



LOWER MINNESOTA RIVER WATERSHED DISTRICT

The location of the meeting is scheduled for the Board Room at the Carver County Government Center

Lower Minnesota River Watershed District
 7:00 PM
 Wednesday, July 18, 2018
 County Board Room, Carver County Government Center, 2nd Floor
 602 East 4th Street, Chaska, MN 55318

Agenda Item	Discussion
1. Call to order	A. Roll Call
2. Approval of agenda	
3. Citizen Forum	<i>Citizens may address the Board of Managers about any item not contained on the regular agenda. A maximum of 15 minutes is allowed for the Forum. If the full 15 minutes are not needed for the Forum, the Board will continue with the agenda. The Board will take no official action on items discussed at the Forum, with the exception of referral to staff or a Board Committee for a recommendation to be brought back to the Board for discussion or action at a future meeting.</i>
4. Consent Agenda	<p><i>All items listed under the consent agenda are considered to be routine by the Board of Managers and will be enacted by one motion and an affirmative vote of a majority of the members present. There will be no separate discussion of these items unless a Board Member or citizen request, in which event, the items will be removed from the consent agenda and considered as a separate item in its normal sequence on the agenda.</i></p> <p>A. Approve Minutes for May 16, 2018 and June 13, 2018 Regular Meeting B. Receive and file Financial Reports C. Approval of Invoices for payment <ul style="list-style-type: none"> i. Barr Engineering - No-rise evaluation and model ii. Burns & McDonnell - April 2018 engineering services iii. US Bank Equipment Finance - July 2018 copier rental iv. Frenette Legislative Advisors - April, May and June 2018 Legislative Retainer v. Steinkraus Development LLC - for July office rent vi. Naiad Consulting, LLC - for April 2018 admin services & expenses </p>
5. New Business/ Presentations	<p>A. USGS B. 2019 Preliminary Budget C. 2018 Financial Audit</p>
6. Old Business	<p>A. Engineering Services Update B. Dredge Management <ul style="list-style-type: none"> i. Funding for dredge material management </p>

	<ul style="list-style-type: none"> ii. Vernon Avenue Dredge Material Management site iii. Private Dredge Material Placement C. Watershed Management Plan D. 2018 Legislative Action E. Education & Outreach F. LMRWD Projects <ul style="list-style-type: none"> i. Eden Prairie Area #3 Stabilization ii. Riley Creek Cooperative project Hennepin County Flying Cloud Drive/CSAH 61 reconstruction project iii. Floodplain Lake Coring Project with Freshwater Society iv. Seminary Fen ravine stabilization project v. Analysis of Dakota County Monitoring vi. East Chaska Creek - CSAH 61 & TH 41 Transportation improvements G. Project/Plan Reviews <ul style="list-style-type: none"> i. I494 Drainage ii. City of Chaska - MCES L-71 lift station project iii. City of Eden Prairie - Abra Auto Body H. MPCA Soil Reference Values - No new information since last update
7. Communications	<ul style="list-style-type: none"> A. Administrator Report B. President C. Managers D. Committees E. Legal Counsel F. Engineer
9. Adjourn	Next meeting of the LMRWD Board of Managers is Wednesday, August 15, 2018

Upcoming meetings/Events

- USACE River Resource Forum - Monday, August 20 - Tuesday, August 21; Lansing Iowa
- [MN Aquatic Invasive Species Research & Management Showcase](#) - September 12, University of Minnesota, Continuing Education and Conference Center, 1890 Buford Avenue, St. Paul, MN
- [Minnesota Water Resource Conference](#) - Tuesday, October 16 - Wednesday, October 17, 2018; River Centre, St. Paul
- [Climate Adaption Conference](#) - November 14, 2018, University of Minnesota, Continuing Education and Conference Center, 1890 Buford Avenue, St. Paul, MN

For Information Only

- WCA Notices
 - City of Burnsville - Notice of Application - Union Pacific RR Stormwater Improvements
 - MNDOT - Notice of Decision - to allow for Metro-wide pond clean-out
- DNR Public Waters Work permits
 - None received
- DNR Water Appropriation permits

- City of Eden Prairie - Permit issued - Hennepin County, construction dewatering, Flying Cloud Drive/Riley Creek
- City of Savage - Request for Comments - Magellan, construction dewatering, to allow for inspection and maintenance of liquid petroleum pipeline
- City of Chaska - Application and permit issued, construction dewatering, to allow for reconstruction of municipal sewer and water mains.

Future Manager Agenda Items list

- Report of water quality testing of Minnesota River from MPCA
- Report on Flying Cloud Landfill
- Record retention policy
- AIS Policy
- Riverbank stabilization policy

Future TAC Agenda Items List

- LMRWD monitoring plan

Item 4.B.
LMRWD 7-18-18

BEGINNING BALANCE	31-May-18	\$ 1,108,067.99
ADD:		
General Fund Revenue:		
Taxes Scott County*		<u>\$ 154,086.71</u>
Total Revenue and Transfers In		\$ 154,086.71
DEDUCT:		
Warrants:		
407380 Barr Engineering	No-rise evaluation & model	\$ 2,107.00
407383 Burns & McDonnell	April 2018 engineering services	\$ 15,117.55
407426 US Bank Equipment Finance	July 2018 copier rental payment	\$ 231.91
407766 Frenette Legislative Advisors	Apr, May & June Legislative Retainer	\$ 9,999.99
407813 Steinkraus Development	June 2018 office rent	\$ 650.00
100005830 Naiad Consulting LLC	April 2018 admin service & exp.	\$ 11,052.10
JE Carver County Finance Dept.	2nd Quarter 2018 Financial Services	\$ 1,210.20
Total Warrants/Reductions		<u>\$ 40,368.75</u>
ENDING BALANCE	30-Jun-18	\$ 1,221,785.95

* Includes \$527.31 of Payments in Lieu

The state of Minnesota makes Payment in Lieu of Property Taxes to offset the costs of maintaining, and the loss of tax base from, natural resource lands.

EXPENDITURES	2018 Budget	April Actual	YTD 2018	Over (Under) Budget
Administrative expenses	\$ 250,000.00	\$ 25,076.43	\$ 96,674.19	\$ (153,325.81)
Cooperative Projects				
Gully Erosion Contingency Fund	\$ -	\$ -	\$ -	\$ -
Ravine Stabilization at Seminary Fen in Chaska	\$ -	\$ -	\$ -	\$ -
Eden Prairie Bank Stabilization Area #3	\$ -	\$ -	\$ -	\$ -
Eagle Creek	\$ -	\$ -	\$ -	\$ -
USGS Sediment & Flow Monitoring	\$ 18,500.00	\$ -	\$ -	\$ (18,500.00)
509 Plan Budget				
<i>Resource Plan Implementation</i>				
Sustainable Lakes Management Plan (Trout Lakes)	\$ 50,000.00	\$ -	\$ -	\$ (50,000.00)
Geomorphic Assessments (Trout Streams)	\$ 50,000.00	\$ -	\$ -	\$ (50,000.00)
Paleolimnology Study (Floodplain Lakes)	\$ 50,000.00	\$ -	\$ -	\$ (50,000.00)
Fen Stewardship Program	\$ 75,000.00	\$ -	\$ -	\$ (75,000.00)
District Boundary Modification	\$ 10,000.00	\$ -	\$ -	\$ (10,000.00)
East Chaska Creek Treatment Wetland Project	\$ 10,000.00	\$ -	\$ -	\$ (10,000.00)
Minnesota River Sediment Reduction Strategy	\$ 25,000.00	\$ -	\$ -	\$ (25,000.00)
Seminary Fen - gap analysis	\$ -	\$ -	\$ -	\$ -
Data Assessments and Program Review	\$ -	\$ -	\$ -	\$ -
Dakota County groundwater modeling	\$ -	\$ -	\$ -	\$ -
Riley Creek Cooperative Project	\$ 50,000.00	\$ -	\$ -	\$ (50,000.00)
Local Water Management Plan reviews	\$ 12,000.00	\$ 4,473.98	\$ 4,511.38	\$ (7,488.62)
Project Reviews	\$ 16,000.00	\$ 1,306.25	\$ 2,784.38	\$ (13,215.62)
<i>Monitoring</i>	\$ 65,000.00	\$ -	\$ 8,419.92	\$ (56,580.08)
<i>Monitoring Data Analysis</i>				\$ -
<i>Technical Assistance</i>				\$ -
<i>Watershed Management Plan</i>				\$ -
Plan Amendment	\$ 50,000.00	\$ 6,607.00	\$ 47,044.90	\$ (2,955.10)
Vegetation Management Standard/Plan	\$ -	\$ -	\$ -	\$ -
<i>Public Education/CAC/Outreach Program</i>	\$ 30,000.00	\$ 600.00	\$ 14,143.98	\$ (15,856.02)
<i>Cost Share Program</i>	\$ 20,000.00	\$ -	\$ -	\$ (20,000.00)
Savage Fen/Dakota Ave. Ravine Stabilization Project	\$ -	\$ -	\$ -	\$ -
Nine Foot Channel	\$ 50,000.00	\$ -	\$ -	\$ (50,000.00)
Dredge Site Improvements	\$ 240,000.00	\$ 2,336.50	\$ 5,489.24	\$ (234,510.76)
Total:	\$ 1,071,500.00	\$ 40,400.16	\$ 179,067.99	



LOWER MINNESOTA RIVER WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting

Wednesday, July 18, 2018

Agenda Item

Item 5. A. - USGS

Prepared By

Linda Loomis, Administrator

Summary

The LMRWD has been a partner with the USGS to maintain a stream gauge to measure Minnesota River flow at Fort Snelling for several years. The District has also partnered with the USGS and the US Army Corps of Engineers to monitor sediment loading in the Minnesota River. The partnership agreements have expired and the USGS would like to continue to partner with the LMRWD and the Corps.

On Wednesday, June 11, Della Young and I met with Joel Groten and James Fallon from the USGS and with Jon Hendrickson from the Corps of Engineers. All parties are interested in continuing the partnership. The USGS provided some information for the Managers, which is attached. Mr. Groten and Mr. Fallon will attend the Board meeting to answer any questions. We also discussed approaching others who use the information about the flow and sediment to participate financially. If other partners are found, the agreements can be amended to include new partners. The MPCA and Met Council are the most likely partners.

Attachments

USGS handout

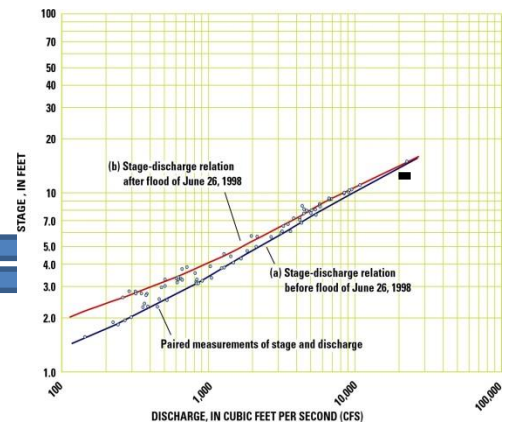
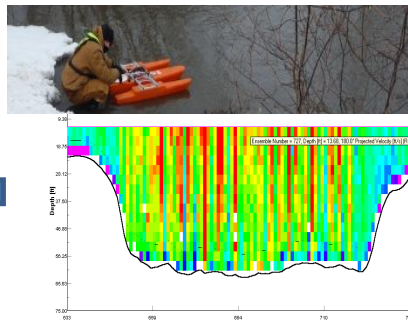
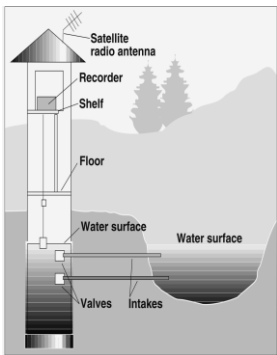
Recommended Action

Authorize participation in USGS flow and sediment monitoring.

Summary of Streamgauge and Sediment Monitoring Operations at Minnesota River at Ft Snelling

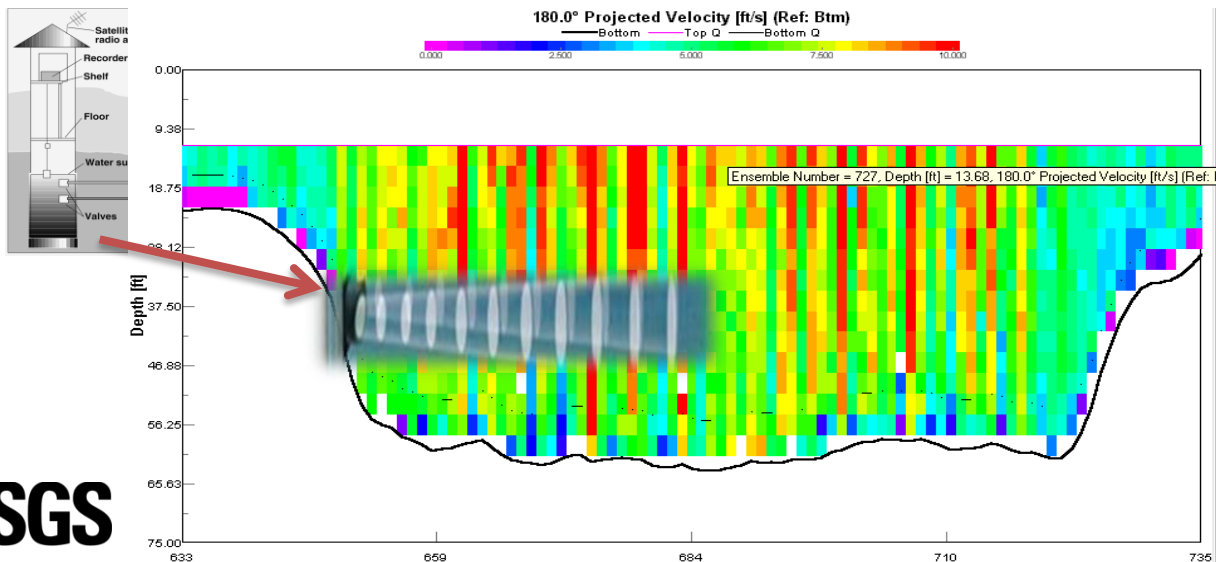
Streamflow computation at Ft Snelling requires extra sensors & parameters

Discharge computed from relationship between continuously recorded stage & frequently measured discharge (stage-discharge relation)



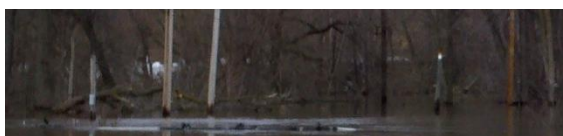
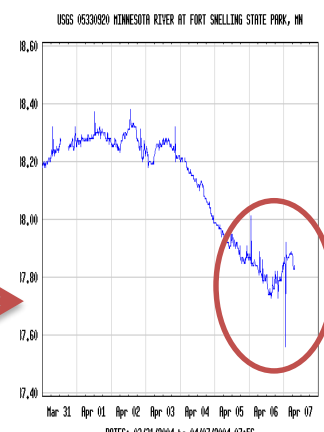
Backwater from downstream nullifies relation at Snelling

- To compute discharge, need 2 more parameters:
Stream velocity + cross-sectional area
- Discharge = stage + **area + velocity** relation (with additional sensor)



History of Gage

- **2004-06** 3-yr funding for O&M by USGS, MCES & LMRWD
- 2004 Jan. Real-time index-velocity streamgage established. Shelter mounted on Airport runway-lights structure 17 ft above floodplain; sensor in river on MCES pier
- 2004 Gage records passing barge that causes 0.3 ft drop in stage & reverse velocities of -1.0 ft/sec for 30-60 minutes
- 2004 Dec Electrical contractor severs ADVm cable (\$3750)
- 2006 Flood damages pier securing ADVm sensor
- 2007 Lower Minnesota RWD assumes funding agreement
- **2008-10** 3-year Funding Agreement with USGS & LMRWD
- 2010 Mar Flood & channel changes require new index-velocity rating (#4). KSTP-5 meets USGS at gage for flood.
- 2010 Jul Met Council announces plans to reconstruct pier. Reschedules for December 2010, then...
- 2010 Sep Floods destroy pier housing ADVm; ADVm lost
- **2011** 1-funding agreement: LMRWD & USGS
- 2011 Feb New ADVm sensor temporarily deployed on remaining pier, provisional discharge posted to web
- 2011 Oct USGS Nebraska staff use side-scanning sonar to locate ADVm & contract diver recovers unit (\$2K), but damaged. New sensor (~\$15K)
 - Continuous sediment load monitoring study begins, which requires data from streamgage and ADVm
- 2011 Nov Met Council contractor finishes pier construction, USGS installs new ADVm sensor on new pier.
- 2012 Changes to channel from flooding and new location of ADVm sensor require complete new development of stage-area-velocity relation for real time discharge
- **2012-16** 5-year funding agreement: LMRWD & USGS
Various upgrades to loggers, instrumentation, etc
- **2017** 1-year funding agreement 2017
- **2018** Streamflow gage currently operating as unfunded



USGS Data Available from Gage

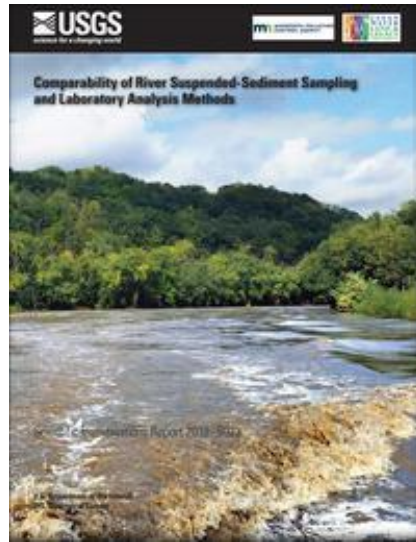
- Real-time stage, discharge, velocity, ...
- WaterAlert – receive text/email alerts based on your values
- WaterWatch streamgage dashboard
https://waterwatch.usgs.gov/?id=wwsa&site_no=05330920
- Archive of instantaneous discharge data
- Annual peak streamflows (used in flood-frequency analyses)
- On-line access to discharge measurements, sediment, WQ data
- Annual Data Report & summary statistics
- StreamStats
- Other features...

Many Agencies, Corporations & public use Ft Snelling data

- USGS uses flow to verify flows downstream on Mississippi
- NWS uses to improve upstream & downstream river forecasting
- USACE for navigation and dredging
- USFWS monitors gage for their Nat'l Wildlife Refuge Operations
- MPCA water-quality studies
- Met Council
 - Discharge for MCES WQ monitoring at site
 - MCES Lower Minnesota modeling study
 - MCES - Discharge for MCES Blue Lake WWTP
- Metropolitan Mosquito Control District monitors for operations
- Excel Energy monitors for power plant operations
- Discharge for suspended & bed sediment studies with LMRWD & USACE
- Navigation industry for barge operation
- Wenck and other consulting firms
- Public for recreation, fishing, cycling, etc
- Site used as USGS demonstration for NWS, Minnehaha Cr WD, for USGS measurement methods on big rivers, ADCPs, ADVMs, local media.

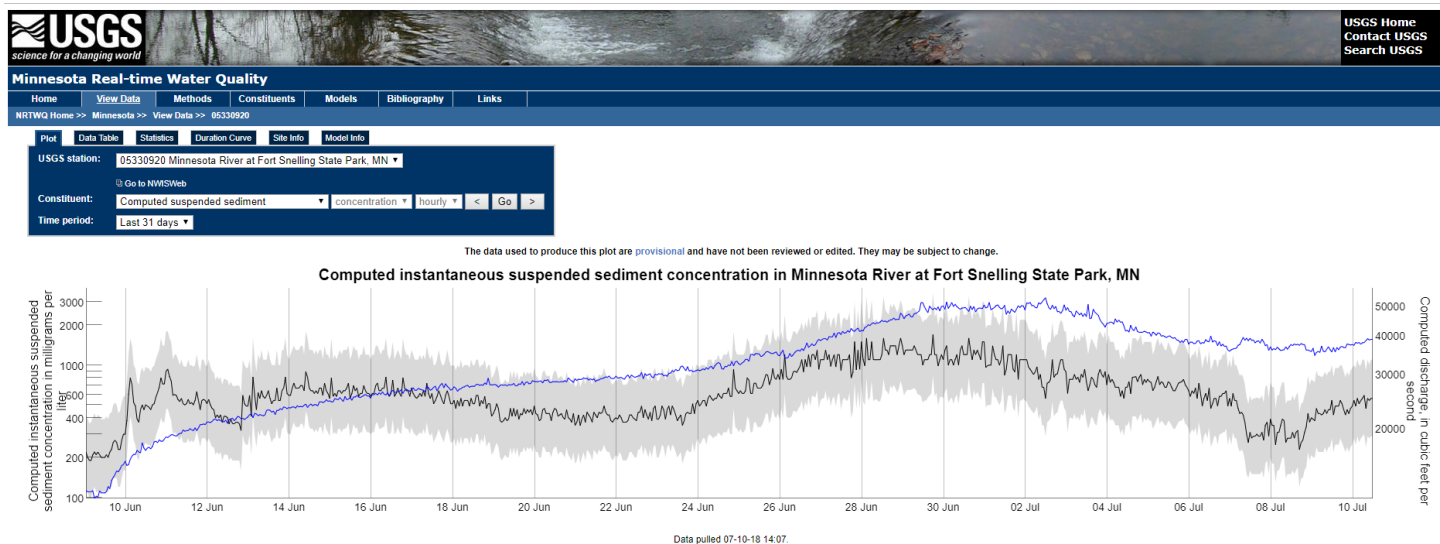
Using Data from Gage and Interpreting

- 2 Peer-Reviewed Reports
 - 2016 published report that was important in understanding sediment transport mechanisms



- 2018 publishing another report on new technology to improve loads

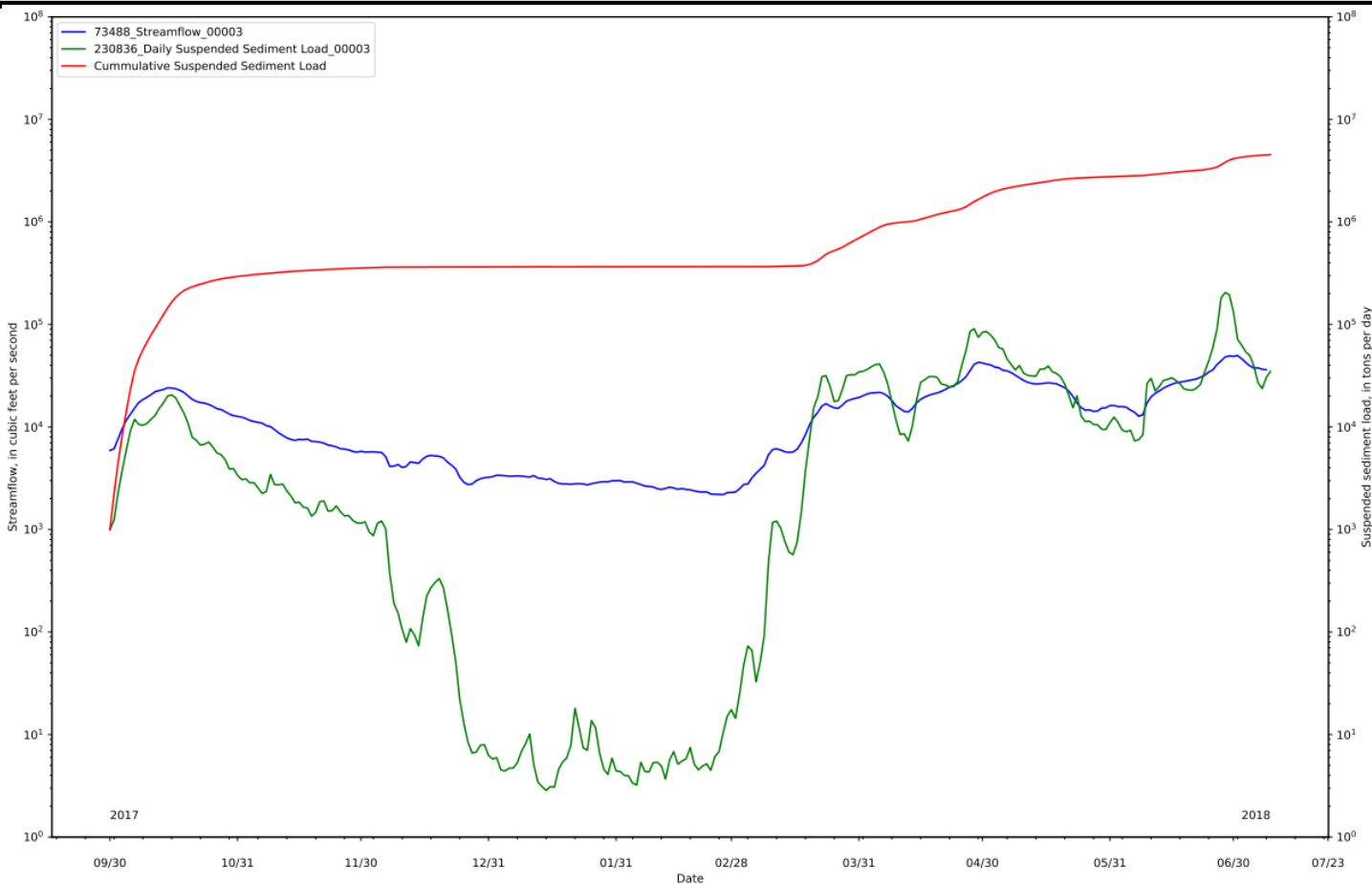
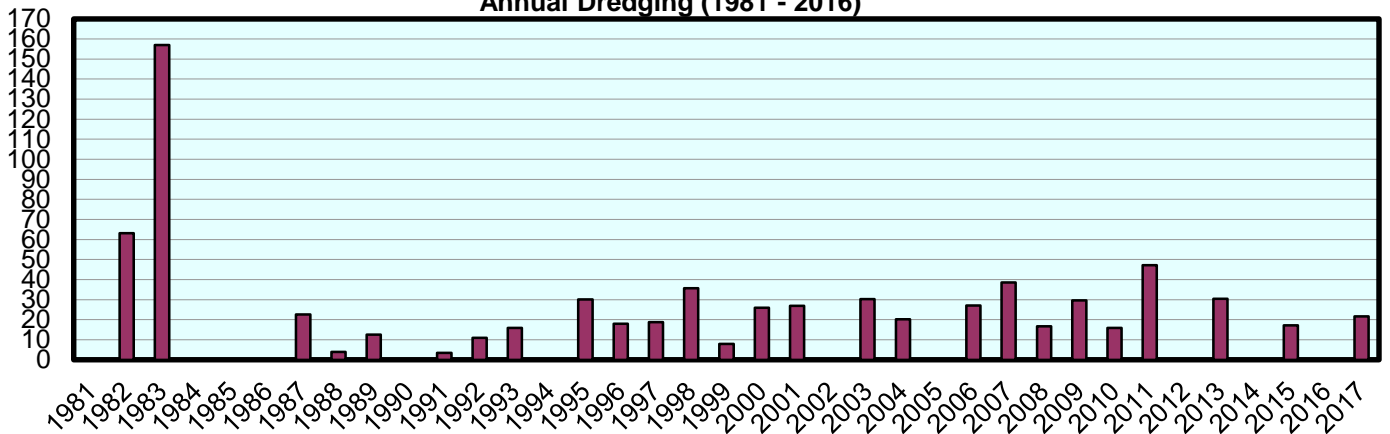
- Continuous Estimates of SSC on USGS NRTWQ Website for Fort Snelling, Jordan Possible



Using Data from Gage and Interpreting

- Using suspended sediment data to inform dredging

Minnesota River - All Cuts (RM. 0.0 - 25.0)
Annual Dredging (1981 - 2016)



Recent & Proposed Funding

Streamgage

- FY17 Agreement
 - USGS: \$6,295 LMRWD: \$10,391 Total: \$16,686
- Our average operating cost for “index velocity” gages is \$21,800
- Propose a modest increase, recognizing there is some cost savings in shared work with sediment
- USGS matching funds are used competitively, so a longer-term agreement would help secure those funds into the future.

Fiscal Year	Total Funding	USGS Matching Funds	Lower Minnesota River Watershed District	Comments
2018	\$ 18,900	\$ 8,000	\$ 10,900	
2019	\$ 19,278	\$ 8,160	\$ 11,118	Assume 2% inflation for out-years of multi-year agreements
2020	\$ 19,664	\$ 8,323	\$ 11,340	
2021	\$ 20,057	\$ 8,490	\$ 11,567	
2022	\$ 20,458	\$ 8,659	\$ 11,799	
TOTAL	\$ 98,356	\$ 41,632	\$ 56,724	

Sediment

- Sediment work in the last 3 Years USGS received \$8,000 in 2016, \$8,240 in 2017, and \$8,500

We're grateful the funding support you've provided for an important monitoring site for the Minnesota River and Twin Cities. Are there concerns we can address?



James Fallon jfallon@usgs.gov 763-783-3255
Joel Groten jgroten@usgs.gov 763-783-3149

Field operations



Gage installation, Oct. 2003



Sensor installation, 2003



Flood damage, sensor lost 2011



Discharge measurement & sampling, 2011



Winter measurement, Feb 2017



Sensor line damage and repair, 2016



Removing debris from sensor, 2017



Sensor maintenance



Radio upgrade, 2017



Flood, 2017, turbidity sensor & gage



LOWER MINNESOTA RIVER WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting

Wednesday, July 18, 2018

Agenda Item

Item 5. B. - 2019 Preliminary Budget

Prepared By

Linda Loomis, Administrator

Summary

The first draft of the 2019 preliminary budget is attached. The budget is based on the implementation plan contained in the draft Watershed Management Plan. The implementation plan is attached. There are some differences between the Plan and the Budget. Differences are:

1. The Plan calls for \$75,000 for the Riley Creek Cooperative Project. This project has been included in previous years and there is enough money from funds already collected that additional money is not needed (Riley Creek balance sheet is attached)
2. USGS stream flow and sediment monitoring costs were not included in the plan.
3. Municipal Plan review costs and Project review costs were not identified in the plan
4. Money has been included in 2017 and 2018 to address the deficit in the Channel Fund. This was not included in the Plan. In 2019, \$80,000 is included to reduce the deficit.

The proposed levy for 2019 will remain the same as in 2018. I have not yet received the Net Tax Capacity Distribution for the counties, the distribution shown in the draft preliminary budget reflect the 2018 distribution. If the Board wants to make any changes to the draft preliminary budget, direction should be provided before the August Board meeting.

A public hearing will be held at the August meeting to present and adopt the budget and certify the levy payable in 2018 to the counties.

Attachments

Draft preliminary 2019 budget

Table 4.1 Implementation Program Budget from draft Watershed Management Plan

Riley Creek balance sheet

Recommended Action

Provide direction to staff

2019 proposed LMRWD Budget for Administration Operations
2017/2018 Adopted Budget - 2018 Actuals/Projected - 2019 Proposed

Account	Adopted 2017	Adopted 2018	YTD 2018	Projected 2019	Proposed 2019
Revenues:					
General Property Tax	\$ 614,755.78	\$ 725,000.00	\$ 154,086.71	\$ 725,000.00	\$ 725,000.00
Interest Revenue	\$ 26,684.00				
License Revenue from placement of dredge					\$ 25,000.00
Revenue from sale of dredge material	\$ 32,128.00	\$ 30,000.00		\$ -	\$ 5,000.00
Grant income		\$ 5,500.00	\$ 4,500.00	\$ 5,500.00	\$ 5,500.00
State of MN Grant for Dredge Material Mgmt.				\$ 240,000.00	\$ 240,000.00
Metro-area Watershed Based Funding Grant					\$ 136,055.00
Miscellaneous Income	\$ 1,210.00				
Total Revenues	\$ 674,777.78	\$ 760,500.00	\$ 158,586.71	\$ 970,500.00	\$ 1,136,555.00
Expenses:					
10 Wages-General	\$ -	\$ -	\$ -	\$ -	\$ -
11 Severance Allowance	\$ -				
12 Benefits	\$ -	\$ -	\$ -	\$ -	\$ -
13 PERA Expense	\$ -	\$ -			
14 Payroll Tax (FICA/Medicare)	\$ -	\$ -	\$ -	\$ -	\$ -
15 Unemployment compensation	\$ -	\$ -			
16 Manager Per Diem	\$ 9,000.00	\$ 9,000.00	\$ -	\$ 6,000.00	\$ 9,000.00
17 Manager Expense (mileage/food/registrations)	\$ 3,500.00	\$ 4,000.00	\$ -	\$ 3,500.00	\$ 4,000.00
18 Telecommunications-Cell-Internet/Phone	\$ -	\$ -	\$ -	\$ -	\$ -
19 Postage	\$ 1,000.00	\$ 500.00	\$ 20.00	\$ 1,000.00	\$ 500.00
20 Photocopying	\$ 1,000.00	\$ 2,000.00	\$ 649.00	\$ 600.00	\$ 2,000.00
21 Newsletter Expense(Web Articles)	\$ -	\$ -		\$ -	\$ -
22 Legal Notices-General	\$ 1,500.00	\$ 1,500.00	\$ 1,066.00	\$ 1,000.00	\$ 1,500.00
23 Dues	\$ 4,000.00	\$ 7,500.00	\$ 7,500.00	\$ 4,000.00	\$ 7,500.00
24 Publications	\$ -		\$ -	\$ -	
25 Professional Services-General	\$ 132,400.00	\$ 126,100.00	\$ 38,997.00	\$ 130,000.00	\$ 120,100.00
26 Legal Fees-General	\$ 11,000.00	\$ 11,000.00	\$ 2,559.00	\$ 11,000.00	\$ 11,000.00
27 Accounting/Payroll Fees	\$ 4,700.00	\$ 5,000.00	\$ 2,483.00	\$ 4,578.00	\$ 5,000.00
28 Engineering-General	\$ 20,000.00	\$ 20,000.00	\$ 8,592.00	\$ 11,000.00	\$ 20,000.00
29 Audit Fees	\$ 13,500.00	\$ 14,000.00	\$ 190.00	\$ 13,212.00	\$ 14,500.00
30 Equipment-Maintenance	\$ 500.00	\$ 500.00	\$ 136.00	\$ 500.00	\$ 500.00
31 Taxable meal reimbursement	\$ 500.00	\$ 500.00	\$ 89.00	\$ 300.00	\$ 500.00
32 Mileage	\$ 6,000.00	\$ 6,000.00	\$ 1,083.00	\$ 5,000.00	\$ 6,000.00
33 Training & Education	\$ 1,500.00	\$ 1,500.00	\$ 124.00	\$ 1,500.00	\$ 1,500.00
34 Lodging/ Staff Travel	\$ 1,500.00	\$ 1,500.00	\$ -	\$ -	\$ 1,500.00
35 Rent	\$ 8,000.00	\$ 8,000.00	\$ 4,551.00	\$ 8,000.00	\$ 8,000.00
36 Web Expense-Design & Hosting (Moved to E & O)	\$ -		\$ -	\$ -	
37 Equipment-Lease	\$ 3,000.00	\$ 3,000.00	\$ 1,689.00	\$ 3,000.00	\$ 3,000.00
38 Insurance & Bonds	\$ 9,000.00	\$ 10,000.00	\$ 6,056.00	\$ 9,000.00	\$ 10,500.00
39 Bank Charges		\$ -		\$ -	\$ -
40 Cleaning Service	\$ -	\$ -	\$ -	\$ -	\$ -
41 Meeting Supplies/Expense	\$ 100.00	\$ 100.00	\$ 59.00	\$ 100.00	\$ 100.00
42 Office Supplies	\$ 300.00	\$ 300.00	\$ 121.00	\$ 300.00	\$ 300.00
43 Equipment-General	\$ -			\$ -	
44 Miscellaneous-General	\$ 3,000.00	\$ 3,000.00	\$ 706.00	\$ 3,000.00	\$ 3,000.00
45 Lobbying	\$ 15,000.00	\$ 15,000.00	\$ 20,000.00	\$ 20,000.00	\$ 20,000.00
Total Expense for Administration:	\$ 250,000.00	\$ 250,000.00	\$ 96,670.00	\$ 236,590.00	\$ 250,000.00

2019 Proposed Budget
2018 Adopted Budget - 2018 Actuals/Projected - 2019 Proposed

Account	2018 Adopted	YTD 2018	Projected 2018	Proposed 2019
Revenues:				
5 General Property Tax				
6 Carver County	\$ 42,113.07		\$ 43,158.53	\$ 42,113.08
7 Dakota County	\$ 73,373.63		\$ 79,570.91	\$ 73,373.63
8 Hennepin County	\$ 316,479.90		\$ 325,266.18	\$ 316,479.90
9 Scott County	\$ 293,033.40	\$154,086.71	\$ 277,004.38	\$ 293,033.40
10 Total Levy:	\$ 725,000.00	\$154,086.71	\$ 725,000.00	\$ 725,000.00
11 Interest Revenue	\$ 26,000.00			
12 Met Council Grant-(WOMP Station Monitoring)	\$ 5,500.00	\$ 4,500.00	\$ 5,500.00	\$ 5,500.00
State of MN Grant for Dredge Material Management	\$ 240,000.00		\$ 240,000.00	\$ 240,000.00
Metro-Area Watershed Based funding grants				\$ 136,055.00
13 Revenue for use of Vernon Avenue dredge for dewatering private material	\$ 25,000.00		\$ 25,000.00	\$ 25,000.00
14 Revenues from sale of dredge material	\$ 5,000.00		\$ 50,000.00	\$ 5,000.00
16 Total Revenues:	\$ 1,026,500.00	\$158,586.71	\$ 1,045,500.00	\$ 1,136,555.00
Expenses:				
18 Administration	\$ 250,000.00	\$ 96,674.19	\$ 250,000.00	\$ 250,000.00
20 Cooperative Projects				
21 Eden Prairie Bank Stabilization -#3			\$ -	\$ -
25 Eagle Creek			\$ -	\$ -
30 Gully Erosion Contingency			\$ -	\$ -
31 USGS	\$ 18,500.00		\$ 18,500.00	\$ 19,700.00
34 Ravine Stabilization at Seminary Fen in Chaska			\$ 110,400.00	\$ -
35 Riley Creek Cooperative Project with RPB/CWD	\$ 50,000.00		\$ 75,000.00	
40 509 Plan Budget				
41 Resource Plan Implementation				
42 Assumption Creek Hydrology Restoration Project				\$ 30,000.00
43 Carver Creek restoration Project				\$ 80,000.00
44 Groundwater Screening Tool Modal				\$ 50,000.00
45 Eagle Creek (East Branch) Project				\$ 10,000.00
46 East Creek Bank Stabilization Project				\$ 50,000.00
47 East Creek Water Quality Treatment Project				\$ 50,000.00
48 Minnesota River Floodplain Model Feasibility Study				\$ 30,000.00
49 Schroeder's Acres Park/Savage Fen Stormwater Management Project				\$ 39,555.00
50 Spring Creek Project				\$ 45,000.00
51 West Chaska Creek Project				\$ 50,000.00
52 Sustainable Lakes Management Plan (Trout Lakes)	\$ 50,000.00		\$ 50,000.00	
53 Geomorphc Assessments (Trout Streams)	\$ 50,000.00		\$ 50,000.00	
54 Paleolimnology Study (Floodplain Lakes)	\$ 50,000.00		\$ 50,000.00	
55 Fen Stewardship Program	\$ 75,000.00		\$ 75,000.00	\$ 25,000.00
56 District Boundary Modification Project	\$ 10,000.00		\$ 10,000.00	
57 East Chaska Creek Treatment Wetland Project	\$ 10,000.00		\$ 10,000.00	
58 Minnesota River Sediment Reduction Strategy	\$ 25,000.00		\$ 25,000.00	\$ 25,000.00
62 Riley Creek Cooperative Project	\$ 50,000.00		\$ 150,000.00	
63 Local Water Management Plan reviews	\$ 12,000.00	\$ 4,511.38	\$ 12,000.00	\$ 12,000.00
64 Project Reviews	\$ 16,000.00	\$ 2,784.38	\$ 16,000.00	\$ 16,000.00
65 Monitoring	\$ 65,000.00	\$ 8,419.92	\$ 65,000.00	\$ 65,000.00
66 Monitoring Data Analysis	\$ -			
67 Technical Assistance	\$ -			
68 Watershed Management Plan				
69 Next Generation Watershed Management Plan	\$ -			
70 Plan Clarification and proposed rules		\$ -	\$ -	
71 Plan Amendment	\$ 50,000.00	\$ 47,044.90	\$ 50,000.00	
72 Vegetation Management Standard/Plan				\$ 50,000.00
73 Public Education/Citizen Advisory Committee/Outreach Program	\$ 30,000.00	\$ 14,143.98	\$ 30,000.00	\$ 30,000.00
74 Cost Share Program	\$ 20,000.00		\$ 20,000.00	\$ 20,000.00
75 Nine Foot Channel	\$ 50,000.00		\$ 50,000.00	\$ 80,000.00
76 Dredge Site Restoration	\$ 240,000.00	\$ 5,489.24	\$ 240,000.00	\$ 240,000.00
91 Total Non-administrative Expenses:	\$ 821,500.00	\$ 82,393.80	\$ 1,125,291.00	\$ 1,017,255.00
93 Revenue less Expenses	\$ (45,000.00)	\$ (20,481.28)	\$ (329,791.00)	\$ (130,700.00)
95 Beginning Fund Balance - January 1	\$ 1,053,759.83			\$ 1,008,759.83
96 Total Revenue	\$ 1,026,500.00			\$ 1,136,555.00
97 Total Expenses	\$ (1,071,500.00)			\$ (1,267,255.00)
98 Ending Fund Balance - December 31 (projected)	\$ 1,008,759.83			\$ 878,059.83

Class	2016 Actual	2017 Actual	2018 Actual	2019 Actual	Total Project
Riley Creek					
Budgeted					
2016	\$ 45,000.00	\$ -	\$ -		
2017	\$ -	\$ 100,000.00	\$ -		
2018	\$ -	\$ -	\$ 50,000.00		
2019	\$ -	\$ -	\$ -	\$ 75,000.00	\$ 75,000.00
Total Revenues	\$ 45,000.00	\$ 100,000.00	\$ 50,000.00	\$ 75,000.00	\$ 270,000.00
Expenses					
Nov-16 23271509.00-1	\$ 9,022.98	\$ -			
Aug-16 23271509.00-2	\$ 8,353.38	\$ -			
Sep-16 23271509.00-3	\$ 10,262.77	\$ -			
Oct-16 23271509.00-4	\$ 3,651.50	\$ -			
Nov-16 23270509.00-5	\$ 2,728.50	\$ -			
Dec-16 23271509.00-6	\$ 5,033.50	\$ -			
Jan-17 23271509.00-7	\$ -	\$ 2,799.05			
Mar-17 23271509.00-8	\$ -	\$ 870.50			
Oct-17 23271509.00-9	\$ -	\$ 2,063.50			
Nov-17 23271509.00-10	\$ -	\$ 582.50			
18-Jul Construction	\$ -	\$ -	\$ 73,846.49		
Total Expenses	\$ 39,052.63	\$ 6,315.55	\$ 73,846.49	\$ -	\$ 119,214.67

Total Project Revenues \$ 270,000.00

Total Expenses to date \$ 119,214.67

Total funds remaining after after LMRWD Project \$ 150,785.33

Funds committed to RPBCWD Project \$ 150,000.00

TOTAL funds remaining \$ 785.33



LOWER MINNESOTA RIVER WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting

Wednesday, July 18, 2018

Agenda Item

Item 5. C. - 2018 Financial Audit Services

Prepared By

Linda Loomis, Administrator

Summary

The LMRWD has a two year agreement with Redpath and Company for financial audit services which covered FY 2016 and 2017. Peggy Moeller from Redpath offered a two or a three financial audit service agreement. The LMRWD paid Redpath \$13,390 and \$13,520 for audit services in 2016 and 2017 respectively.

Ms. Moeller is proposing a 3% increase for 2018 and each subsequent year of either a two year or a three year proposal. The benefit of a three year agreement is that it affords the LMRWD protection against inflation. Redpath is familiar with the LMRWD and the audit has run smoothly with Carver County

Attachments

No attachments

Recommended Action

Direct staff regarding terms of audit services agreement



LOWER MINNESOTA RIVER WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting

Wednesday, July 18, 2018

Agenda Item

Item 6. A. - Engineering Services Update

Prepared By

Linda Loomis, Administrator

Summary

At the April meeting of the Board of Managers, Young Environmental Consulting Group, LLC was appointed as the technical consultant for the LMRWD. Staff has been working to prepare an agreement for services between the LMRWD and Young Environmental. Since the appointment of Young Environmental as technical consultant, there have been some personnel changes at the firm. An update is attached.

Attachments

Young Environmental Engineering Consulting Group, LLC Staffing Update

Recommended Action

No action recommended

Technical Memorandum

To: Linda Loomis, Administrator

From: Della Schall Young, CPESC, PMP

Date: July 13, 2018

Re: 2018-2020 Engineering Services Contract – Young Environmental Consulting Group, LLC Staffing Update

Thank you for allowing Young Environmental Consulting Group, LLC (Young Environmental) time to fill the void left by the unexpected passing of Lisa Buchli.

We wish to inform you that Young Environmental has brought in Gary Gilbert to serve as the district engineer for the 2018–2020 engineering services contract. He has over 30 years of civil and environmental engineering experience focused on groundwater assessment and remediation, stormwater design for residential and commercial projects, and construction administration on a wide range of projects. Gary's expertise (like the current district engineer) complements the District's needs and will be of importance during future discussions about the Burnsville landfill site and how the subsurface plume will be managed once groundwater pumping is terminated. He has an Associate degree in Water and Wastewater Treatment from Vermillion Community College and a Bachelor of Science degree in Environmental Engineering from the Montana School of Mineral Science. He is a licensed engineer in the states of Minnesota and Wisconsin. Gary's hourly billing rate is \$150 per hour.

Thanks again for giving Young Environmental the time needed to bring on an engineer. Know that our team, which includes engineers and scientists from Burns & McDonnell and Barr Engineering Company, has the breadth and depth of experience required by the District to move its vision and mission of water and natural resources protection, preservation, and restoration forward. Please feel free to contact me with any questions you may have.



LOWER MINNESOTA RIVER WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting

Wednesday, July 18, 2018

Agenda Item

Item 6. B. - Dredge Management

Prepared By

Linda Loomis, Administrator

Summary

i. Funding for dredge material management

We received comments from the DNR regarding the addition of dredge management as a permanent capital project of the District. Those comments are attached; we are still waiting for comments from BWSR.

ii. Vernon Avenue Dredge Material Management site

Staff has received the no-rise evaluation and met with Taylor Luke to discuss how dredge material should be managed so that it does not create a rise in the flood stage of the river. Mr. Luke discussed possible alternative options for the placement of dredge material on the site. Those alternatives were shared with Jeff Weiss of Barr Engineering, who prepared the no-rise evaluations. We are waiting for the no-rise to be revised to reflect the alternatives before sharing the evaluation with the city of Savage.

Staff is ready to move ahead with other aspects of the work plan that was submitted to BWSR. Burns & McDonnell prepared a Task Order for the work. \$240,000 is in the budget for this work.

iii. Private Dredge Material Placement

Private material from 2017 has been removed from the site. New material has not been placed because of the high water in the river. The private parties have been looking at ways to reuse the material to reduce the cost of managing the material. The amount of water in the material is a hindrance to reuse. Building a second cell to allow material to remain on the LMRWD site an extra year to dewatering was discussed. However, the material drains by gravity and infiltration; and because the material is contained in a cell every time it rains, it absorbs water again.

LS Marine has suggested that rather than contain the material in berms for two years it might dry out faster if the material is removed from the containment cell and stacked in small piles. This would allow more air movement and keep the material from soaking up as much rain water. This is one of the new alternatives that will be looked for the no-rise. Much of this is discussed in the attached Task Order.

Attachments

Comments from DNR

Burns & McDonnell Implementation of Pre-Design Studies Task Order

Recommended Action

Motion to accept and authorize execution of Task Order

June 14, 2018

Linda Loomis
Administrator, Lower Minnesota River Watershed District
6677 Olson Memorial Highway
Golden Valley, MN 55427

Re: Engineer's Report: Lower Minnesota River Watershed District - Dredge Management Project Update

Dear Linda Loomis,

On behalf of the Director of the Division of Ecological and Water Resources of the Minnesota Department of Natural Resources (DNR), I offer the following comments on the Engineer's Report for the above-cited project, in accordance with Minnesota Statutes section 103D.605, subdivision 2.

The dredge material management site is subject to the Channel Maintenance and Management Plan (CMMP) for the Navigation System on the Upper Mississippi, Minnesota, and St. Croix Rivers. There does not appear to be significant changes in the project that would be inconsistent with the CMMP.

We understand that the Lower Minnesota River Watershed District (District) evaluated the following changes to the current Dredge Management Project:

- Reconfigure the dredge placement site from one cell to two cells;
- Add two water control structures (one per cell);
- Add a culvert along Vernon Avenue;
- Vernon Avenue upgrade;
- Change the access site for private slip dredge material unloading.

In relation to the project site, as stated within the project report, the site lies within the Minnesota River floodway. The update memo does not include a detailed stage increase analysis under the floodplain section. The DNR expects that the no-rise modeling and analysis will be provided as part of the CUP amendment process and that the analysis will adequately demonstrate how the District will meet FEMA and the City of Savage's requirements related to floodway fill. The DNR will review the amendment request when the City routes it for review and comment. The District has stated a request will be made to remove the CUP condition to remove fill during flood events. We expect there will be an analysis certifying that any dredge fill left in place will not cause a rise, as required by the City of Savage and FEMA regulations.

In relation to state-listed Threatened and Endangered species, while the DNR doesn't have any concerns regarding the proposed modifications, it is unclear whether potential impacts to state-listed species were considered in the original plan. To ensure compliance with the Minnesota Endangered Species Statute and Rules, the DNR recommends that all watershed projects involving new disturbance include an assessment of potential impacts to state-listed species. Please visit the [NHIS webpage](#) for information on how to request a Natural Heritage Review or enter into a license agreement with the DNR for the use of the Rare Features Data.

Thank you for your consideration of these comments.

Sincerely,


Dan Lais
Regional Manager

- CC: MN DNR - Bill Huber
- MN DNR - Jennie Skancke
- City of Savage – Jesse Carlson
- BWSR – Ben Carlson

Website Address:

The website address for Minnesota DNR's Natural Heritage Information System webpage is:
<https://www.dnr.state.mn.us/nhnrp/nhis.html>.

Memorandum



Date: July 12, 2018 *(Email transmittal)*
To: Linda Loomis, Administrator
From: Eric Watruba, Project Manager
Subject: Implementation of Pre-Design Studies Task Order
Cargill East River (MN – 14.2 RMP) Dredge Material Site

The Lower Minnesota River Watershed District (District) intends to implement certain pre-design studies to support the planned capital improvement projects at the Cargill East River (MN – 14.2 RMP) Dredge Material Site (Site) located on the Minnesota River in Savage, Minnesota. The pre-design studies were identified in the Work Plan that was prepared on behalf of the District by Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) and Young Environmental Consulting Group, LLC (Young Environmental) and approved by the Board of Water and Soil Resources (BWSR). This Task Order identifies the pre-design studies to be performed and that were discussed during our meeting on July 2, 2018. In addition, a revised conceptual Site design was also discussed with LS Marine during the July 2, 2018, meeting. The revised conceptual Site design should be completed before the pre-designs are performed.

Scope of Work

The following items to be completed under this Task Order are described below. A Project Timeline is also attached that shows the overall schedule for completion of these items.

Task 1: Revised Conceptual Site Design:

During our meeting on July 2, 2018, LS Marine provided comments on the conceptual reconfigured Site design that was presented in the Technical Memorandum (Tech Memo) titled, “*Estimate of Probable Cost, Cargill East River (MN – 14.2 RMP) Dredge Material Site,*” prepared by Burns & McDonnell, Young Environmental, and Berrini & Associates, LLC, dated February 15, 2017. Burns & McDonnell will prepare a revised conceptual Site design based on LS Marine’s comments for use during Hydrologic and Hydraulic (H&H) modeling (to be completed by others), in discussions with the City of Savage for a revised Conditional Use Permit (CUP), and in the implementation of the pre-design studies described in the tasks below.

- *Estimated Cost: \$3,500*
- *Deliverable: Revised conceptual Site design figure*
- *Schedule: July 2018*

Task 2: Assistance with Hydrologic and Hydraulic Modeling

Per the Federal Emergency Management Agency (FEMA), the Site is located within the Minnesota River floodway portion of the floodplain. Permits associated with work on the Site, which is in the floodway, are administered locally by the City of Savage. The District was issued a Conditional Use Permit (CUP) by the City of Savage in 2006. The CUP was amended in 2014 and is up for review. As confirmed by City of

Memorandum (cont'd)



(Email transmittal)

July 12, 2018
Page 2

Savage, they will require hydrologic and hydraulic modeling (H&H) of the reconfigured Site design to demonstrate that the dredge material will not raise the flood stage.

Barr Engineering previously completed a draft of the H&H modeling based on the conceptual reconfigured Site design that was presented in the February 2017 Tech Memo. However, as described in Task 1, this conceptual design is being revised. Barr Engineering will update the H&H modeling based on this revised conceptual design.

For this Task Order, only costs associated with supporting this effort are shown. Support efforts may include a meeting with the selected firm to complete the H&H analysis and addressing questions or Requests for Information (RFIs) from the firm.

- *Estimated Cost: \$3,000*
- *Deliverable: None*
- *Schedule: Dependent on H&H modeling firm*

Task 3: Desktop Wetland Analysis:

There is a wetland in the northwestern corner of the Site, between Port Richards and Vernon Avenue. Although the revised conceptual Site design described in Task 1 is not likely to impact the wetland, a desktop wetland analysis will provide further evidence to verify this assumption. The desktop wetland analysis will be completed by a Professional Wetland Scientist (PWS) and a Minnesota Wetland Delineator Certified Professional (WDCP) and submitted to the City of Savage, as requested. It should be noted that if the desktop wetland analysis determines a field survey is required or if the revised conceptual Site design encroaches upon the existing wetland, additional work may be needed to assess whether the wetland will be impacted by the modification project and additional costs may be incurred.

- *Estimated Cost: \$3,500*
- *Deliverable: Desktop wetland analysis report*
- *Schedule: Summer 2018*

Task 4: Threatened and Endangered Species Survey:

During the study of the Site completed as part of the COE-sponsored Dredge Material Management Plan in March 2007, the United States Fish and Wildlife Service concurred with the findings that the Site and proposed operations would not adversely affect federally listed Threatened and Endangered (T&E) species. Given the ongoing listing and delisting of T&E species on a federal and state level, an updated T&E survey is required prior to implementing the reconfigured Site design. The T&E survey will be completed by an environmental specialist in accordance with applicable state and federal requirements.

- *Estimated Cost: \$10,000*
- *Deliverable: T&E survey report*
- *Schedule: Summer 2018*

Task 5: Geotechnical Evaluation

A geotechnical evaluation of the Site is needed to aid in the detailed engineering design of the reconfigured Site. The geotechnical evaluation will evaluate the suitability of the onsite material for use in construction and evaluate the stability of the berms during various conditions (e.g., during a flood event). Burns & McDonnell will subcontract with a geotechnical firm to complete the geotechnical evaluation. The evaluation will be completed by a licensed professional engineer registered in the State of Minnesota.

Geotechnical borings will be advanced at the Site with a drill rig and soil samples will be collected for laboratory analysis to determine engineering properties of the soil. The number of borings and soil samples will be determined in consultation with the geotechnical engineering firm performing the work. Using the Site-specific data, slope stability analyses will be completed with slope stability modelling computer software.

For this Task Order, an allowance of up to \$25,000 is included to complete the geotechnical evaluation, which matches the estimated cost presented in the Work Plan approved by BWSR. Burns & McDonnell will communicate actual costs to complete this task once proposals are obtained from subcontractors.

- *Allowance: \$25,000*
- *Deliverable: Geotechnical Evaluation Report*
- *Schedule: Summer 2018*

Task 6: Topographic Survey

A topographic survey of the Site is needed to aid in the detailed engineering design of the reconfigured Site. Burns & McDonnell will subcontract with a licensed professional surveyor registered in the State of Minnesota to complete the survey. The survey will include the collection of elevation data as required to define surface irregularities, break lines, void areas, and boundaries. The survey will also locate and determine elevations for objects like property corner monuments, ditches, culverts, utilities, etc.

For this Task Order, an allowance of up to \$12,000 is included to complete the topographic survey, which matches the estimated cost presented in the Work Plan approved by BWSR. Burns & McDonnell will communicate actual costs to complete this task once proposals are obtained from subcontractors.

- *Allowance: \$12,000*
- *Deliverable: Topographic survey in AutoCAD format (or similar)*
- *Schedule: Summer 2018*

Task 7: Preliminary Engineering Design and Permitting

Engineering design and permitting of the reconfigured conceptual Site design needs to be completed in accordance with Minnesota Pollution Control Agency (MPCA) requirements and to incorporate the

Memorandum (cont'd)



(Email transmittal)

July 12, 2018
Page 4

information determined from the H&H modeling (to be completed by others) and the pre-design studies described in this Task Order.

The detailed design documents (i.e., plans and specifications) can then be used by a contractor to construct the reconfigured Site design. The detailed engineering design and permitting will be completed by a licensed professional engineer registered in the State of Minnesota.

For this Task Order, up to \$55,000 out of the \$110,000 approved by BWSR for this task is proposed to begin preliminary engineering and permitting efforts, coordinate with various subcontractors, and to coordinate and support permitting efforts with the City of Savage for an amended CUP. A future Task Order will be submitted to the District for final detailed engineering design.

- *Estimated Cost: \$55,000*
- *Deliverable: None for this Task Order. Future deliverables will include detailed design documents (i.e., plans and specifications).*
- *Schedule: Summer/Fall 2018*

Cost Estimate

Task Description	Estimate
Task 1: Revised Conceptual Site Design	\$3,500
Task 2: Assistance with Hydrologic and Hydraulic Modeling	\$3,000
Task 3: Desktop Wetland Analysis	\$3,500
Task 4: Threatened and Endangered Species Survey	\$10,000
Task 5: Geotechnical Evaluation	\$25,000
Task 6: Topographic Survey	\$12,000
Task 7: Preliminary Engineering Design and Permitting	\$55,000
Total:	\$112,000

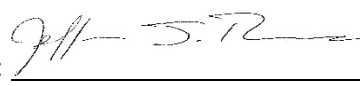
Memorandum (cont'd)



(Email transmittal)

July 12, 2018
Page 5

If you find this scope and cost estimate to be acceptable, please complete the signature block below and return the executed copy of this proposal to the Consultant, as notice to proceed. Services will be provided in accordance with the Agreement between the Lower Minnesota River Watershed District and Burns & McDonnell Engineering Company, Inc., executed on November 16, 2016.

<p><u>Accepted and Agreed to: Implementation of Pre-Design Studies Task Order for Cargill East River (MN – 14.2 RMP) Dredge Material Site</u></p> <p>CLIENT Lower Minnesota River Watershed District</p> <p>By: _____ Name: _____ Title: _____</p>	<p>CONSULTANT Burns & McDonnell Engineering Company, Inc.</p> <p>By:  _____</p> <p>Name: Jeffrey J. Thuma Title: Senior Hydrogeologist/Regional Manager</p>
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PROJECT TIMELINE
 PRIVATE DREDGE MATERIAL CONTAINMENT
 Lower Minnesota River Watershed District
 City of Savage
 Burns & McDonnell Project No. 96668

ID	ID	Task Name	Duration	Start	Finish	Qtr 3, 2018			Qtr 4, 2018			Qtr 1, 2019			Qtr 2, 2019		
						Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	1	Private Dredge Material Containment	233 days	Wed 7/18/18	Fri 6/7/19												
2	2	B&McD Task Order Approval from LMRWD	0 days	Wed 7/18/18	Wed 7/18/18												
3	3	Revised Conceptual Site Design	5 days	Wed 7/18/18	Tue 7/24/18												
4	4	Revised Hydrologic and Hydraulic Modeling	10 days	Wed 7/18/18	Tue 7/31/18												
5	5	Hydrologic and Hydraulic Modeling Results Approval from City of Savage	10 days	Wed 8/1/18	Tue 8/14/18												
6	6	Wetlands Analysis	5 days	Mon 8/20/18	Fri 8/24/18												
7	7	Threatened and Endangered Species Survey	25 days	Mon 8/20/18	Fri 9/21/18												
8	8	Scope/RFP for Topographic Survey	5 days	Mon 8/20/18	Fri 8/24/18												
9	9	Scope/RFP for Geotechnical Survey & Slope Stability Analysis	5 days	Mon 8/20/18	Fri 8/24/18												
10	10	Contractor Bidding for Topographic and Geotechnical Work	5 days	Mon 8/27/18	Fri 8/31/18												
11	11	Establish Contracts for Topographic and Geotechnical Work	5 days	Mon 9/3/18	Fri 9/7/18												
12	12	Mobilization for Topographic Survey Field Work	10 days	Mon 9/10/18	Fri 9/21/18												
13	13	Topographic Survey Field Work	2 days	Mon 9/24/18	Tue 9/25/18												
14	14	Topographic Survey Submittal	15 days	Wed 9/26/18	Tue 10/16/18												
15	15	Mobilization for Geotechnical Field Work	10 days	Mon 9/10/18	Fri 9/21/18												
16	16	Geotechnical Field Work	3 days	Mon 9/24/18	Wed 9/26/18												
17	17	Geotechnical Report Submittal (includes Slope Stability & Flood Protection)	30 days	Thu 9/27/18	Wed 11/7/18												
18	18	Detailed Engineering Design & Permitting	66 days	Mon 8/20/18	Mon 11/19/18												
19	19	Design & Permitting Approval from City of Savage, LS Marine, and LMRWD	20 days	Tue 11/20/18	Mon 12/17/18												
20	20	Bidding for Construction	20 days	Tue 12/18/18	Mon 1/14/19												
21	21	Award Construction Contract	20 days	Tue 1/15/19	Mon 2/11/19												
22	22	Construction	40 days	Mon 4/15/19	Fri 6/7/19												
23	23																
24	24																
25	25																
26	26																
27	27																

Project Timeline Private Dredge Material Contai Date: Tue 7/10/18	Task		Project Summary		Manual Task		Start-only		External Tasks		Manual Progress		Deadline
	Split		Inactive Task		Duration-only		Finish-only		External Milestone		Manual Progress		Progress
	Milestone		Inactive Milestone		Manual Summary Rollup		External Milestone						
	Summary		Inactive Summary		Manual Summary		External Milestone						



LOWER MINNESOTA RIVER WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting

Wednesday, July 18, 2018

Agenda Item

Item 6. C. - Watershed Management Plan

Prepared By

Linda Loomis, Administrator

Summary

The 90-day draft for Comprehensive Watershed Management Plan has been submitted to BWSR and other review agencies. BWSR has requested that review agencies submit comments to BWSR or the LMRWD by Monday, August 6th. The 90-day draft will be presented to the BWSR Central Region Committee at its August 23rd meeting. Staff has been invited to present the plan to the committee; however the committee will hold its meeting in Worthington... The BWSR Board Conservationist for the LMRWD, Steve Christopher, has agreed to present the plan to the committee to save LMRWD staff a trip to Worthington. Staff will meet with Mr. Christopher ahead of the August 23rd meeting to discuss some of the decision making and ensure that the items that are most important to the District are highlighted.

Following presentation to and review of the 90-day draft by the BWSR Central Region Committee, we expect the plan to go before the BWSR Board at its September meeting.

Attachments

No attachments

Recommended Action

No action recommended



LOWER MINNESOTA RIVER WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting

Wednesday, July 18, 2018

Agenda Item

Item 6. D. - Legislative Action

Prepared By

Linda Loomis, Administrator

Summary

Staff has been discussing items that the LMRWD might want to include in its legislative agenda. One item that came up, that the Board may not be aware that came up during the Plan Amendment process is the closing of the Burnsville Landfill. The city of Burnsville expressed concern about the LMRWD focus on groundwater appropriation near High Value Resources and how this may affect a known plume of pollution created by the Burnsville Landfill.

Currently, Kraemer Mining Operations dewateres its mine pits. This dewatering is helping to keep the plume from migrating to the Minnesota River. The City's concern is that if dewatering were to terminate, the plume would follow the path of groundwater movement and pollute the Minnesota River. The MPCA is trying to work with the property owner to clean up the Landfill site. Staff will work with the District's lobbyist Lisa Frenette to draft a position for the Board to review and approve, along with others.

Attachments

No attachments

Recommended Action

No action recommended



LOWER MINNESOTA RIVER WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting

Wednesday, July 18, 2018

Agenda Item

Item 6. E. - Education & Outreach

Prepared By

Linda Loomis, Administrator

Summary

The LMRWD hosted a tour of the Minnesota River as part of the MAWD Summer Tour. Over 180 people attended the tour. 85 of them were registered through MAWD. The District received many compliments on the tour and even the pilot of the Betsy Northrup commented, as he seldom gets to take the boat up the Minnesota River.

The total cost of the tour to the LMRWD follows:

Cost of River Boat Rental	\$2,050.00
Box lunches & Food Service charge	\$2,471.45
Bottled Water	\$ 338.55
Taxes & Port Fees	<u>\$ 472.35</u>
Total:	\$5,332.35

MAWD has asked the LMRWD to pay for the extra bus from Country Inn & Suites in Chanhassen to Harriet Island, since we did not need buses from Harriet Island back to CHS. The difference between the cost of the extra bus and the buses from Harriet Island to CHS was a wash; \$409.50 vs. \$409.50. So I agreed to make the payment. This brings the total cost of the tour to \$5741.85.

Attachments

No attachments

Recommended Action

No recommended action



LOWER MINNESOTA RIVER WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting

Wednesday, July 18, 2018

Agenda Item

Item 6. F. - LMRWD Projects

Prepared By

Linda Loomis, Administrator

Summary

i. Eden Prairie Area #3 Stabilization

No new information since last update

ii. Riley Creek Cooperative project Hennepin County Flying Cloud Drive/CSAH 61 reconstruction project

This project is complete! Jeff Weiss from Barr Engineering provided inspection services for the LMRWD on this project. It was completed on June 29th. Mr. Weiss inspected the project after completion and is happy with the execution of the project.

iii. Floodplain Lake Coring Project with Freshwater Society

The final report for the floodplain lake coring project has been received and is attached. Dr. Carrie Jennings has submitted an abstract to present the process and findings of the project at the Minnesota Water Resource Conference in October.

A Contract Fulfillment Letter from Freshwater and the final report are attached.

iv. Seminary Fen ravine stabilization project

I met with Steve Christopher from BWSR. He and I completed the final reporting that was needed for this project. Payment has been requested.

v. Analysis of Dakota County Monitoring

This project was placed on the Dakota County list for Metro-area Watershed Based Funding. BWSR has requested the District meet with them to discuss the eligibility of this project for funding under that program.

vi. East Chaska Creek - CSAH 61 & TH 41 Transportation improvements

This project was placed on the Carver County list for Metro-area Watershed Based Funding. BWSR has requested additional information on this project and staff is working to pull together and submit the information requested.

Attachments

Sediment Accumulation in the Floodplain of the Lower Minnesota River Watershed
Contract fulfillment letter from Freshwater

Recommended Action

No action recommended



Sediment Accumulation in the Floodplain of Lower Minnesota River Watershed

Carrie E. Jennings, P.G., PhD, Freshwater

Vania Stefanova, PhD, and Mark Shapley, PhD, Lac Core, University of Minnesota

FRESHWATER



Executive Summary

The main objective of this work is to provide a direct assessment of sediment accumulation in the floodplain of Lower Minnesota River Watershed to better document how sedimentation in this reach has changed as a result of changes in flow in the post-settlement period. The method selected was to core floodplain lakes and to interpret sediment and pollen spores archived in the mud on the floor of lake lake in the context of the known changes in the ecological history of the area. Then the major ecological shifts as indicated by pollen assemblages would be correlated to dated horizons in nearby lakes. Correlation was chosen over directly dating the sediment as a cost-saving measure. Indications of land disturbance, cultivation, erosion and flooding helped further constrain the interpretations of the ages of horizons.

If all of the interpreted horizons are correct, and linear sedimentation rates accurately reflect the lake history, sedimentation rates were 1 cm/y^{-1} from 1860 to 1910, peaked at 2.44 cm/y^{-1} from 1950 to 1993 and have decreased to 1.4 cm/y^{-1} from 1993 to 2018. However, dated profiles for many Minnesota lakes (Engstrom, 2007) suggests that both over- and underestimates of sedimentation rates are possible with the linear interpolation method used here to estimate post-1850 accumulation rates in Rice lake. Comparison of the linear sedimentation rates to dated rates for two nearby lakes are up to 44% greater.

The cores taken for this project have been archived and could be dated at some future time to get more precise estimates of the change in sedimentation rate.

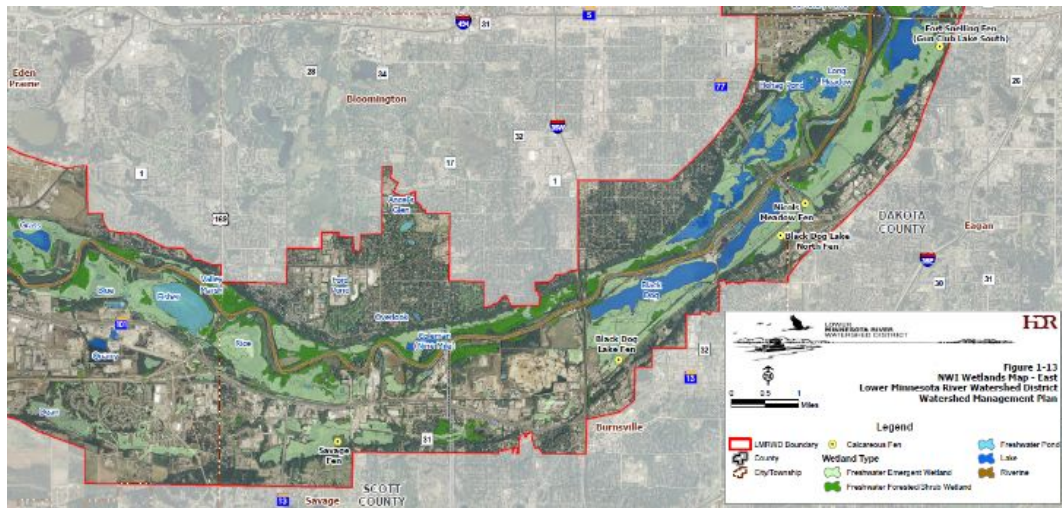
Introduction

The Minnesota River occupies a deep and broad valley created by the drainage of a large lake at the end of the glacial period, approximately 13,400 years ago (Clayton and Moran, 1982; Matsch, 1983). The tributaries to the Minnesota are adjusting their gradients to this change and delivering sediment to the Minnesota River as they excavate their valleys (Gran et al., 2009). The Minnesota River does not have the capacity to carry away sediment delivered to it by its tributaries and therefore the valley has been filling in since shortly after it was created (Wright, 1990). The rate of sediment accumulation varies spatially, with climate, and with other factors that affect watershed hydrology and the hydrologic cycle—e.g. ground cover and artificial drainage.

Changes in river flow have been documented by gauging efforts (Wilcock et al., 2009; Groeten et al., 2016). The intensification of agriculture and agricultural drainage have increased peak flows in rivers at certain times of year and that changing rainfall patterns have also increased flows (Schottler et al., 2013). As a result, rivers have widened significantly, nick points on tributaries have retreated more rapidly, and meander migration rates have increased (Belmont et al., 2011). All of these changes have led to increased sediment delivery by the tributaries, erosion on the main-stem river, and greater in-channel sediment loads.

Lake Pepin, a riverine lake on the Mississippi River downstream of the confluence of the Minnesota, St. Croix and Mississippi rivers archives the combined record of changes in these three watersheds. It is filling in almost ten times faster than pre-settlement rates (Engstrom et al., 2009). High sediment-loading watersheds within the Minnesota River basin have been identified as the primary sources (e.g. Gran et al., 2009; Groeten et al., 2016) and estimates of the changes in run-off ratio in agricultural vs. non-agricultural watersheds modeled (Schottler et al., 2013).

The 14.7-mile-long reach of the Minnesota River between Chaska and Minneapolis is dredged for navigation through a collaborative arrangement between the Saint Paul District of the U.S. Army Corps of Engineers and the Lower Minnesota River Watershed District. How has this reach been impacted by increases in flow and sediment load? That has not yet been fully quantified however, gauging data and dredging history begin to tell the story of this altered river system. The perception is that in-channel sediment loads are greater resulting in greater volumes of dredged material and increased expense and difficulty of disposing of the dredge spoils.



Study Area

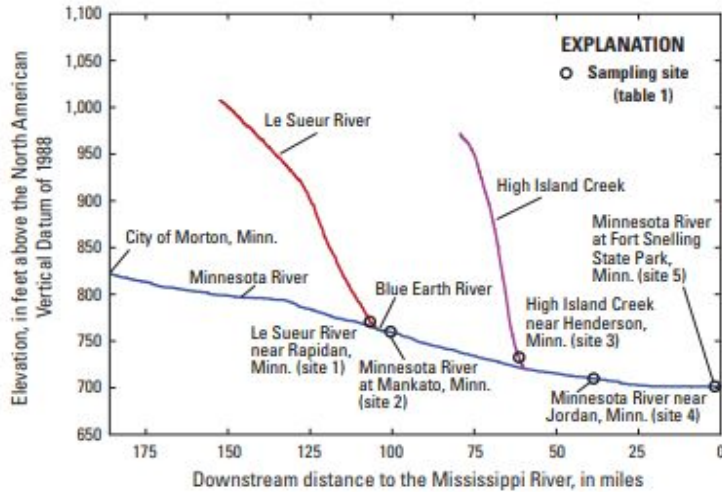


Figure 2. Stream gradients along the Minnesota River (from Morton to Fort Snelling State Park, Minnesota) and three tributaries (Le Sueur River, Blue Earth River, and High Island Creek).

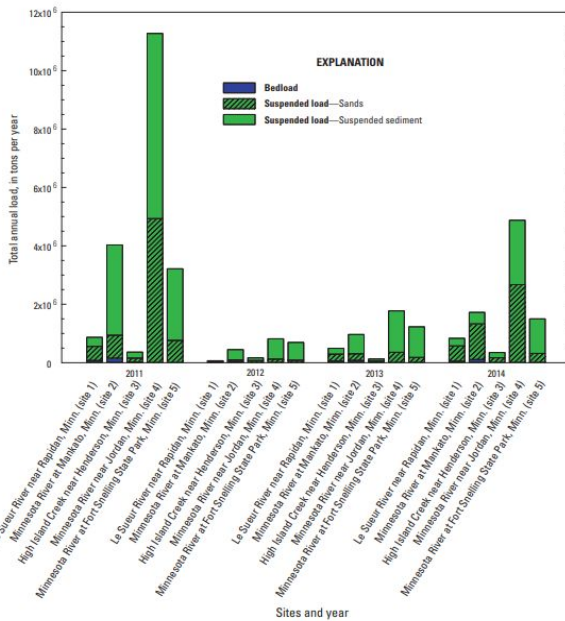


Figure 12. R-LOADEST loads at five sites in the lower Minnesota River Basin, calendar years 2011 through 2014.

The reach of the Minnesota River within the Lower Minnesota River Watershed District is wider than upstream reaches and has a lower gradient. This change in valley slope and geometry leads to a slowing of the river and accumulation of sediment under natural conditions. For each of the four years analyzed in a recent USGS report, there is more sediment coming into this reach than leaving it (see last two columns on the right for each year in the bar chart, Groeten et al., 2016). On average, 200 tons of sediment per mile has to be stored in the channel, levee and floodplain. (Groeten et al., 2016).



The volume of material in such a truck are distributed in each mile of the Lower

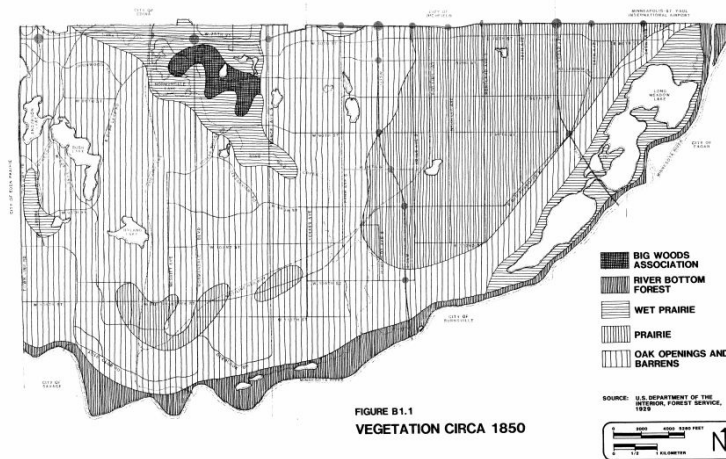
Minnesota River on average each year. https://commons.wikimedia.org/wiki/File:200_Ton_Truck.JPG

Exactly how the sediment is distributed across the width of the valley is not known. However, stable floodplain lakes that exist behind the natural levee are natural places for the record of sedimentation events to be archived. Lakes also archive airborne and river-transported pollen and plant macrofossils that can be linked to landscape and climate changes both locally and distally and used to date changes in sediment accumulation.

Vegetation

At the time of the Public Land Survey (1853-1856) Scott and Hennepin county's vegetation included upland deciduous forest, wetland, prairie, and oak openings and barrens (Biological Report No. 89, MN DNR 2007). According to the Public Land Survey data, the majority of the Hennepin County was heavily forested except for large swaths of prairie and oak openings or barrens mostly along the Minnesota River valley. There is a high probability that fire-dependent plant communities such as prairie and oak openings and barrens were managed locally with the use of fire by Native Americans. Early topographic maps show the distribution of wetlands and forest in 1901.

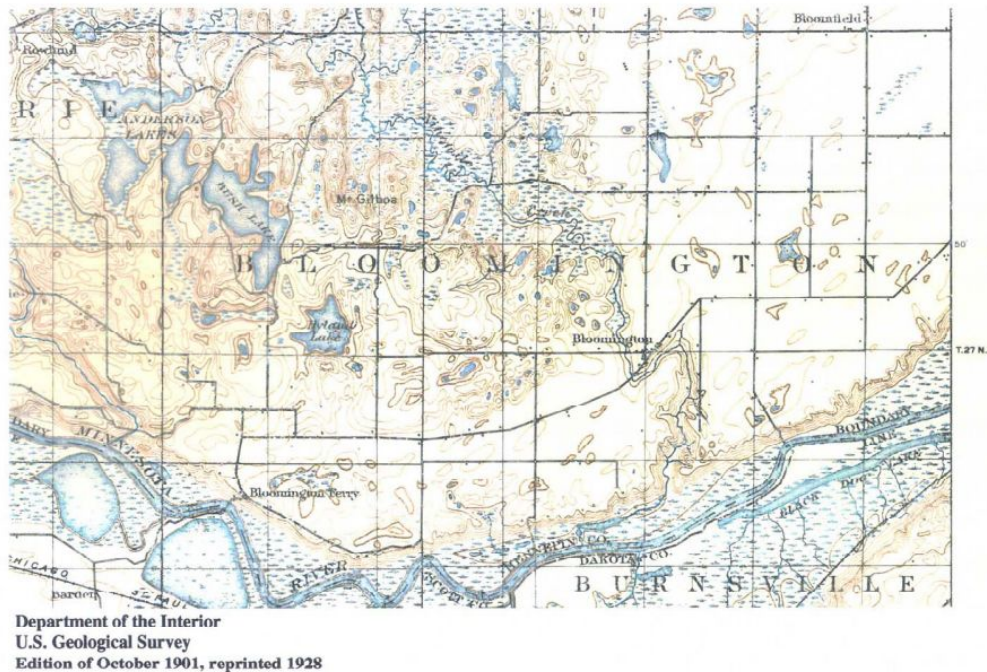
FIGURE 2
Presettlement Vegetation Map



City of Bloomington, Minnesota
Department of Community Development
October 1982

<https://www.bloomingtonmn.gov/sites/default/files/media/WetlandProtectionProgramMgmtPlan.pdf>

FIGURE 3
USGS Minneapolis 15 Minute Quadrangle Map (Circa 1901)



Very little of the original vegetation remains. Modern floodplain lakes are surrounded by forests of silver maple subtype with a tall, open super-canopy of cottonwood above a continuous canopy of silver maple. Other trees that are found within the canopy include basswood, American elm, green ash, and peach-leaved willow. The flooded wetlands around the lakes are dominated by river bulrush, cattails, lake sedge, wild rice, burr reed, bluejoint grass, and rice cutgrass. Other common plants are broad-leaved arrowhead, water plantain, sweet flag, water parsnip, wild mint, and American water-horehound. Corn fields appear on the south side of the lake along the Minnesota River including a much beloved sweet corn maze that operated as a tourist attraction.

Human history

The area has been home to Native Americans for over 12,000 years (Gibbon, 2012). Burial mounds in Memorial Park in Shakopee date back approximately 2,000 years. Locations of encampments and farming villages of Native Americans were documented and visited by early European explorers (e.g. Featherstonhaugh, 1847) and the archaeological record supports the utilization of freshwater resources and the relative stability of the lakeshores of floodplain lakes.

Shakopee, the closest town to Rice Lake was designated as Scott County seat in 1853. In 1860 a railroad was built and the population reached 1,138, and then almost doubled between 1910 and 1912 reaching a population of 2,302. Other events in the settlement history of the region that might impact the sediment accumulating in the Minnesota River floodplain include a great fire in the Minnesota River valley in 1879; expansion of Minneapolis and suburban development throughout the early to mid 1900's; a major flood in 1965; the completion of Highway 169 in 1996; and protection of the Minnesota River Valley National Wildlife Refuge and associated restoration efforts.

Methods

The inorganic and organic sediment that is archived in a floodplain lake enters through its tributaries and during flood events on the Minnesota. It can also be airborne. Changes in mineral properties are interpreted as a change in sediment source; changes in the amount of sediment can be interpreted as erosion and flood events in the watershed. The duration of flooding may also impact sediment accumulation.

Wind-blown pollen can be far-traveled or in immediate proximity to the lake; this is in part dependent on the type of pollen. For example, pine can be very far-traveled. Organics can also originate within the lake by the growth and death of organisms that inhabit it. Therefore, lakes store histories of both local and distal land-use and climate change and combine a history of erosion, sedimentation, vegetation, fire (charcoal) as well as development in the area.

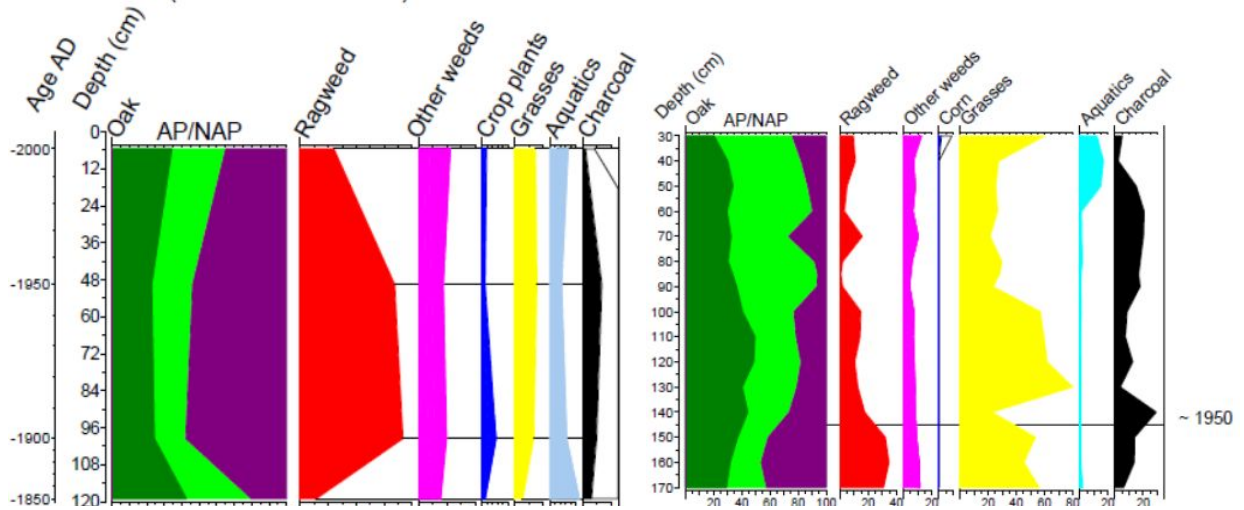
To get an absolute chronology of events would require a way to date the material that accumulated in the lake. However, it is also possible to use marker horizons of known age to date intervals in a lake core. To avoid the expense of procuring dates on the material in our cores, we proposed to compare the sediment and vegetation records of these lakes to well-dated records from 3 lakes in Hennepin and Carver counties. This approach provides a comparative chronological scale to assess changes in the sedimentation rates in the floodplain lakes.



Location of Rice and Coleman lakes, and nearby, dated lakes, Mitchel and Round used for reference.

RICE LAKE (HENNEPIN COUNTY)
Core RL 1 - Pollen percentages of selected taxa

ROUND LAKE (HENNEPIN COUNTY)



Dated pollen accumulation records from lakes to be used for comparison. Lotus, Mitchell and Round have dated pollen stratigraphy and are close enough to Rice and Coleman lakes in the floodplain for correlation.

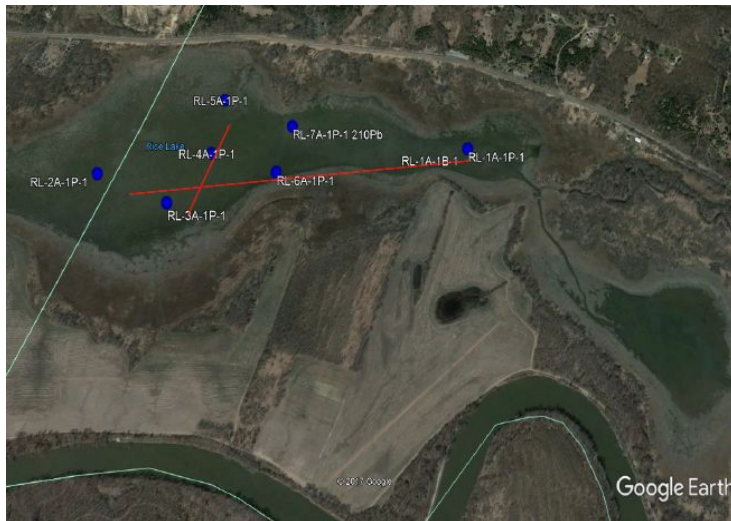
Fieldwork

Two lakes, Rice and Coleman lakes located in the floodplain of the Lower Minnesota were selected to assess historic changes in sediment accumulation rates based on pollen-correlated



core intervals. The lakes were selected after reviewing available information on depth, ownership and access to the floodplain lakes in the lower Minnesota River valley and following site visits during late summer 2017.

Location of Coleman Lake behind a levee on the Minnesota River. *Flood water enters the lake primarily from the west.*



Rice Lake core locations. *These were the initial cores collected in the fall of 2017*



Additional core in Rice Lake. *After review of the initial cores, we took one more of a deeper interval during January of 2018.*

During the visits vegetation samples were also collected to assist with identification of plant micro-remains remains found in the core. Lake properties are summarized in Table 1.

Table 1. *Information about lake area (ac), maximum lake depth (cm), water and core depth, and source water for lake.*

Lake	Area (ac)	Max lake depth (ft)	Core	Water depth (cm)	Core depth (cm)	Water supply
Coleman	114	185?				Nine Mile Creek, seepage and springs
			CL-1	160	151.5	
			CL-2	165	117	
			CL-3	184	114.5	
			CL-4	174	113	
			CL-5	159	110	
			CL-6	170	82	
			CL-7	185	102.5	
Rice lake		91				Bluff Creek, springs and intermittent surface drainage
			RL-1	80	170	
			RL-2	75	118	
			RL-3	77	120	
			RL-4	80	114.5	
			RL-5	79	119	
			RL-6	70	93.5	
			RL-8B	ice	377.5	

Forteen sediment cores were recovered along two transects in the studied lakes (Figures x and x) in the fall of 2017 and February 2018. Cores were named and numbered in a way consistent with Lac Core, University of Minnesota methods and archived there.

Laboratory work

All cores were scanned every 5 mm for their physical properties (p-wave velocity, gamma-ray-density and magnetic susceptibility) using a GEOTEK™ multi-sensor core logger. The cores were subsequently split, photographed and described by macroscopic structure and texture and by microscopic composition. Weighed subsamples were taken from regular intervals throughout the cores for loss-on-ignition (LOI) analysis to determine bulk density and dry weight percent of organic, carbonate, and noncarbonate mineral matter. Sediment subsamples were heated at 105°C to determine dry density, then sequentially heated at 550°C and 1000°C to determine organic matter and carbonate mineral content from post-ignition weight loss, respectively. LOI analysis was performed by LacCore staff. The bulk sediment measurements of magnetic susceptibility (MS) reflect the concentration of magnetizable mineral phases in the sediment, often viewed as reflecting the concentration of clastic mineral material and interpreted as a signal of erosional intensity on the sediment-contributing landscape.

In both lakes a reference core was chosen for detailed pollen analysis and for establishing a pollen stratigraphy. For these cores sediment samples for pollen analysis were taken every 10 cm whereas for the rest of the cores only two samples from near-basal material were taken for correlation with the main core.

Pollen preparation follows the classical chemical method, including acetolysis (Faegri and Iversen, 1989). Pollen percentages are based on the pollen sum of arboreal pollen, including trees and shrubs (AP,) and non-arboreal pollen (NAP), excluding spores of *Bryophyta* and *Pteridophyta* and pollen of aquatic plants, and excluding grass pollen because of

overrepresentation (over 100 pollen grains per sample). At least 200 to 300 terrestrial pollen grains were identified to the lowest possible taxonomic level with keys of Reille (1992; 1998), Beug (2004), and the pollen reference collection at the University of Minnesota. Charcoal particles larger than 20 μm interpreted as an indicator of regional fires (Tinner and Hu, 2003) were also counted. Non-pollen palynomorphs were identified according to van Geel and others (1989). Both charcoal and non-pollen palynomorphs are presented as percentages of the main pollen sum. Analysis of the pollen data was done using a program called *Tilia* 1.5.11 (Grimm 2011) that calculated percentages and created graphics.

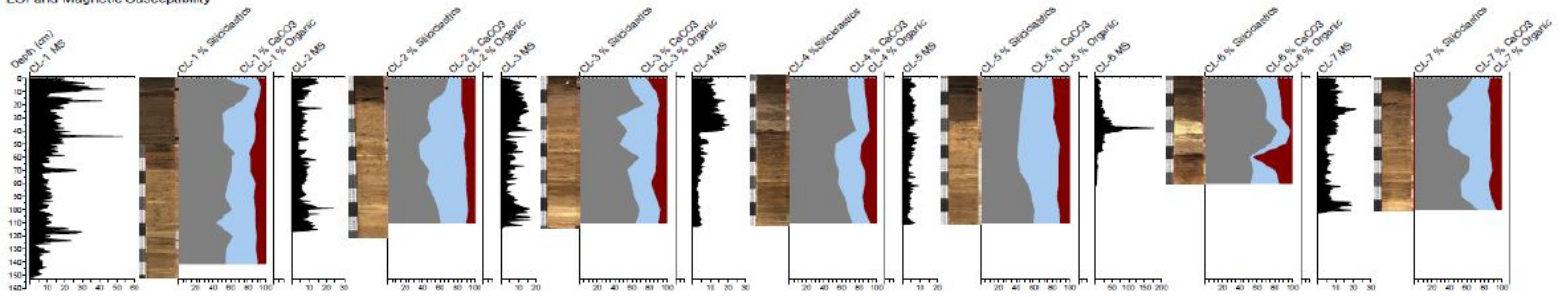
Results

Organic sedimentary material in cores collected in this setting may include algal matter produced within the lake itself, local vegetation from lake margins and the surrounding floodplain, and the organic component of sediment transported down the Minnesota River. Carbonate mineral sediment includes both a carbonate component of the Minnesota River sediment load derived from carbonate-bearing sedimentary rocks, and carbonate sediment produced through biochemical precipitation within the lakes. Non-carbonate mineral matter may include locally eroded silt and sand from the immediate watershed, but in this setting will be primarily derived from upstream erosion in the watershed of the Minnesota River and its tributaries.

Sediment in Coleman Lake

Silty carbonate mud and diatomaceous carbonate mud are the dominant sediment types. The changes in sediment composition are more pronounced in the upper 30-40 cm of the cores. There the siliciclastic fraction increases from 40-60% to up to 85% and the magnetic susceptibility (MS) shows a distinct increase. The amount of carbonate increases to up to 40% between 30 and 60 cm. The organic component remains low (10-15%) with the exception of core CL-6 where it has a maximum 50% at 75 cm. Well defined maxima in magnetic susceptibility are observed between 100 and 120-130 cm in core CL-1, CL-2, CL-3 and CL-7. (FigureX).

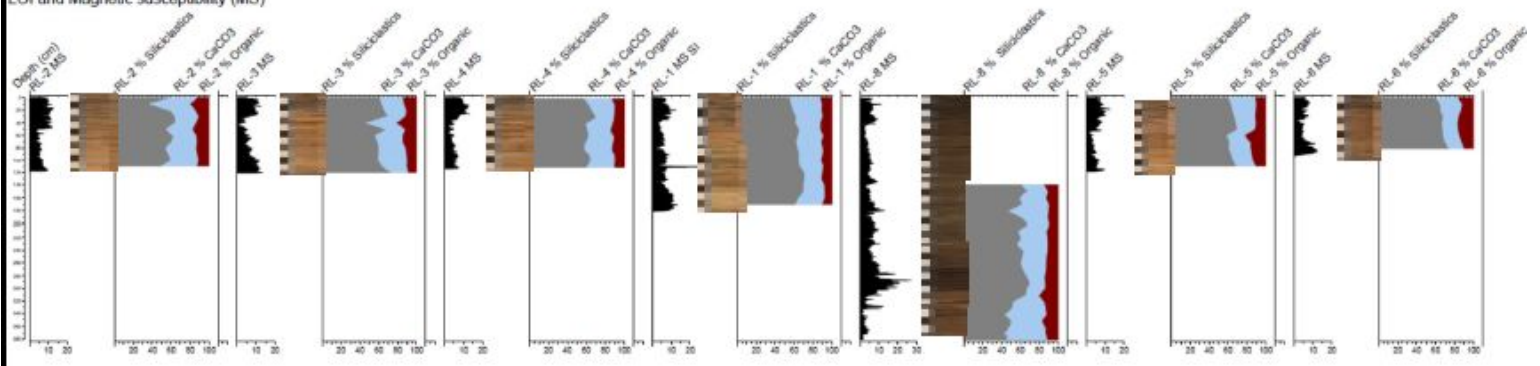
COLEMAN LAKE
LOI and Magnetic Susceptibility



Sediment in Rice Lake

All sediment cores comprise alternating silty carbonate mud and diatomaceous carbonate mud with some silt. The siliciclastic material (50-80%) dominates the sediments from Rice Lake. The lowest siliciclastic percentages (up to 50%) are between 390 and 340 cm in core RL-8, where the highest carbonate percentages of up to 40% appear. The inorganic component increase up to 80 % between 340 and 300 cm in core RL-8 accompanied by an increase in magnetic susceptibility values. Except for core RL-2, the inorganic fraction decreases in the top 20-40 cm. This decrease is accompanied by an increase in the carbonates and for cores RL -2 and RL-3 an increase in the organic fraction. All cores show high MS in top 30-35 cm (Figure 5).

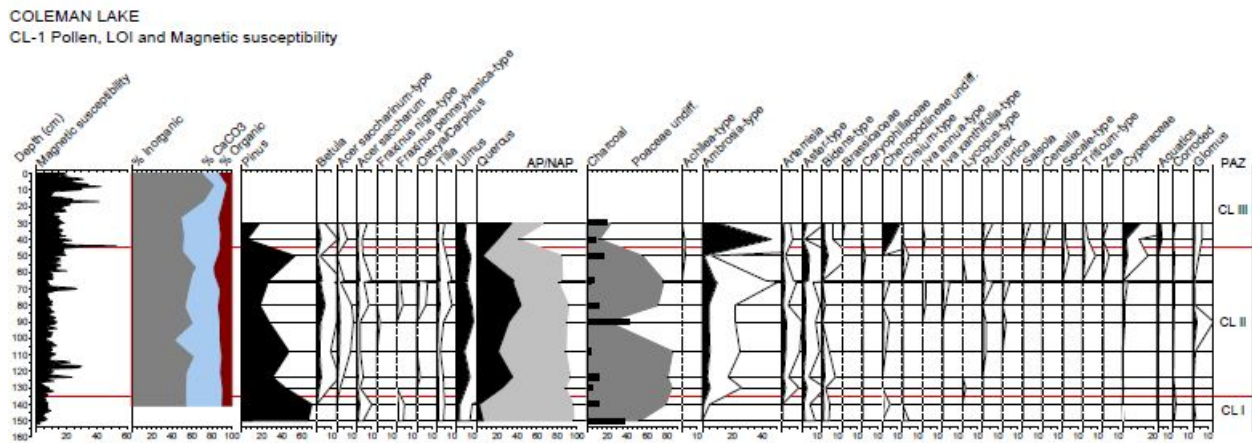
RICE LAKE
LOI and Magnetic susceptibility (MS)



Pollen

Representative cores from each lake are discussed in detail. Pollen zones that are statistically determined help frame the ecological history of the lake and region. Key pollen events can then be linked to dated pollen stratigraphy in nearby lakes.

Pollen stratigraphy of Coleman Lake

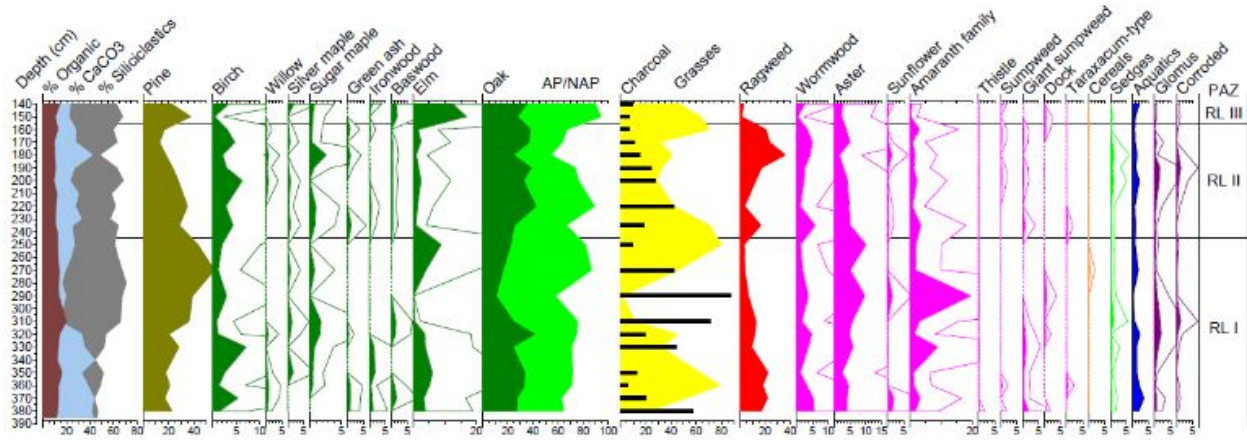


The pollen stratigraphy of core CL-1 is represented with three pollen zones recognized by stratigraphically constrained cluster analysis in CONNISS (Grimm, 1987).

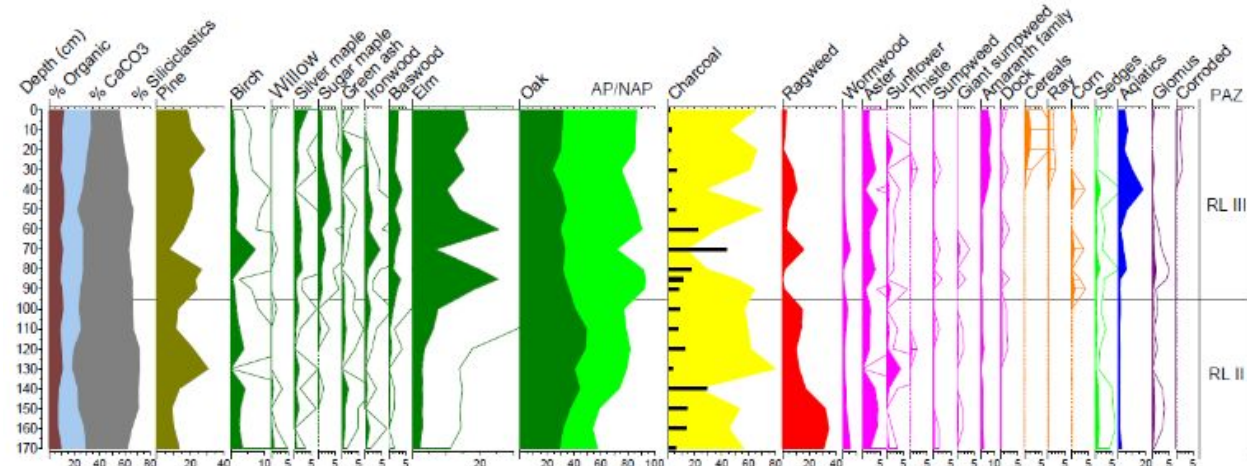
Zone CL I is characterized by low taxonomic diversity as few pollen types were founded: pine (*Pinus*) pollen up to 80%, grass (Poaceae) pollen (excluded from the pollen sum) up to 80%, and small amount of oak (*Quercus*), elm (*Ulmus*), *Ambrosia* (ragweed), *Artemisia* (wormwood) and *Aster*-type (aster). Microscopic charcoal, up to 40% in the most bottom pollen spectrum indicates fire activity in near the lake and involving wetland vegetation dominated by grasses or more likely nearby prairie fires. The high amount of pine pollen likely has a long-distance origin facilitated by the treeless vegetation around the lake. In Zone CL II oak and elm are dominant among the tree species. The most distinct feature of Zone CL III is the high peak of *Ambrosia* pollen percentages, up 40% following a sharp decrease in *Quercus* (oak) values (from 40 to 10%).

Pollen Stratigraphy of Rice Lake

RICE LAKE
Core RL-8



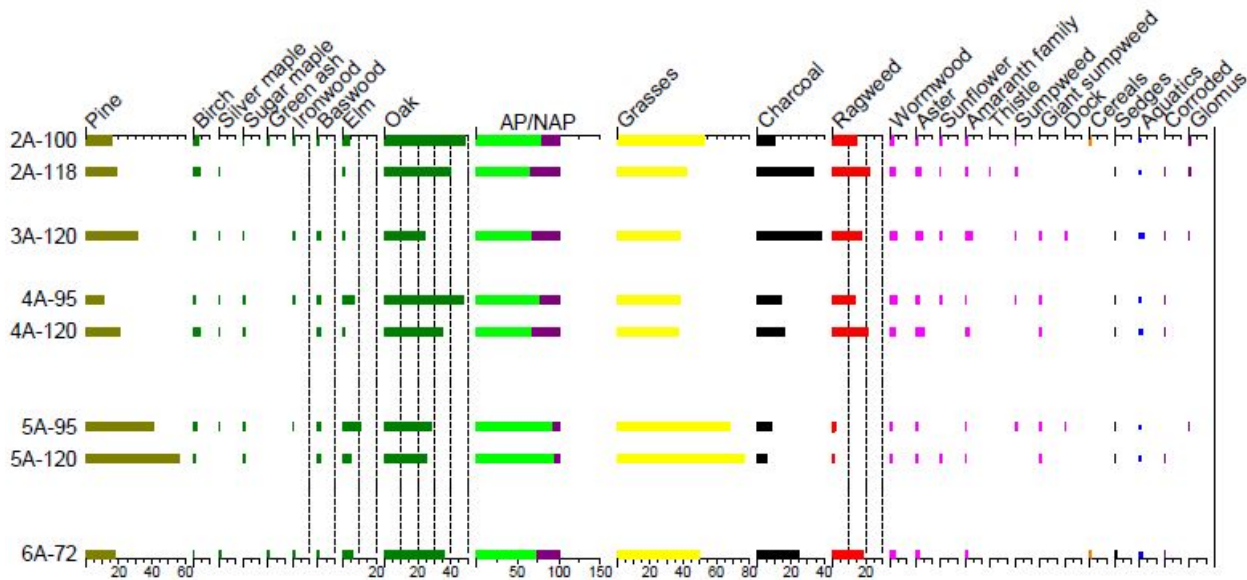
RICE LAKE
Core RL-1



Three pollen zones are also recognized in Rice Lake by stratigraphically constrained cluster analysis in CONNISS (Grimm, 1991). Zone RL I (RL-8), dominated by grasses (up to 80%) and prairie herb types (wormwood, aster species, sunflower and ragweed) reflects the regional pre-settlement wetland and prairie vegetation along with some oak openings registered with oak pollen (25-40%), elm (up to 10%), sugar, silver maple, and birch. The high amount of charcoal between 270 and 330 cm most probably indicates independent fires near the lake in the wetland

and upland forests as shown in the decreased pollen percentages of the grasses, oak and fire-sensitive elm and sugar maple. Corroded pollen grains and fungal spores of *Glomus* in the same interval point to increase erosion in the lake catchment. Amaranth species are pioneers and their spread on the burned wetland areas is interpreted in the zone with a maximum in their percentage values. An increase in the amount of pine pollen above the charcoal interval indicate openings in the forest canopy facilitating pollen transport. The most characteristic feature for zone RL II (RL-8 and RL-1) is the rise in *Ambrosia* percentages by up to 40%, followed by an increase in the oak pollen from 30 to 50%. In zone RL III (RL-8 and RL-1) the most significant change is the increase in the elm pollen percentages up to 30%.

RICE LAKE
Short cores transect



The pollen spectra of the analyzed sediment samples at selected depths in the short cores show analogues with dominant pollen types similar to those at the same depths in core RL-1. This indicates a similar sedimentation process and rate in the different parts of the lakes.

Discussion

The pre-settlement regional vegetation in the study area, reflected in zone RL I in the pollen diagram for core RL-8 from Rice Lake consisted of wetlands, prairies and oak openings. The high charcoal amount in pollen spectra in this zone indicates intensive fires. This is an expected result given the literature documenting the extent of prairies and their fire dependence (Umbanhower, 2004). It is possible that some of the fires had anthropogenic origins because the area was occupied by native Americans. The charcoal layer in the sediments shows high magnetic properties and an increase in inorganic component of the sediment as result of soil erosion after the fires. The sediment of the post-settlement horizon has higher carbonate amounts that is correlated to a greater percentage of cultivated acres in the surrounded lake catchment (Umbanhower et. al. 2011).

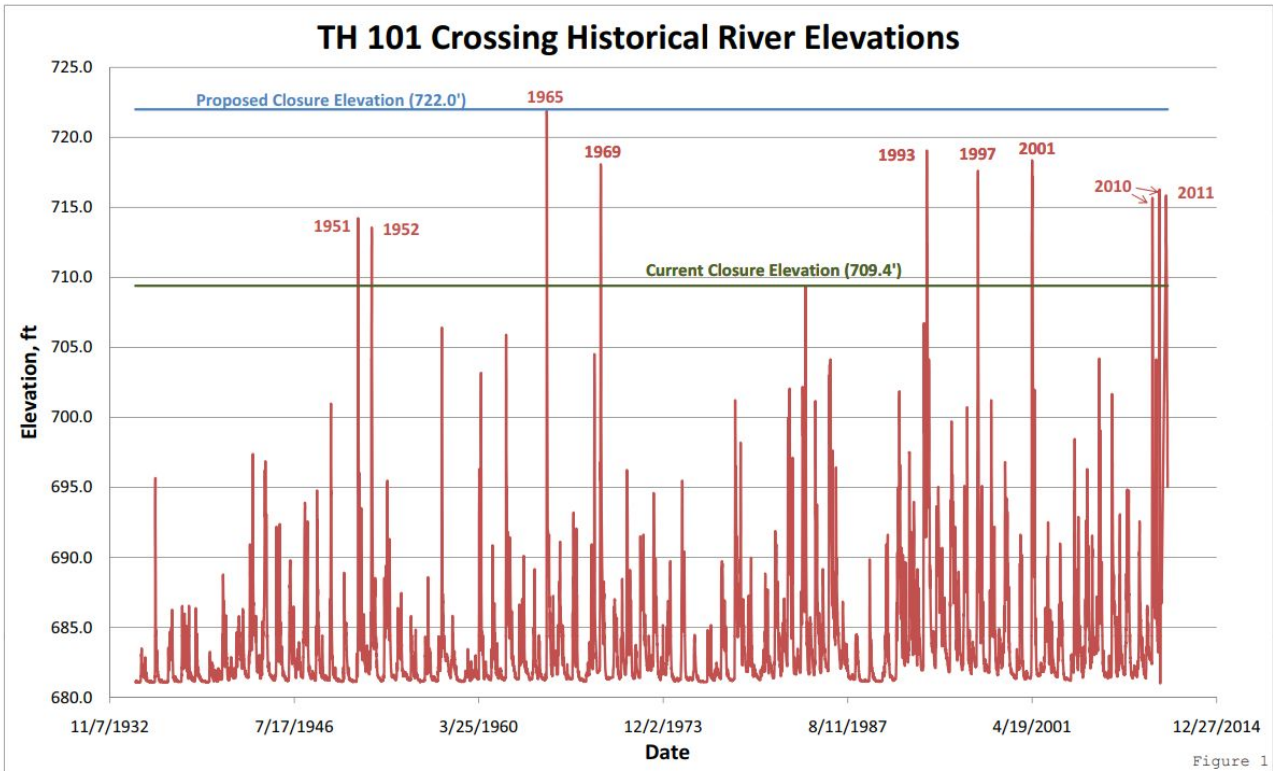
Almost all cores from Race and Coleman lakes have distinct magnetic peaks in the top 30-40 cm that could reflecting larger and more frequent flooding in the valley since 1993. The changes in the magnetic properties in the cores from Coleman Lake are more pronounced than those in Rice Lake but because of the unclear pollen stratigraphy of the main core CL-1 it is difficult to correlate them to particular flood events. The pollen stratigraphy for Coleman Lake most probably reflects the vegetation changes reflected in the upper part of Zone RL II and the entire Zone RL III.

There is a river gauge located upstream of the bridge near [Jordan](#). Those records and the record of Highway 101 bridge closing due to flooding help constrain when sediment-laden floodwaters might have inundated Rice Lake. The bridge was closed six times between 1993 and 2011 with closure times varying from several days to several weeks when water elevations exceeded 709.4' (SEH, 2011, <http://www.dot.state.mn.us/floodmitigation/docs/mn-river-study.pdf>). Typically, the lakes in the floodplain are flooded during 10-year recurrence flood events.

Table 1 – Days Highway 101 Crossing Closed During Flood Events 1965 - 2011

Flooding Event	⁽¹⁾ Highway 101 Days Closed
Spring 2011	43
Fall 2010	16
Spring 2010	27
Spring 2001	29
Spring 1997	18
Summer 1993	27
Spring 1969	17
Spring 1965	15

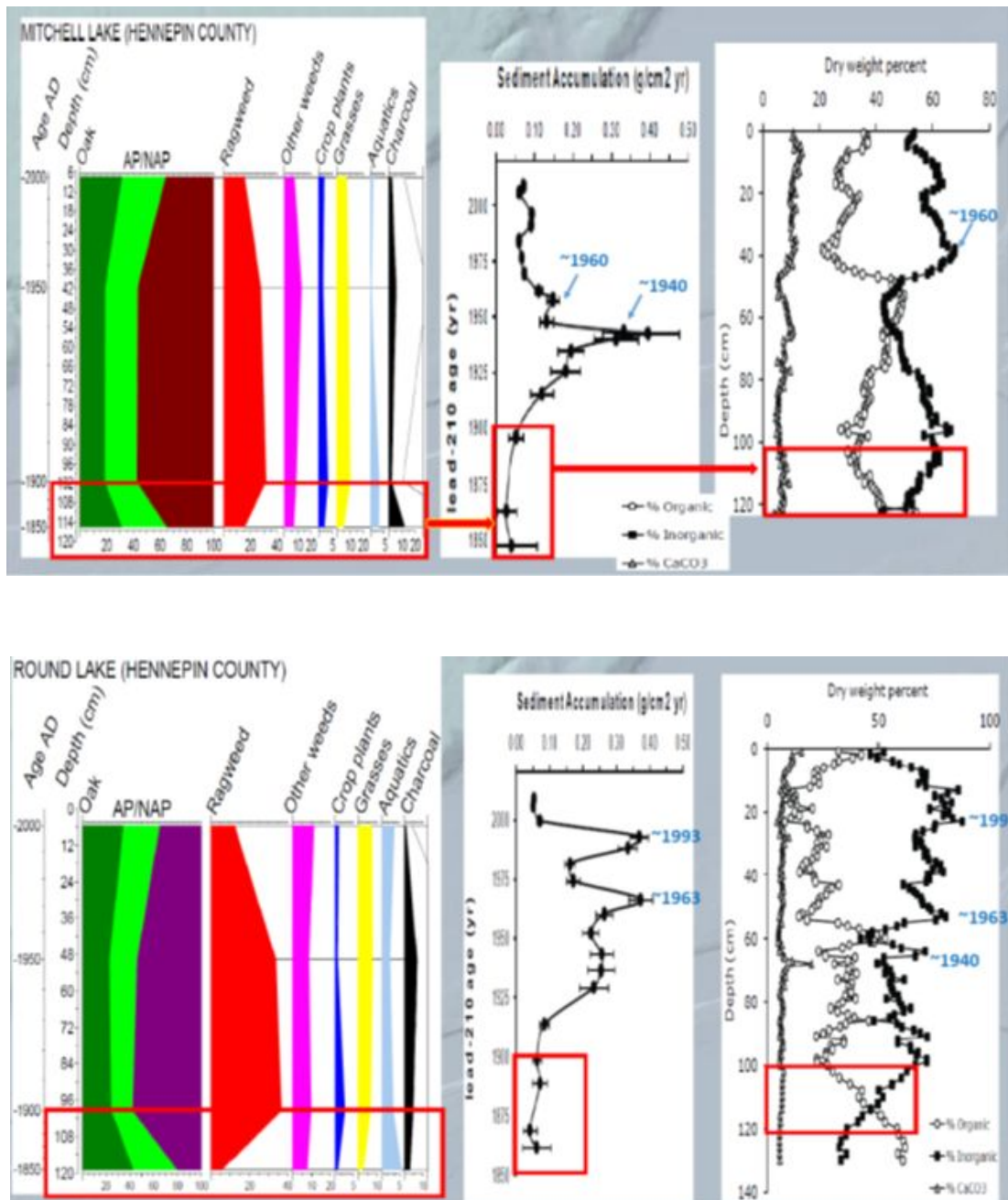
⁽¹⁾ Data for 2010 and 2011 were obtained from MnDOT. Data for 1993, 1997 and 2001 were obtained from the *Trunk Highway 41 Draft Environmental Impact Statement (DEIS)*. Data for 1965-1969 were estimated from historic hydrograph plots and assuming the road is closed for three days beyond the date when the water level dropped below the closure elevation to conduct maintenance and restoration work.



The variability in magnetic susceptibility in the upper portion of Core RLHC17-1A-1P-1 could be related to influx of magnetic grains carried in the river during these flood events.

Ambrosia rise and sedimentation rates

The rise in *Ambrosia* pollen associated with the Euro-American settlement was dated at 1900 AD in Mitchell (102 cm) and 1910 in Round Lake (98 cm). These lakes, located 3-4 miles away from Rice Lake are the closest palynologically studied and dated lakes, used for biostratigraphical comparison.



The rise in *Ambrosia* in both lakes is preceded by an increase in the inorganic content of sediment, as well as a higher charcoal amount (Mitchell Lake) that appears up to 20 cm below the and it is dated at 1850 when the city of Eden Prairie, the closest populated place was established. The increase in the inorganic component of sediment most probably marks the settlement horizon whereas the *Ambrosia* rise reflects the time of intensified agriculture in the area about 50 years later after the arrival of the first European settlers.

Similar increases in the inorganic component of the sediment that occurs one to several centimeters below the *Ambrosia* rise was observed in cores from Crystal Bay, Lake Minnetonka. However, because of the uncertainty in the measurements of the ^{210}Pb activity, the increased inorganic sediment component was accepted as a pre-settlement event (Murtchie, 1985). There are no other studies in the area where the pollen analysis is performed on ^{210}Pb and ^{137}Cs dated cores and *Ambrosia* rise is independently dated.

In Rice lake the *Ambrosia* rise which is accompanied by a peak in the magnetic susceptibility and carbonate component at 180 cm (core RL-8), is above an interval between 230 and 190 cm with higher charcoal amounts and additional indicators of erosion (fungal spores of *Glomus*, corroded pollen grains and very large individual carbonate grains and carbonate aggregates formed in soils). This points to intensification of anthropogenic activity in the area. It is very possible that the settlement horizon in the lake starts at 230 cm and that this horizon correlates to 1850-1860 when the nearby town of Shakopee was established and the first railroad in the region was built. Whereas the *Ambrosia* at 180 cm might reflect the farming development facilitated by improved transportation around 1910-1912 when the population in Shakopee almost doubled compared to 1860.

The decrease in *Ambrosia* pollen in Mitchell and Round lakes is dated at 1950 and in the Rice lake pollen diagrams it appears at 140 cm. The pronounced magnetic susceptibility picks in the top 30-40 cm in all cores from Rice and Coleman lakes might be related to the floods events since 1993.

Taking all of these age interpretations at face value, a linear rate of modern sedimentation was calculated. If the correlations are correct, sediment accumulation rates were:

- 1 cm/y⁻¹ from 1860 to 1910
- 1.0 cm/y⁻¹ from 1910 to 1950
- 2.44cm/y⁻¹ from 1950 to 1993
- 1.4 cm/y⁻¹ from 1993 to 2018

However, ²¹⁰Pb profiles for many lakes (Engstrom, 2007) suggests that both over- and underestimates of sedimentation rates are possible with this linear interpolation method used here to estimate post-1850 accumulation rates in Rice lake. Comparison of the linear sedimentation rates estimated for Mitchell (0.9cm/y) and Round (0.9cm/y) lakes with ²¹⁰Pb-corrected sedimentation rates shows that the maximum dated sedimentation rates were 0.95cm/y around 1940 in Mitchell Lake and up to 1.3 cm/y in Round L around 1966.

Summary and Future Work

If all of the interpreted horizons are correct sedimentation rates peaked at 2.44cm/y⁻¹ from 1950 to 1993 and have decreased to 1.4 cm/y⁻¹ from 1993 to 2018.

Dating key intervals in the core would firm up these interpretations. That magnetic susceptibility peaks indicate recent flood events, while logical, is a hypothesis that should and could be easily tested. The settlement and other anthropogenic disturbances that are interpreted from pollen, sediment and other aspects of the sediment stratigraphy could be dated to firm up the dates of those change and refine the assumed linear interpolation method. Comparison of the linear sedimentation rates to dated rates for two nearby lakes are up to 44% greater. The cores taken for this project have been archived and could be dated at some future time to get more precise estimates of the change in sedimentation rate.

A project funded by DNR Fisheries concerning carp barriers will have relevant information when it is completed. That 3-year project was conducted by the Water Resource Center, Minnesota State University, Mankato who were enlisted by Peter Sorenson to perform repeat bathymetric surveys of the Minnesota River channel from Mankato to the Mississippi confluence. Those surveys would better reflect change in the channel itself.

Acknowledgements

Sediment cores were collected and loss-on-ignition analysis were completed by LacCore (National Lacustrine Core Repository), Department of Earth Sciences, University of Minnesota, Minneapolis (<http://lrc.geo.umn.edu/corefac.htm>). Christa Drake (LacCore) made the pollen preparation

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FRESHWATER

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Linda Loomis, Administrator,
Lower Minnesota River Watershed District
c/o Naiad Consulting, LLC
6677 Olson Memorial Highway
Golden Valley, MN 55427

June 29, 2018

Dear Linda,

Please accept this report and links to deliverables as the final report for the contract signed by Yvonne Shirk for the Lower Minnesota River Watershed Board for \$36,100. With your approval we returned to core a second time in order to go deeper. You agreed to provide an additional \$1100 for this in an email dated 1/25/2018.

The Lower Minnesota River Watershed contract with Freshwater Society was designed provide an assessment of sediment accumulation in the floodplain of Lower Minnesota River Watershed; relate the changes in the sedimentation rates to land management changes and river inputs; communicate the results with stakeholders and develop strategies for a return to a more natural setting for the floodplain.

Specifically, we proposed the following tasks and timeline:

- 1. Site Selection and Fieldwork:** Review of available information and site visits to determine lake suitability.
- 2.** Collect vegetation to assist with identification of plant remains found in the core.
- 3.** Collect six sediment cores in at least two lakes (totaling at least 12 cores).

We cored in fall 2017 and then again in January, 2018. Local vegetation was sampled and is described in the report.

- 4. Sediment Analyses:** Catalog sediments, fossil pollen and non-pollen palynomorphs (stomata, algal cenobia, fungal spores and charcoal particles) preserved in the lake sediments for each core.
- 5.** Inorganic and organic geochemical measurements (loss on ignition or LOI) along with microscopic examination of sediment composition will be used to distinguish the origin of the sediment components as endogenic (organic matter and calcium carbonate formed within the lakes) or allogenic (eroded from the watershed and deposited during floods).
- 6.** Provide a written and visual description of the sediment record for each core and correlate them within the lakes to determine if there are any missing intervals.



7. Compare to well-dated pollen diagrams from 3 lakes in Hennepin and Carver counties to provide a chronological scale to calculate the sedimentation rate.

These tasks were completed April, 2018

8. **Data Synthesis:** Relate the changes in the rates of lake sediment accumulation to the changes in land use and river input.
9. Paper of sufficient detail for submittal to an academic journal

The final report, completed June, 2018, is included in this communication.

Abstracts and presentations:

- April 16, 2108, North Central GSA, Ames, Iowa. Technical Session on [Fluvial Adjustments in the Highly-Altered Agricultural Landscape of the Postglacial Upper Midwest](https://gsa.confex.com/gsa/2018NC/meetingapp.cgi/Paper/313175)
<https://gsa.confex.com/gsa/2018NC/meetingapp.cgi/Paper/313175>
- Abstract submitted for Fall,2018 Water Resources Conference.
https://umn.qualtrics.com/CP/Report.php?SID=SV_6yAtwwMme9qhN9X&R=R_5at16ZOkRve24yB

Our final tasks have been completed and our accountant, Julie Fliflet will be invoicing you for the total of \$37,200. I will be mailing you hardcopies of the report for your files after you have a chance to review it.

It has been a pleasure to work with you over this past year.

Respectfully,

Carrie E. Jennings
Research and Policy Director, Freshwater



LOWER MINNESOTA RIVER WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting

Wednesday, July 18, 2018

Agenda Item

Item 6. G. - Project/Plan reviews

Prepared By

Linda Loomis, Administrator

Summary

i. **I494 Drainage**

The LMRWD was notified that MNDOT is planning a mill and overlay project for Highway 5 near the Mendota Bridge. Staff is working with engineers for the project. to determine if opportunities are available with this project to improve stormwater run-off from roadways within the project area. As staff understands the project currently no new impervious surface will be added and the plan is to replace old stormwater conveyances with like.

ii. **City of Chaska - MCES L-71 lift station project**

The permit for water appropriation for this project has been issued. The engineer has asked the LMRWD for a letter stating that the LMRWD does not manage a permitting system and that the LGU is responsible for assuring the project complies with LMRWD standards. Staff is reviewing the projects to see if there are concerns that need to be conveyed to the city.

iii. **City of Eden Prairie - Abra Auto Body**

This project appeared on the June agenda. Manager Raby asked if this project was in the LMRWD. Staff has checked on the location of the project and it appears that it is located in an area that was transferred to Riley/Purgatory/Bluff Creek WD. Staff will inform the city and RPBCWD.

Attachments

No attachments

Recommended Action

No action recommended