

**Swan Creek Watershed
Flood Risk Reduction Meeting**

**Governor's Inn, Casselton, ND
11:00 a.m.**

**Cass County Joint Water Resource District
April 8th, 2014**

WELCOME

Rodger Olson - Introductions

- Please silence you cell phones
- Please sign the record of attendance
- Introduction of board members & staff
- Introduction of presenters

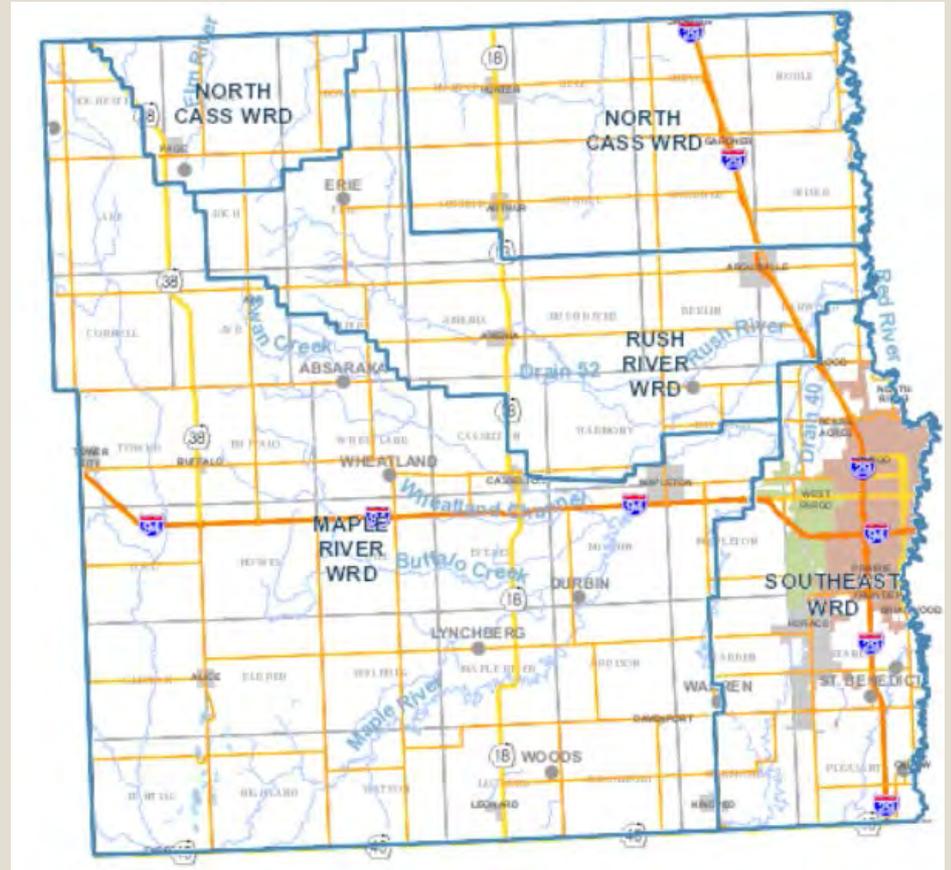
Introduction

Swan Creek Watershed

- **Maple River Water Resource District**
 - Rodger Olson, Chair
 - Jurgen Suhr, Vice Chair
 - Gerald Melvin
- Appointed by Cass County Commission
- Owns, operates, and collects assessments for several existing projects in the Maple River Watershed within Cass County

Introduction

- Water Resource District Organization
 - Cass County Joint WRD
 - Maple River
 - Rush River
 - North Cass
 - Southeast Cass



Introduction

- **Cass County Joint Water Resource District**
 - Mark Brodshaug, Chair (Southeast Cass)
 - Rodger Olson, Vice Chair (Maple River)
 - Raymond Wolfer (Rush River)
 - Michael Buringrud (North Cass)
 - Dan Jacobson (Southeast Cass)
- Appointed by individual WRD boards
- Constructed the Maple River Dam
- Develops detention projects within Cass County

Introduction

◦ Presenters

- Chad Engels – Moore Engineering
- Pat Downs – Red River Retention Authority
- Jon Roeschlein – Bois De Sioux Watershed District
Wheaton, MN

Introduction

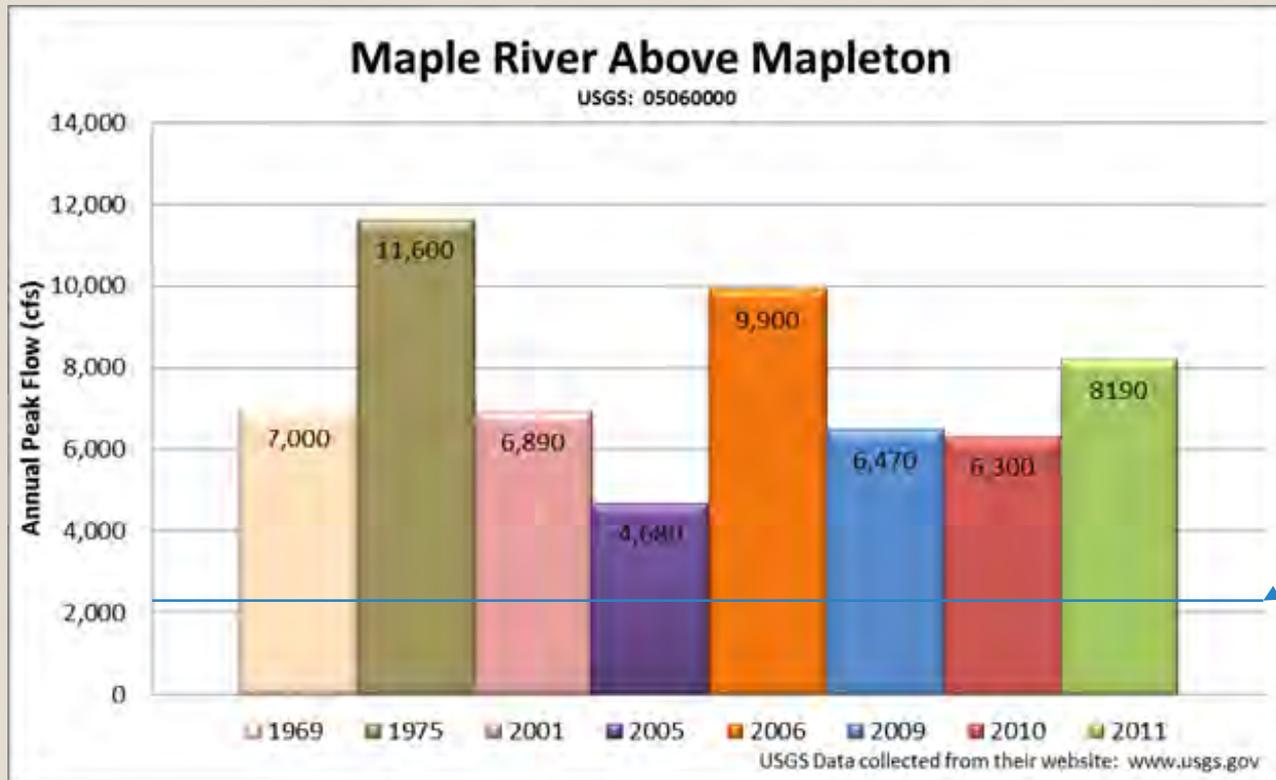
- Questions we hope to answer.....
 - Why are we having this meeting?
 - Why now?
 - What is the cost?
 - What are the benefits?
 - What is the schedule?
 - How would these projects work?
 - What would these projects look like?
 - Who are flood risk reduction projects for?

Chad Engels, PE
Moore Engineering, Inc.

Why.....

- Why are we having this meeting?

- Repetitive flooding - 6 historic floods in past 14 years
- Record floods occur in the summer too
- June 15, 2005 & July 2, 1975



Top 8 Floods

1959 – 1976

1977 – 2000 No Data

2001 – Current

(32 year gage record)

Minor Flood Stage - 2,200 cfs

2009 Spring Flood

Overland Flooding
Maple River Watershed



2010 Spring Flood

**Overland Flooding
Near Casselton**



2010 Spring Flood

**Overland Flooding
Near Mapleton**



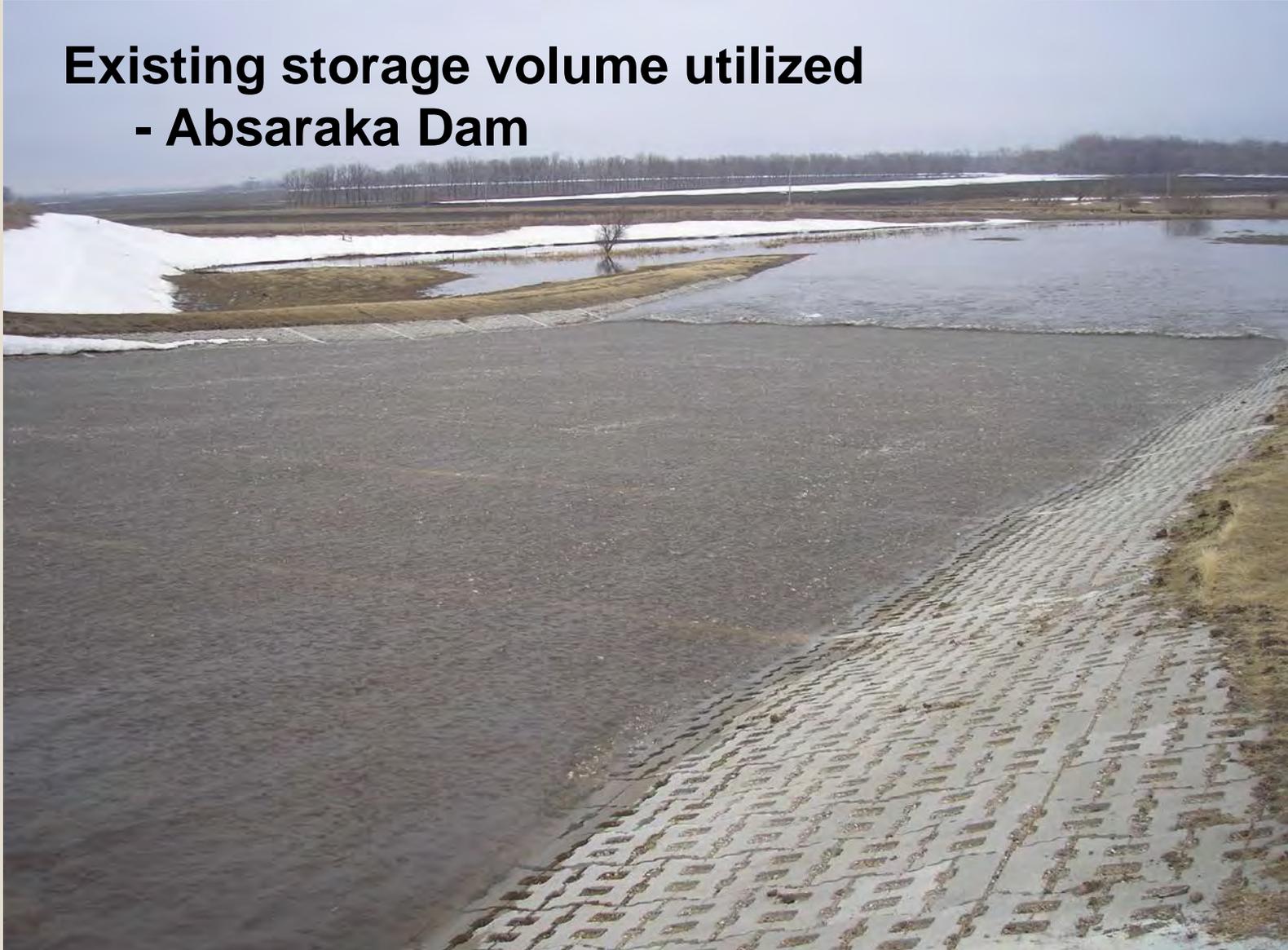
2011 Spring Flood

**Existing storage volume utilized
- Absaraka Dam**



2011 Spring Flood

**Existing storage volume utilized
- Absaraka Dam**



2011 Spring Flood

Existing storage volume utilized
- Absaraka Dam



2011 Spring Flood

Countless Road Washouts



2011 Spring Flood

Another Road Washout



2011 Spring Flood



Bridge Washouts

2009 Spring Flood

Transportation Disruptions Maple River Watershed



2011 Spring Flood

Transportation Disruptions I-29 North of Harwood



2009 Spring Flood

**Emergency Flood Protection
Casselton, ND**



2009 Spring Flood



Stranded Homeowners

Delayed Planting



Summer Floods - Crops



• Why now?

- Frequent flooding...spring & summer
- Affordability...new funding sources!
 - New ND State Water Commission cost share policy
 - New Federal Farm Bill funding
 - Increased Red River Joint WRD cost share (recent)
 - Cass County sales tax (recent)
- Technology
 - Recent completion of LiDAR and G.I.S. based watershed models

Who will benefit?

- **Who will flood risk reduction be for?**
 - Any future flood risk reduction project constructed in the Swan Creek Watershed should be built for the purpose of reducing flooding in the Swan Creek Watershed.
 - Projects should be constructed for the primary purpose of benefitting local agriculture and the local rural community in the Swan Creek Watershed. Projects should also benefit the City of Casselton.
 - Projects should not be constructed for the primary purpose of benefitting Red River communities, although these areas would benefit secondarily.
 - Local benefits must outweigh local costs!

Funding.....

Pat Downs

Red River Retention Authority

- Cost Share Partners
 - **North Dakota State Water Commission**
 - 60% cost share (no federal participation)
 - 50% (with federal participation)
 - Easements and lands are cost share eligible

Funding.....

- Cost Share Partners
 - **Federal Farm Bill**
 - PL-566 (NRCS Small Watershed Protection Program)
 - Absaraka Dam was a PL-566 project
 - \$5 Million cap per project likely (existing rule)
 - 4,000 AC-FT project cap likely (existing rule)

Funding.....

- Cost Share Partners
 - **Red River Joint Water Resource District**
 - Collects 2 mills from each member county annually
 - 65% cost share (non-state, non-federal)
 - Easements and lands are cost share eligible

Funding.....

- Cost Share Partners
 - **Cass County Funding**
 - Flood Control Measure Sales Tax (1/2 cent)
 - 20 years: April 1, 2011 – March 31, 2031
 - 50% Cost Share (non-federal, non-state, non-RRJWRD)

Example \$10.0 Million Project

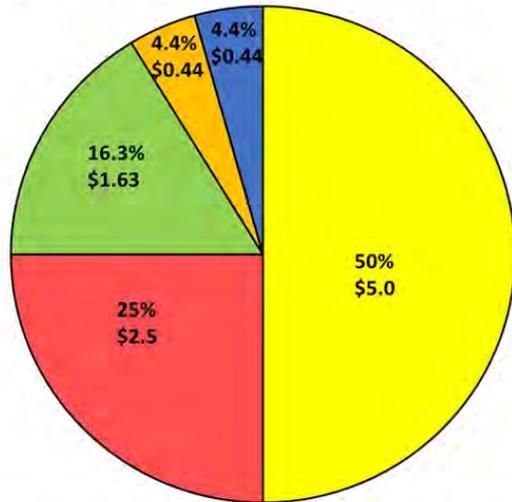
With Federal Funding

Without Federal Funding

	Cost Share (%)	Total Funding (\$ in millions)
Federal	50	5
NDSWC (50% non-federal)	25	2.5
RRJWRD (65% non-federal, non-state)	16.3	1.6
Cass Co. Sales Tax	4.4	437.5 k
Local*	4.4	437.5 k
Total	100	10

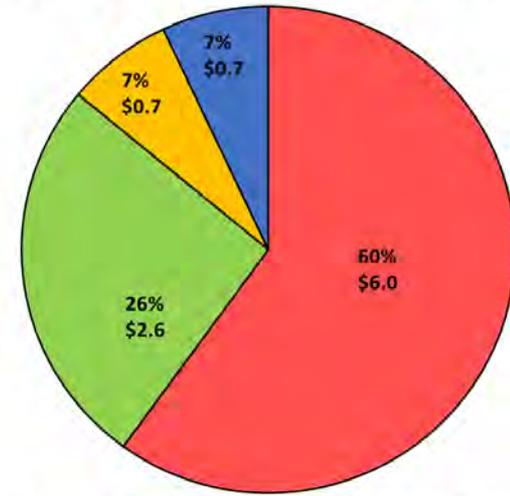
	Cost Share (%)	Total Funding (\$ in millions)
Federal	0	0
NDSWC (60% non-federal)	60	6
RRJWRD (65% non-federal, non-state)	26	2.6
Cass Co. Sales Tax	7	700 k
Local*	7	700 k
Total	100	10

Cost Share/Funding (\$ in millions)



Legend: Federal (Yellow), NDSWC (Red), RRJWRD (Green), Cass Co. Sales Tax (Orange), Local (Blue)

Cost Share/Funding (\$ in millions)



Legend: Federal (Yellow), NDSWC (Red), RRJWRD (Green), Cass Co. Sales Tax (Orange), Local (Blue)

Funding.....

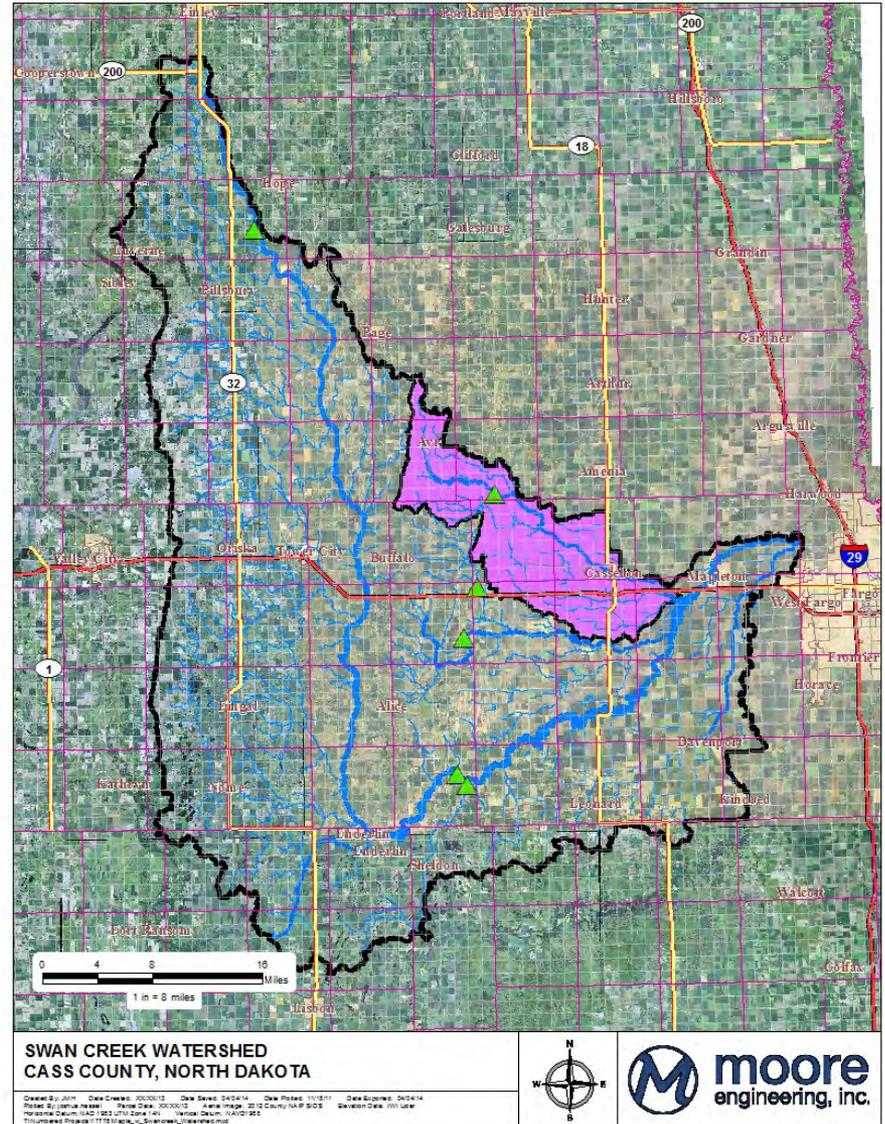
- **Funding Summary**

- Local cost relatively small for Detention Projects
- With federal funding, local cost can be less than 5% of the total project cost
- Without federal funding, local cost can be less than 10% of the total project cost

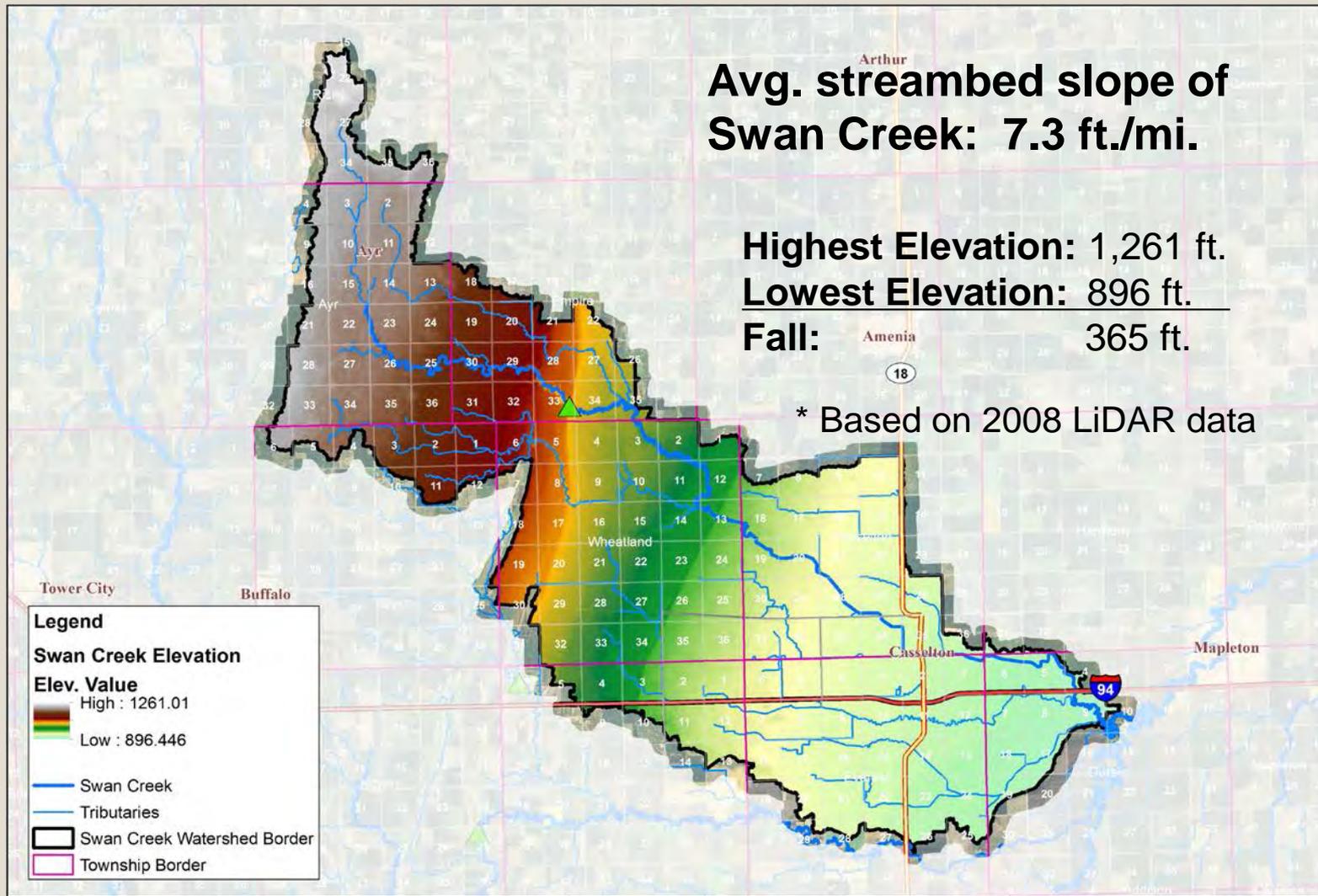
Swan Creek Watershed

Maple River Watershed
1,584 mi.²

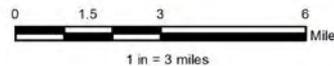
Swan Creek Watershed
137 mi.² (9%)



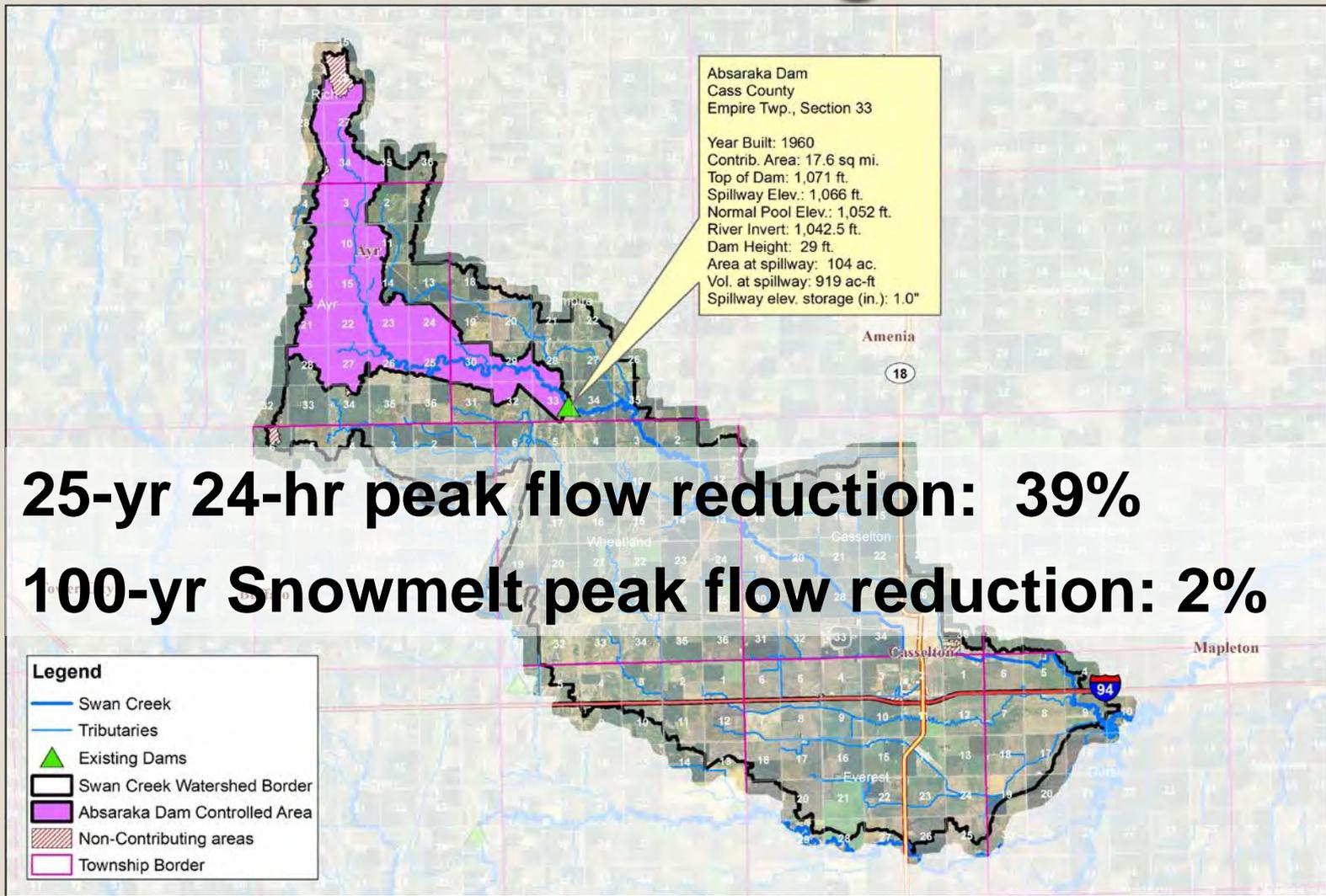
Swan Creek Watershed



The Swan Creek Watershed Elevation Map

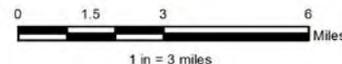


Absaraka Dam Modeling

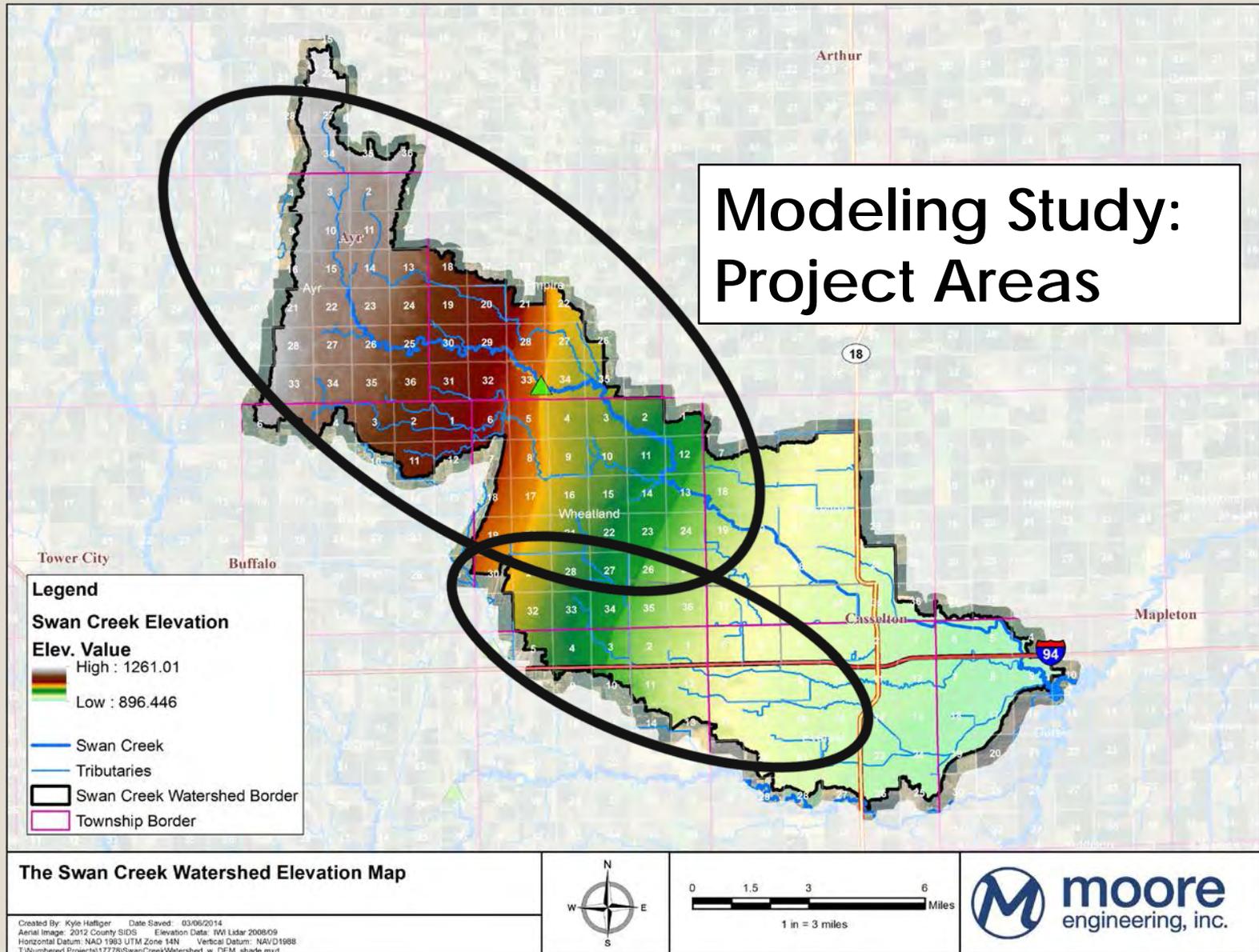


Existing Controlled Areas (13% of the area controlled)

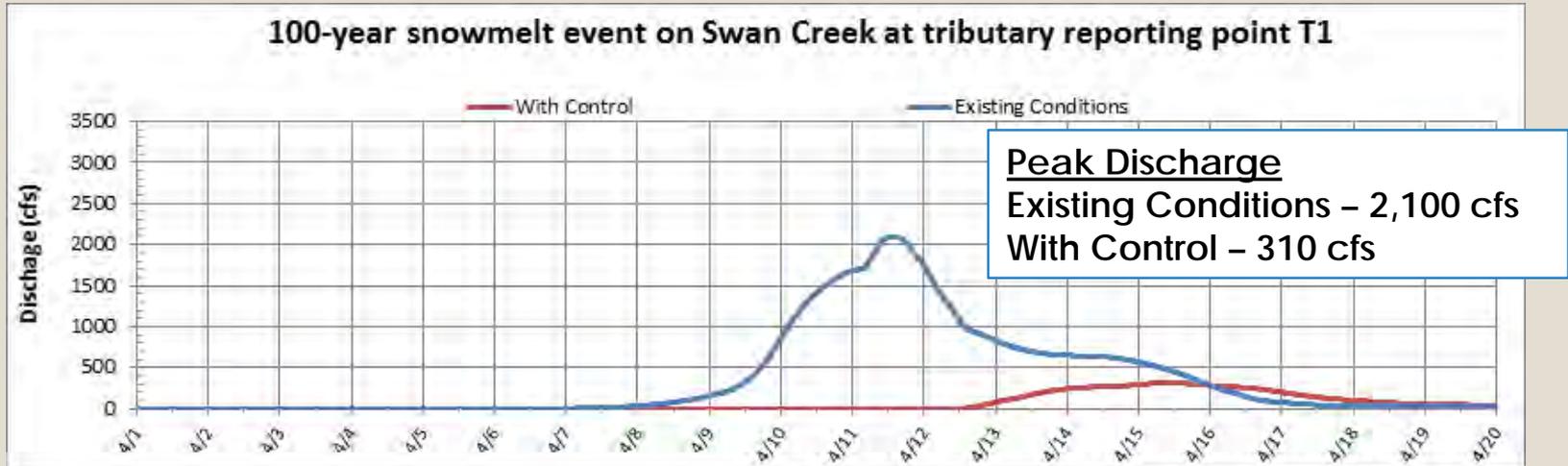
Created By: Kyle Haffiger Date Saved: 03/06/2014
Aerial Image: 2012 County SIDS Elevation Data: IWI Lidar 2008/09
Horizontal Datum: NAD 1983 UTM Zone 14N Vertical Datum: NAVD1988
T:\Numbered Projects\17778\Existing Controlled Areas.mxd



Flood Reduction Modeling



Flood Reduction Benefits



Peak reduction: 85%

Volume reduction: 76%



Peak reduction: 80%

Volume reduction: 63%

How Does it Work?

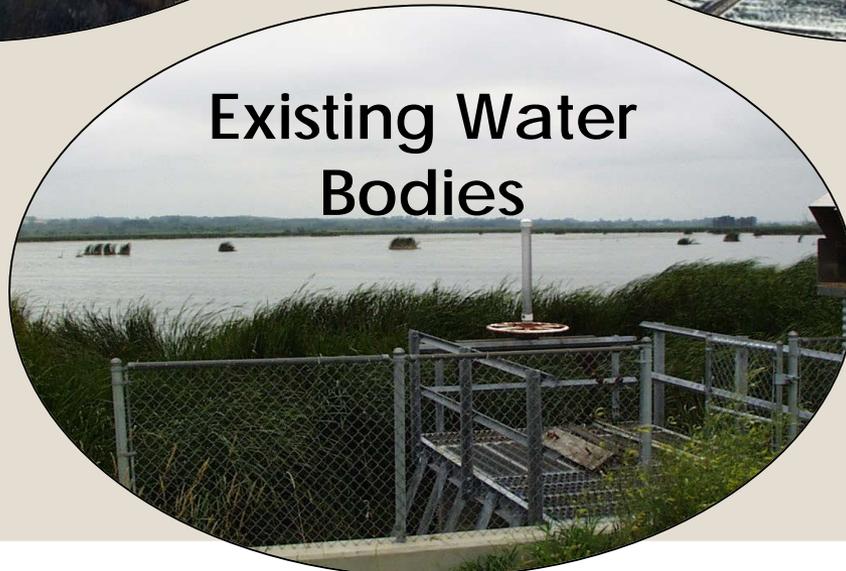
River Channel



Off-River
(Off-Channel)



Existing Water
Bodies



Example Off-Channel Detention

Angus Oslo Site #4
Snake River Watershed, MN

Angus, MN
Polk County

Controls 23 square miles
4,500 Ac-Ft of gated storage

ANGUS OSLO SITE #4

An aerial photograph showing a large, rectangular, light-colored detention pond situated in a lush green agricultural landscape. The pond is surrounded by fields and a road. The sky is overcast and grey.

Example Off-Channel Detention

PL-566 Project
Snake River Watershed, MN

Warren, MN
Marshall County

Controls 57 square miles
Storage Capacity: 6,800 Ac-Ft

OFF CHANNEL STORAGE SITE
PL-566 PROJECT



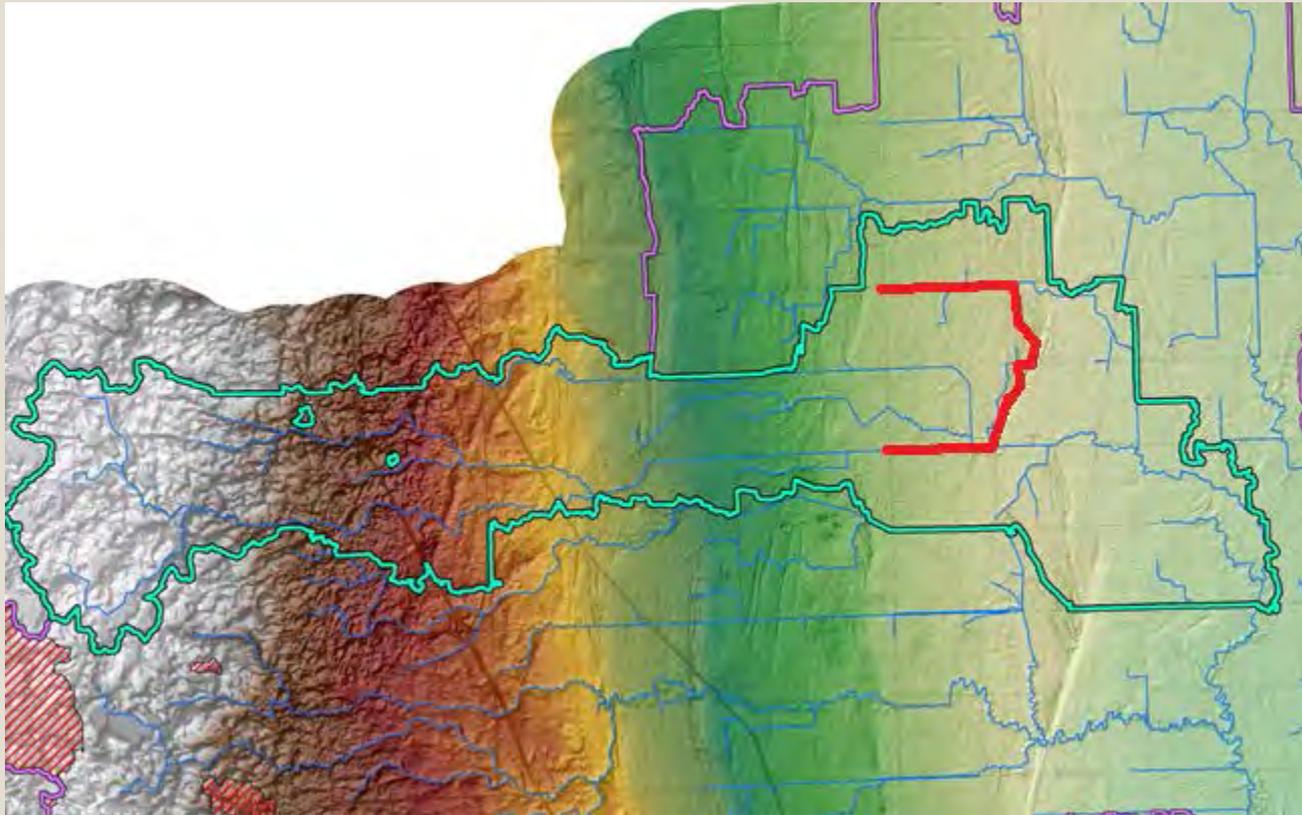
Site Selection Method

◦ Site Identification Criteria

- Control minimum of 20 square miles (if possible)
- Store a minimum of 3 inches of runoff (if possible)
- Avoid impact to residential structures / infrastructure
- Avoid mainstem locations where permitting will be overly burdensome if possible
- Primarily select sites with less environmental impacts where practical
- Minimize impacts to farmland
- Reasonable levee heights & inundation impacts
- Sites can be gated or ungated depending on circumstances
- Dry storage concept for majority of storage area

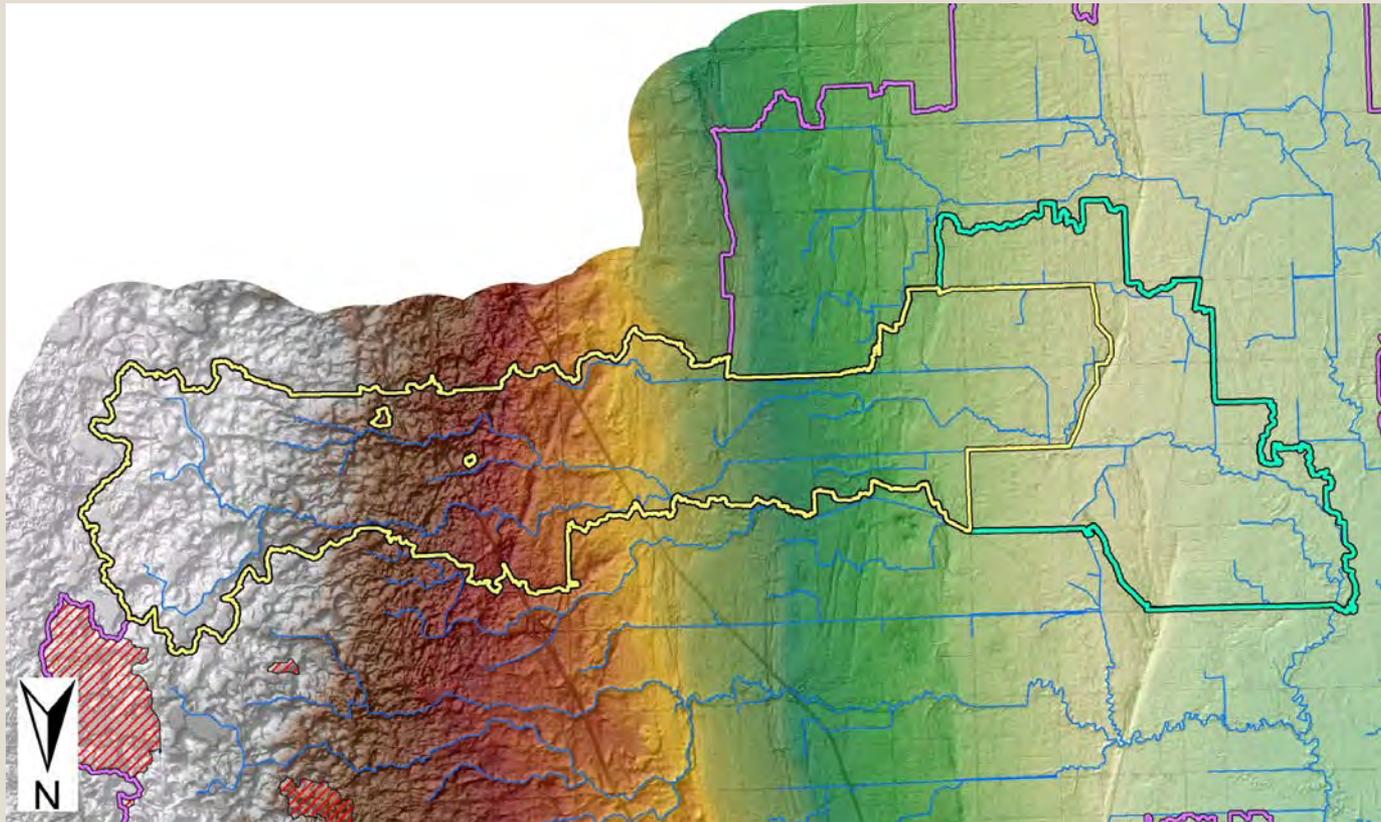
Example Site Selection

Identify Project Location



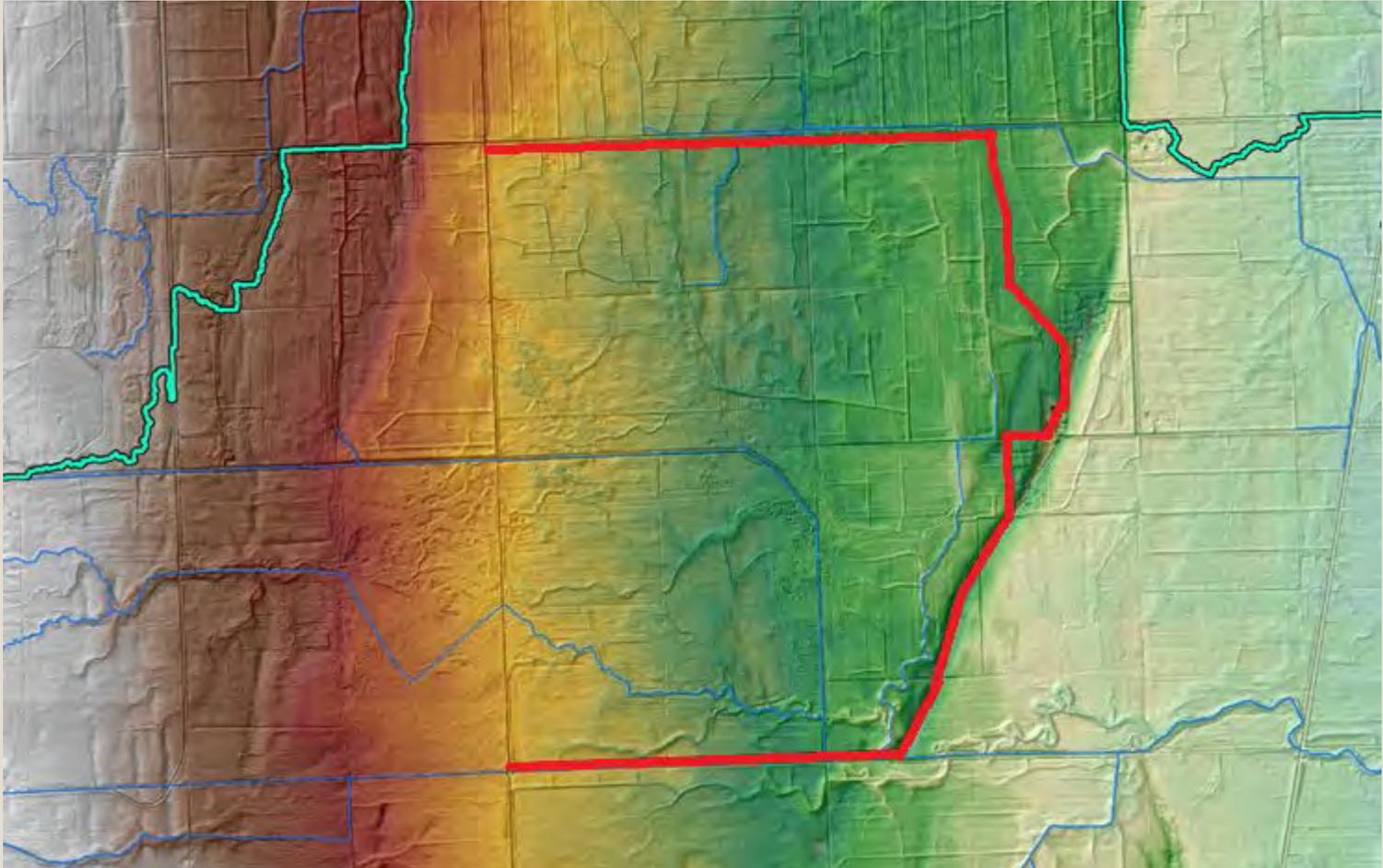
Example Site Selection

Determine Contributing Area



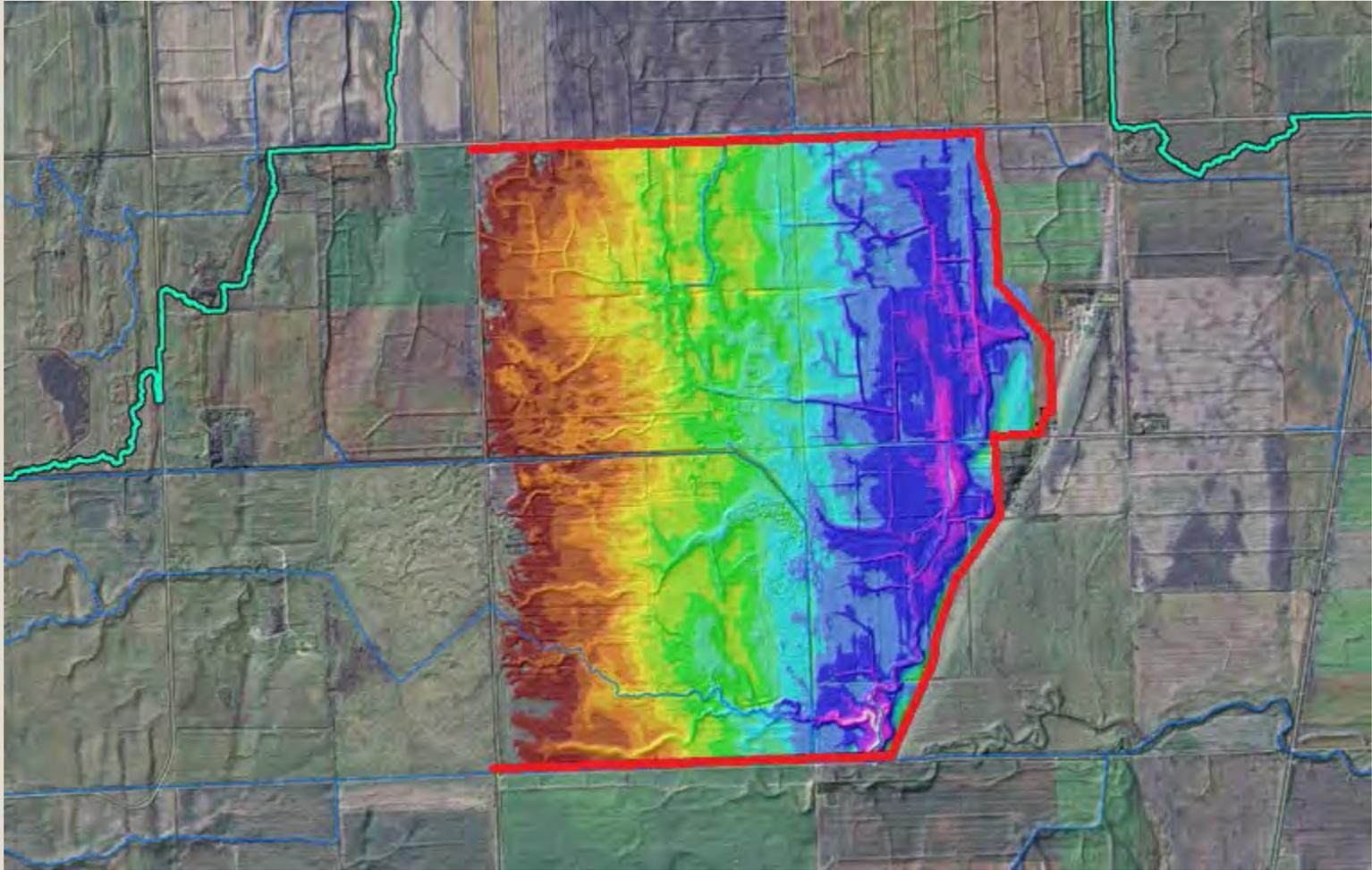
Example Site Selection

Refine Site to Meet Storage Goal



Example Site Selection

Inundation Depth

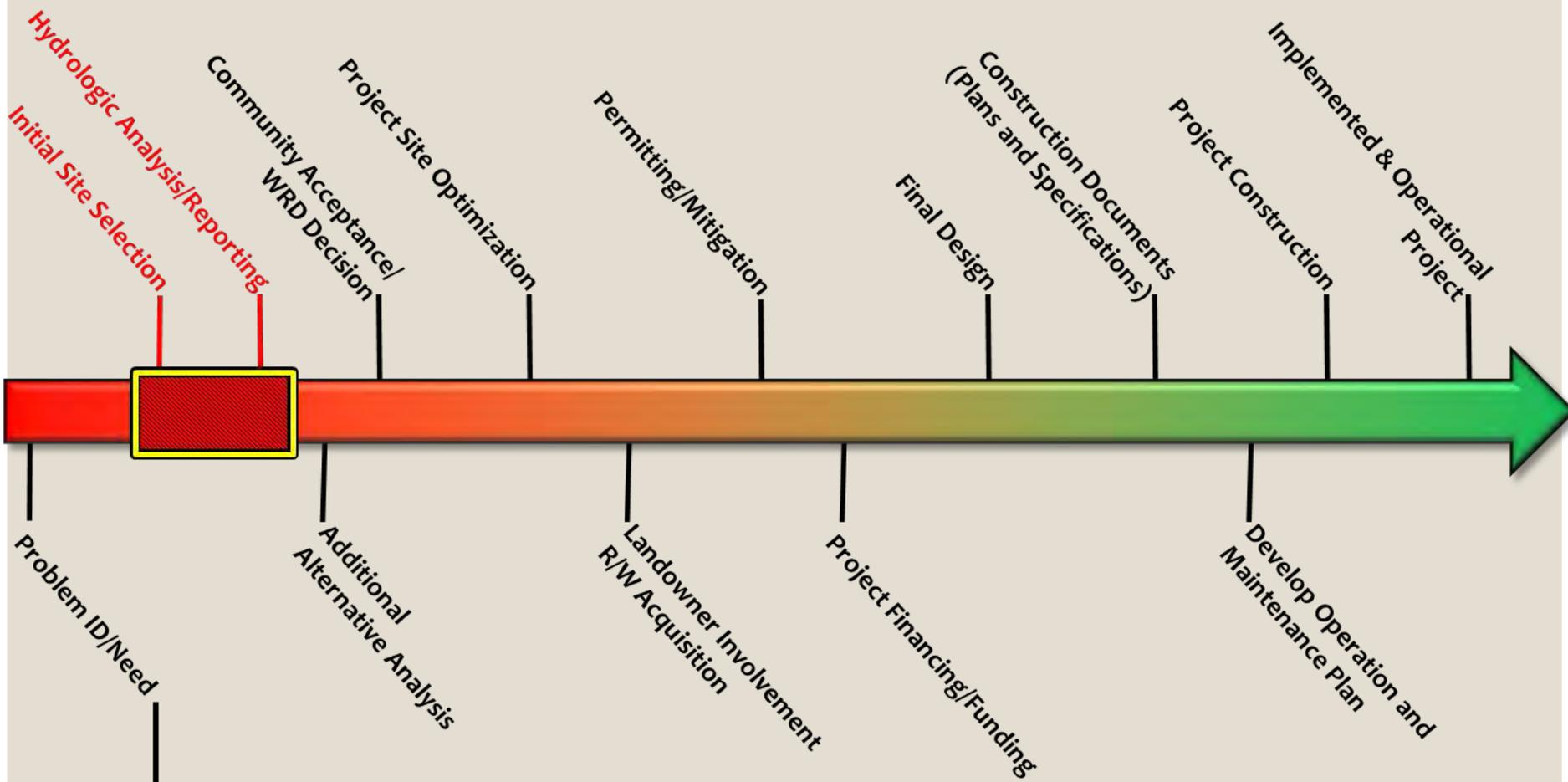


Goals.....

◦ Project Goals

- Fairly compensate landowners
- **Continue to farm majority of project interior!**
- Tile interior of project
- Utilize entire project for spring runoff
- Utilize a portion of the project for frequent summer flood reduction benefits
- Determine fair compensation method if project is needed for extreme summer flooding
- Incorporate water quality benefits within a portion of the project.

Schedule



- Local
- Regional
- Basin – RRBC LTFS



North Ottawa Presentation

Flood Related Costs

Cass County Highway Department

- 2009 County Road & Bridge Total \$4.3 Million
- 2010 County Road & Bridge Total \$2.4 Million
- 2011 County Road & Bridge Total \$3.4 Million

Townships

- ???

Agriculture

- ???