



WWMD

Waterford Waterway Management District

Waterford Wisconsin Waterways
Eco-system Restoration Project to
Dredge
Fox River and Tichigan Lake

WWMD-ESR Tasks to Dredge

WWMD PROJECT DESCRIPTION



**IMPLEMENTATION OF
RECOMMENDED LMP ELEMENTS
for Fox River & Tichigan Lake**



http://www.sewrpc.org/SEWRPCFiles/Publications/CAPR/capr-283_vol-02_waterford_impoundment.pdf

DESCRIPTION OF THE PROJECT AREA



Reason for the Proposed Project

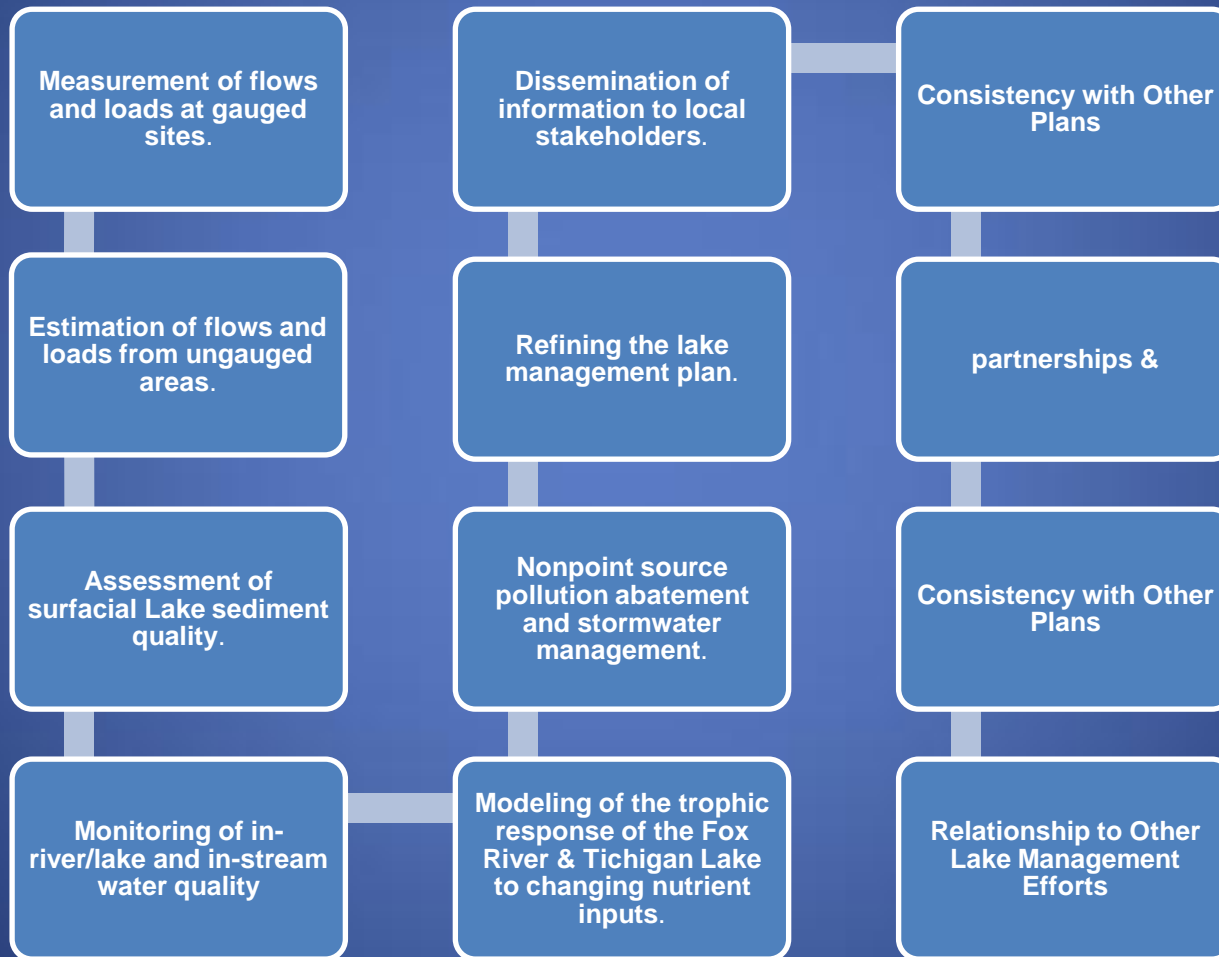


Project Goals and objectives



**Methods and activities,
deliverables,
and public participation plan**

WWMD-ESR Tasks to Dredge



Lake Management Plan

SEWRPC - LMP

http://www.sewrpc.org/SEWRPCFiles/Publications/CAPR/capr-283_vol-02_waterford_impoundment.pdf

FEASIBILITY ASSESSMENT OF DREDGING - phase I

<http://www.sewrpc.org/SEWRPCFiles/Environment/RecentPublications/waterford-waterway-dredging-se.pdf>



Storm Water Run-Off

- 12 sites where located
- 9 of 12 sites have been completed
- Balance of sites will need possible rain gardens



Storm Water Run-Off Projects

- Beach Dr. Storm water abatement
- Fox isle Shoreline Erosion Control
- Golden Bay Storm water abatement
- HWY 164 Storm water abatement
- Waterford Park Stream bank Stabilization
- Island View Bay Drainage improvement
- Schmidt & Canton island Shoreline Stabilization
- Idlewood Dr. Storm water abatement
- Grand Dr / Buena Park Storm water abatement

Storm Water Erosion Control

Directly Affecting the WWMD Impoundment

Project Title	Start Date	End Date	Cost	Responsibility
<u>Projects directly affecting the WWMD impoundment:</u>				
1. Highway 164 Storm water abatement project	7/06	12/07	\$97,000	WWMD, FRC
2. Island View Bay Drainage improvement project	3/08	7/09	\$70,500	WWMD, FRC
3. Idlewood Drive Storm water abatement project	12/08	~ 6/10	\$50,000	WWMD, FRC
4. Grand Drive / Buena Park water abatement project	12/08	~ 9/10	\$21,000	WWMD, FRC
5. Golden Bay Storm water abatement project	1/04	9/04	\$50,000	FRC, TW, RC
6. Beach Drive Storm water abatement project	1/02	9/02	\$10,000	FRC, TW, RC
7. Fox Isle Shoreline erosion control project	2/02	9/02	\$50,000	FRC, VW, RC
8. Village of Waterford Park stream bank stabilization project	11/07	10/08t	\$111,111	FRC, VW, RC
9. Schmidt & Canton Island shoreline stabilization project		10/09	\$5,800	FRC

<u>Projects affecting erosion into the Fox River north of the WWMD impoundment:</u>				
1. Big Bend Lions Club stream bank stabilization project	?/02	12/03	\$25,000	FRC
2. Fox River Inn Erosion protection and stream bank stabilization project	1/02	8/03	\$210,000	FRC, WC
3. Langmesser Park stream bank stabilization project	9/01	8/02	\$68,000	FRC
4. Mukwonago Indianhead park stream bank stabilization project	11/07	7/09	\$87,000	FRC, VM
5. Mukwonago Phantom Wood Road storm water erosion control project	12/08	~7/10	\$40,000	FRC, TM
6. Mukwonago Park shoreline stabilization project	12/08		\$22,500	FRC, TM
7. Vernon Wildlife Area Flowage Restoration project	8/09		\$20,000	FRC, DNR, FVM
8. Vernon Wildlife Area Stream bank stabilization project	8/09	~8/10	\$5,800	FRC, DNR, FVM
9. Kossik Steam Stream bank stabilization project	5/09		\$6,000	FRC

Notes:

- FRC = Southeastern Wisconsin Fox River Commission
 - WWMD = Waterford Waterway Management District
 - TW = Town of Waterford
 - RC = Racine County
 - WC = Waukesha County
 - VM = Village of Mukwonago
 - TM = Town of Mukwonago
- DNR = Department of Natural Resources
FVM = Friends of Vernon Marsh

Yellow indicates after meeting w/ Dick Kosut 3/5/10

Objective

- To reestablish the Fox River main navigational channel from north to south
- Through the waterway at a reasonable depth
- With varying and appropriate widths to accommodate safe and obstruction free boating
- Additional navigational channels will be required to provide access for the property owners to reach the main channel

Objective (con't)

- For landowners in bays around Tichigan Lake to gain access to the lake
- Providing access to Tichigan Lake also provides access to the main Fox River channel
- For landowners around the Fox River to have access from bays and backwaters (that are presently silted in) to the Fox River

Objective (con't)

Issues of Special Concern

- Carp eradication
- Safety
- Structure/habitat preservation (including native vegetation)
- Floodwater storage capability and capacity
- Impact on the Waterford Dam

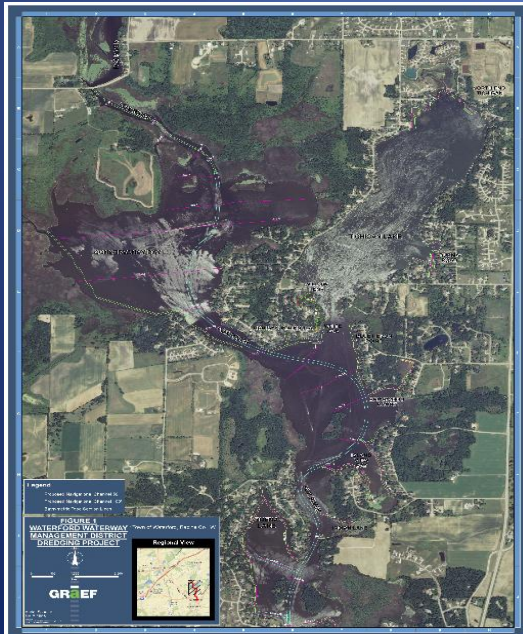


Phase I Feasibility

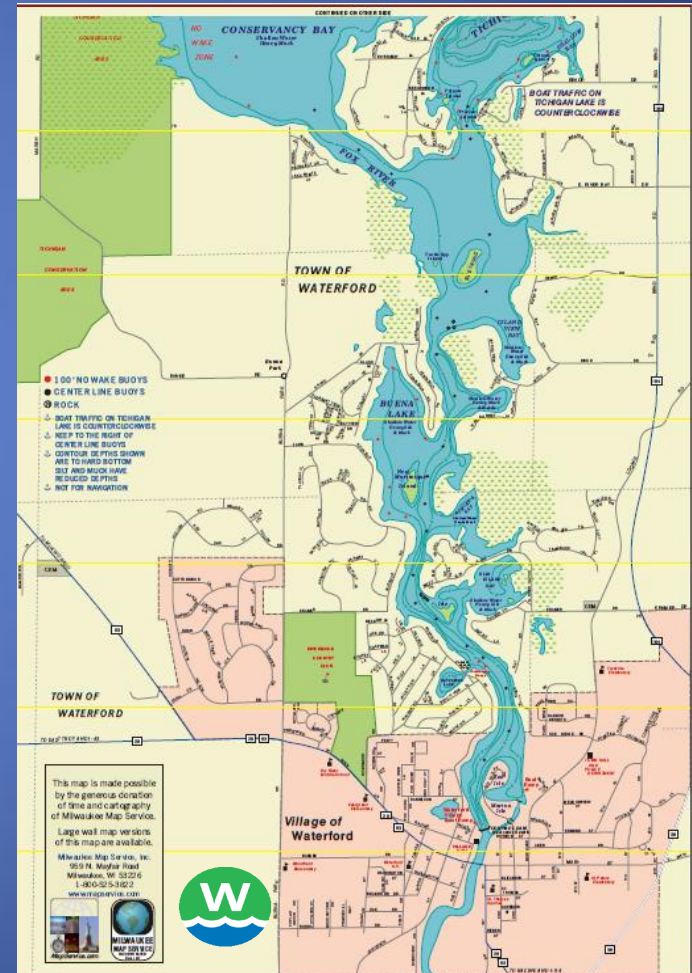
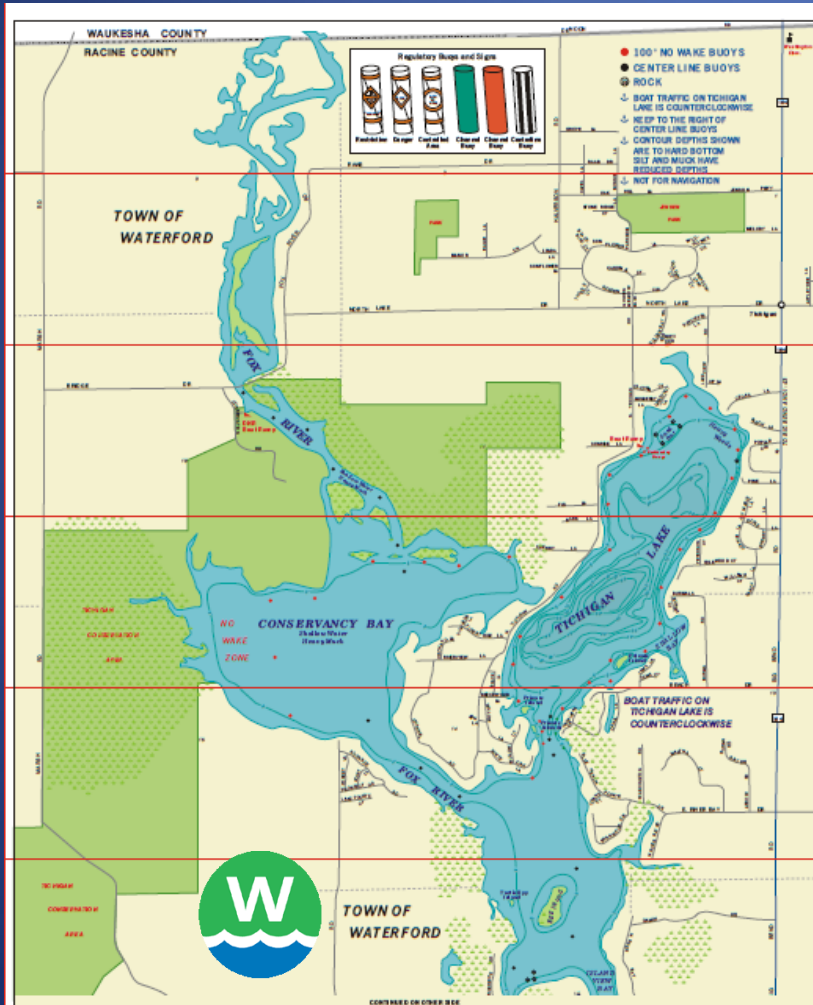
- SEWRPC

<http://www.sewrpc.org/SEWRPCFiles/Environment/RecentPublications/waterford-waterway-dredging-se.pdf>

- SEWRPC preliminary soil depths, completed
- WDNR requesting 56 soil tests for Phase II

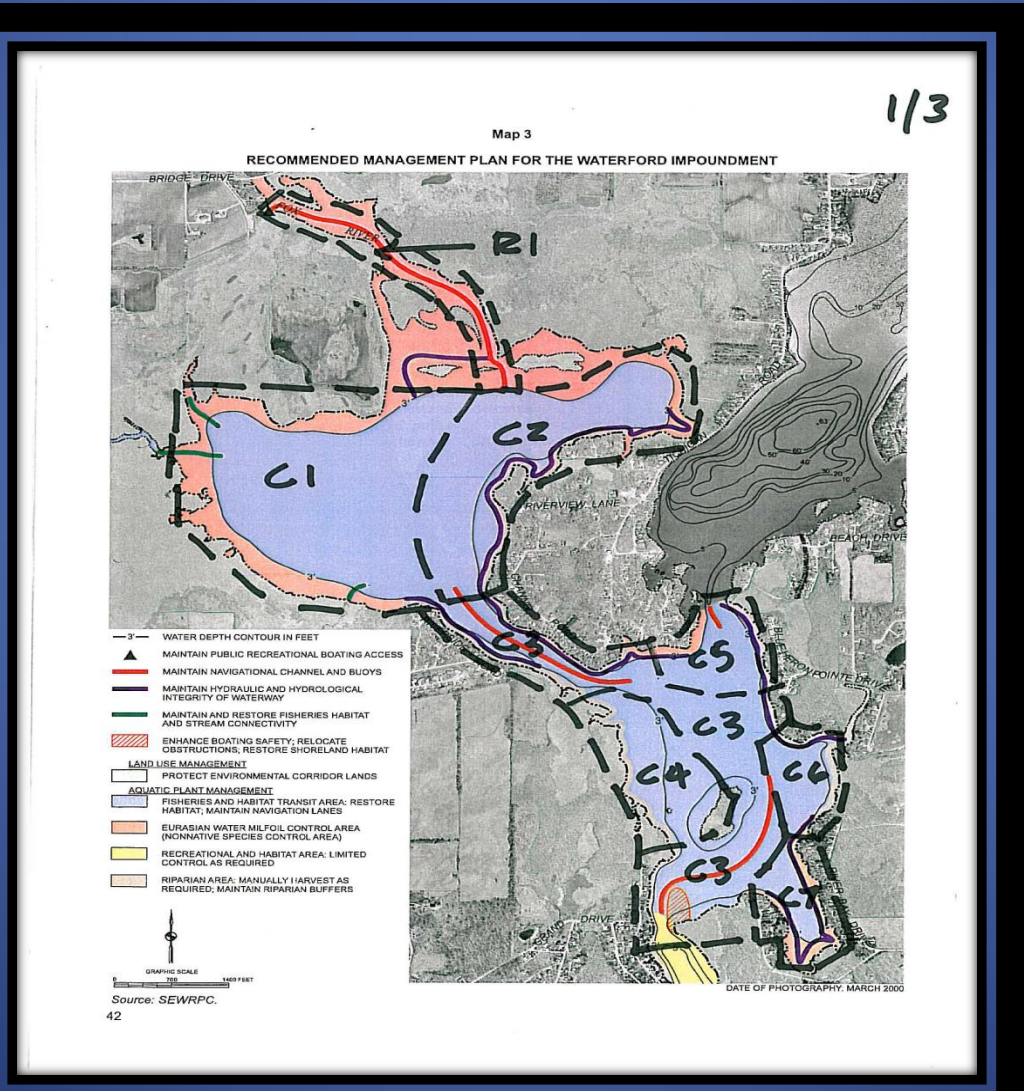


Fox River Basin

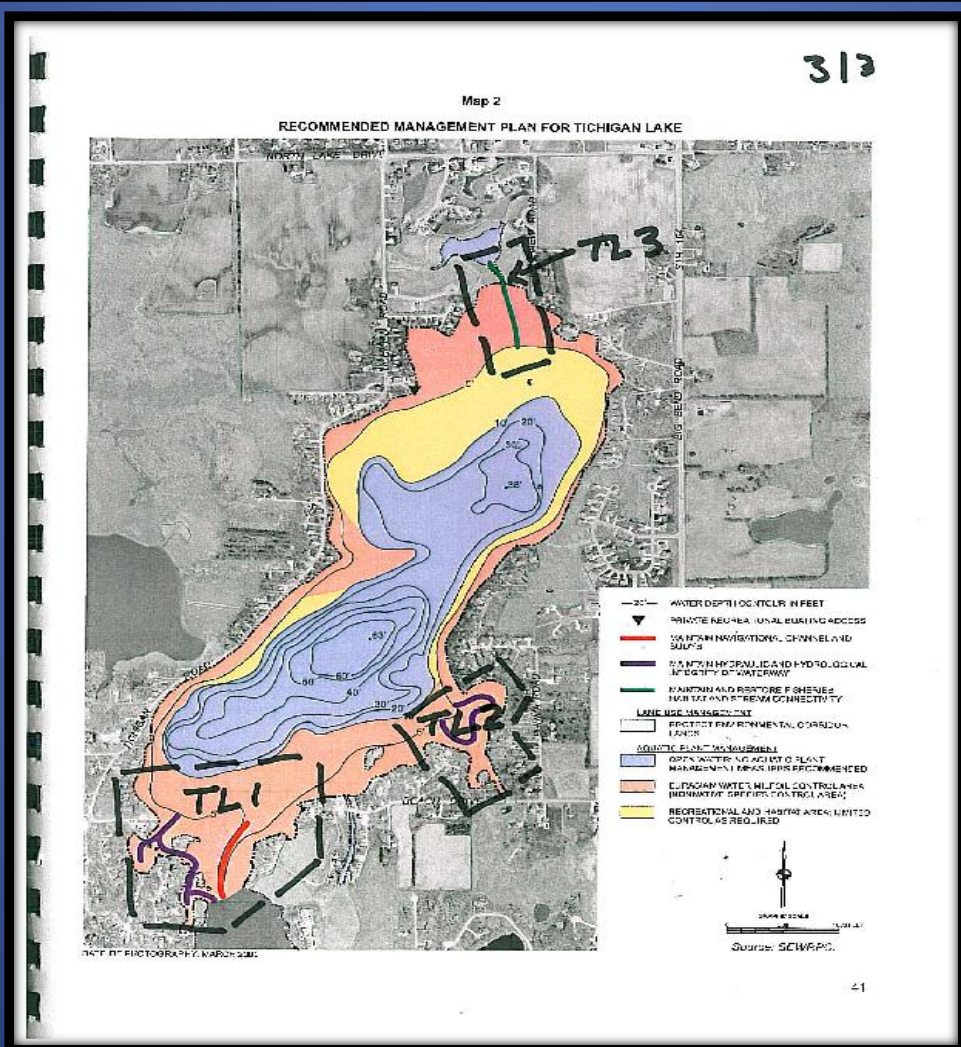


Dredging Maps Recommended by SEWRPC

1/3



Dredging Maps Recommended by SEWRPC



Engineering Scope of Work

Graef Engineering:

- Engineering Scope of Work Documents, completed
- Bathymetry Map of the Impoundment, completed
- Calculate the amount of silt to be removed, completed
- Graef to locate and estimate size of potential disposal sites, TBD

Phase II

- WWMD to proceed with phase II of Dredging starting July 5, 2012
- Sampling sediments in the Waterford Waterway
- Laboratory testing of the samples
- Evaluation of the sample results
- Graef to have meetings with WWMD to discuss the results of the evaluation and transmit the results to the Wisconsin Department of Natural Resources (WDNR)

Graef Engineering

Preliminary Application for Dredging Waterford Impoundment
Prepared for:
Waterford Waterway Management District

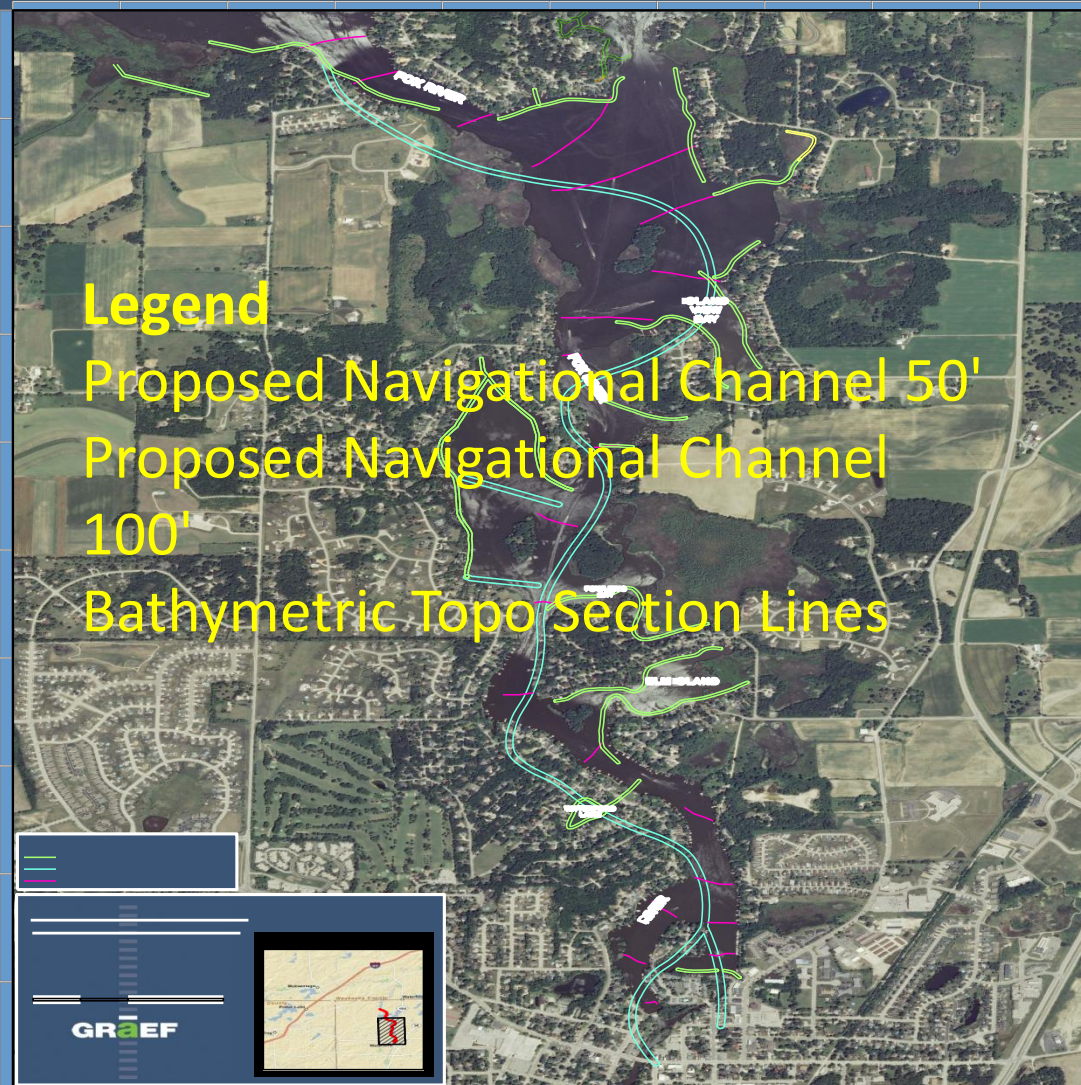
Prepared By:
Brian Schneider, P.E., LEED AP
Geoffrey Parish, PG, PH
GRAEF
One Honey Creek Corporate Center
125 South 84th Street, Suite 401
Milwaukee, Wisconsin 53214-1470
rogologist/Associate



Proposed Navigational Channels & Bathymetric Topo Section Lines



Proposed Navigational Channels & Bathymetric Topo Section Lines



Graef Phase II Services

- Sample Waterford Waterway sediments at 31 locations above the hard pan material in the areas specified in the WDNR sampling matrix with hand tools
- Sample Waterford Waterway sediments at 14 locations above and below the hard pan material in the areas specified in the WDNR sampling matrix with assistance of drilling contractor

Phase II Sampling Summary

- Sampling Summary Waterford Waterway Management District**

Sampling Areas	Dredging	Number of	Samples of Materials to Be Dredged	Total Number of Samples
Volume Sampling (cu.yards) Locations	Sampling Handling			
Sediment Trap	68,000	5	5	5 representative locations, individually composited
Buena Lake	62,000	5	5	5 representative locations, individually composited
Island View Bay	25,600	3	6	6 sample locations, 2 each composited for total of 3 samples
Elm Island Bay	24,400	4	8	8 sample locations, 2 each composited for total of 4 samples
Upper Creek Access sample near creek input to Bay	18,800	2	2	2 representative locations, individually composited. Ensure 1
Tichigan Peninsula	18,550	2	2	2 representative locations, individually composited
Fowlers Bay samples	15,050	3	6	6 representative locations, 2 each composited for total of 3
Blue Heron Point	14,000	2	2	2 representative locations, individually composited
Briarwood Court	12,000	2	2	2 representative locations, individually composited
Indian Lane	6,850	2	2	2 representative locations, individually composited
North End Tichigan	6,600	3	6	6 representative locations, 2 each composited for 3 samples
White Oak Lane	5,900	2	2	2 representative locations, individually composited
Riverside Road	5,200	1	1	1 representative location, individually composited
Island View Bay North	5,100	1	1	1 representative location, individually composited
Burma Road	4,500	2	2	2 representative locations, individually composited
Willow Lane	4,400	2	2	2 representative locations, individually composited
Dam Area*	4,300	2	2	2 representative locations, individually composited
Lower Creek Access	2,600	0		
Waterford Lake	800	0		

Phase II Sampling Summary (con't)

- **Sampling Summary Waterford Waterway Management District**

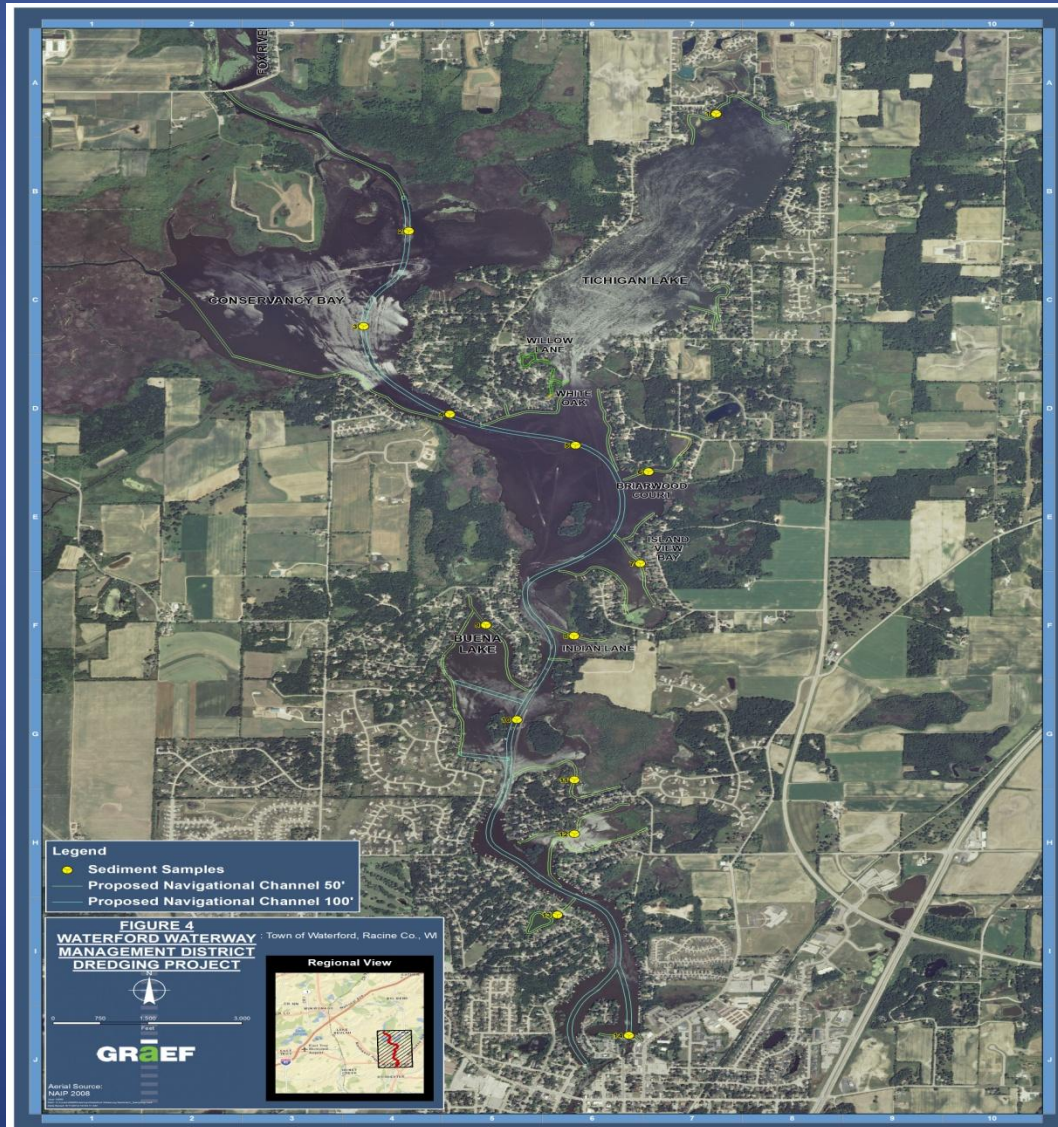
Sampling Areas	Dredging	Samples of Materials to Be Dredged
Volume	Sample Parameters	
(cu.yards)		
Sediment Trap	68,000	Metals, Pesticides, Nutrients, TOC, Sediment size. 2 samples for PCBs.
Buena Lake	62,000	Metals, Pesticides, Nutrients, TOC, Sediment size. 2 samples for PCBs.
Island View Bay	25,600	Metals, Pesticides, Nutrients, TOC, Sediment size. 1 sample for PCBs.
Elm Island Bay	24,400	Metals, Pesticides, Nutrients, TOC, Sediment size. 1 sample for PCBs.
Upper Creek Access	18,800	Metals, Nutrients, TOC, Sediment size. 1 sample for pesticides.
Tichigan Peninsula	18,550	Metals, Nutrients, TOC, Sediment size. 1 sample for PCBs and Pesticides.
Fowlers Bay	15,050	Metals, Nutrients, TOC, Sediment size. 1 sample for pesticides.
Blue Heron Point	14,000	Metals, Nutrients, Sediment size.
Briarwood Court	12,000	Metals, Nutrients, Sediment size.
Indian Lane	6,850	Metals, Nutrients, Sediment size.
North End Tichigan	6,600	Metals, Pesticides, Nutrients, TOC, Sediment size. 1 sample for PCBs and PAHs.
White Oak Lane	5,900	Metals, Nutrients, Sediment size. 1 sample for pesticides and TOC.
Riverside Road	5,200	Metals, Nutrients, Sediment size.
Island View Bay North	5,100	Metals, Nutrients, Sediment size.
Burma Road	4,500	Metals, Nutrients, Sediment size.
Willow Lane	4,400	Metals, Nutrients, Sediment size.
Dam Area*	4,300	Metals, Pesticides, PAHs, Nutrients, TOC, Sediment size. 1 sample for PCBs.
Lower Creek Access	2,600	
Waterford Lake	800	

Phase II Sampling Summary (con't)

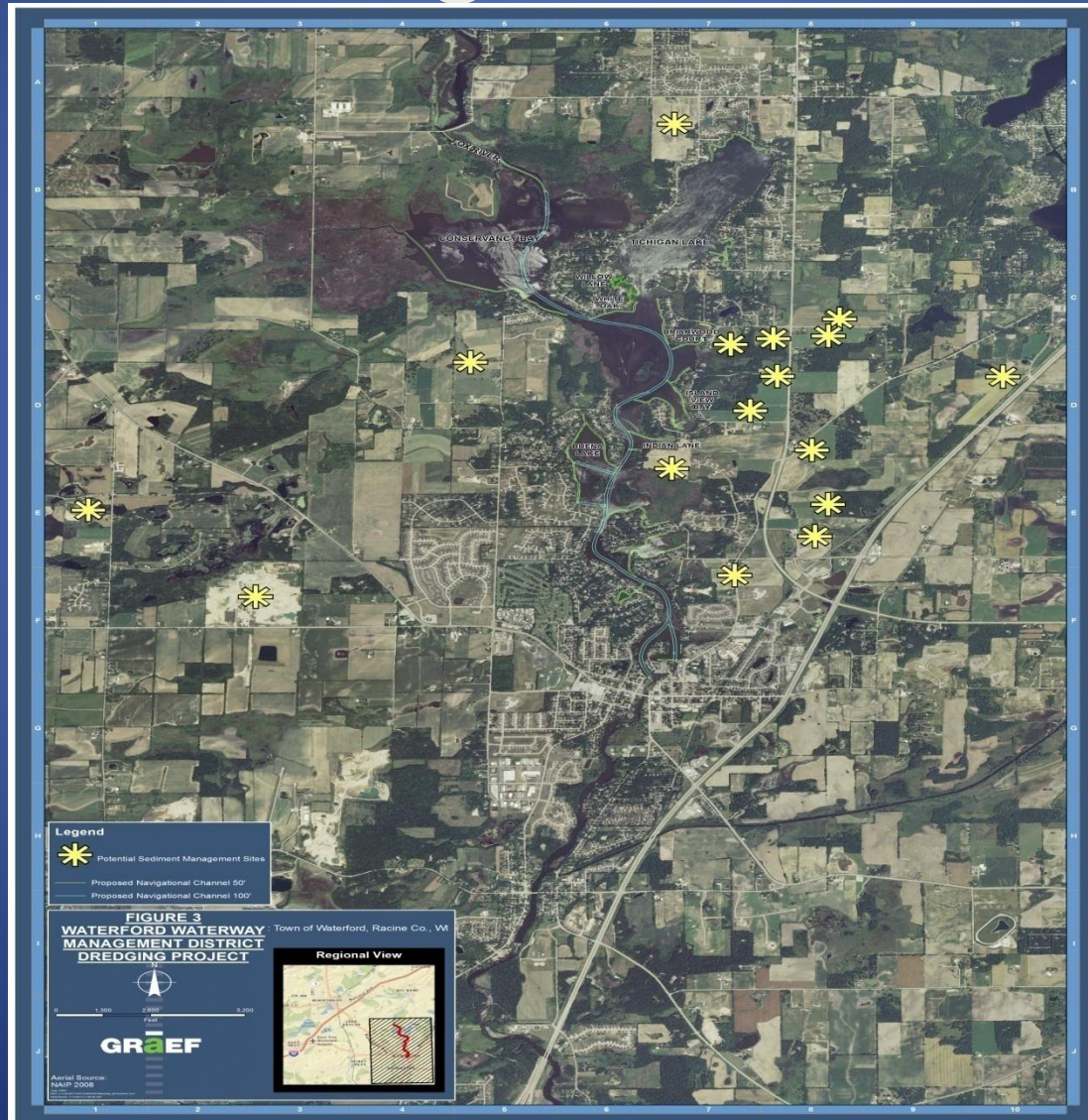
• Sampling Summary Waterford Waterway Management District

• Sampling Areas	Dredging	Samples Beneath Dredging Depth	Total Number of Samples
• Volume Sample Parameters (cu.yards)			
• Sediment Trap	68,000	3	Metals, Pesticides, TOC, Sediment size. 2 samples for PCBs.
• Buena Lake	62,000	2	Metals, Pesticides, TOC, Sediment size. 2 samples for PCBs.
• Island View Bay	25,600	1	Metals, Pesticides, TOC, Sediment size. 1 sample for PCBs.
• Elm Island Bay	24,400	1	Metals, Pesticides, TOC, Sediment size. 1 sample for PCBs.
• Upper Creek Access	18,800		
• Tichigan Peninsula	18,550	1	Metals, Pesticides, TOC, Sediment size.
• Fowlers Bay	15,050		
• Blue Heron Point	14,000		
• Briarwood Court	12,000	1	Metals, Sediment size.
• Indian Lane	6,850		
• North End Tichigan	6,600	1	Metals, Pesticides, TOC, Sediment size.
• White Oak Lane	5,900		
• Riverside Road	5,200		
• Island View Bay North	5,100		
• Burma Road	4,500	1	Metals, Sediment size.
• Willow Lane	4,400	1	Metals, Sediment size.
• Dam Area*	4,300	1	Metals, Pesticides, Nutrients, TOC, PCBs, Sediment size.
• Lower Creek Access	2,600		
• Waterford Lake	800		

Phase II Sediment Samples



Phase II Potential Sediment Management Sites



WWMD Dredging Project - Schedule Phase 2

Microsoft Project - Schedule Phase 2 6-7-12.mpp

ID	Task Name	Duration	Start	July				August				September			October			
				6/24	7/1	7/8	7/15	7/22	7/29	8/5	8/12	8/19	8/26	9/2	9/9	9/16	9/23	9/30
1	Authorization	0 days	Thu 7/5/12		7/5													
2	Mobilization	4 days	Thu 7/5/12		7/5	7/9												
3	Sampling	15 days	Tue 7/10/12			7/10	7/25											
4	Analysis	26 days	Thu 7/12/12			7/12	8/7											
5	Review and Tabulate Results	25 days	Mon 7/30/...				7/30	9/4										
6	Submit Results Summary Memo to WWMD	0 days	Mon 9/3/12									9/3						
7	Report Preparation	35 days	Mon 8/20/...				8/20	9/14										

Project: Schedule Phase 2 6-7-12
Date: Thu 6/7/12

Task		External Milestone		Manual Summary Rollup	
Split		Inactive Task		Manual Summary	
Milestone		Inactive Milestone		Start-only	
Summary		Inactive Summary		Finish-only	
Project Summary		Manual Task		Deadline	
External Tasks		Duration-only		Progress	

Waterford Sediment Volume

Section	Sediment Thickness			Width (ft)	Area (ft ²)	Distance to Down Stream Section (ft)	Channel		Side Slopes	
	side (ft)	Center (ft)	side (ft)				Volume (ft ³)	Volume (yd ³)	Volume (ft ³)	Volume (yd ³)
1	0	0	0	50	0	375	0	0	0	0
2	0	0	0	50	0	785	0	0	0	0
3	0	0	0	50	0	400	0	0	0	0
4	0	0	0	50	0	960	36,000	1,333	0	0
5	1.5	1	2	50	75	330	16,500	611	25,781	955
6	0	0.5	1	50	25	435	79,388	2,940	5,438	201
7	3.4	3.4	3.4	100	340	800	276,000	10,222	231,200	8,563
8	3.5	3.5	3.5	100	350	600	217,500	8,056	183,750	6,806
9	3.75	3.75	3.75	100	375	1,570	412,125	15,264	551,953	20,443
10	1.5	1.5	1.5	100	150	1,080	159,000	5,889	59,625	2,208
11	1.5	1.5	1.5	100	150	735	110,250	4,083	41,344	1,531
12	1.5	1.5	1.5	100	150	1,260	141,750	5,250	70,875	2,625
13	1	0.75	0.5	100	75	1,200	201,000	7,444	18,750	694
14	2.6	2.6	2.6	100	260	1,035	214,763	7,954	174,915	6,478
15	1.4	1.5	1.75	100	155	800	122,000	4,519	50,225	1,860
16	1.5	1.5	1.5	100	150	1,325	212,000	7,852	74,531	2,760
17	1.7	1.7	1.7	100	170	960	158,400	5,867	69,360	2,569
18	1.8	1.5	1.5	100	180	940	75,200	2,785	64,508	2,389
19	0	0	0	100	0	1,570	48,408	1,793	0	0
20	1	0.6	0.25	100	62	1,340	141,817	5,252	17,797	659
21	2.25	1.5	0.75	100	150	1,280	96,000	3,556	90,000	3,333
22	0	0	0	100	0	1,490	0	0	0	0
23	0	0	0	100	0	1,215	0	0	0	0
24	0	0	0	100	0	1,590	0	0	0	0
25	0	0	0	100	0	1,110	50,875	1,884	0	0
26	0.5	1	1.25	100	92	615	46,125	1,708	13,934	516
27	1	0.5	0.25	100	58	860	25,083	929	11,422	423
28	0	0	0	100	0	990	0	0	0	0
29	0	0	0	100	0					
26	0.5	1	1.25	100	92	725	96,667	3,580	16,426	608
30	1.75	1.75	1.75	100	175	490	86,975	3,221	37,516	1,389
31	1.9	1.75	1.75	100	180	295	53,100	1,967	24,605	911
							3,076,925	113,960	1,833,953	67,924
								Estimated (ft ³)	(ft ³)	(yd ³)
								Total Volume	4,910,878	181,884

Side Slope 25 to 1

Feasibility Cost Phase I & II

• Sediment Sampling	\$33,500
– without Drilling Contractor	
• (Sampling at 29 to 31 locations)	
– with Drilling Contractor	
• (Sampling at 12 to 14 locations)	
– Boat Rental, Supplies, and Equipment	
– Coordination and Sample Management	
• Laboratory Sample Analysis	\$21,100
• Data Tables and Statistics, Report Preparation,	
• Meetings, QA/QC, and Project Management	<u>\$ 11,000</u>
•	
• Estimated Cost	\$65,600
•	
• Twelve Percent Weather/Sampling Contingency	
• Based on Sampling Time and Management	<u>\$ 3,750</u>
•	
• Total Contract Addition Phase 2	\$69,350
• Total Contract Addition Phase 1	\$18,150
• Work Completed and Invoiced	<u>\$ 16,981</u>
• Total Contract Amount	<u>\$ 104,481</u>

Then do a break out of the cost share

WWMD (10%)
SEWFRC (90%)

6,078
54,702

6,550
59,950

Funding Phase II

• Sampling	33,500
• Laboratory	21,100
• Project management	<u>11,000</u>
• Totals	65,600
• WWMD (10%)	6,560
• SEWFRC (90%)	59,040

Funding Phase II

- WWMD request that the SEWFRC consider helping fund our dredging project
- WWMD appreciates past and future support



Reference for final Phases I & II

- WWMD - www.wwmd.info

- SEWRPC

http://www.sewrpc.org/SEWRPCFiles/Publications/CAPR/capr-283_vol-01_waterford_impoundment.pdf

http://www.sewrpc.org/SEWRPCFiles/Publications/CAPR/capr-283_vol-02_waterford_impoundment.pdf

<http://www.sewrpc.org/SEWRPCFiles/Environment/RecentPublications/waterford-waterway-dredging-se.pdf>

- Graef - <http://www.graef-usa.com/notice/wwmd>
- SEWFRC – www.sewfrfc.org/
- WDNR – www.dnr.wi.gov/



Questions