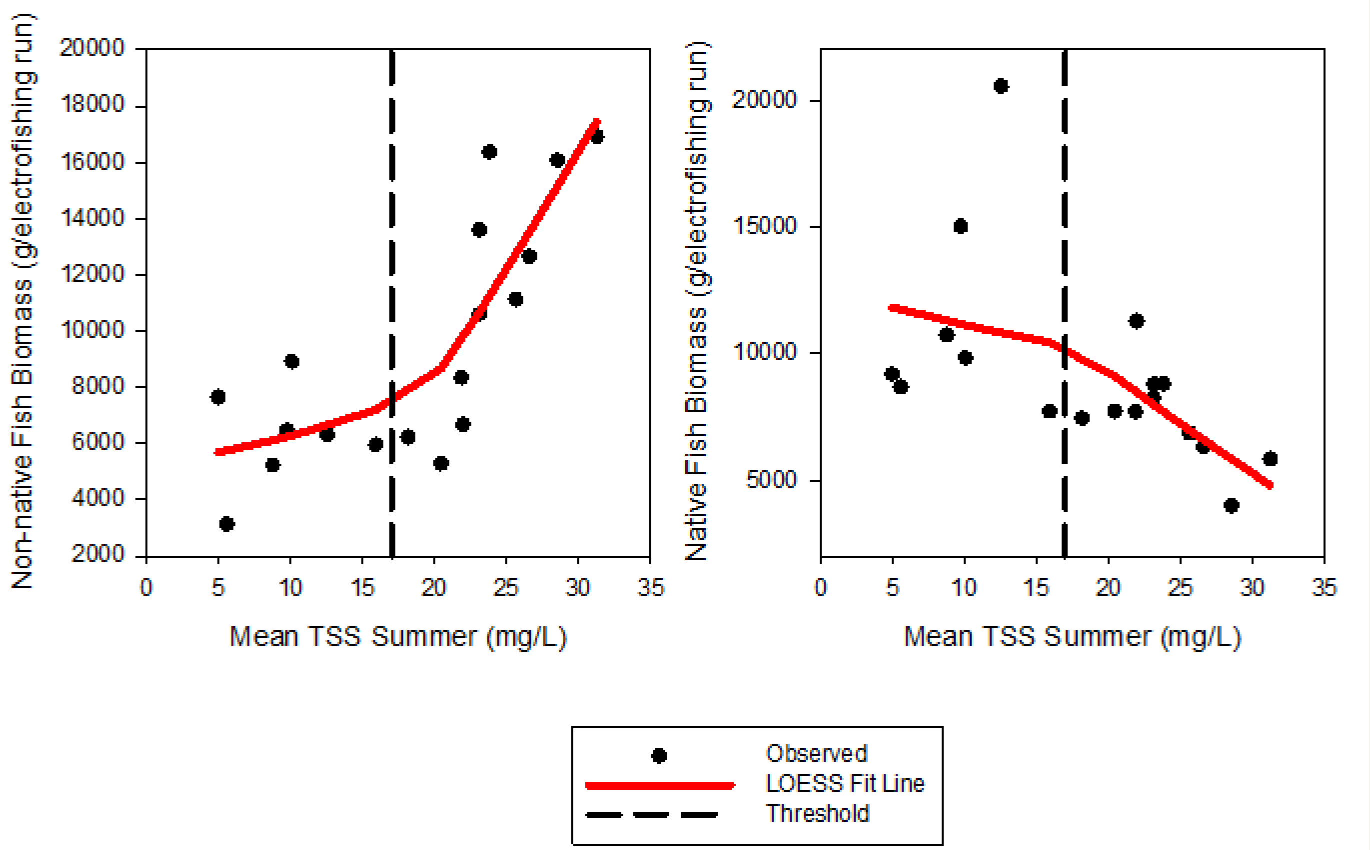


Figure 2. Relation between mean annual non-native and native fish biomass per electrofishing run and mean summer TSS in Pool 8 of the Upper Mississippi River (1993-2011). The solid line indicates the LOESS regression trend. The dotted line indicates the observed threshold (17 mg/L TSS).

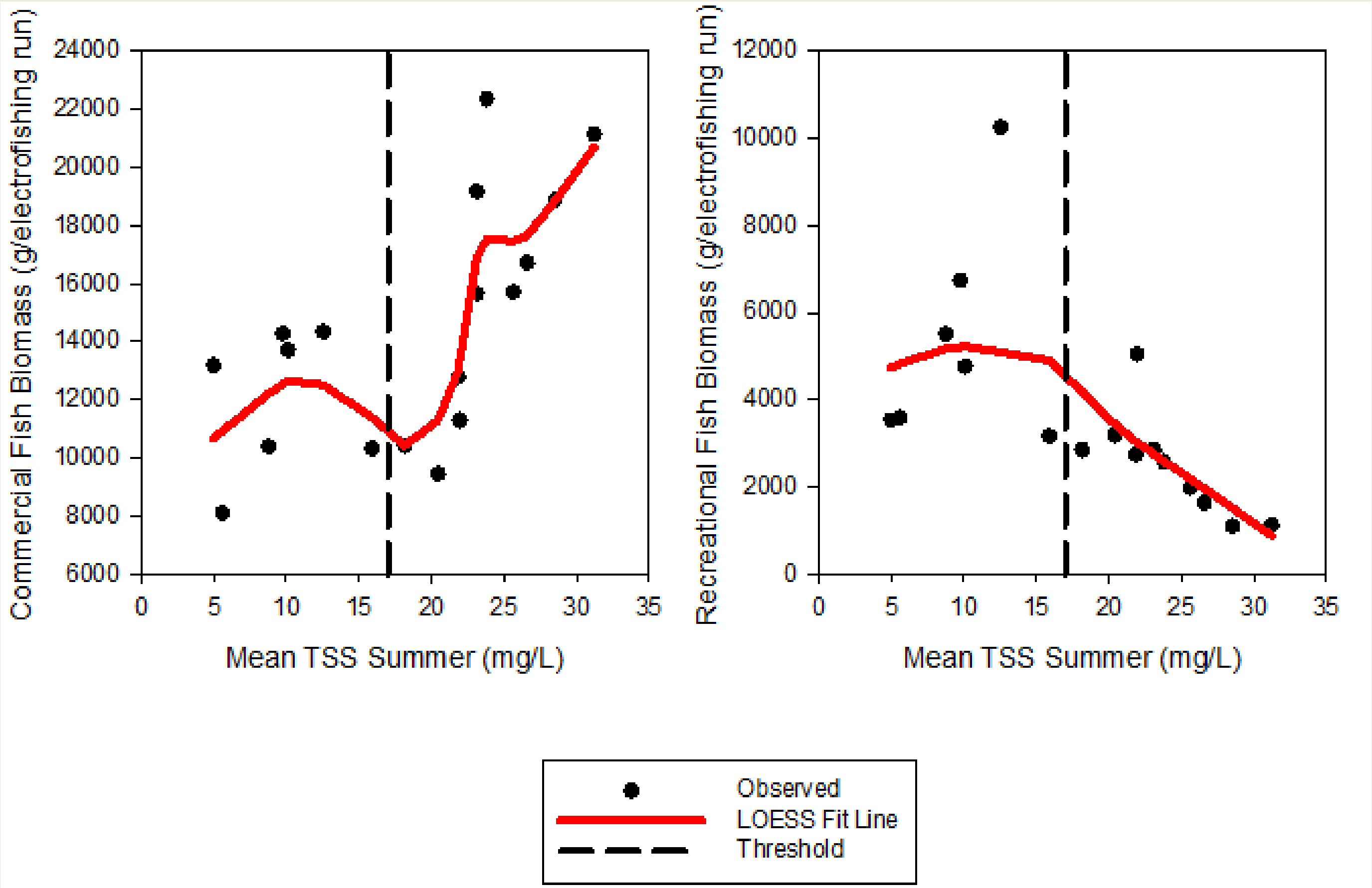
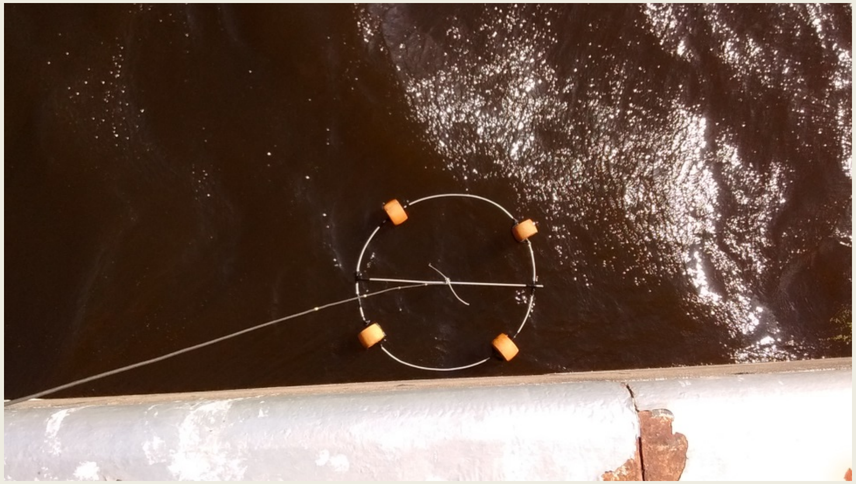
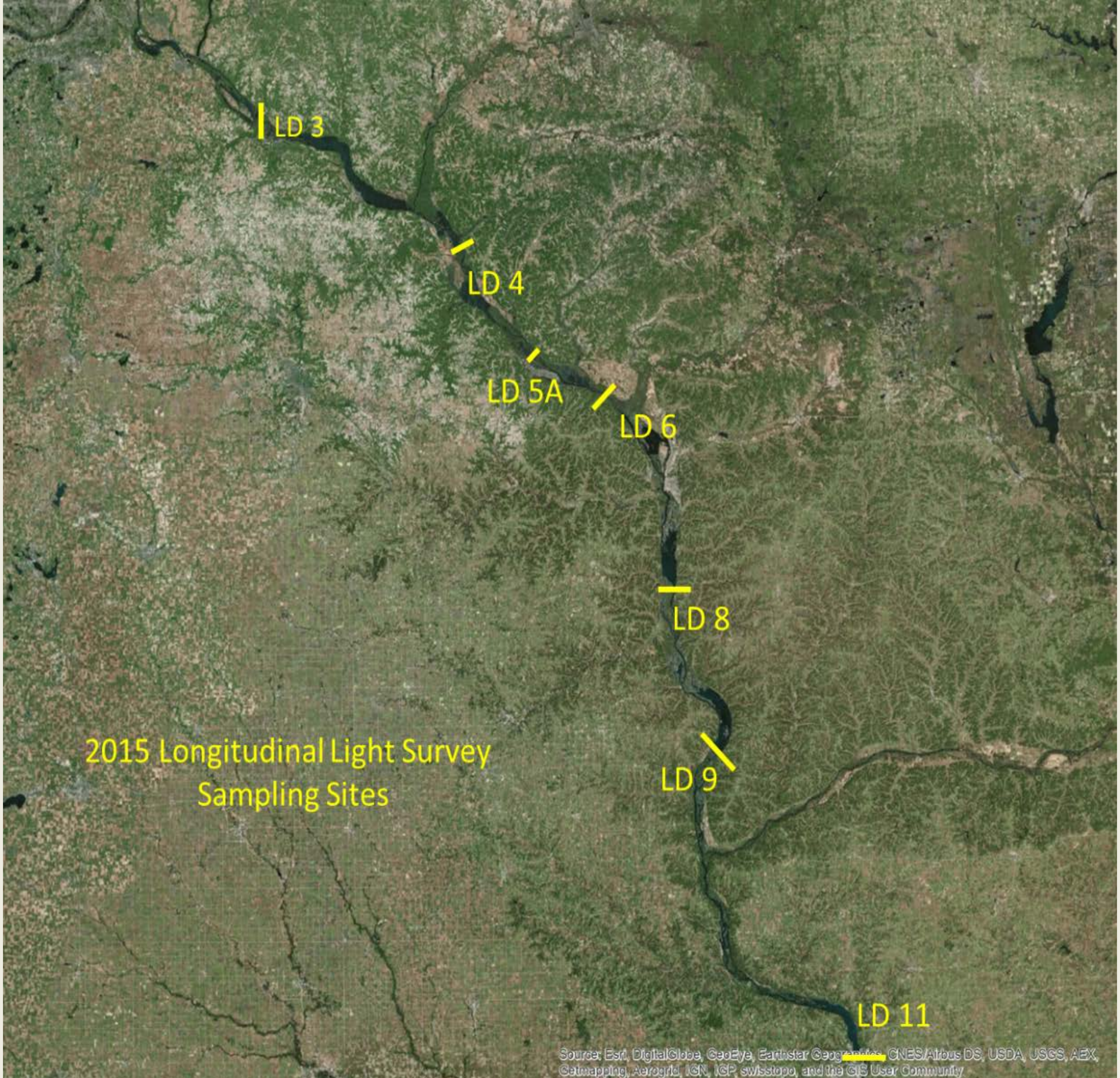


Figure 3. Relation between mean annual commercial and recreational fish biomass per electrofishing run and mean summer TSS in Pool 8 of the Upper Mississippi River (1993-2011). The solid line indicates the LOESS regression trend. The dotted line indicates the observed threshold (17 mg/L TSS).

During the summer of 2015, WDNR Staff conducted a longitudinal survey of water clarity within Wisconsin waters (Lock and Dams 3-11). Since the geographic area I represent is substantial (Pools 3-12), this provides an efficient way to quickly assess WI waters. This approach also allows me to identify weak areas and areas where water clarity is rapidly declining. Water clarity improved substantially between Lock and Dams 3 and 4, as a result of the high sediment trapping efficiency of Lake Pepin (Figure 4). This also gives a great deal of insight into what the Mississippi River, within Wisconsin waters, will look like once Lake Pepin is filled with sediment. Water clarity continued to improve from LD4 to LD6, when peak transparency was reached near Trempealeau, WI. Downstream of LD6, water clarity steadily declined to the Illinois border. Slope analysis of water transparency identifies reaches where transparency is changing most quickly as a function of river mile (Table 1).

This dataset also provides a great deal of insight into the depth water would need to be dredged to establish plant edge habitat. The depth required to establish this critical habitat is very different in Pool 6 as compared to Pool 11. Gradients in light climate need to be a consideration in project planning (Figure 5).




LD 3
LD 4
LD 5A
LD 6
LD 8
LD 9
LD 11
2015 Longitudinal Light Survey
Sampling Sites
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

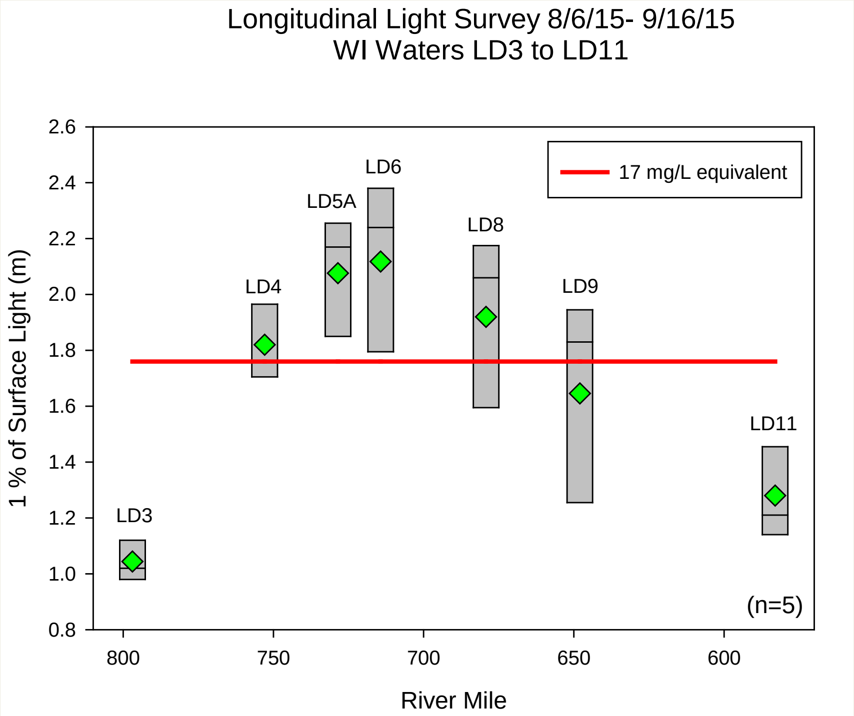
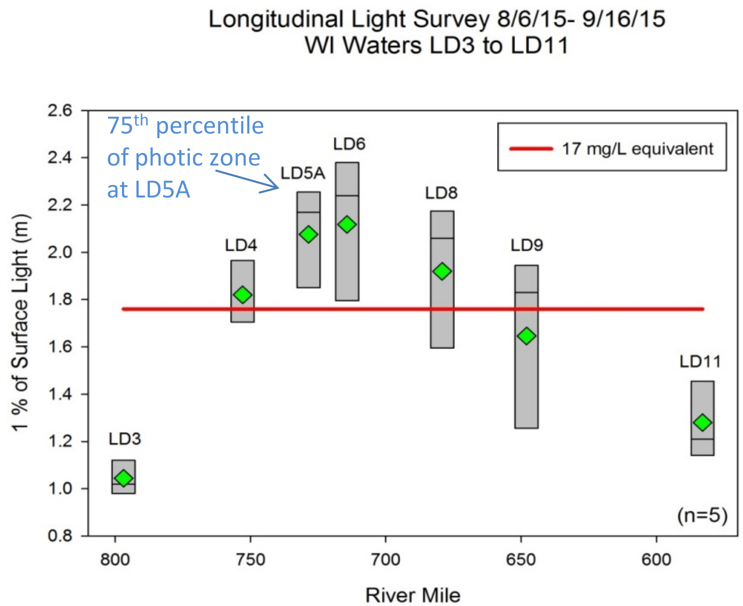


Figure 4. Longitudinal one percent of surface light data collected from Lock and Dams 3-11 during the summer of 2015.

Table 1. Ranked slope analysis of change in water transparency as a function or river mile (Pools 3-11).

Rank	Location	Regression Equation
1	LD3 to LD4	1 % of Surface Light (m) = 15.098 – (0.0176* River Mile)
2	LD4 to LD5A	1 % of Surface Light (m) = 9.719 – (0.0105* River Mile)
3	LD8 to LD9	1 % of Surface Light (m) = -4.045 + (0.00878* River Mile)
4	LD6 to LD8	1 % of Surface Light (m) = -1.911 + (0.00564* River Mile)
5	LD9 to LD11	1 % of Surface Light (m) = -2.003 + (0.00563* River Mile)
6	LD5A to LD6	1 % of Surface Light (m) = 4.231 - (0.00296* River Mile)



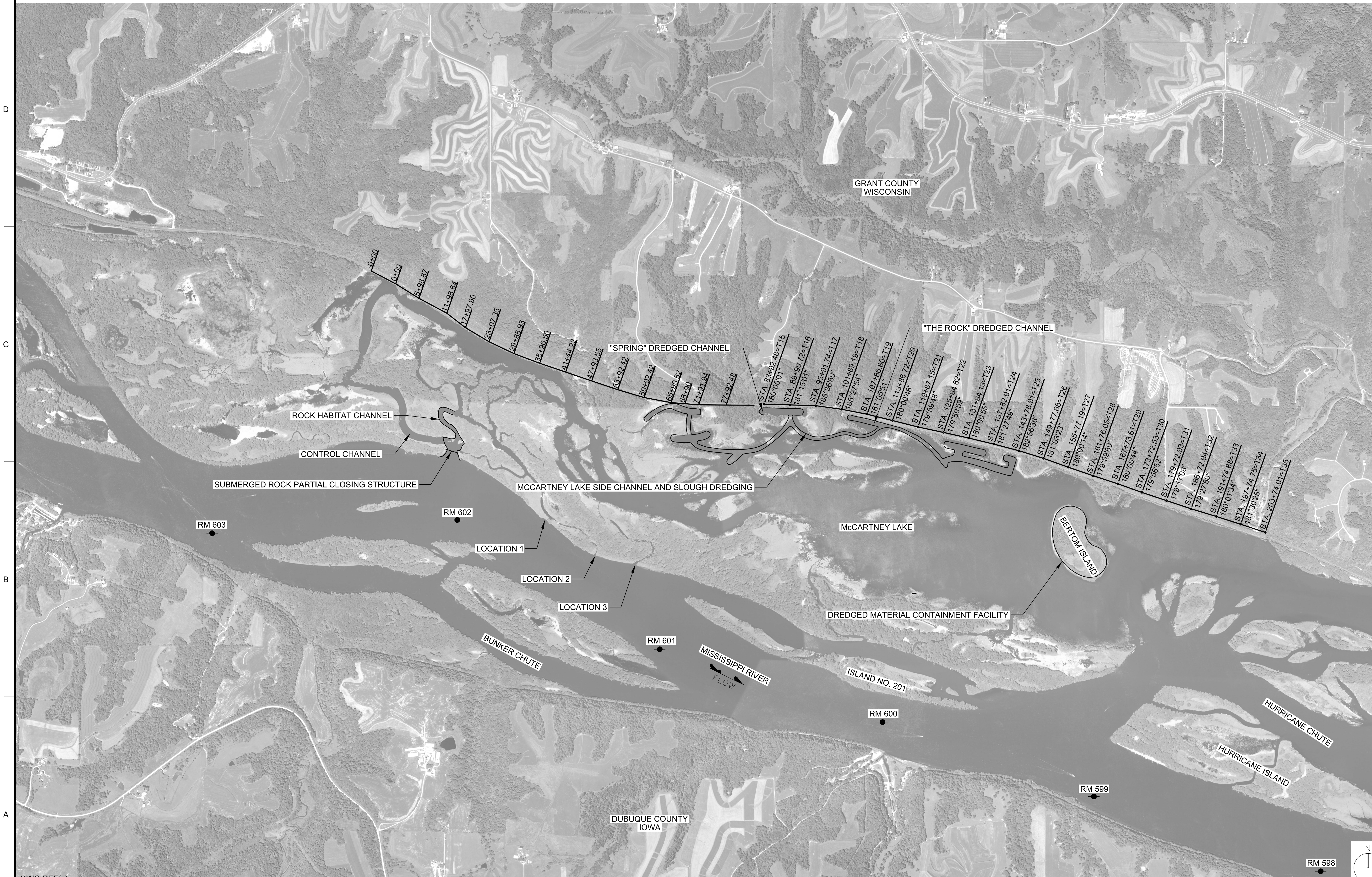
Pool	75 % photic zone (m)	75 % photic zone (ft)	Dredge to depth by Pool (75%+1 ft)
3-Upper 4	1.17	3.84	4.84
Lower 4	1.95	6.40	7.40
5	2.3	7.55	8.55
5A	2.3	7.55	8.55
6	2.4	7.87	8.87
7	2.4	7.87	8.87
8	2.2	7.22	8.22
9	1.95	6.40	7.40
10	1.95	6.40	7.40
11	1.48	4.86	5.86

Figure 5. Longitudinal one percent of surface light (photic zone) data collected from Lock and Dams 3-11 during the summer of 2015. The red line denotes the one percent of surface light equivalent to 17 mg/L TSS. This threshold has been identified as an ecological threshold for native and recreational fisheries.
Below: Recommended dredge-to-depth by pool using the 75th percentile of photic zone plus 1 foot principle.

In relation to meeting the light threshold of 17 mg/L TSS to move the fish community to a more native species assemblage, we failed to meet our light goal upstream of Lake Pepin (Pools 3 and Upper 4) and again in Pools 9-11. This speaks to the need for projects to improve water clarity in these reaches of river through habitat projects (e.g. island building in windswept impounded areas of Pools 9 and 11) and watershed improvements. In areas where we are meeting our water clarity goals (Pools Lower 4-8), projects to improve water clarity do not appear to be needed at this time and we should consider directing our habitat activities toward other projects, like backwater dredging, to increase off-channel depth lost due to sedimentation. We should still strive to implement watershed improvements in this reach to extend the geographic extent of areas meeting our water clarity goals. This targeted approach to restoration would seek to put the right habitat project, in the right place, at the right time.

Bob Hurt

Attachment C
Site Plan, Monitoring Plan



DWG REF(s) : ______________

A1 SITE PLAN - 2016 INSPECTION OF COMPLETED WORKS

SCALE : 1"=1000'-0"

0 1000' 2000'

US Army Corps of Engineers®

MARK	DATE	DESCRIPTION	APPR.

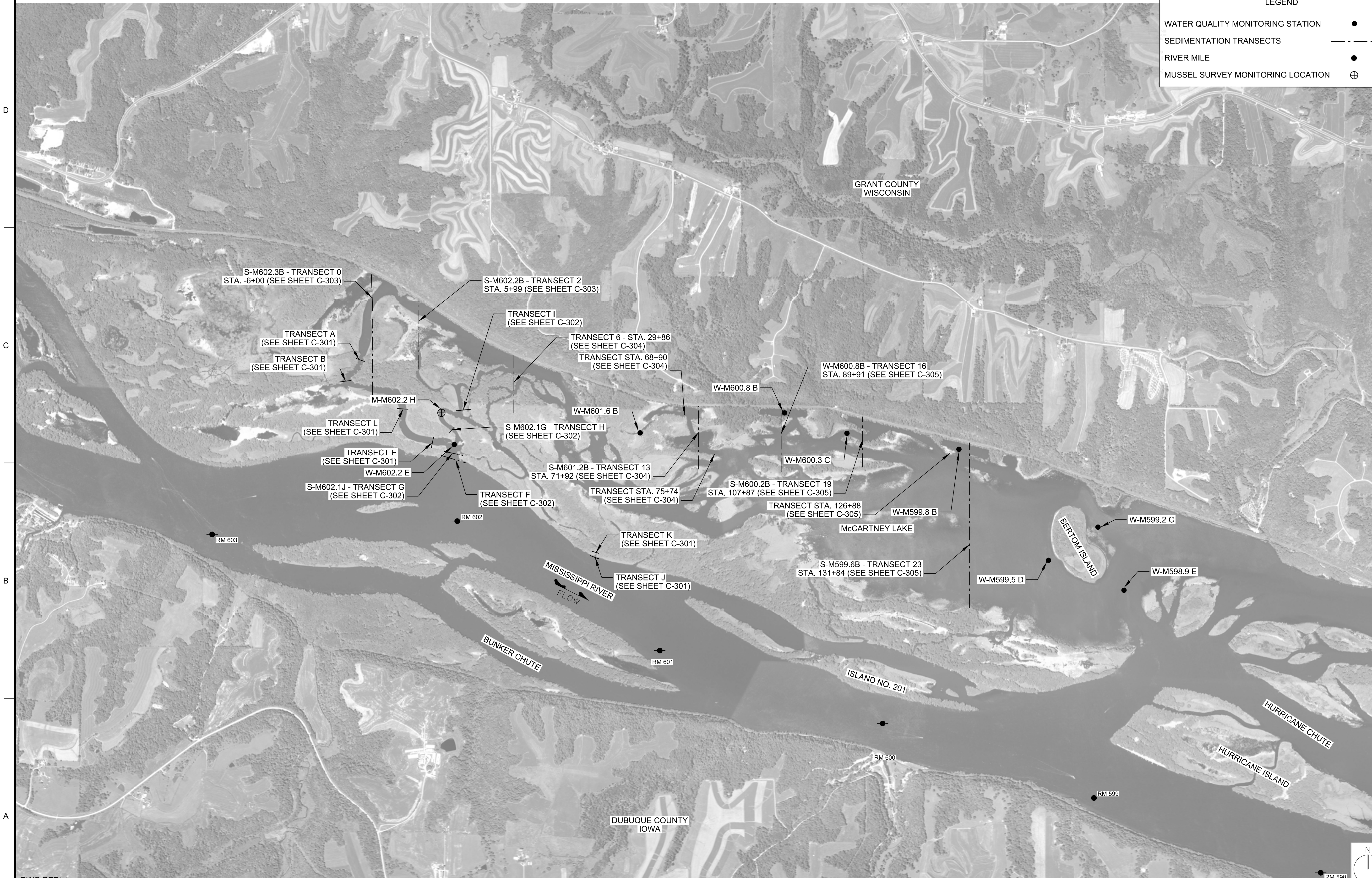
U.S. ARMY CORPS OF ENGINEERS
ROCK ISLAND DISTRICT
ROCK ISLAND, ILLINOIS

DESIGNED BY: SJG		DATE:
DWN BY: JMF	CKD BY:	SOLICITATION NO.:
SUBMITTED BY: HLA		CONTRACT NO.:
PLOT SCALE: AS SHOWN	PLOT DATE:	PROJECT CODE: PER
SIZE: ANSI D	FILE NAME: PERC-102xxx.dgn	

MISSISSIPPI RIVER
RIVER MILES 599.0 - 602.8
GRANT COUNTY, WI
BERTOM AND MCCARTNEY LAKES HREP
PERFORMANCE EVALUATION REPORT

SITE PLAN -
2016 INSPECTION OF COMPLETED WORKS

Sheet
ID
C-102



LEGEND

WATER QUALITY MONITORING STATION	●
SEDIMENTATION TRANSECTS	— · — · —
RIVER MILE	—●
MUSSEL SURVEY MONITORING LOCATION	⊕

DWG REF(s) : ____________

A1 MONITORING PLAN

SCALE : 1"=1000'-0"

0 1000' 2000'

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE	APPR.

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

DESIGNED BY: SJG		DATE:
DWN BY: JMF	CKD BY:	SOLICITATION NO.:
SUBMITTED BY: HLA		CONTRACT NO.:
PLOT SCALE: AS SHOWN	PLOT DATE:	PROJECT CODE: PER
SIZE: ANSI D	FILE NAME: PERC-102xxx.dgn	

MISSISSIPPI RIVER
RIVER MILES 599.0 - 602.8
GRANT COUNTY, WI
BERTOM AND MCCARTNEY LAKES HREP
PERFORMANCE EVALUATION REPORT
MONITORING PLAN

Sheet
ID
C-102