



Water Quality and Storage Grant Program

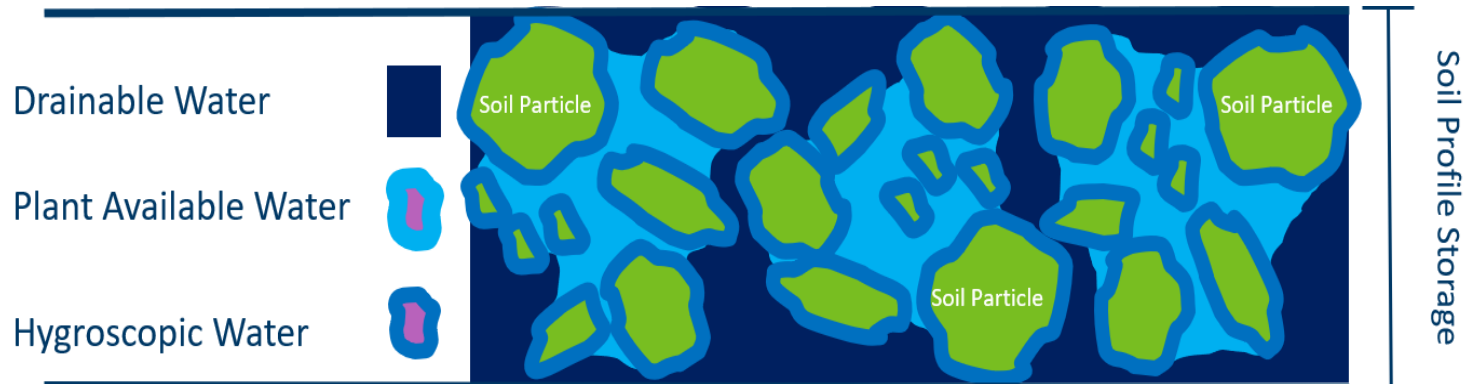
Rita Weaver, P.E. | BWSR Chief Engineer

Presentation Overview

- Water Storage Primer
- Water Quality and Storage Program Overview
- Types of storage we've been funding
- Storage on Drainage Systems
- Downstream Considerations

Water Storage Primer

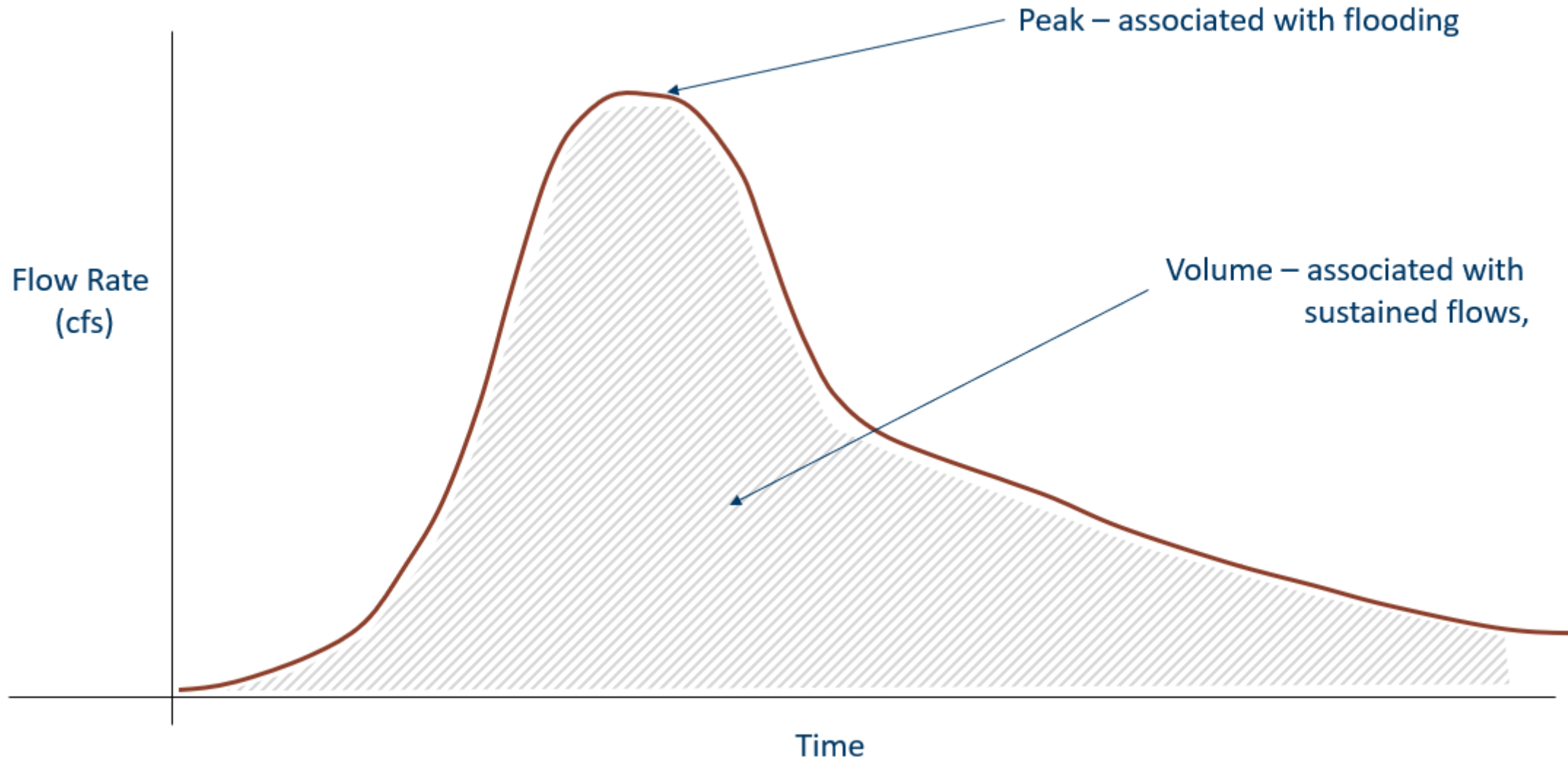
What does Storage Mean to You?



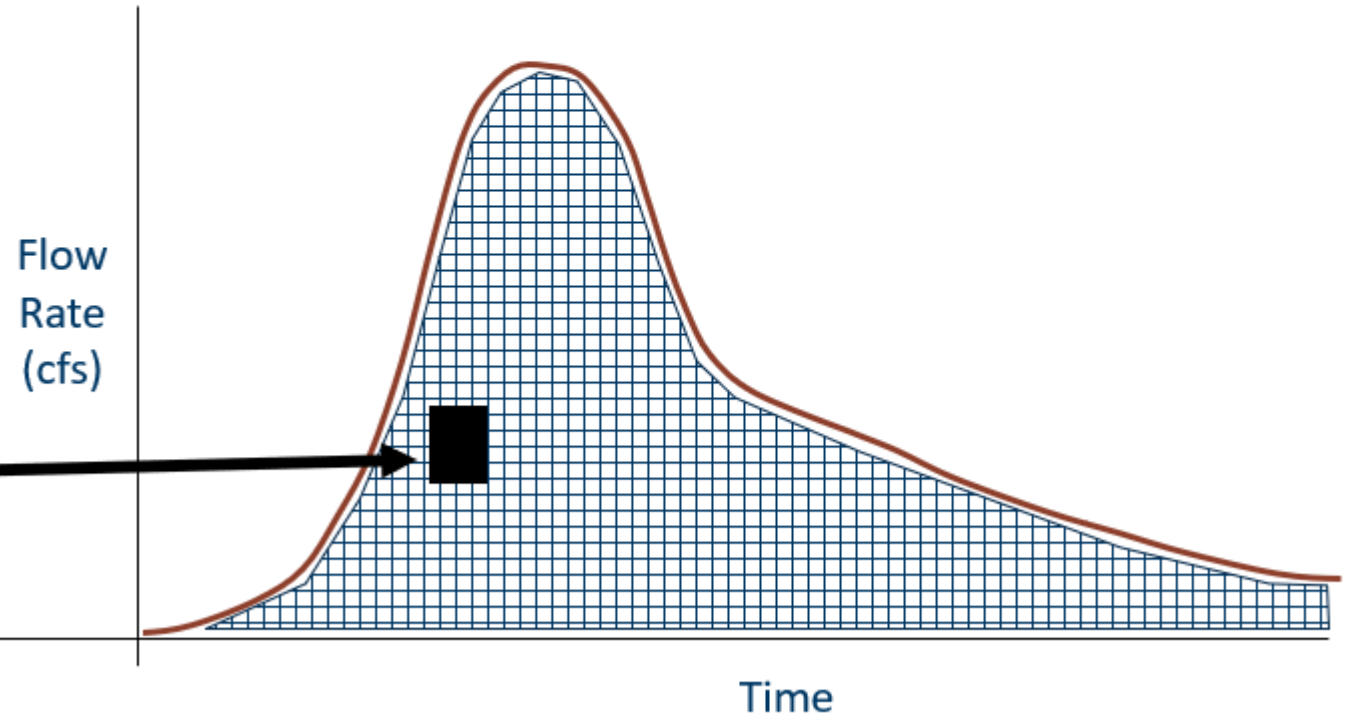
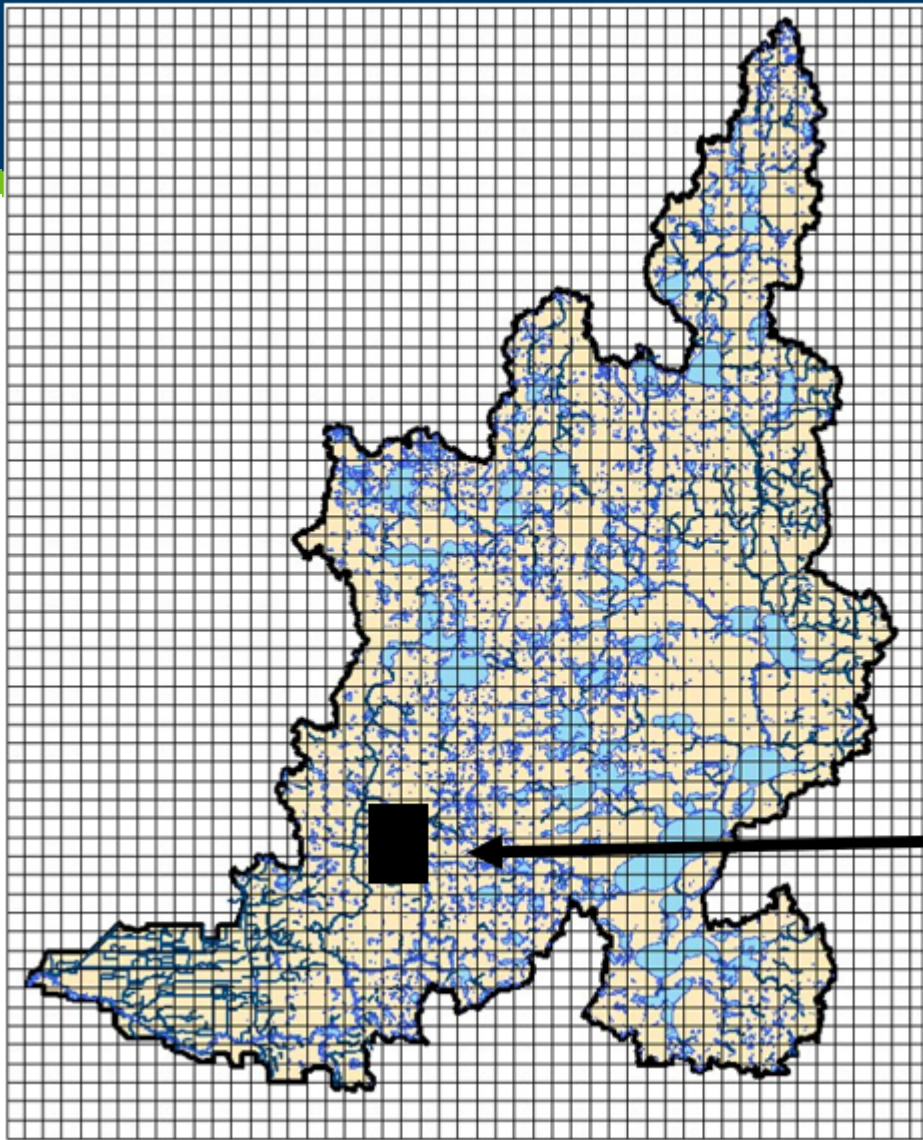
How do we pick what to construct?

- Look at our overall goals and think about what problem we want to solve
 - flooding,
 - water quality,
 - erosion,
 - improve habitat
- Depending on the goal, engineers/hydrologists look at how they can change the runoff hydrograph

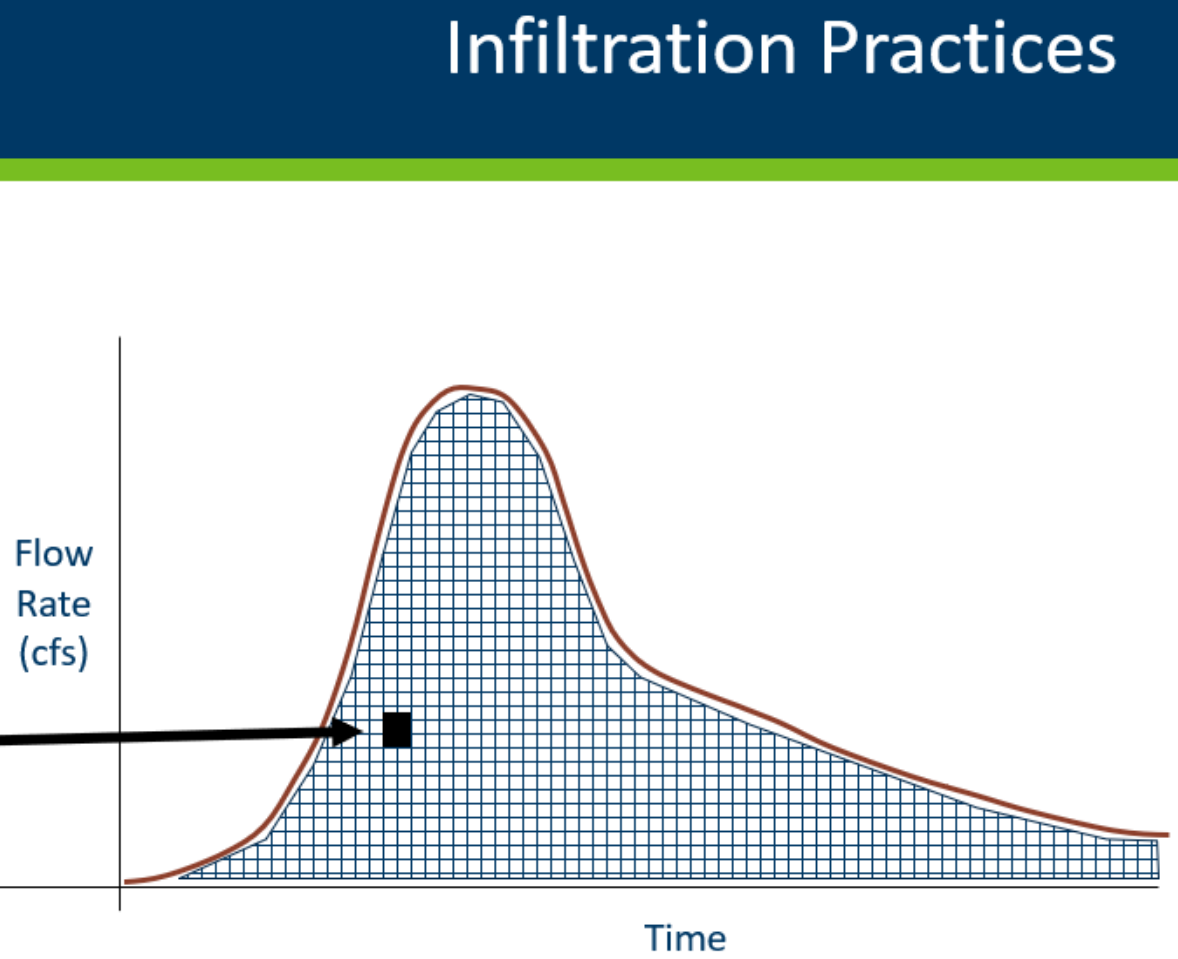
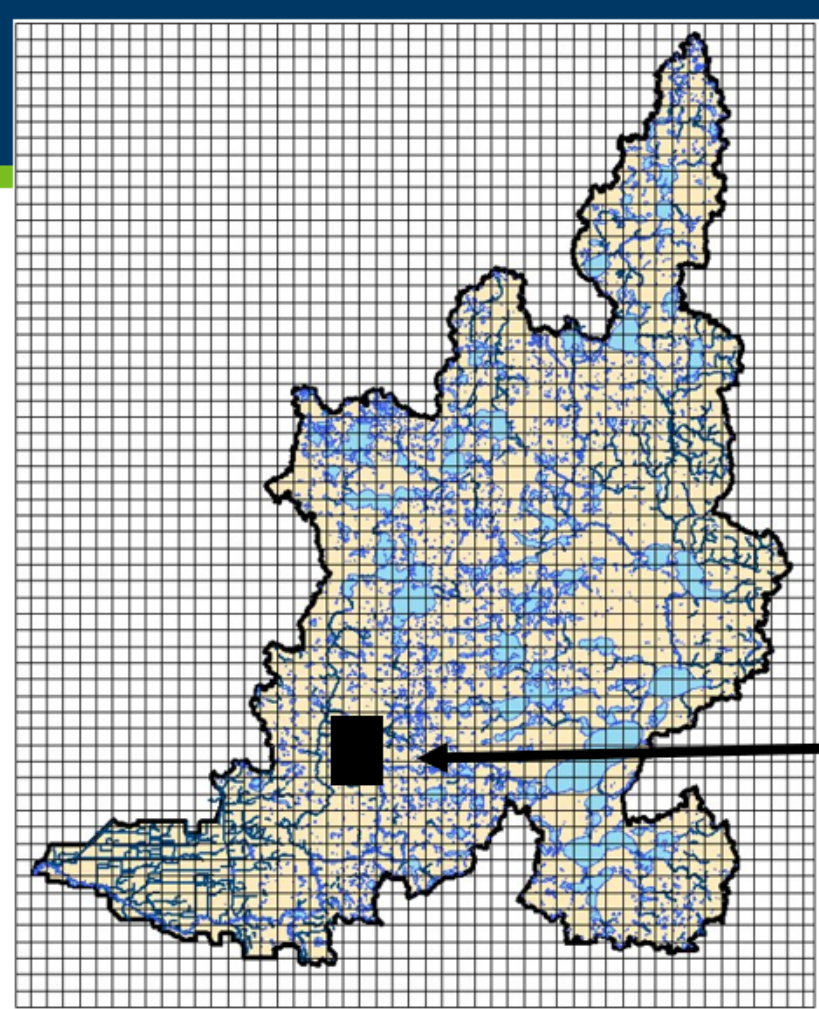
Runoff Hydrograph



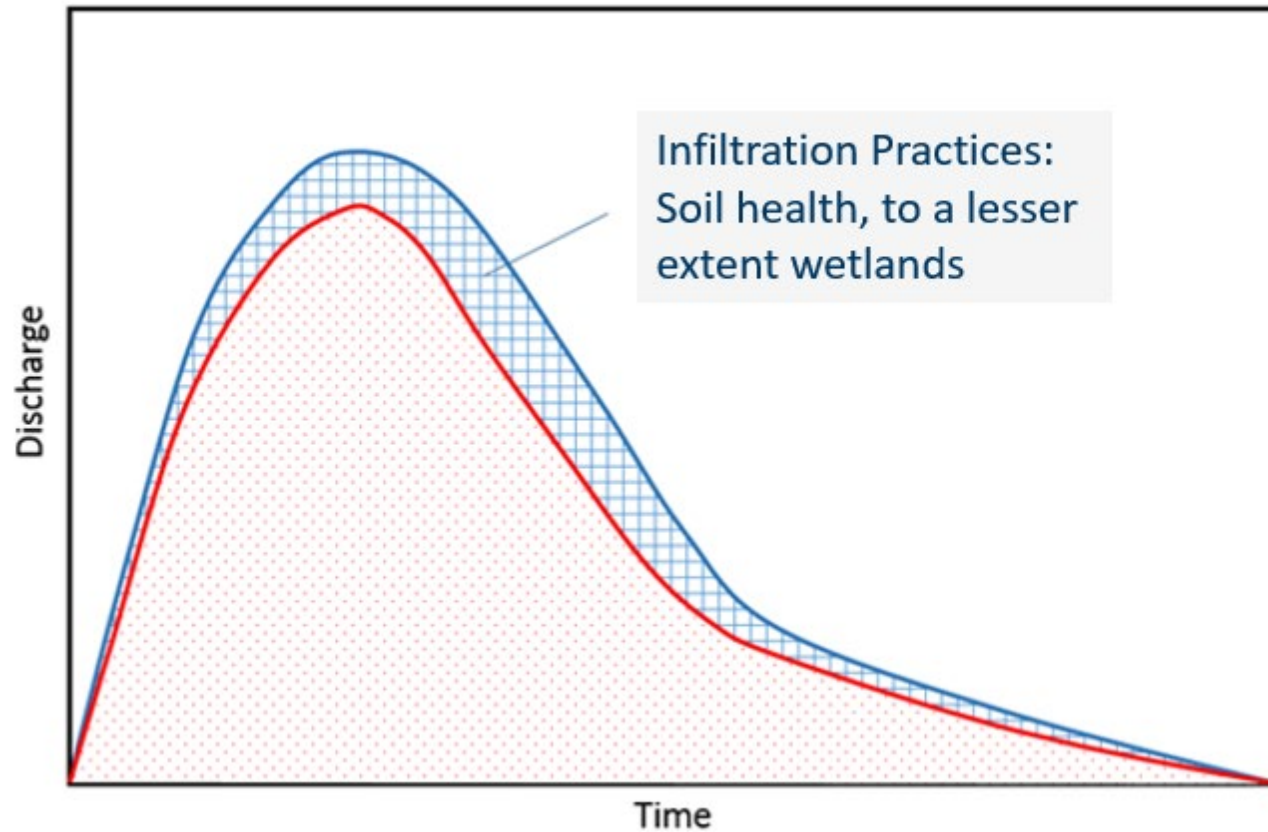
Runoff Hydrograph



Infiltration Practices



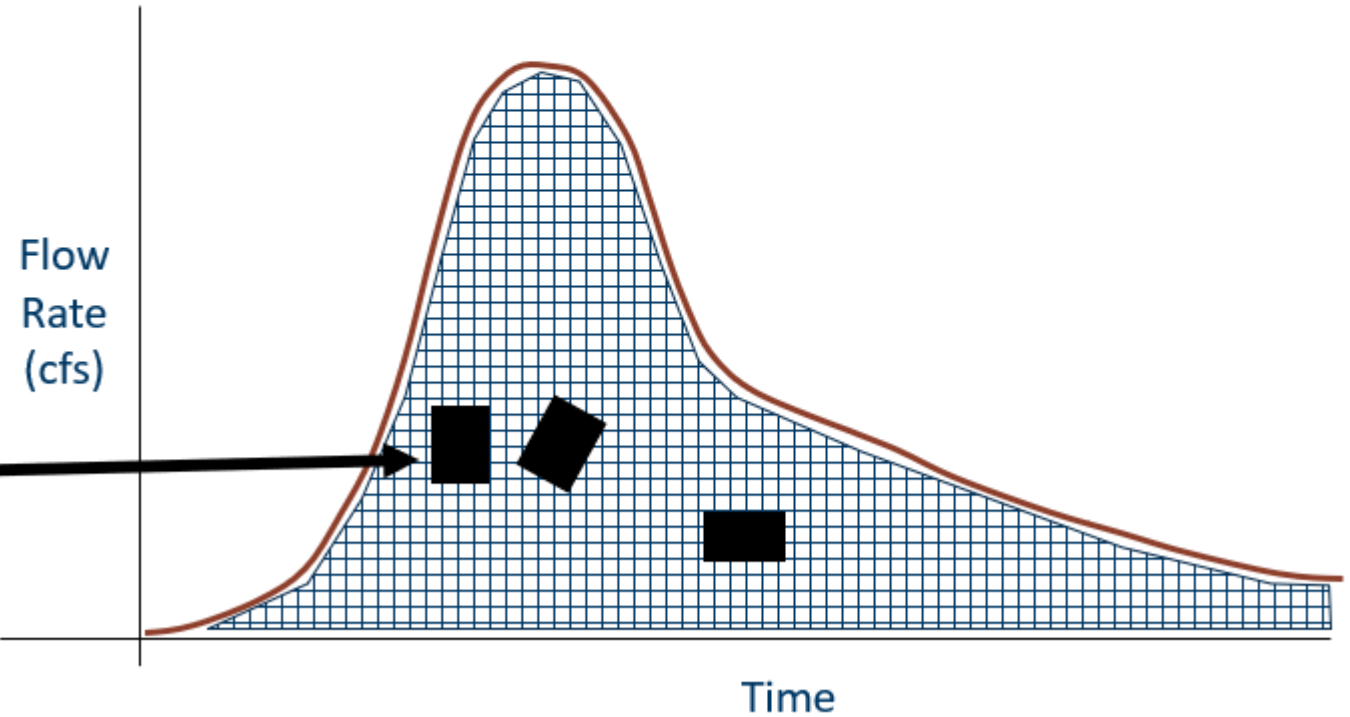
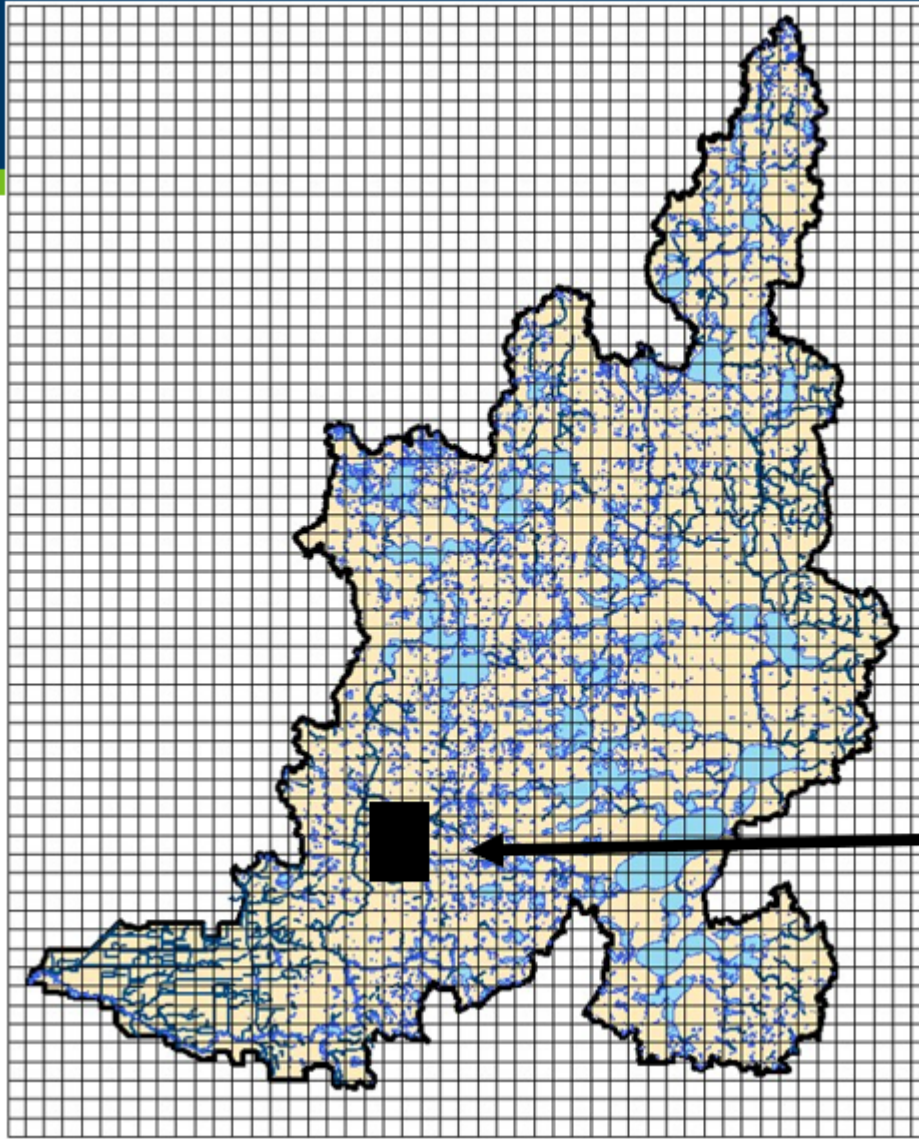
Infiltration Practices



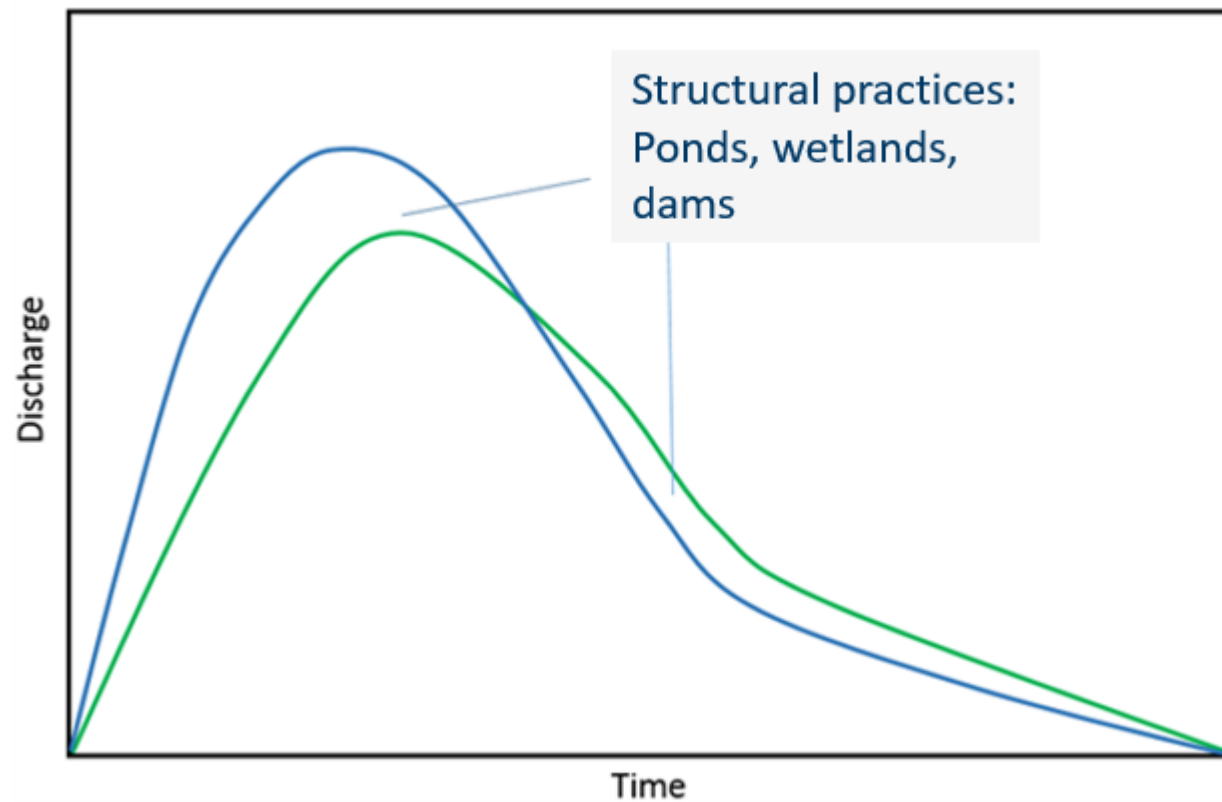
Pros: beneficial wherever they are located in the watershed (planning not as necessary)

Cons: Many, many projects needed to make a difference in the hydrograph

Structural Practices



Structural Practices



Pros: one project can make a big difference

Cons: changes peak only – not volume

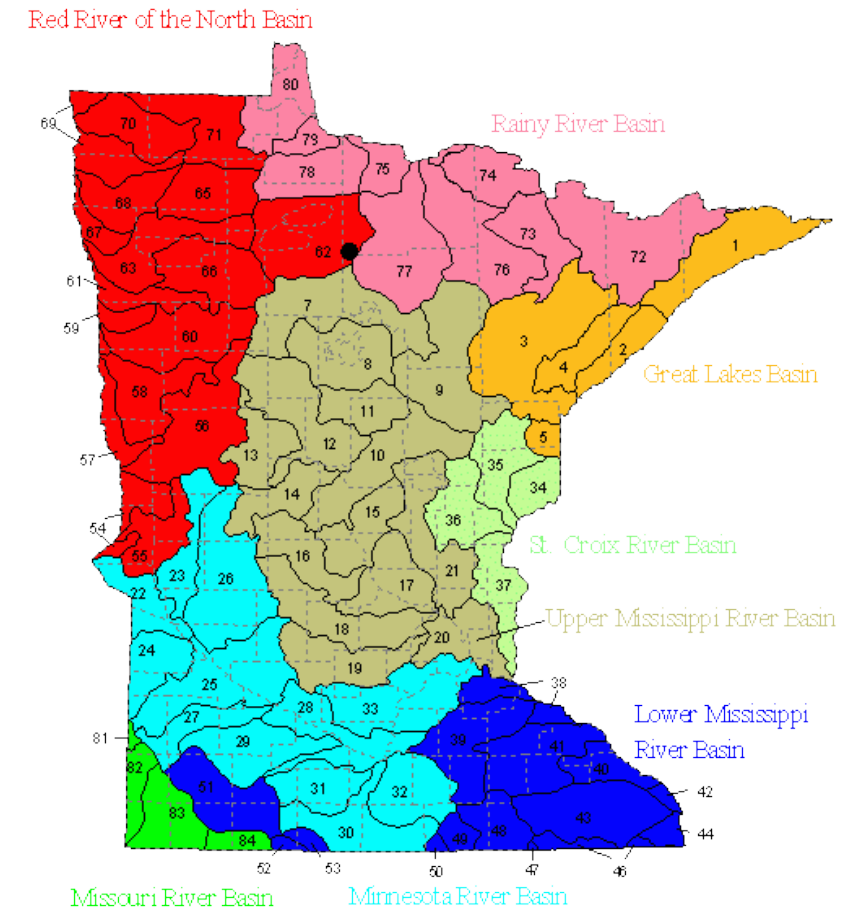
Water Quality and Storage Program Overview

Subd. 2. Establishment.

(a) The board must establish a program to provide financial assistance to local units of government to control water volume and rates to protect infrastructure, improve water quality and related public benefits, and mitigate climate change impacts.

(b) In establishing a water quality and storage program, the board must give priority to the Minnesota River basin and the lower Mississippi River basin in Minnesota.

MAJOR BASINS AND WATERSHEDS OF MINNESOTA



<https://www.dnr.state.mn.us/watersheds/map.html>

Basic Program Details

- Project or Practice must result in a reduction in peak flow rates and/or volumes
- Applicant must show how project improves flooding concerns, water quality issues, or addresses vulnerabilities to climate change
- Feasibility study required (planning must be done) for Final Design and Construction Funds
- Funds available to develop a Feasibility Study
- Project lifespan must be 25-years with a plan for maintenance
- Eligible applicants include municipalities, towns, counties, soil and water conservation districts, watershed districts, or organizations formed for the joint exercise of powers, as defined under section 103B.305, subdivision 5, and includes Tribal Governments

Program to Date

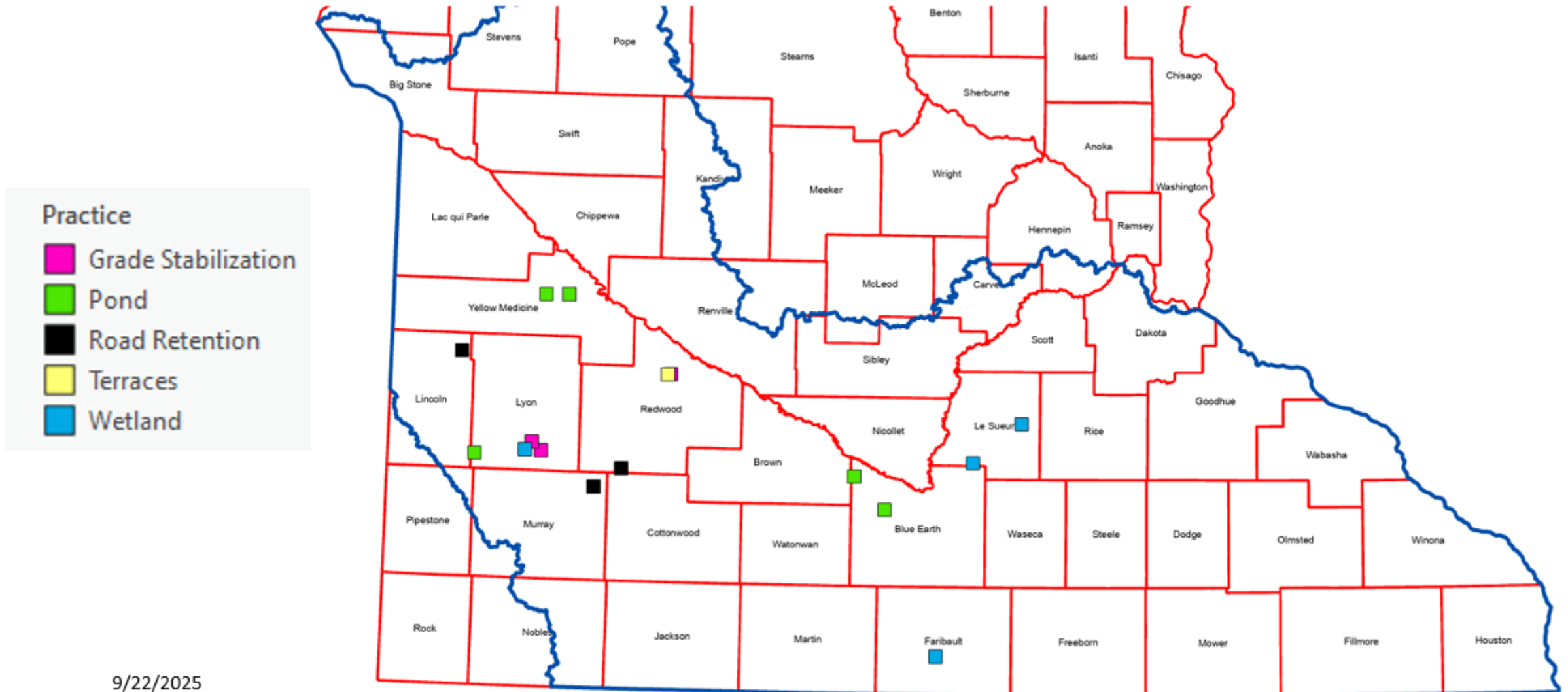
- Total Funding: \$19M from State Legislature
(\$2 Million FY22-23 and \$17 Million FY24-25)
- Total Awarded: \$8,642,660 (much held back to match federal grants)
- 57 total applications
- 8 modeling and conceptual design projects funded
- 15 final design and construction projects funded

Outcomes (in MN River Basin)

- All but two projects in the priority area (one construction project, one modeling project)
- 1,500+ acre-feet/yr of storage added
- 10k+ tons/yr total suspended solids captured
- Almost 13k/yr pounds of phosphorus retained

Project Type	# Installed
Grade Stabilization	4
Wetland Restoration/ Storage Added	4
Storage Basin	6
Road Retention	2
Terraces	1
WASCOBs	5

Map of Project Sites



Types of Projects We've Been Funding

Types of Projects



Recently funded Retention Structure



WASCOB (Photo from NRCS Practice Standard)

Types of Projects



Grade Stabilization Structure (Photo from NRCS Practice Standard)

Area II Grade Stabilization Structure (drone footage from D&G Excavating)



Types of Projects

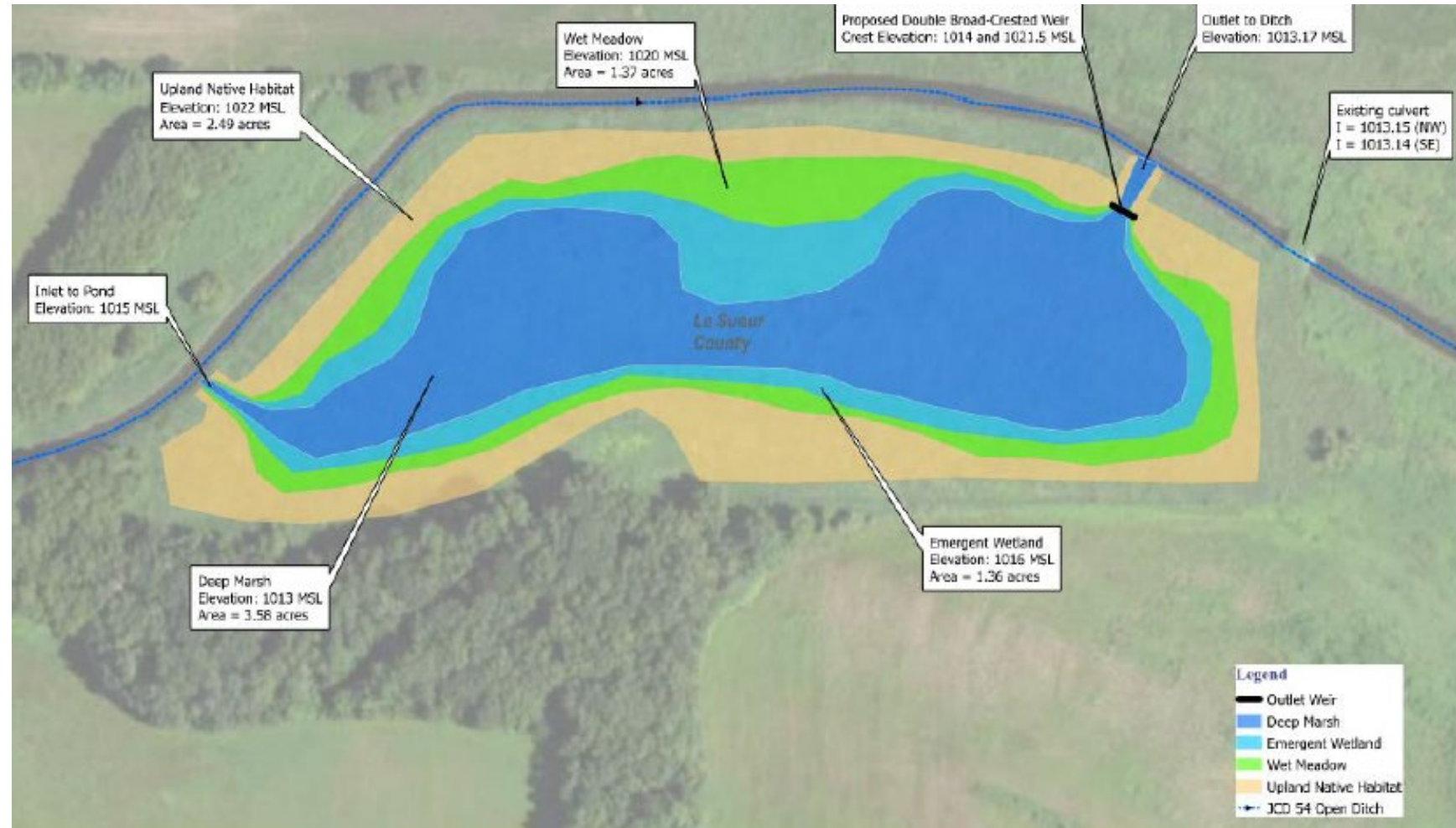


Area II Road Retention (photos from Area II)

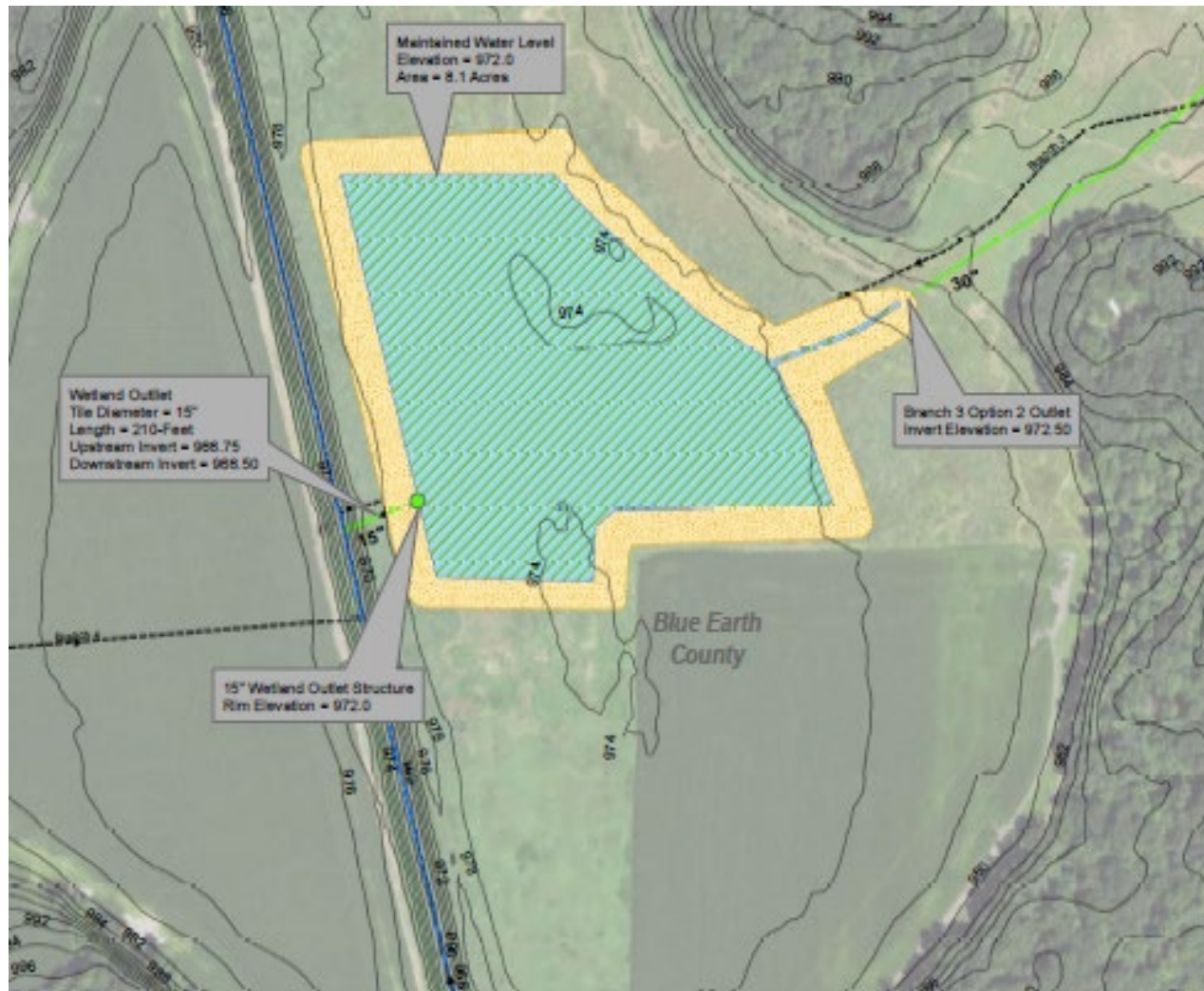


Storage on Drainage Systems

Storage on Drainage Systems



Storage on Drainage Systems



Storage on Drainage Systems



Why Drainage Systems?

Twentieth century agricultural drainage creates more erosive rivers

Shawn P. Schottler,^{1*} Jason Ulrich,² Patrick Belmont,³ Richard Moore,⁴ J. Wesley Lauer,⁵
Daniel R. Engstrom¹ and James E. Almendinger¹

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Increased precipitation as the main driver of increased streamflow in tile-drained watersheds of the upper midwestern U.S.

[S. Gupta](#), [Nathaniel W. Baeumler](#), [Andrew C. Kessler](#), [Melinda K. Brown](#), [W. M. Schuh](#), [Kari A. Wolf](#) [less](#) • Published 2018 •

Environmental Science • Transactions of the ASABE

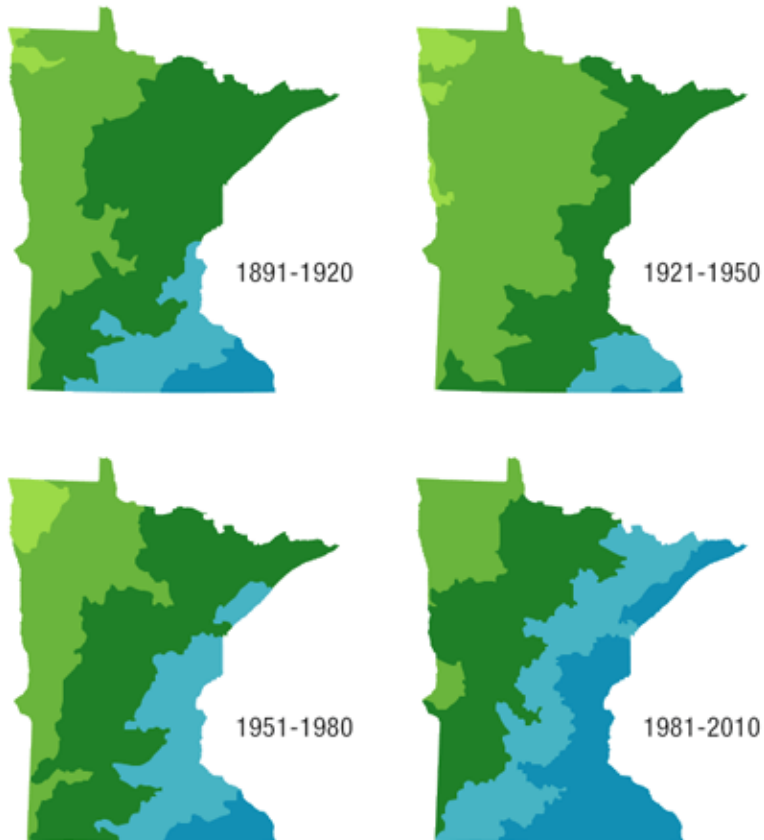
More Rainfall, More Intense Events

MN is experiencing more rainfall and more intense events – and it may get worse

Precipitation change in Minnesota

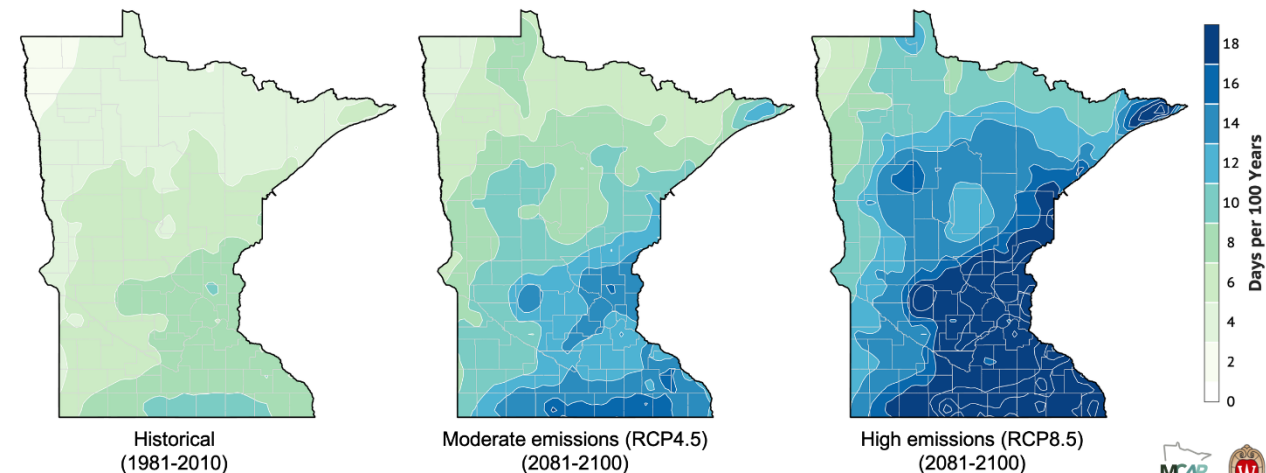
Average Annual Rainfall

- Less than 20 inches
- 21-25 inches
- 26-28 inches
- 29-30 inches
- Greater than 30 inches



Source: Adopted from Gupta, S.C., A.C. Kessler, and M.K. Brown. 2014. Data from Minnesota Department of Natural Resources, state climatology office.

Average number of days per 100 years when daily rainfall exceeds 4 inches



climate.umn.edu



MN's Drainage History

1858 Public Statutes of the State of MN, Chapter 128. Lands allows for drainage

CHAPTER LXXIII.

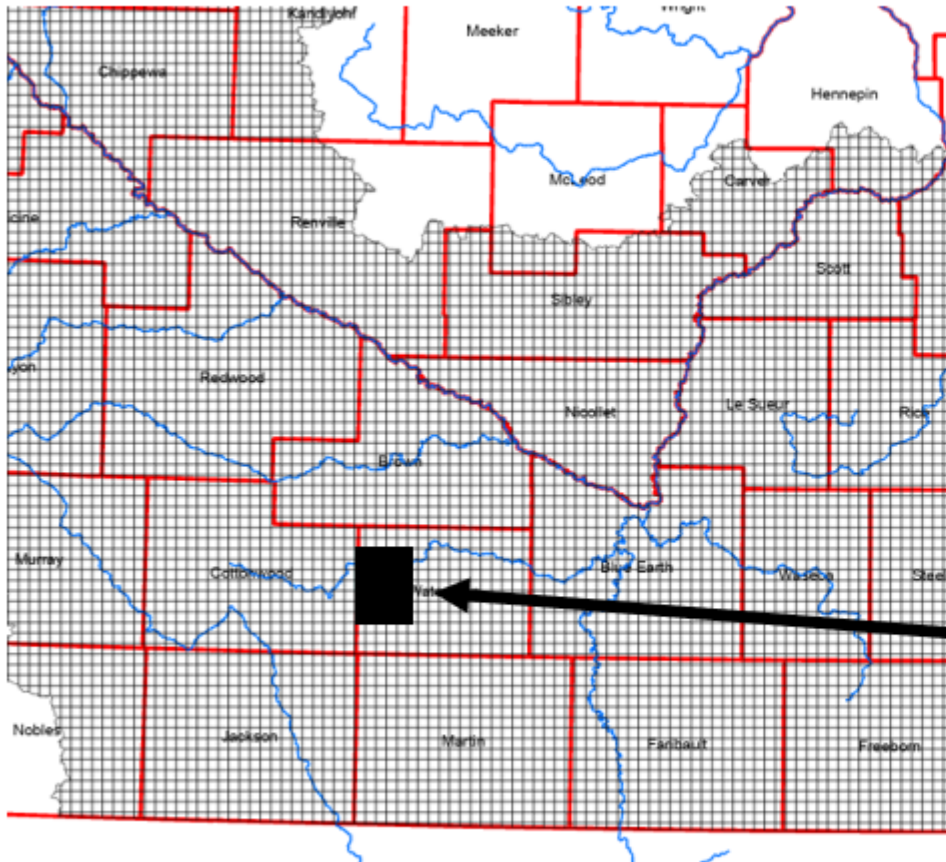
An Act to regulate and encourage the Drainage of Lands.

SECTION 1. That any number of persons may associate themselves together for the purpose of draining lands and

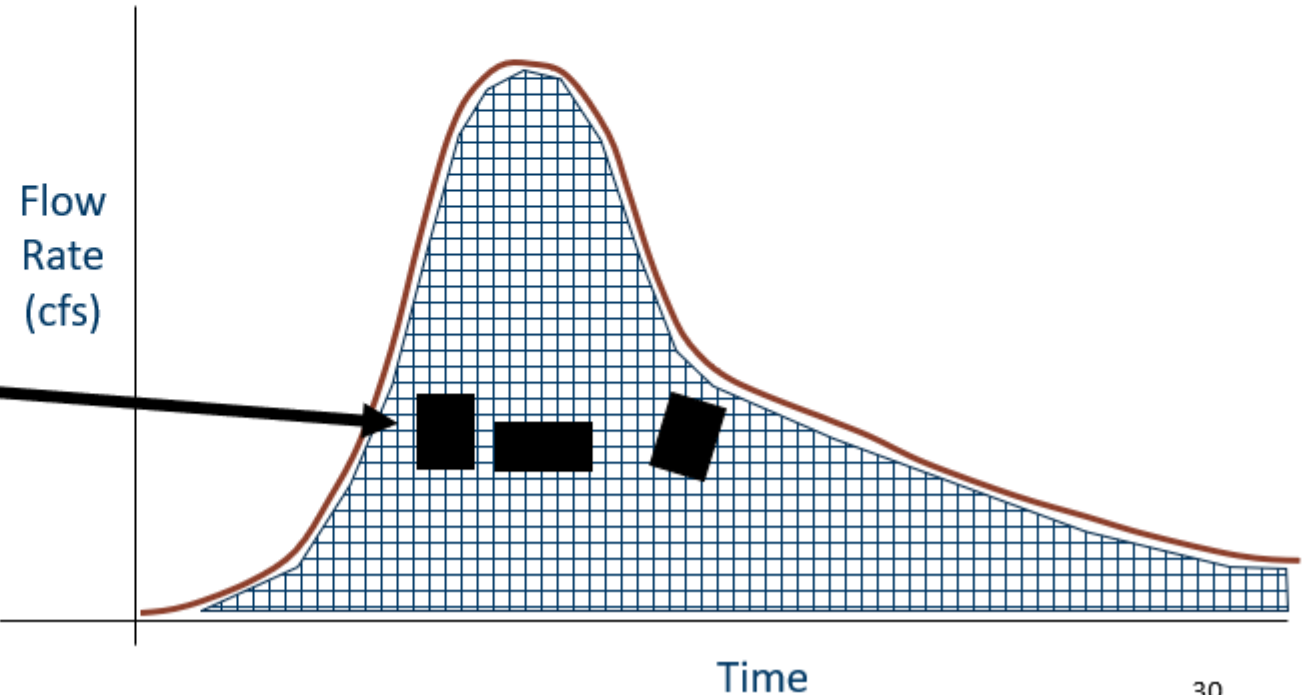
SEC 5. The owner or owners of any lands through which said conduits shall pass, and who shall have paid their assessments thereon, shall, in all future time have the right and privilege to make lateral drains through any portion of their lands so assessed, and to lead and conduct the same into

Additional
Consideration
(downstream flows)

Potential Side Effects?

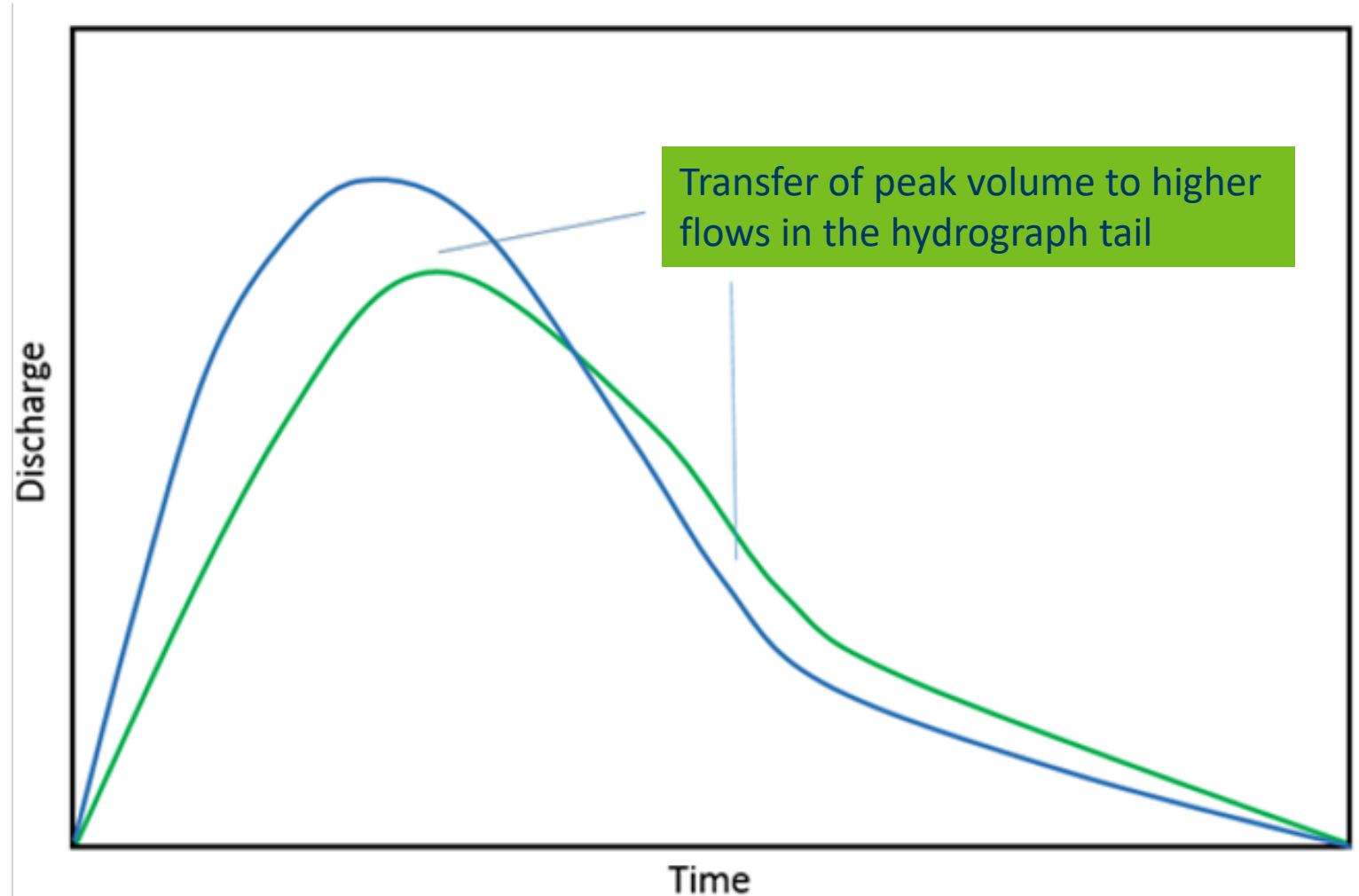


- What is the effect on the MN River?
- Can we track the cumulative effect?



Potential Side Effects?

In addition to tracking how new storage will change the peak of the MN River Hydrograph, we don't know how the storage will change the baseflow in the Minnesota River



Current State of Funding

- \$19 Million appropriated to date with approximately 11 Million Remaining
- Federal RCPP Grant of 24.1 Million? Awarded in Oct, **Rescinded as of June 11th**
- FY 25-26 State Appropriation? **NONE**
- LCCMR Application of \$8 Million? **Didn't make it to the 2nd round**
- UASCE PAS for Basin Study: **ON HOLD**

Thank You!

Rita Weaver

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