Stantec

PRWD H&H Study

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Project Overview

1. Complete a Hydrologic & Hydraulic (H&H) model to map flood prone areas and develop a stormwater plan. The H&H model will include surveying, inventory of structures and conveyance, and asset management. Modeling will include the 24-hour, 2-, 10-, 100- and 500-year NOAA Atlas 14 precipitation events.

2. The stormwater model will refine targeted locations for scaled resiliency and potential mitigation projects. The stormwater plan will describe the problem areas and include potential mitigation alternatives. Mitigation solutions will be scaled with basic design concepts, preliminary cost estimates and implementation schedules by project.
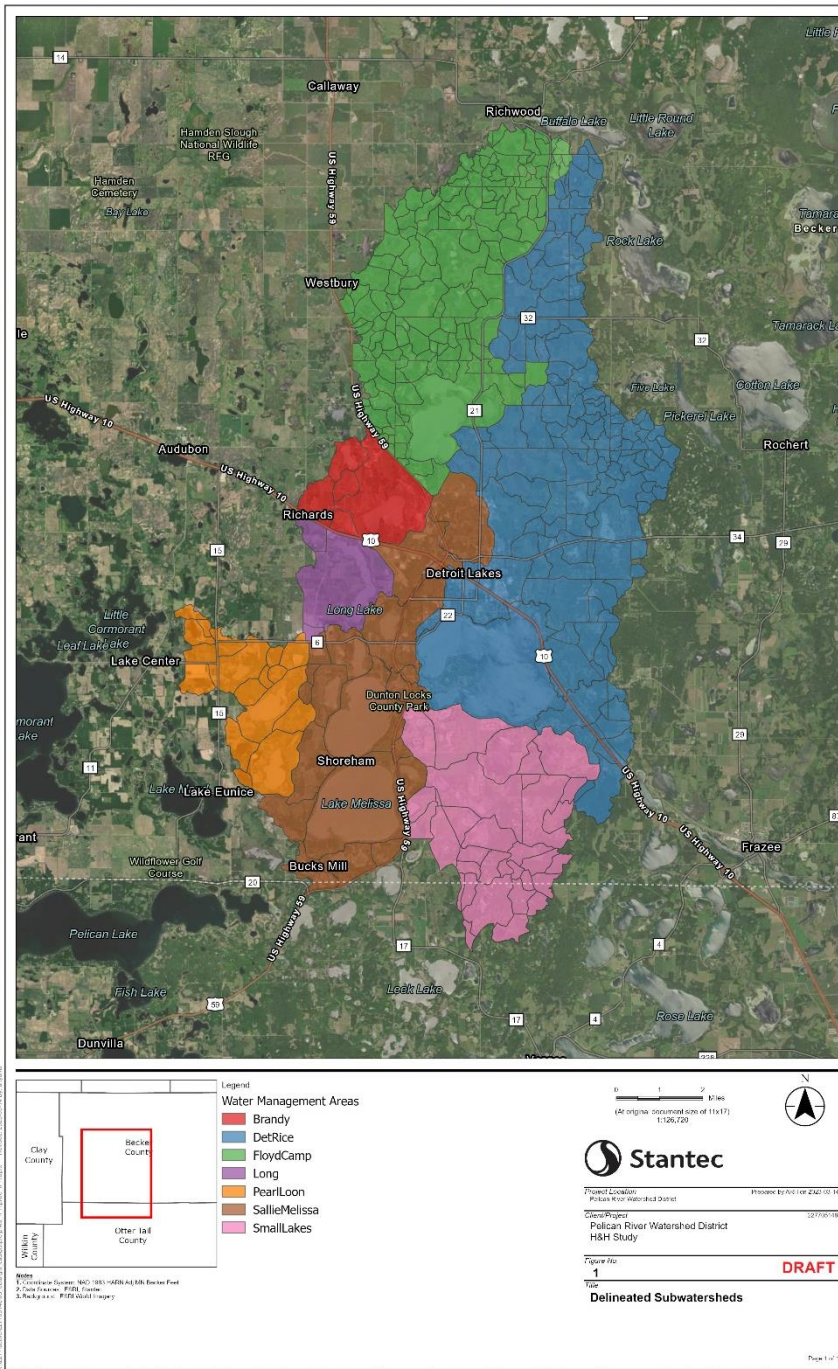
Project Overview

3. Community engagement will be incorporated through the project to document local knowledge of problem areas.

4. Guide floodplain management ordinances and rules, assessing conveyance capacity, preserving floodplain storage, and aiding in the development of hydraulic infrastructure design standards, and to assist in water quality and restoration studies. The study will also be a valuable tool to assist in future water quality and restoration studies.

Legend
Water Management Areas
- Brandy
- DetRice
- FloydCamp
- Long
- PearlLoon
- SallieMelissa
- SmallLakes

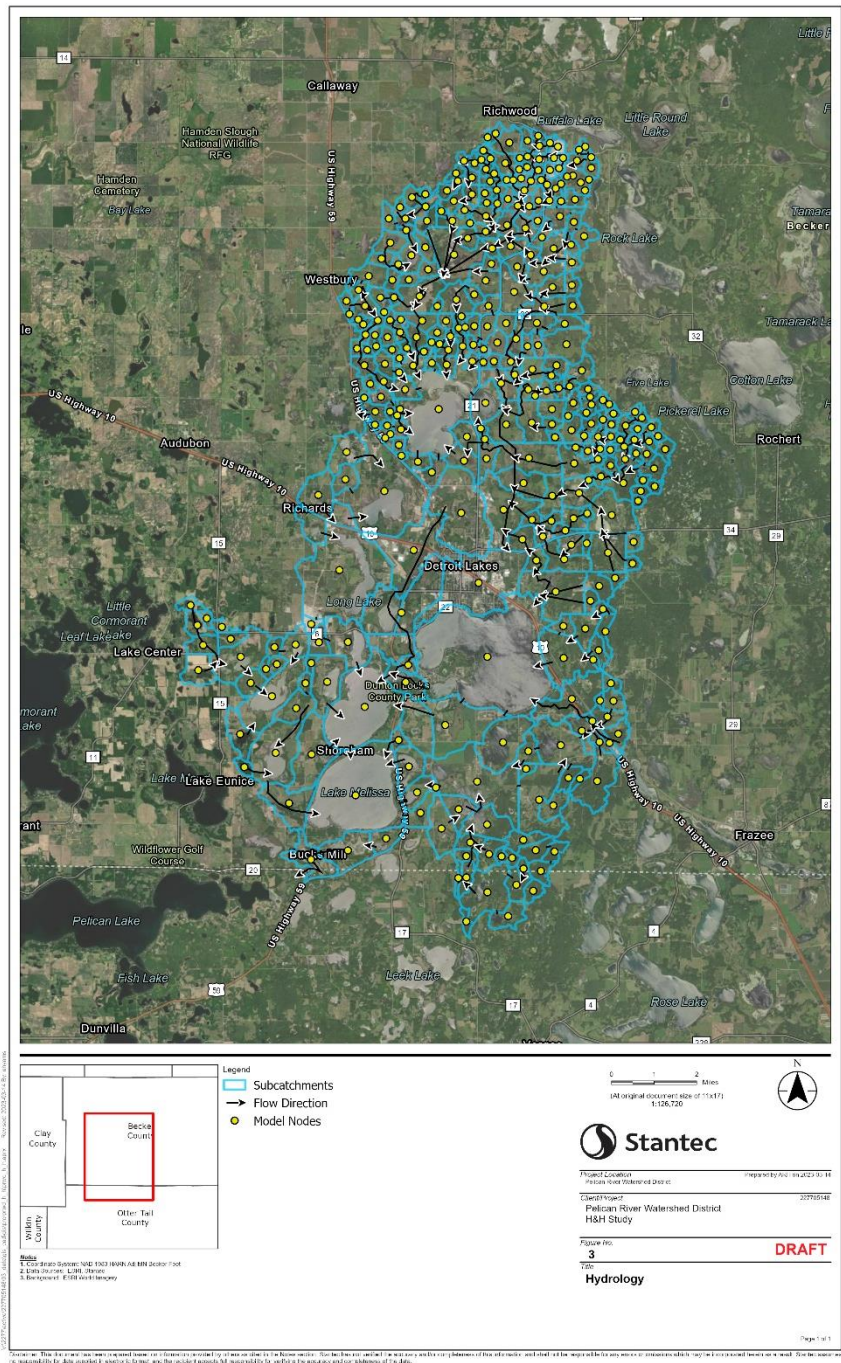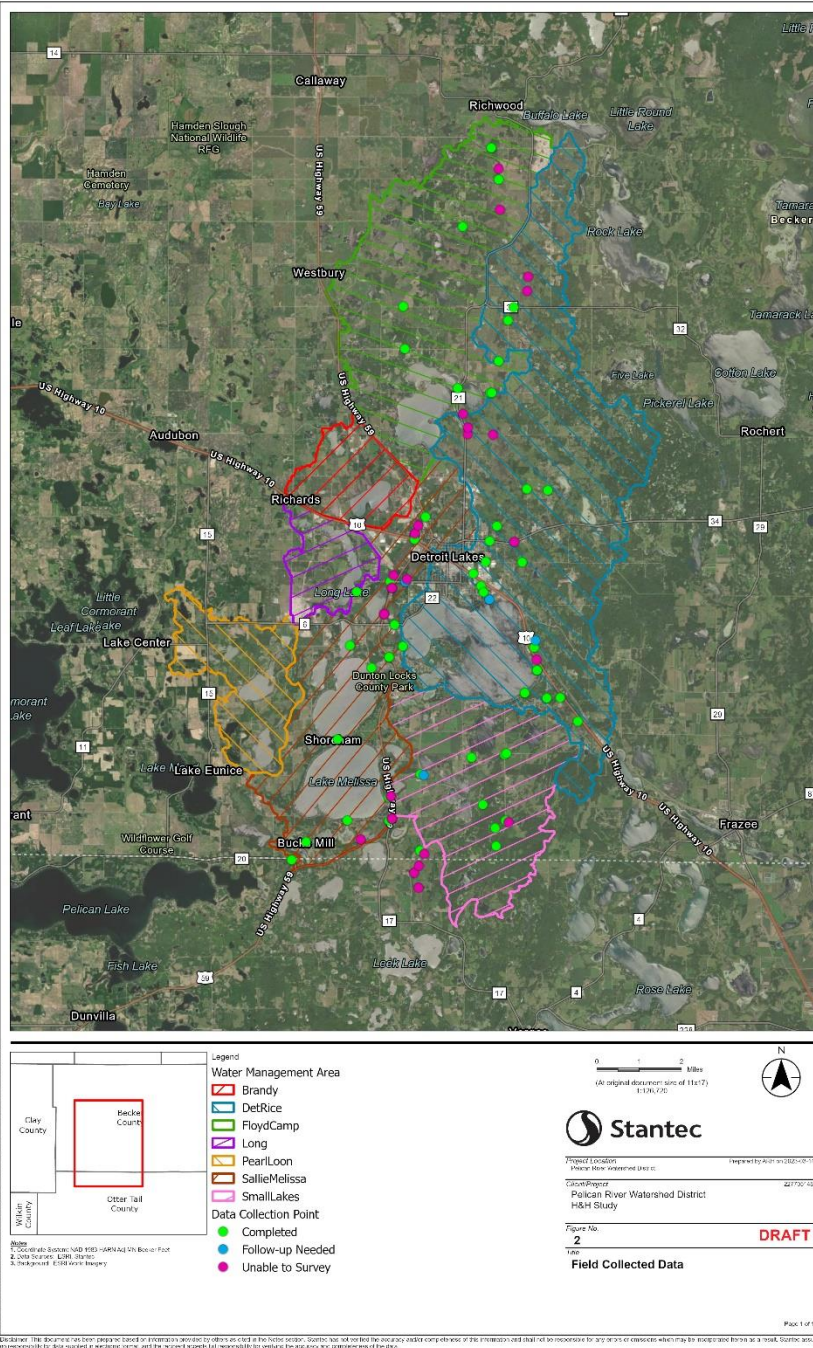Stantec

DRAFT

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Delineated Subwatersheds

H&H Modeling

- PRWD Groups
- Used LIDAR to create subwatersheds
- Runoff hydrographs for 2, 10, 100, and 500 yr. (24 hr.) events
- Runoff flow rate and volume
- HWL elevations
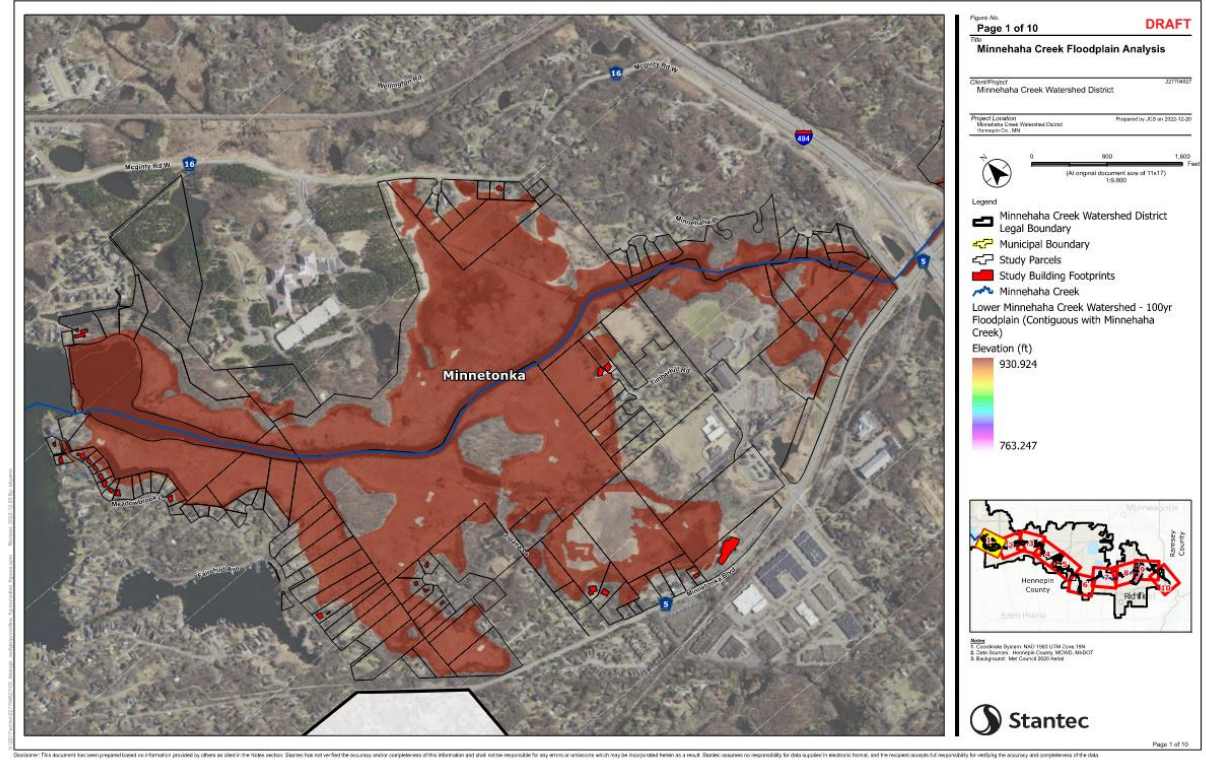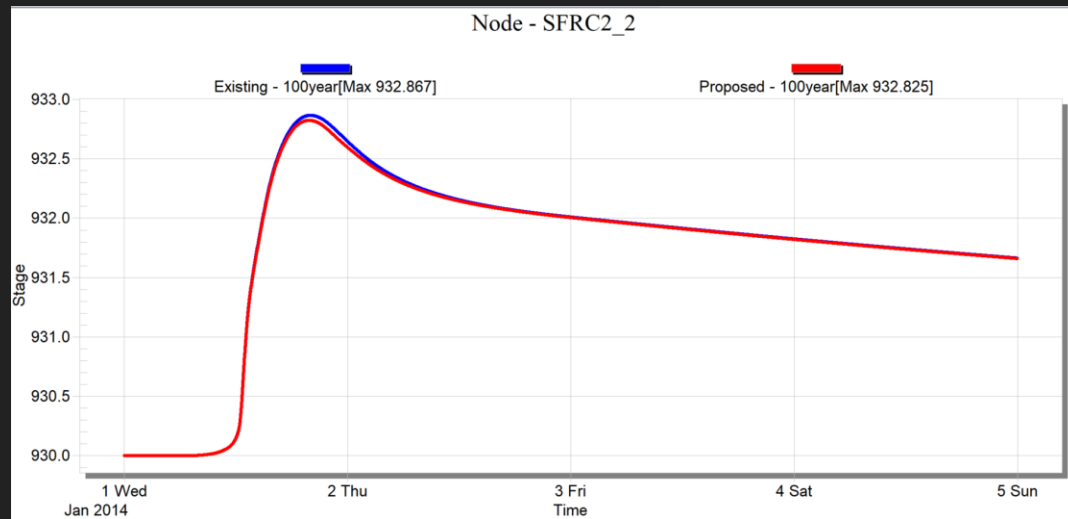- Flow Attenuation/Storage

H&H Modeling

Field Data Collection

Field work surveying culverts and points of interest in the watershed

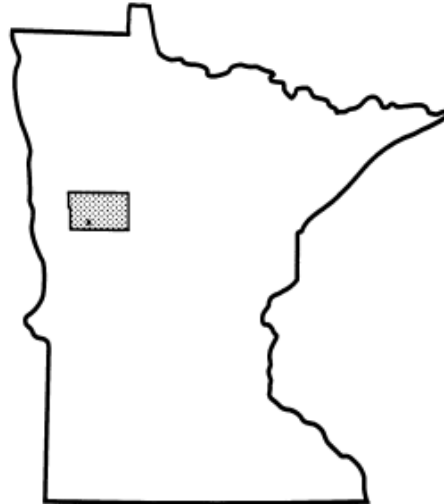- Pipe type, size, condition, layout, erosion, obstruction
- Georeferenced photos

Results

- Planning Tool
- Identify Issues and Analyze Solutions
- Inundation Maps
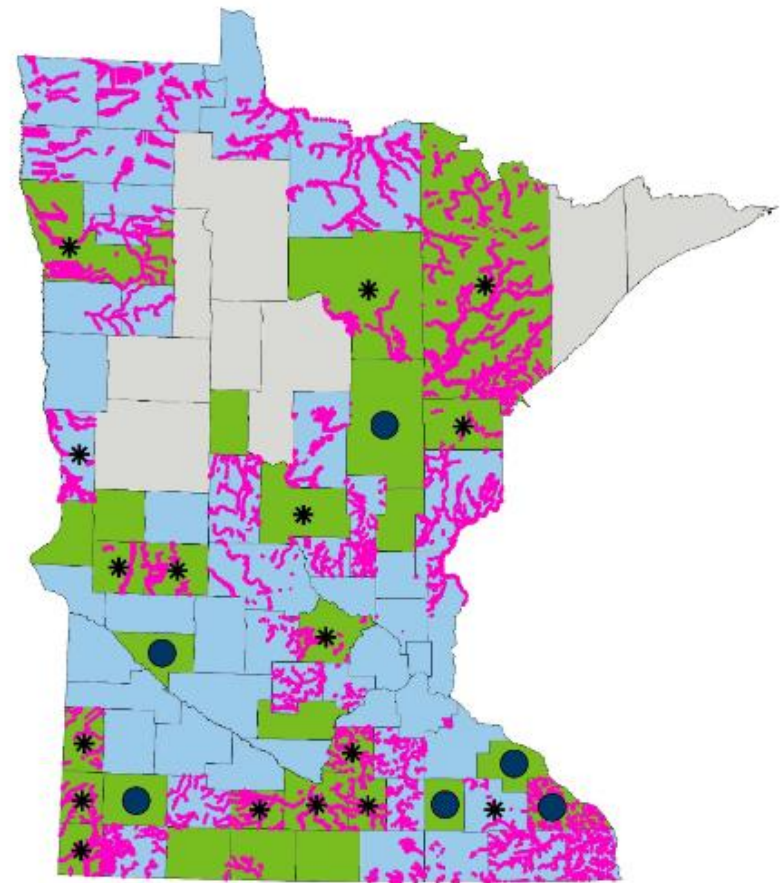- Unsteady Hydrographs
- FEMA Grants

Current FEMA Floodplain Maps

- City of Detroit Lakes, Becker County
- Year of Study is 1986 and is out of date with current conditions
- Flood Insurance Study for Incorporated Area of Detroit Lakes

Current FEMA Floodplain Maps

Ceil Strauss
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MN DNR State Floodplain Manager

DFIRM Counties
Paper Map Counties
Unmapped Counties
Estimated 1% Base Flood Elevations
Preliminary DFIRMs Available
Countywide Modernization

Estimated FEMA Map Modernization Status in Minnesota - by County

DEPARTMENT OF NATURAL RESOURCES

12/27/2022

Note: Dates shown as Month-Year are estimates; Dates shown as MM/DD/YY are actual date

County	Status	Preliminary Map	Local Official / Open House	90-day starts	90-day ends	LFD*	Effective map date**
AITKIN	Co Modernization						NA
ANOKA	Effective	9/30/2011; rev 7/16/13	12/15/11	2/21/14	5/21/14	6/16/15	12/16/15
BECKER	No Map						NA
BELTRAMI	No Map						NA
BENTON	Effective	9/29/09	12/8/09	5/18/10	8/16/10	2/16/11	8/16/11
BIG STONE	Effective	10/01/04	2/16/05	6/21/05	9/21/05	10/17/05	4/17/06
BLUE EARTH	90-day ended	12/9/09; rev 4/20/11; 9/12/18; 8/28/20 (3 panels); Feb-23 (panels)	6/1/11; 11/7/18; 1/5/21; 6/10/21	9/21/11; 7/29/21; 11/10/21	12/20/11; 10/26/21; 2/8/22	2023	2024
BROWN	Effective	6/15/06	8/9/06	1/4/08	4/4/08	3/25/09	9/25/09
CARLTON	90-day ended	5/28/2021	8/19/21; 9/23/21	3/31/22; 6/24/22	6/29/22; 9/22/22	2023	2024
CARVER	Effective	9/30/11; rev 9/14/15 & 1/31/18	3/8/2012; 7/19/2016	12/29/16	3/29/17	6/21/18	12/21/18
CASS	No Map						NA
CHIPPEWA	Preliminary	12/20/22	2023	2023	2023		NA

County	Status	Preliminary Map	Local Official / Open House	90-day starts	90-day ends	LFD*	Effective map date**
MARTIN	No New Map						NA
MC LEOD	Effective	9/30/11	1/8/13	5/17/13	8/14/13	1/7/14	7/7/14
MEEKER	Effective	10/29/10	12/15/10	2/10/11	5/11/11	10/3/11	4/3/12
MILLE LACS	Effective	8/11/10; 9/16/11	12/14/10	1/20/11	4/20/11	9/4/12	3/4/12
MORRISON	Preliminary	11/3/22	1/19/23	2023	2023	2023	2024
MOWER	Effective	6/30/11	11/9/11	1/2/12	4/1/12	3/4/13	9/4/13
MURRAY	Co Modernization+	2024					NA
NICOLLET	Effective	3/31/2011; rev late 2011; 9/12/18; 2/28/20	5/31/11; 11/8/18; 4/9/20	7/29/21	10/26/21	4/13/22	10/13/22
NOBLES	Effective	7/26/10; rev 11/21/12	1/25/11	5/15/13	8/12/13	11/19/13	5/19/14
NORMAN	Effective	2/8/13; 4/12/18 (levee panels)	3/19/13	7/9/13	10/9/13	3/30/15;6/20/19 (levee panels)	9/30/15; 12/20/19
OLMSTED	Effective	6/30/11; rev 9/14/15; 5/29/20 (panels); 2023 (levee panels)	4/17/13; 11/10/2020 (panels); 2/23/21	7/17/13; 3/17/16; 7/27/21 (panels)	10/15/13; 6/17/16; 10/25/21 (panels)	10/19/16; Mar-23 (Zumbro panels)	4/19/17; 2023 (panels)
OTTER TAIL	No Map						NA
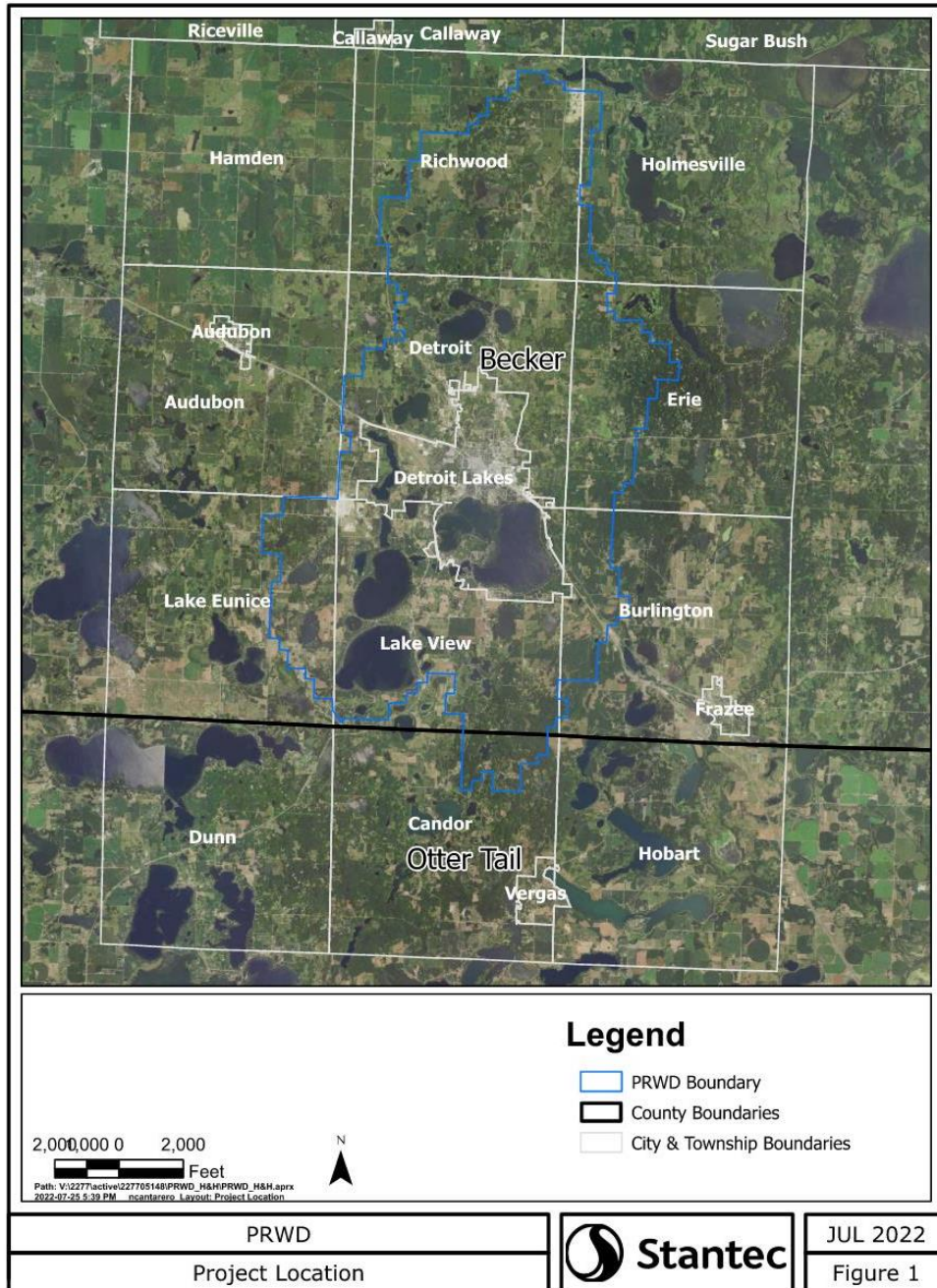
Public Engagement

- Developing ArcGIS Online interactive Story Map
  - To be embedded or linked on PRWD's website
  - Visualize preliminary H&H model results and other relevant watershed data
  - Provide opportunity for input from community and project partners
  - Story Map Example

Tool Development

- Develop ArcGIS Online interactive application
  - Visualize H&H model results and other relevant watershed data
  - Internal application to support district staff
  - Can be embedded or linked to PRWD's website with customization of data that is publicly viewable
  - Work with PRWD staff to promote involvement
  - [Web Application Example](#)

Summary Plan and Report

- Summarize Modeling Methodology and Results

- Discuss HSEM Process and Public Engagement

- Create interactive application for PRWD

- Provide Recommendations for Stormwater and Floodplain Management
  - Conceptual level design for up to 5 areas with floodplain/stormwater issues
  - Up to 3 conceptual level solutions

- Water quality improvement opportunities and support for MS4 communities

- Opens opportunities for funding support

Project Financial Overview

- Total project cost: $197,000

Budget Category	Grant Award	PRWD Match
Project Management		$9,300
Modeling/Reporting	$126,600	$32,900
Public Engagement	$21,150	$7,050
TOTAL	$147,750 (75%)	$49,250 (25%)

Questions?

Photo: Lake Sallie at County Highway 19