

**RED RIVER BASIN FLOOD DAMAGE REDUCTION WORK GROUP  
MEETING AGENDA**

June 21, 2016

Red Lake Watershed District Office  
Thief River Falls

- 1:00 Introductions and Review Agenda (Greg/Jerome)
- 1:05 Review and approve April 20 meeting notes (Greg/Jerome)
- Review action items
  - Review status of FY16 objectives
- 1:15 FY 2016 Budget Update (Naomi)
- 1:25 FY 2017 Budget Review and Approval
- 1:45 Committee Updates
- Project Team Handbook update
  - Project Readiness form update
  - Legislative and Farm Bill funding related issues (Ron H.)
  - Communications team
  - TSAC update
    - o Wetland monitoring result update
- 2:00 Update on RCPP small watershed planning (Keith Weston, NRCS)
- 2:15 Watershed District Updates
- 2:40 Agency and Organization Updates
- 2:50 Buffer Mapping Update
- 3:05 Review and discuss letter to Collin Peterson regarding tile drainage and flood damage reduction
- 3:20 Other Items
- 3:30 Adjourn

**RED RIVER BASIN FLOOD DAMAGE REDUCTION WORK GROUP  
MEETING NOTES**

April 20, 2016

MN DOT Meeting Room, Detroit Lakes, MN

These meeting notes are provided as a record for this meeting. **Action Items are indicated in bold italicized text.**

Work Group members present: Jerome Deal, Keith Weston, Eddie Bernhardson, LeRoy Carriere, Bruce Nelson, Rob Sip, Brian Dwight, Brian Lacey, Dan Wilkens, Jim Ziegler, Greg Holmvik, Shane Bowe. Jerry VanAmburgh. Ryan Frohling. Stephanie Miranowski

Guests present: Henry Van Offelen, Naomi Goral, Nick Brown, Pat Downs, Nate Dalager. Jeppe Kjaersgaard, Ted Rud

Introductions and Review Agenda. Meeting agenda was reviewed and approved. Greg was unable to attend due to illness.

Review and approve February 16 meeting notes. Highlights of the February meeting notes were reviewed and approved. Henry provided an update on the FY16 objectives.

Budget update

- FY16 – Quarter one expense requests were sent to DNR for reimbursement soon. We went over budget for the March Conference due to the two-day format. We are on course to have more than adequate expenses to use the annual budget funds. It was recommended that **Henry and Naomi work to get the 2<sup>nd</sup> and 3<sup>rd</sup> quarter expenses submitted to DNR as soon as is possible. The finance committee should meet prior to the June meeting in order to make recommendations for FY 16 year end re-allocations and draft an FY17 budget.**

Committee Updates

- March Conference Review- general discussion about March Conference. Some interest in exploring some cost savings by negotiating with the hotel facility. Planning needs to begin for the 2017 conference.
- PT handbook – The readiness form is being updated to a project status report and the Points of Concurrence will be updated in collaboration with the USACE as part of the RRB feasibility study.
- Project Readiness – A final revised form is under review. Target completion for June meeting.
- Legislative Update – Ron's monthly report was provided in the meeting packet.
- TSAC – no progress has been made in completing the project assessment project. Meeting with IWI staff to get 2016 monitoring done and to work on reporting.

- Communications Team – The joint RRWMB, FDRWG, and the RRBC will meet to work on communications issues and needs. Website is being updated.

#### RCPP Update

Keith Weston presented an update on the RCPP program. Almost all agreements for the 14 watershed plans have been signed. There was discussion of the role of project teams in the process and generally agreed that use of the PTs in the process would be good but that it was at the discretion of each watershed district to use the PTs when possible in the planning process. Project Team expenses including those from FDRWG funds can be used as eligible match in the process.

#### USACE Update

The USACE is working with the RRWMB and NRCS to coordinate the 404 permit requirements with the NRCS federal environmental review requirements in the PL-566 planning efforts (attached). The USACE is also working to update the concurrence point guidance found in the project team handbook under the feasibility study. The Redpath project 404 permit will be complete once the 408 permitting requirements are met.

#### Watershed District Project Team Updates

The watershed update handout was distributed, reviewed, and updated as needed during the meeting. Now that signed agreements with NRCS are complete for most watersheds PL-566 planning is beginning.

#### Agency and Organization Updates

The agency and organization update sheet was distributed, reviewed, and updated as needed during the meeting.

#### Red River Basin Drainage Water Management Demonstration Project

Jeppe Kjaersgaard gave the work group a presentation on the ongoing drainage water management research in the basin (attached).

#### Other Items

No other items were presented.

#### Upcoming Events

May 23 - 1,000 WRP easement celebration

June 1 and 2 - RRBC tour

June 5 and 6 - Agricultural Committee tour and listening session

June 23 –Red River Valley Drainage Water Management Tour

Late August – BWSR Board Tour East Grand Forks

Meeting Adjourned at 3:45

# RED RIVER BASIN FLOOD DAMAGE REDUCTION WORK GROUP

## Proposed FY 2017 Budget

Minnesota's Flood Damage Reduction Work Group is working to ensure the full implementation of the 1998 Mediation Agreement. This spending plan identifies sufficient funds to continue a reasonable level of planning, project development, coordination, and oversight of the project team process.

<b>Work Item</b>	<b>FY16</b>	<b>FY17 proposed</b>
Project Team Support	120,000	120,000
Project Monitoring	90,000	95,000
Project Acceleration Grants	28,000	23,000
TSAC: Coordination and projects	15,000	11,000
Work Group Meetings and Conference	6,000	10,000
Communications and Outreach	5,000	5,000
<b>Total</b>	<b>264,000</b>	<b>264,000</b>

# Red River Watershed Management Board Mediation Income/Expense FY2016

	Approved Amount	Received Amount	Expenditures	Expenditures	Transfer In/(Out)	Amount Remaining To Allocate
Work Group Meetings and Conference	6,000.00	211.55	11,745.48			-5,745.48
Project Monitoring						
Water Quality			75,000.00			-75,000.00
Other Monitoring						0.00
Total Monitoring	90,000.00	0.00	75,000.00	0.00	0.00	15,000.00
Overall Plan Update						0.00
Distributed Detention Strategy						
RRWMB						
BRRWWD						
Total Distributed Detention Strategy	5,000.00		300.00			4,700.00
Communications and Outreach	28,000.00		10,000.00			18,000.00
Project Development Grants						
TSAC Coordination						
WSN						
HDR						0.00
Other	15,000.00	764.77	11,145.00			0.00
TSAC Projects						
Culvert Sizing Phase II						
Project Assessment						
Total TSAC Coordination	15,000.00	764.77	11,145.00	0.00	0.00	3,855.00
Watershed District Support						
Project Acceleration Grants						
PT Support						0.00
Bois de Sioux WD	15,000.00		15,481.18	11,968.76		-12,449.94
Buffalo-Red River WD	15,000.00		15,000.00	4,712.81		-4,712.81
Middle River-Snake River WD	15,000.00		12,234.75	0.00		2,765.25
Red Lake WD	15,000.00		15,000.00	18,650.87		-18,650.87
Roseau River WD	15,000.00		15,000.00	26,033.73		-26,033.73
Sand Hill River WD	15,000.00		0.00	0.00		15,000.00
Two Rivers WD	15,000.00		1,044.90	0.00		13,955.10
Wild Rice WD	15,000.00		15,000.00	5,682.52		-5,682.52
PT Support - Other						0.00
Total PT Support	120,000.00	75,484.05	88,760.83	67,048.69	0.00	-35,809.52
Total Watershed District Support	120,000.00	75,484.05	88,760.83	67,048.69	0.00	31,239.17
Total Mediation	264,000.00	76,460.37	196,951.31	67,048.69	0.00	-0.00

**Flood Damage Reduction Work Group FY 16 Objectives (June 21, 2016)**

Objective	Lead	Committee / Support	Status & Expected Completion
1. Schedule and coordinate six work group meetings	Henry	Naomi	June is meeting 6
2. Create quarterly update project development tracking table	Henry	WD administrators	Remains a work in progress.
3. Quarterly update and review of budget	Henry & Naomi	Finance Committee	In process. Q1 done. Q2 done. Q3 in process.
4. Review and update financial protocols as needed	Henry & Naomi	Finance Committee	A new system is in place to make FY 16 reporting easier.
5. Develop Communications Plan	To be determined.	Communication Committee	Ongoing.
6. Update the work group website and maintain	To be determined.	Communication Committee	Ongoing.
7. Produce annual report to legislature	Henry & Naomi	Communication Committee	FY16 year-end report not complete.
8. Plan and implement March Conference	Henry & Naomi	Conference Planning Committee	Complete. Planning for next year has begun
9. Review and update PT handbook	Henry	New Committee - WD administrator, DNR and BWSR PT members	Readiness form almost done. Now "project status".
10. Update project readiness form	Brian	Dan Thul, Jim Ziegler, WD administrator, Ron Harnack	Almost complete.
11. Incorporate lessons learned from Green Meadow process into PT handbook	Henry, Brian, Chuck	Jerry, Kevin	Complete. March Conference workshop item.
12. Hold early coordination meetings with USACE as needed	Henry	WD administrators, consultants	Ongoing - Regular communication has started.
13. Update project monitoring protocols			WQ update complete. TSAC work on other areas.
14. Develop project monitoring guidance document, educate PT members			TSAC still needs to work on this.
15. Host one TSAC meeting	Henry	TSAC	Complete. Another one to be scheduled.
16. Conduct and complete FDR project assessment work		TSAC	Ongoing TSAC project.

# Watershed District Project Team Reports

## June 21, 2016 - FDR Work Group Meeting

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### Bois de Sioux

The BdSWD is beginning the RCPP Planning Process for the Bois de Sioux Direct sub-watershed. Several board members attended the Federal Ag Committee meeting in Moorhead on June 6 to learn more about the program and process. Staff attended the first RCPP workshop in West Fargo on June 7 to discuss the detailed processes required. An Agency Scoping meeting was held on June 8 in the BdSWD office. This process continues to progress.

Progress is being made on acquiring the remaining lands needed for the Redpath Impoundment, mainly the by-pass corridor. Due to no approved bonding bill in the 2016 legislative session, it appears any work beyond land acquisition will come to a halt. Without bonding bill funding, further development cannot proceed. We have requested \$2M for the next biennium.

The North Ottawa Phase 5C construction work is complete. Final inspection, survey, and reporting is underway. Closing out the contracts (construction and funding) along with finalizing the Operations and Maintenance Manual are next on the work lists.

Discussions regarding the Big Lake project have been re-vitalized. Legislation was introduced to establish a drawdown lake elevation. A meeting was held May 6 with the MnDNR to discuss the situation. Completing an EAW would be the next step in the process according to the MnDNR. The Board is concerned with the expenditure of funds to complete the EAW with no assurance that a permit would be issued. Discussions continue.

### Buffalo – Red

Since 04/20/16, the BRRWD's PT has met once, on June 16<sup>th</sup>. Our next meeting is tentatively scheduled for Thursday, August 18, 2016 at 7:00 PM in the Watershed Office. At our meeting last week, we received updates on several projects: Stony Creek Comprehensive Planning – Houston Engineering, Inc. (HEI) is working with DNR Dam Safety and the dam hazard classification; Barnesville Township – the BRRWD Board of Managers are working on setting land easement values for retention areas based on the County's appraised market values; South Branch of the Buffalo River – discussed a Phase 1A project, east of Trunk Highway (T.H.) No. 9, which will route flows from Wilkin County Ditch (C.D.) No. 44 (installed in the late 1800s) back to the original river channel, next steps include meeting with the affected agencies in this Phase 1A area; and Otter Tail River and Whiskey Creek – HEI continues to make good progress on the preliminary surveys for both areas.

We've recently learned that we received a \$2.8 million Targeted Watershed grant from BWSR for Wolverton Creek Restoration. Our application for the same project to the Legislative Citizen Commission on Minnesota Resources (LCCMR) was not approved. We also have an application pending with the Lessard-Sams Outdoor Heritage Council (LSOHC) for \$3.015 million. The 26.2 mile channel restoration has been divided into three phases. Construction is expected to in the spring of 2017. We also plan to meet with the Phase 1 landowners, requesting that they submit an application to the Natural Resources Conservation Service (NRCS) for 2017 Wetland Restoration Enhancement (WRE) funds to help with the land easements/construction.

Construction is progressing well regarding Phase 4 on the Oakport Flood Mitigation project. Barring any weather related issues, R.J. Zavoral and Sons, Inc. hope to be done around Labor Day, 2016.

A Fall Tour is tentatively being planned for Thursday, September 8, 2016. Invitees will include PT members, the BRRWD Advisory Committee, SWCD Supervisors, County Commissioners, and state and federal elected leaders.

### Wild Rice

To be provided at the meeting.

### Red Lake

Red Lake Watershed District and consultant met with various MNDNR staff in Bemidji on April 20<sup>th</sup> to discuss water level targets on Four Legged Lake as well as number of structures that would be incorporated into the project. We accomplished a lot at this meeting which ultimately lead to an agreement on waters levels as well as the feeling among the group that one structure would be sufficient to accomplish the projects goals. These ideas will be brought back to the PWT for discussion at our regularly scheduled meeting held at the RLWD Board Room June 17, 2016.

The Red Lake Watershed District and consultant also discussed Little Pine Lake WMA and the possibility of revising the operating plan slightly to gain additional flood storage on this complex during large rainfall events or spring runoff. Additional information will be compiled by the DNR and will give updates to the PWT at our regularly scheduled meeting held at the RLWD Board Room June 17, 2016.

The District will also be holding public meeting for Four Legged Lake Watershed and Pine Lake Watershed July 12<sup>th</sup> at the Gonvick Community Center from 4:00 pm to 7:30 pm. Although we have already held various public meetings on these project, the upcoming meetings are being held in accordance to the RCPP agreements the District has with the NRCS.

### Sand Hill

To be provided at the meeting. copy and paste from email.

### Middle Snake Tamarac.

To be provided at the meeting. JD 14.... JD 19...

### Two Rivers

Working on the RCPP/PL566 laundry list and we have a meeting scheduled for June 30<sup>th</sup>. Monitoring well installed 6/22/16.

### Joe River

Nothing to report

### Roseau River

To be provided at the meeting.



# Agency and Organization Updates

## June 21, 2016 - FDR Work Group meeting

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### BWSR

To be provided at the meeting.

### DNR

- Project teams – DNR staff continue to participate in the project work teams that are active. The JD14 team is now starting and Green Meadow is restarting. Lead staff and PT members have been assigned for all anticipated project teams.
- Roseau WMA work will be started this summer. Roseau Lake rehabilitation planning continues. Staff lead development of the LSOHC proposal for the Goose Prairie WMA project.
- Development of a Klondike fen management plan has begun with staff assigned. A monitoring site visit is scheduled for June 22.
- Environmental review – Staff are prepared to assist with ER needs especially in the context of PL-566 planning.
- Buffer mapping – the buffer mapping project continues. 2,500+ comments received on draft map. All comments responded to individually. A new map will be available around July 1. Additional comments received will be processed for an updated October map.
- Riparian corridor projects and easements – Henry and Jamison are working with WRWD to successfully adapt the RIM program for use in channel corridor restoration projects.
- NR planning – DNR staff continue to participate in the process and review the draft in the One Watershed One Plan in the Red Lake Pilot watershed.
- FM Diversion –
  - **\*Summer 2016** — DNR makes adequacy decision on Final EIS.
  - **\*Summer 2016** — DNR permitting decisions.

### FSA

Crop acreage certification is in full swing. ARC/PLC enrollment is also quite busy. Facility Loan requests are higher than anticipated. FSA is now able to process facility loans for used equipment, vehicles, and portable equipment.

### IWI

Attached.

### MDA

To be provided at the meeting. July 14, 15, 16. June 23

### PCA

**WRAPS** – The following WRAPS and TMDL's have been public noticed and are moving through the final approval stage:

**Buffalo/Red** – TMDL's have been sent to EPA, Response to WRAPS comments have been completed. Once final approval of TMDL's by EPA is received, the WRAPS is final and published. Expect less than 30 days.

**Mustinka** – TMDL’s have been sent to EPA, Response to WRAPS comments are being drafted. Once final approval of TMDL’s by EPA is received, the WRAPS is final and published. Expect less than 30 days.

**Sand Hill** – Public notice complete. Final edits to TMDL’s and WRAPS are being drafted. TMDL’s should be sent to EPA within 10 days. Expect finalization in less than 60 days.

Other WRAPS that are nearing completion and should be finalized in the next 90-120 days include:

**Upper Red, Bois De Souix, Thief River.**

**Staffing Issues: Monitoring Coordinator** (Joe Hadash position) – this position has been vacant for 15 months due to budget shortfalls. **Update:** Backfill for this position is currently posted through June 22, 2016. Expect to fill by mid July.

**Project Manager** (Tara Mercil position) – This position has been vacant for 7 months. **Update:** Backfill for this position has been approved and posting packet has been submitted. Expect posting to open before July 1 and filling before August 1.

**Red Lake Band**

Nothing new to report.

**Red River Basin Agency Interaction Team**

Nothing new to report.

**RRBC**

No report.

**RRRA**

Nothing to report.

**SWCDs**

No report.

**USFWS**

No report.

**USACE**

The USACE St. Paul District Regulatory Branch has identified Corps Project Manager (PM) Craig Jarnot as the main point of contact for all PL-566 projects in the Red River Basin within the State of Minnesota. Jarnot is located in the Bemidji Regulatory Field Office and will be responsible for any Clean Water Act (CWA) Section 404 permitting requirements, coordination with the SLO’s, as well as coordination with NRCS regarding the NRCS review point and USACE CWA Section 404 concurrence points. Jarnot will be attending as many Project Work Team (PWT) meetings and coordination meetings as possible. Given the large number of PL-566 projects under simultaneous review, the USACE expects advanced notice of all PWT and coordination meetings to ensure Jarnot can attend or an alternate PM can attend if Jarnot is unavailable.

**Agricultural Sector**

Too be provided at meeting.

## *May 2016 International Water Institute Monitoring and Education Activity Report*

### **FDR, Condition, Watershed, and SWAG Projects:**

- WPLMN monitoring has slowed with low water levels. Most sites are currently on a 2-3 week rotation. Water levels are low and are currently listed in the MN DNR Stream Report as having normal to low flows. Staff have been calculating 2014 loads for the WPLMN project sites since mid-February and have completed loads for all but a handful of sites that have available flow data. The final project report for FY14\_15 is in progress.
- Staff are working with Henry Van Offlen to begin the organization/planning for the 2016 monitoring project reports which will incorporate wetland plant community conditions, water quality, and other available information. A model/draft report will be developed using information for the Brandt Impoundment.
- Monitoring equipment has been delivered to basin partners including the River Watch Schools. There still remains several MPCA owned equipment units in need of repair due to lack of Detroit Lakes MPCA staff positions able to perform the necessary maintenance. Staff recently retired and or moved on and it appears these positions will not be filled going forward.
- BRRWD water quality monitoring project began the last week in April. IWI staff will be collecting monthly water quality samples at 21 sites and downloading flow data from 7 sites in the Buffalo Red Watershed District. Work will take place April through October.

### **River Watch:**

- Staff have been assisting River Watch teams with equipment issues and monitoring. Many of the teams began monitoring in early March.
- River Of Dreams project activities wrapped up in April with schools releasing their canoes. Fertile 4<sup>th</sup> grade released on April 14<sup>th</sup>, Plummer April 15<sup>th</sup>, Fisher April 18<sup>th</sup>, and Newfolden April 19<sup>th</sup>. Five teachers and 107 elementary students participated in this project in 2016. The project interim report was submitted to the NW MN Foundation Board April 28, 2016. The final project report is due December 31, 2016.
- Work on the final report for the 2014 – 2015 River Watch CWL project is in progress. Participating educators have been contacted to provide input and feedback on the River Watch programs via survey and written comments. Educator responses will be used in the evaluation portion of the final report as well as to shape future program offerings.
- IWI staff have been busy coordinating with Wilderness Inquiry staff in planning June paddle events on the Red Lake River. Full day events are scheduled June 8<sup>th</sup> Crookston, June 9<sup>th</sup> Thief River Falls, June 10<sup>th</sup> East Grand Forks, and ½ day June 11<sup>th</sup> East Grand Forks. These paddle events will be open to the public. Wilderness Inquiry will have 24 foot 10 passenger canoes on hand to accommodate attendees. Advertising and invites will be coming out soon watch/read/listen your local news.
- Staff are in the process of locating biological monitoring sites and establishing biological monitoring protocols for our River Watch teams. They will be monitoring a select few locations starting this fall.
- Spring River Explorer trips have been scheduled for five schools. Schools to paddle in May include Valley-Edinburg May 17, Cavalier May 18, Walhalla May 19, Newfolden May 20, and Clearbrook May 31.

## *May 2016 International Water Institute Watershed Research Activity Report*

### **PL566 Planning/Project Acceleration:**

- Assembling damage figures (without project condition)
- Prep and planning - Project Team meeting 4/21
- Prep and planning - Initial public scoping meeting 5/5

### **PTMApp**

- Interview - Minnesota Public Radio News article out this week [www.mpr.org/news](http://www.mpr.org/news)
- Workshop planning - Wilken county
- Public dataset posted – request user access @ <http://ptmapp.rrbdin.org/>

### **MN Drainage Work Group – GIS/Drainage Assessment.**

- Initial method and results compiled/under review.
- Method and initial results briefing early June.
  - Full DWG presentation June 9<sup>th</sup>.

### **RRBDIN**

- LiDAR Viewer updates in progress
- Amazon Cloud services contract in place
  - Will assess budget impact regularly (at least quarterly) a long-term funding plan is needed.
- LiDAR data will remain at NDSU until phase-out
  - After phase out - users can access LiDAR data via ND and MN data websites.



**TO:** Minnesota Flood Damage Reduction Work Group

**FROM:** Robert Sip, Environmental Policy Specialist, Minnesota Department of Agriculture  
Jeppe Kjaersgaard, Research Scientist, Minnesota Department of Agriculture

**RE:** Proposal to Add Total Phosphorus and Orthophosphate to the Water Analysis Program for the Red River Valley Drainage Water Management Project at Rothsay, Minnesota

**DATE:** June 16, 2016

**INTRODUCTION:** This proposal is submitted in response to a request by the Minnesota Flood Damage Reduction Workgroup (FDRWG) at their regular meeting held on April 20, 2016 in Detroit Lakes, MN. Subsurface (tile) drains installed on agricultural land with poor natural drainage allows more timely field operations and generally contributes to improved crop yields. Concerns over water quality and hydrologic impacts caused by subsurface drainage have led to an opportunity to improve some aspects of the practice. The Red River Watershed Management Board has also adopted drainage management guidelines for its member watershed districts recently. It is anticipated that this project will provide additional information to water managers as they continue to consider new drainage rules and regulations or amend existing policies in the Red River Basin.

**PROJECT OBJECTIVE:** To design, install and demonstrate long-term water quality and hydrologic impacts of managed drainage practices in the Red River Basin, including the use of subsurface drainage and controlled drainage as ***flood reduction and mitigation strategies***. Additional information about the Red River Valley Drainage Water Management project, including field locations and practices, is provided in the enclosed project fact sheet.

**MONITORING AND EQUIPMENT:** The monitoring program include continuous monitoring of surface and subsurface runoff quantity. Water samples are collected using automated water samplers. Meteorological information is collected using an automated agricultural weather station to enable the estimation of crop water use to help establish the field water balance.

**RATIONALE:** At present, water samples are scheduled to be analyzed for nitrate-nitrogen and nitrite-nitrogen, and total suspended solids from the surface runoff sites. On April 20, 2016, the Minnesota FDRWG recognized phosphorus as another important nutrient causing water quality degradation in receiving water bodies. Harmful algae growth in many lakes including Lake Winnipeg, the receiving water body of the Red River, is limited by phosphorus. Practices to reduce exports of phosphorus from agricultural production systems may help minimize algae growth.

Because the majority of phosphorus residing in the soil is bound to particles, phosphorus transport tends to occur when these particles are moved within a field or off a field. This can occur via wind and water erosion. Subsurface drainage tends to reduce surface runoff events and may thus help reduce phosphorus exports. However, emerging evidence suggests that subsurface drainage systems may also provide a pathway for phosphorus loss in some soils. The primary form of phosphorus found in subsurface drainage is the highly bioavailable orthophosphate. While the losses of phosphorus through the drains are small from a soil fertility standpoint, they may be substantial in an ecosystem context.

The Red River Valley Drainage Water Management project is designed to quantify the hydrologic and water quality impacts between land with and without subsurface drains installed, including the use of subsurface drainage **to reduce flood damages**. Adding total phosphorus and orthophosphate to the water analysis program to supplement the flow measurements will greatly enhance the project's impact and provide valuable information about the water quality and hydrologic impacts of the demonstrated drainage practices.

**CONNECTIONS TO FLOOD DAMAGE REDUCTION:** The information collected as part of the project will relate to the work of the Minnesota FDRWG in several ways, including:

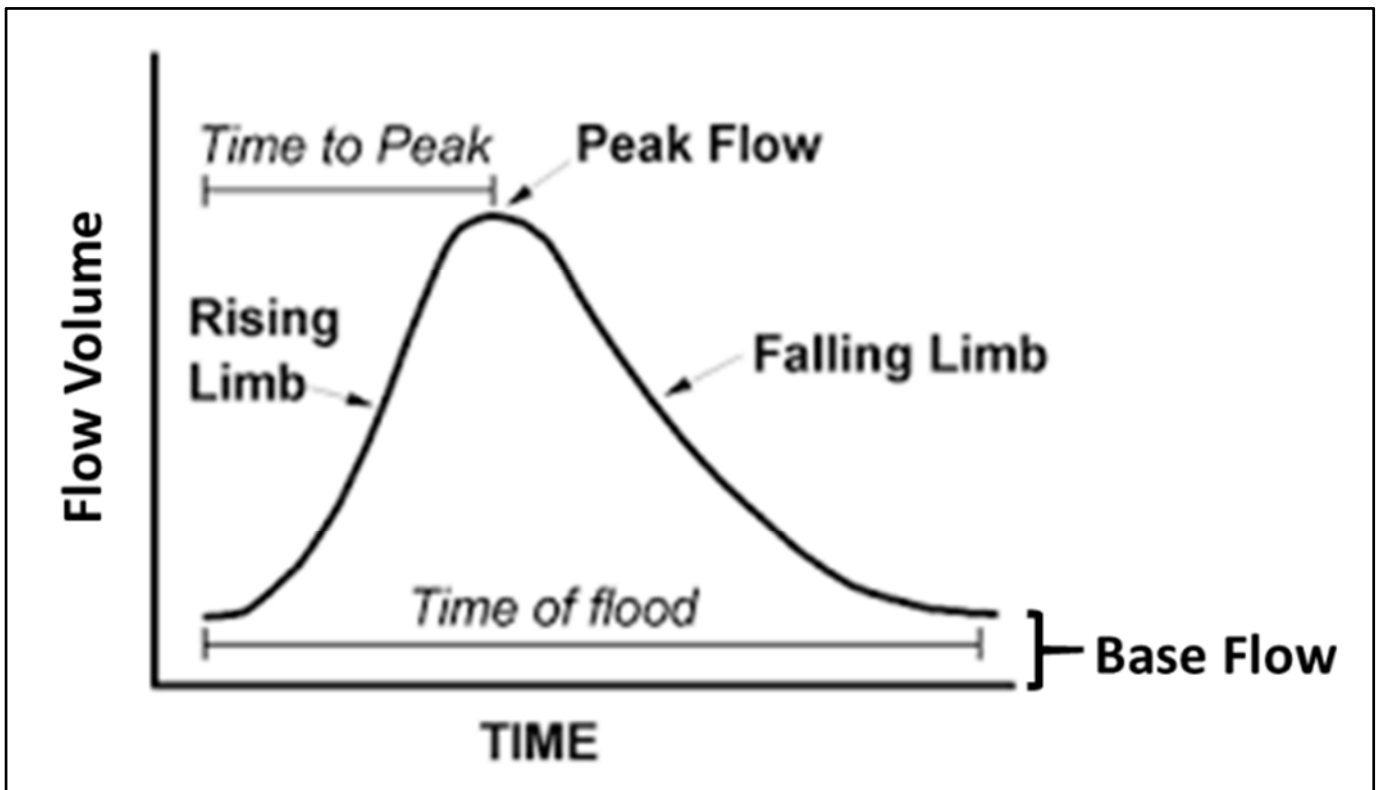
- Quantify the impacts of subsurface drainage on field hydrology, including help characterize the use of subsurface drainage and controlled drainage practices for flood reduction and mitigation.
- Quantify the degradation of water quality incurred during flood events at the field scale, including help characterize and minimize the export of plant nutrients and sediment.
- Provide field-verified information to studies seeking to explore and quantify local and basin-wide strategies for flood damage reduction.
- Provide educational opportunities for managing drainage water for flood damage reduction stakeholders, including producers, land owners, agricultural advisors, local and regional public officials, soil and water conservation districts and watershed district board members and personnel, industry representatives and others.

**BUDGET INFORMATION:** Three cost options are included for the Minnesota FDRWG to consider:

1. Option A - To collect basic water quality information, which is estimated to provide inadequate information for extrapolating the results to other areas within the Red River Basin (**\$4,480/year**).
2. Option B – It is estimated that this option will provide a base level of information for extrapolating the results to other areas within the Red River Basin (**\$9,632/year**).
3. Option C – This option will provide higher statistical levels of information for extrapolating the results to other areas within the Red River Basin (**\$15,008/year**).

The cost options cover water analysis expenses for total phosphorus and orthophosphate only. Expenses related to staff time spent collecting the water samples, travel to and from the field sites, shipping expenses and other costs are covered from other funding sources.

In the budget it is assumed there will be 8 surface runoff events per year resulting from snowmelt or high intensity rainfall events. In addition, it is assumed the subsurface drain lines will have water running during 16 weeks per year. The water samples from surface and subsurface runoff are collected using automated water samplers which are programmed to increase the sampling frequency when the flow volume changes. This will enable water sample collection during base flow conditions as well as during the period with increasing flow (rising limb), at the peak flow rate and the period of decreasing flow (falling limb), Figure 1, resulting in 4 samples per event.



**Figure 1.** Schematic of the relationship between time and flow volume of an idealized runoff event. Time to peak denotes the time interval between the onset of increasing flow (such as after a rainfall event) to peak flow.

It is assumed that the analysis costs for total phosphorus and orthophosphate is \$28 per water sample, based on a quote from the Minnesota Valley Testing Laboratories. This is the laboratory MDA is using for the nitrate-nitrogen and nitrite-nitrogen analysis. The overall project duration is intended to be at least seven years, but at this time MDA is requesting funding from the Minnesota FDRWG for three years. The three cost options are detailed in the following, with all costs expressed on an annual basis:

**Option A - Estimated Cost is \$4,480 Per Year:**

- Surface water runoff from 8 surface runoff events at field 1 (3 sites),
- Subsurface water samples collected every other week at field 1 (2 sites),
- No samples collected from field 2.

Sample location	No of sites	Weeks of flow	Collection Frequency	No of samples	\$/sample	Estimated cost
Field 1 Surface Runoff	3	n/a	8 events per year	4 per event	\$28	\$2,688
Field 1 Subsurface Drainage	2	16 per year	0.5 samples per week	4 per event	\$28	\$1,792
Field 2 Subsurface Drainage	2	16 per year	0	-	\$28	\$0
Field 2 Saturated Buffer	7	16 per year	0	-	\$28	\$0
<b>Sum</b>						<b>\$4,480</b>

**Option B - Estimated Cost is \$9,632 Per Year:**

- Surface water runoff from 8 surface runoff events at field 1 (3 sites),
- Subsurface water samples collected every week at field 1 (2 sites),
- Subsurface water samples collected every other week at field 2 (2 sites), and within the saturated buffer (7 sites, including 6 observation wells).

Sample location	No of sites	Weeks of flow	Collection Frequency	No of samples	\$/sample	Estimated cost
Field 1 Surface Runoff	3	n/a	8 events per year	4 per event	\$28	\$2,688
Field 1 Subsurface Drainage	2	16 per year	1 samples per week	4 per event	\$28	\$3,584
Field 2 Subsurface Drainage	2	16 per year	0.5 samples per week	4 per event	\$28	\$1,792
Field 2 Saturated Buffer	7	16 per year	0.5 samples per week	1 per event	\$28	\$1,568
<b>Sum</b>						<b>\$9,632</b>

**Option C - Estimated C is \$15,008 Per Year:**

- Surface water runoff from 8 surface runoff events at field 1 (3 sites),
- Subsurface water samples collected twice per week at field 1 (2 sites),
- Subsurface water samples collected every week at field 2 (2 sites), and within the saturated buffer every other week (7 sites, including 6 observation wells).

Sample location	No of sites	Weeks of flow	Collection Frequency	No of samples	\$/sample	Estimated cost
Field 1 Surface Runoff	3	n/a	8 events per year	4 per event	\$28	\$2,688
Field 1 Subsurface Drainage	2	16 per year	2 samples per week	4 per event	\$28	\$7,168
Field 2 Subsurface Drainage	2	16 per year	1 samples per week	4 per event	\$28	\$3,584
Field 2 Saturated Buffer	7	16 per year	0.5 samples per week	1 per event	\$28	\$1,568
<b>Sum</b>						<b>\$15,008</b>