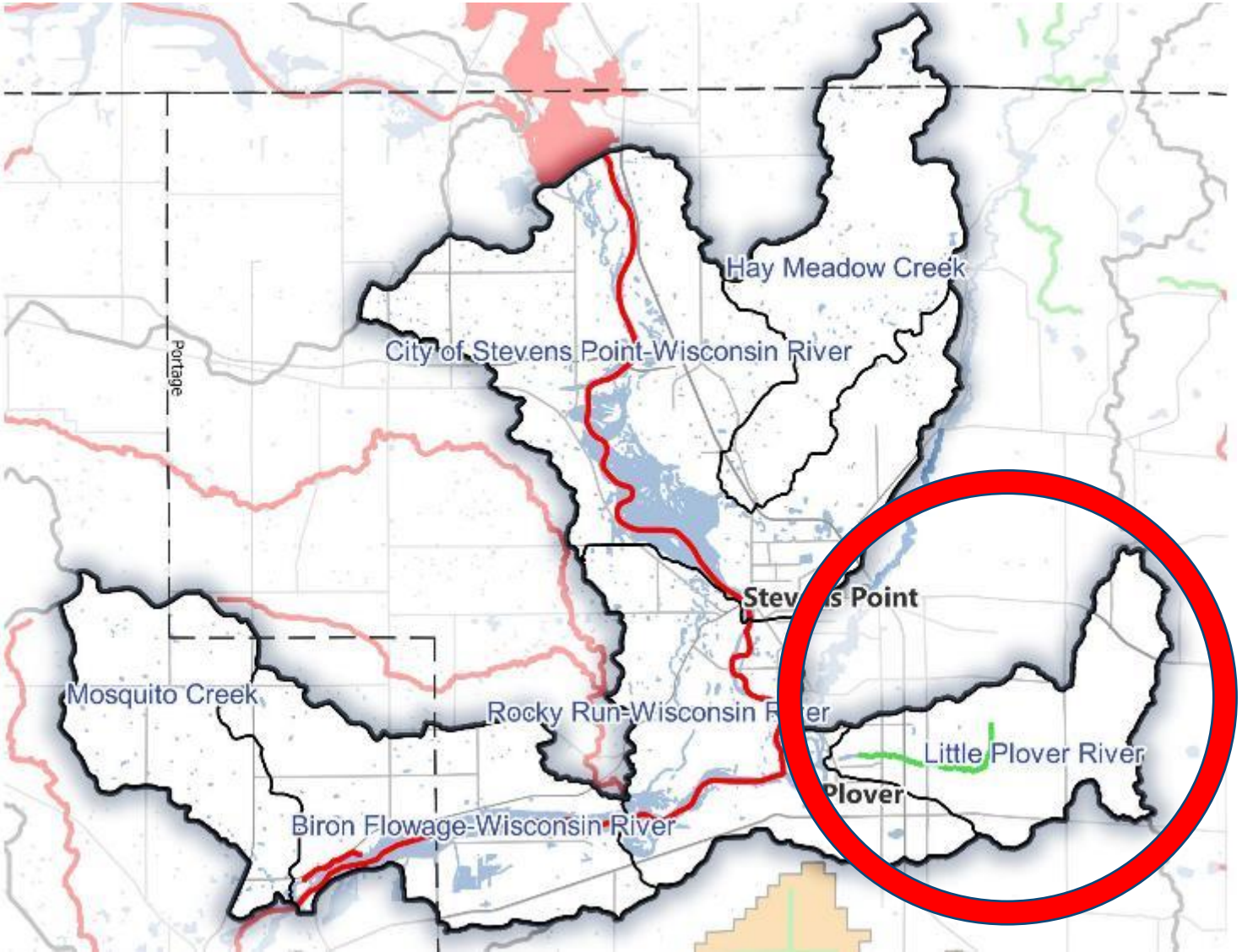
Little Plover River Watershed Enhancement Project – A Wetland Story

Tracy Hames, Executive Director

Wisconsin Wetlands ASSOCIATION

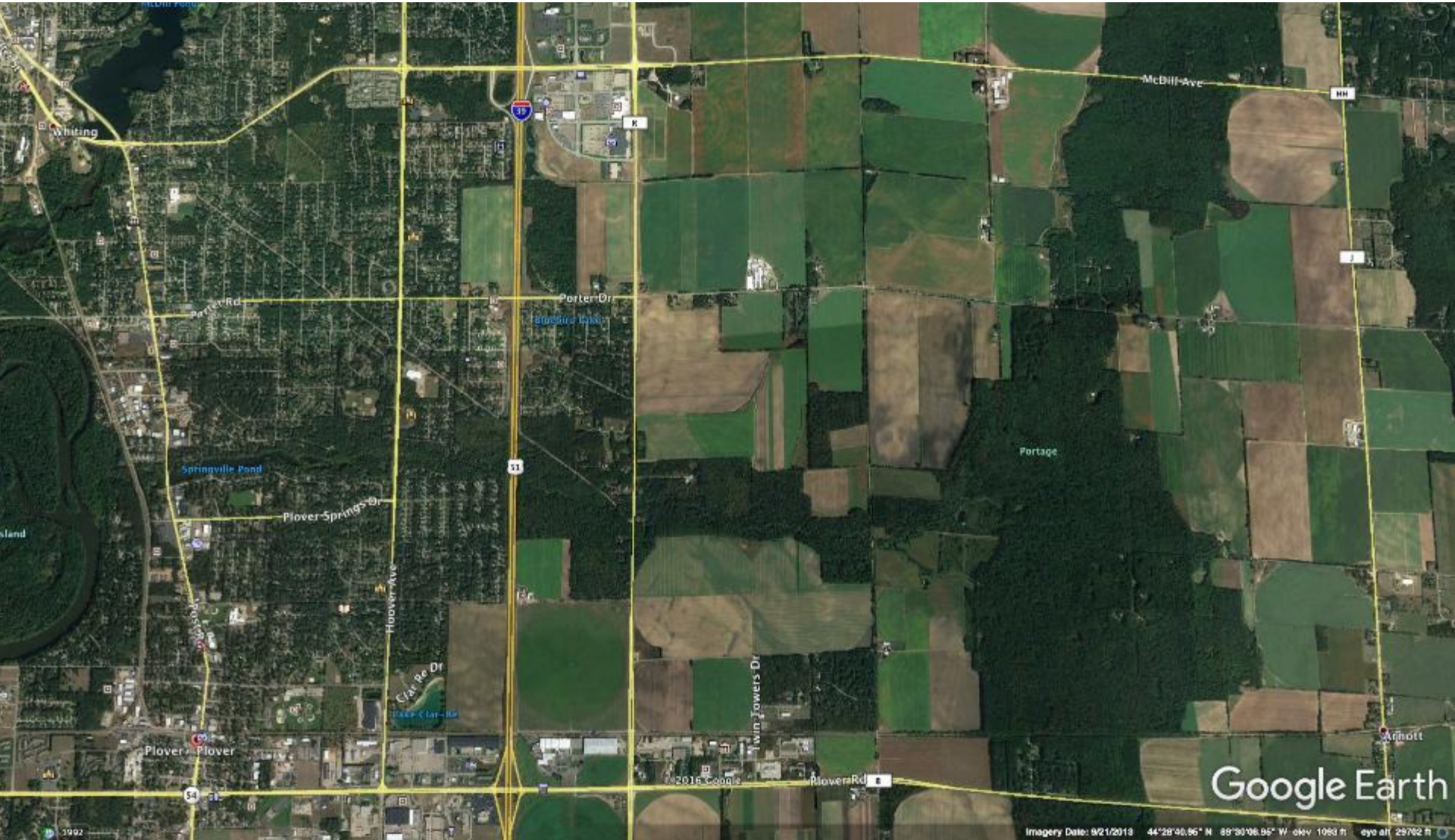
Little Plover River Watershed (HUC 12)

City of Stevens Point-Wisconsin River HUC 10



Little Plover River Watershed

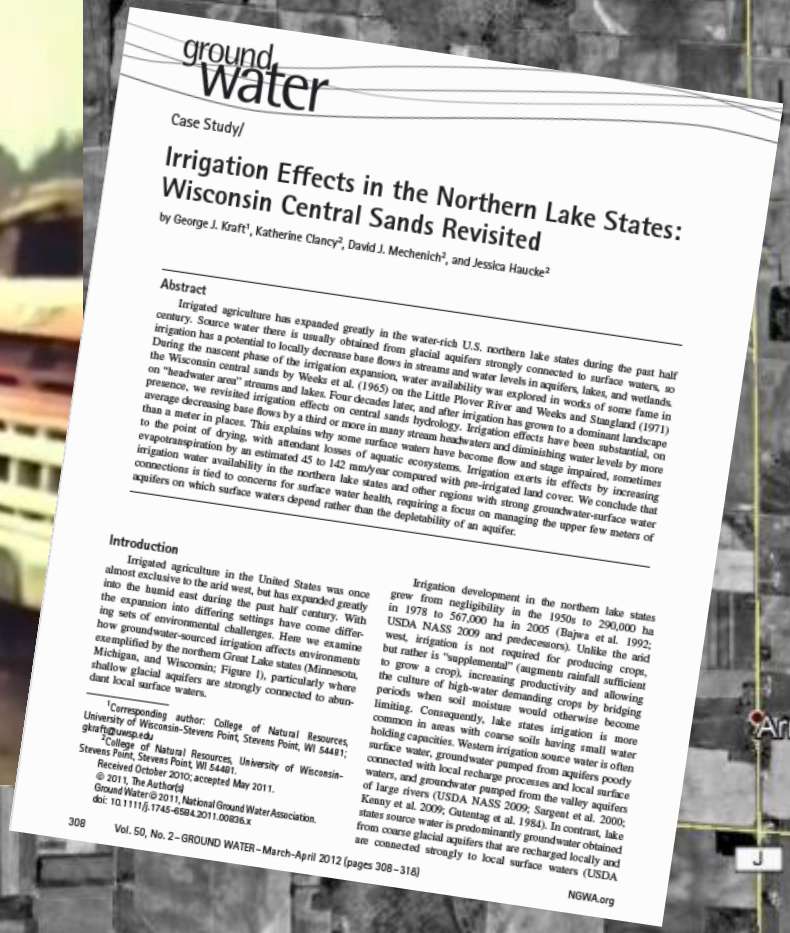
LPR - ~5 miles long, 80-90% Groundwater-fed



Long History of Study

High-Capacity Wells

USGS 1960s pumping test movie



ground water

Case Study/

Irrigation Effects in the Northern Lake States: Wisconsin Central Sands Revisited

by George J. Kraft[1], Katherine Clancy[2], David J. Mechenich[3], and Jessica Haucke[2]

Abstract

Irrigated agriculture has expanded greatly in the water-rich U.S. northern lake states during the past half century. Source water there is usually obtained from glacial aquifers strongly connected to surface waters, so irrigation has a potential to locally decrease base flows in streams and water levels in aquifers, lakes, and wetlands. During the nascent phase of the irrigation expansion, water availability was explored in works of some fame in the Wisconsin central sands by Weeks et al. (1965) on the Little Plover River and Weeks and Stangland (1971) on "headwater area" streams and lakes. Four decades later, and after irrigation has grown to a dominant landscape presence, we revisited irrigation effects on central sands hydrology. Irrigation effects have been substantial, on average decreasing base flows by a third or more in many stream headwaters and diminishing water levels by more than a meter in places. This explains why some surface waters have become flow and stage impaired, sometimes to the point of drying, with attendant losses of aquatic ecosystems. Irrigation exerts its effects by increasing evapotranspiration by an estimated 45 to 142 mm/year compared with pre-irrigated land cover. We conclude that irrigation water availability in the northern lake states and other regions with strong groundwater-surface water connections is tied to concerns for surface water health, requiring a focus on managing the upper few meters of aquifers on which surface waters depend rather than the depletability of an aquifer.

Introduction

Irrigated agriculture in the United States was once almost exclusive to the arid west, but has expanded greatly into the humid east during the past half century. With the expansion into differing settings have come differing sets of environmental challenges. Here we examine how groundwater-sourced irrigation affects environments exemplified by the northern Great Lake states (Minnesota, Michigan, and Wisconsin; Figure 1), particularly where shallow glacial aquifers are strongly connected to abundant local surface waters.

Irrigation development in the northern lake states grew from negligibility in the 1950s to 290,000 ha in 1978 to 567,000 ha in 2005 (Bajwa et al. 1992; USDA NASS 2009 and predecessors). Unlike the arid west, irrigation is not required for producing crops, but rather is "supplemental" (augments rainfall sufficient to grow a crop), increasing productivity and allowing the culture of high-water demanding crops by bridging periods when soil moisture would otherwise become limiting. Consequently, lake states irrigation is more common in areas with coarse soils having small water holding capacities. Western irrigation source water is often surface water, groundwater pumped from aquifers poorly connected with local recharge processes and local surface waters, and groundwater pumped from the valley aquifers of large rivers (USDA NASS 2009; Sargent et al. 2000; Kenny et al. 2009; Gutentag et al. 1984). In contrast, lake states source water is predominantly groundwater obtained from coarse glacial aquifers that are recharged locally and are connected strongly to local surface waters (USDA

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Long History of Controversy

Little Plover River partially dried up in 2005 - 2009

High-Capacity Wells

Friends of the Little Plover River

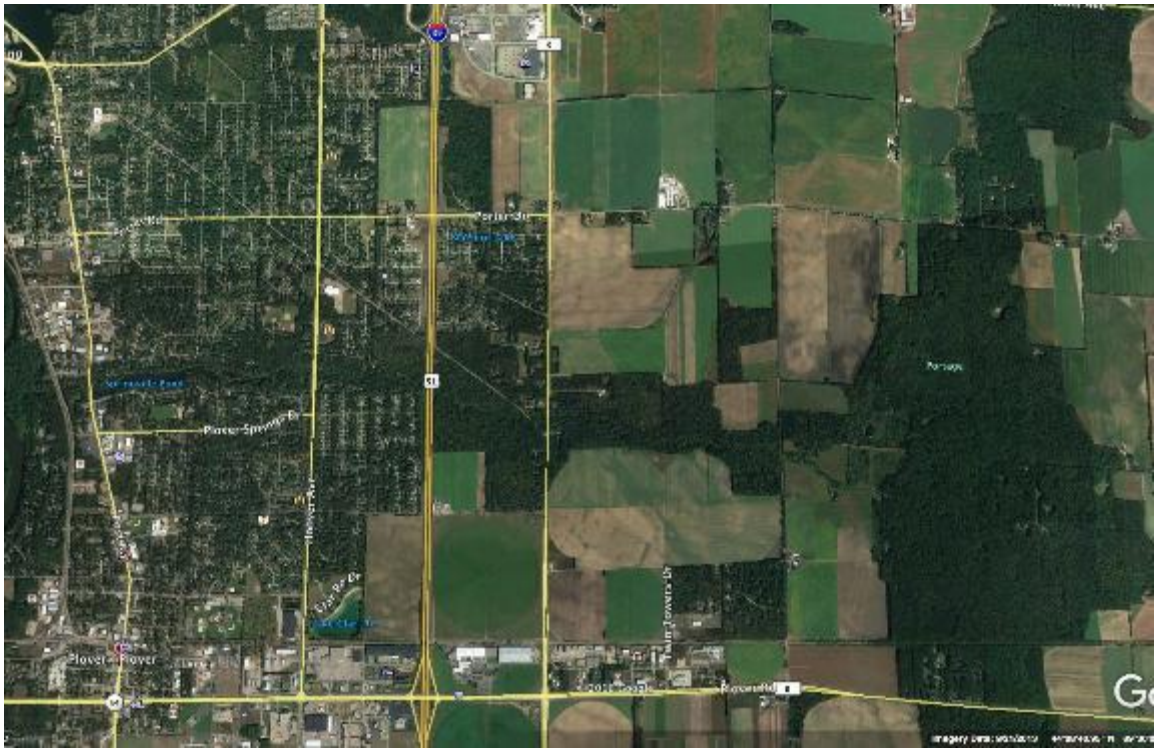
Little Plover River Watershed Enhancement Project

Improve watershed health

- Increase river flow
- Enhance habitat
- Improve quality of life

Find voluntary solutions

Use best available science



EOR water ecology community

Wisconsin Wetlands Association

Portage County 1842 The Heart of Wisconsin

Home Grown Wisconsin Potatoes

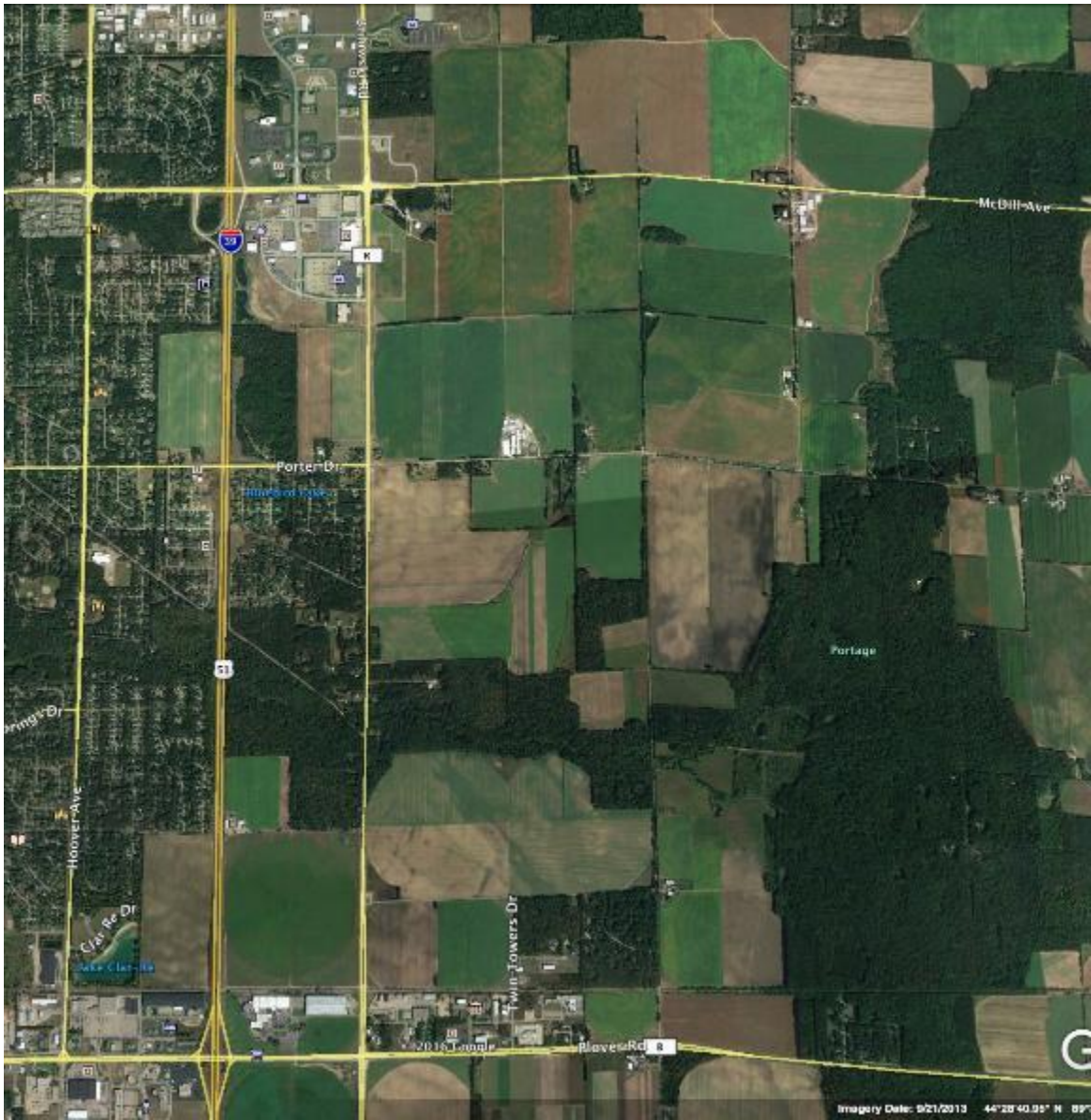
Wisconsin Wildlife Federation

Wisconsin Dept. of Natural Resources

Plover Wisconsin

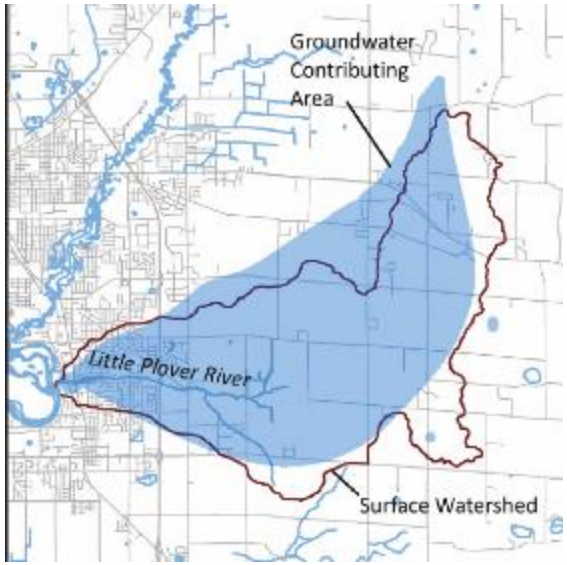
Goals

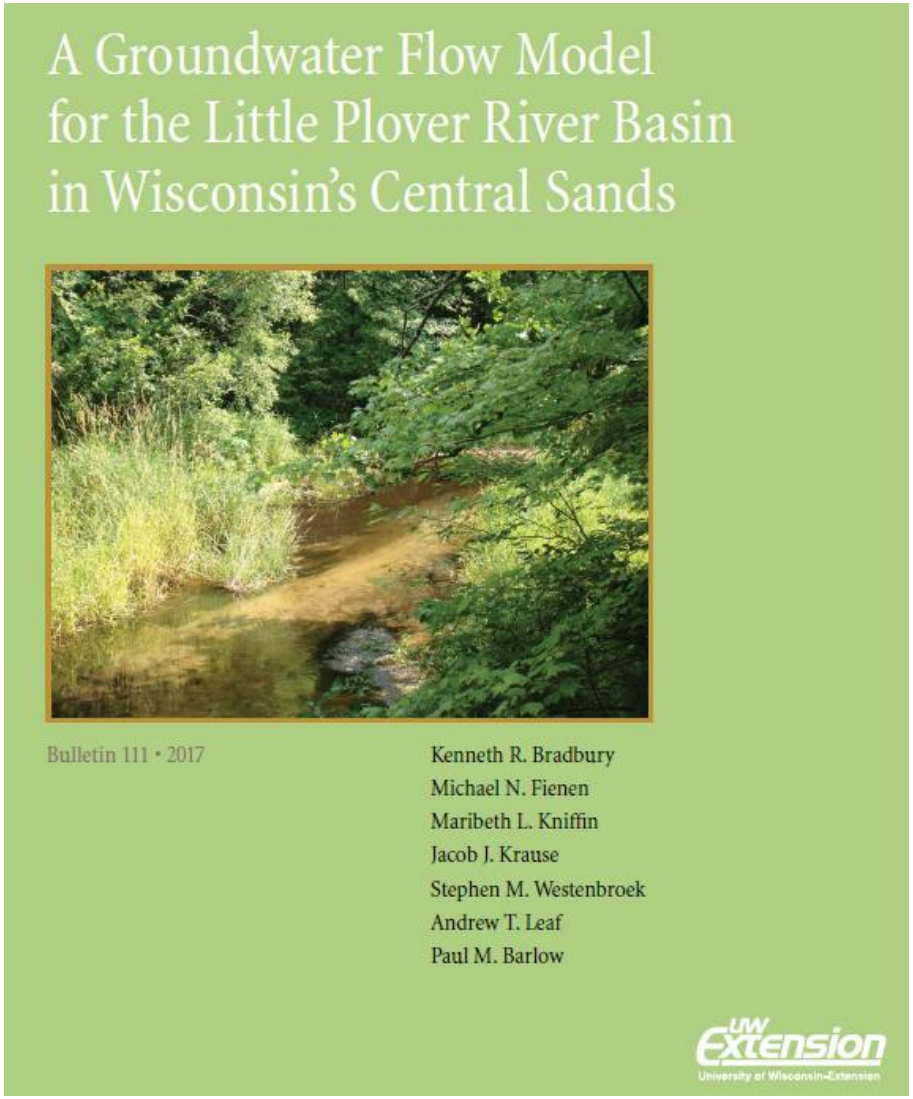
- Improve LPR flow and aquatic health
- Improve surface-groundwater connections and water retention
- Alleviate flooding
- Improve & expand
  - habitat
  - economic
  - recreation opportunities



Watershed Approach

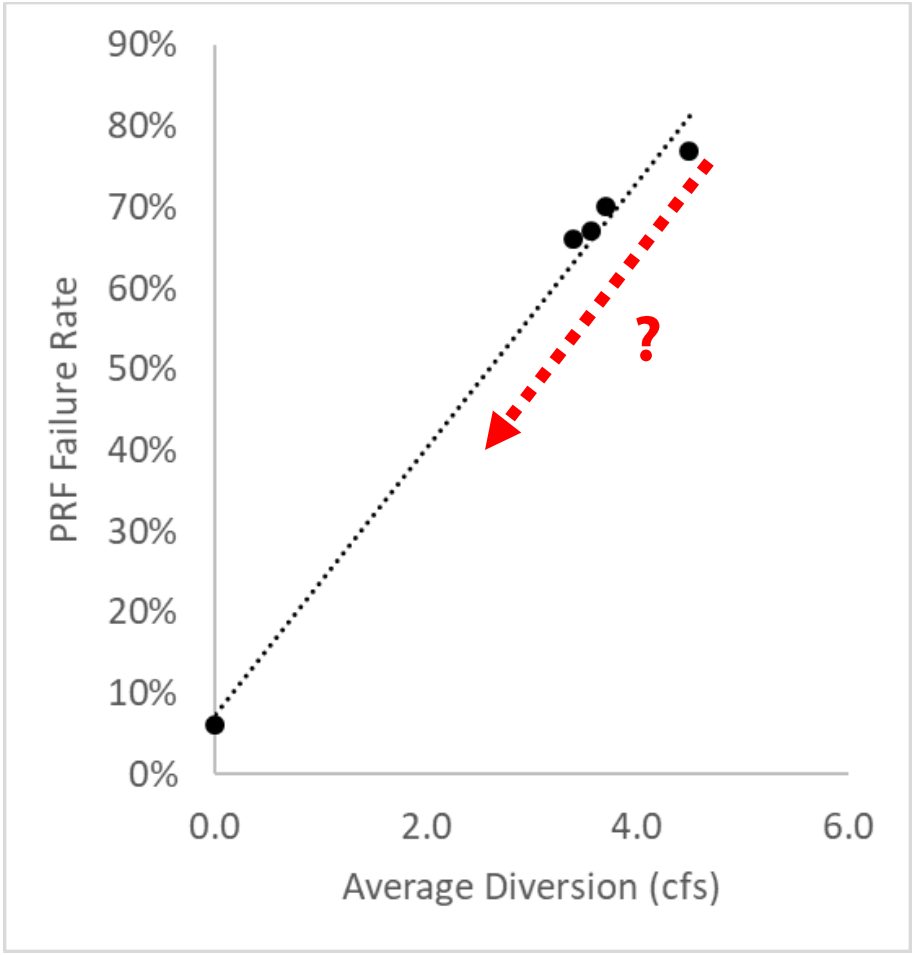
- Set targets
- Prioritization strategy
  - Short-term
  - Long-term
- Project implementation
- Monitoring





Flow Targets

- Public Rights Flows related to diversion
- Seasonality important
- Ultimate goal is healthy fishery
- Diversion reduction needed?

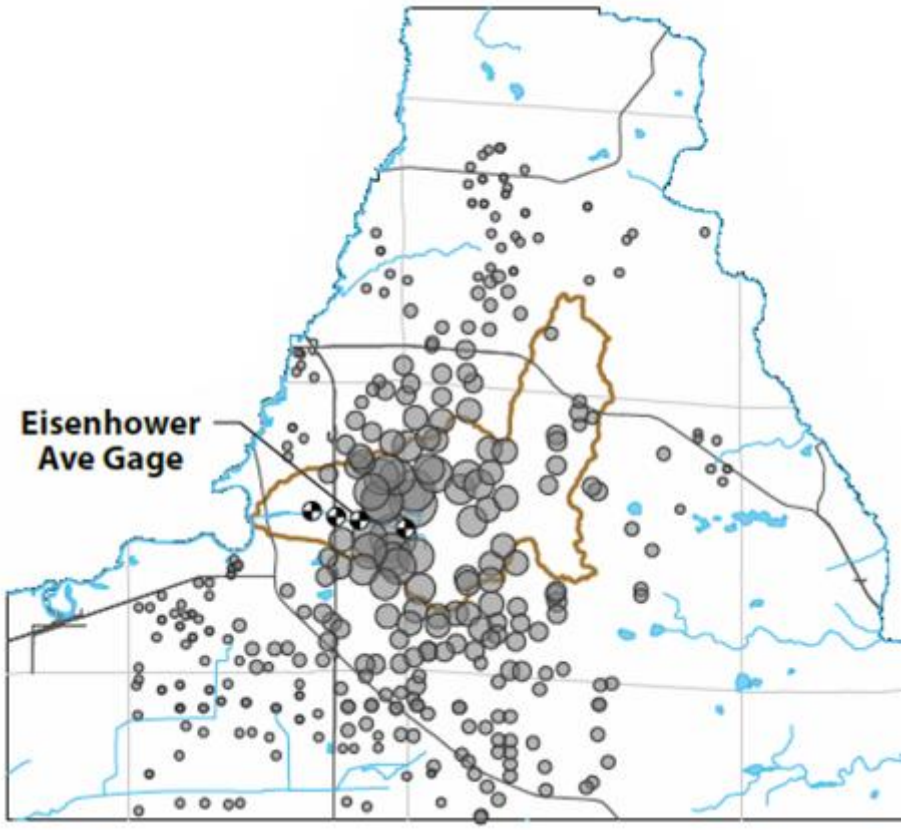


(Data from Kraft, 2012)

Water Budget Analysis

Alternatives Analysis Report

- Dozens of wells affect flow
- Closer wells have more impact
- Groundwater model quantifying flow increases
- Prioritizing actions by location / benefits

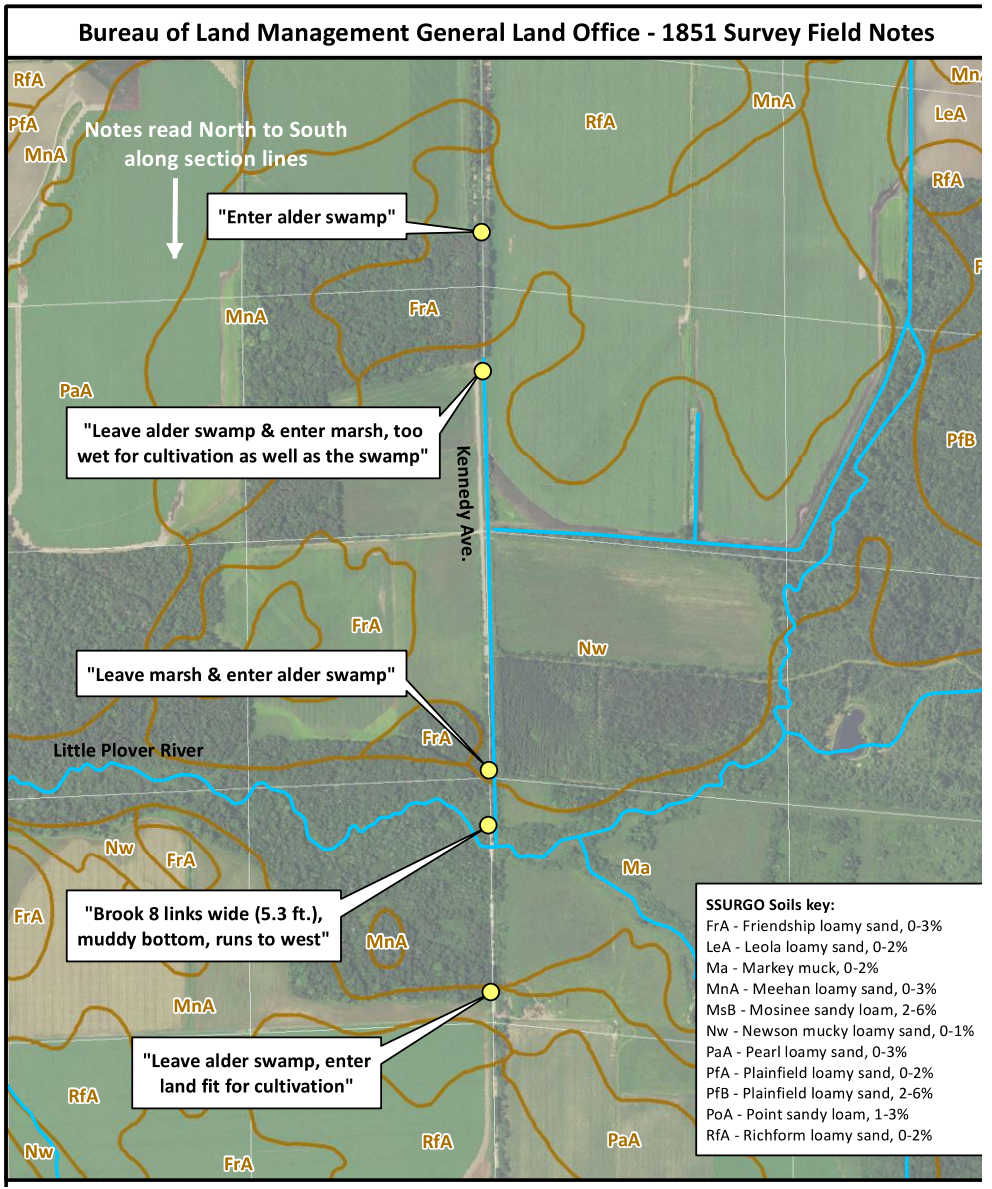


Depletion potential from MODFLOW (WGNHS & USGS)

Water Budget Not the Whole Story

Historical Perspective

- GLO Surveys – 1851
- Bordner surveys – 1930's
- Historical aerial photos
- Wetland soils
- Ask the three questions



What's Changed?

Let's tell the story

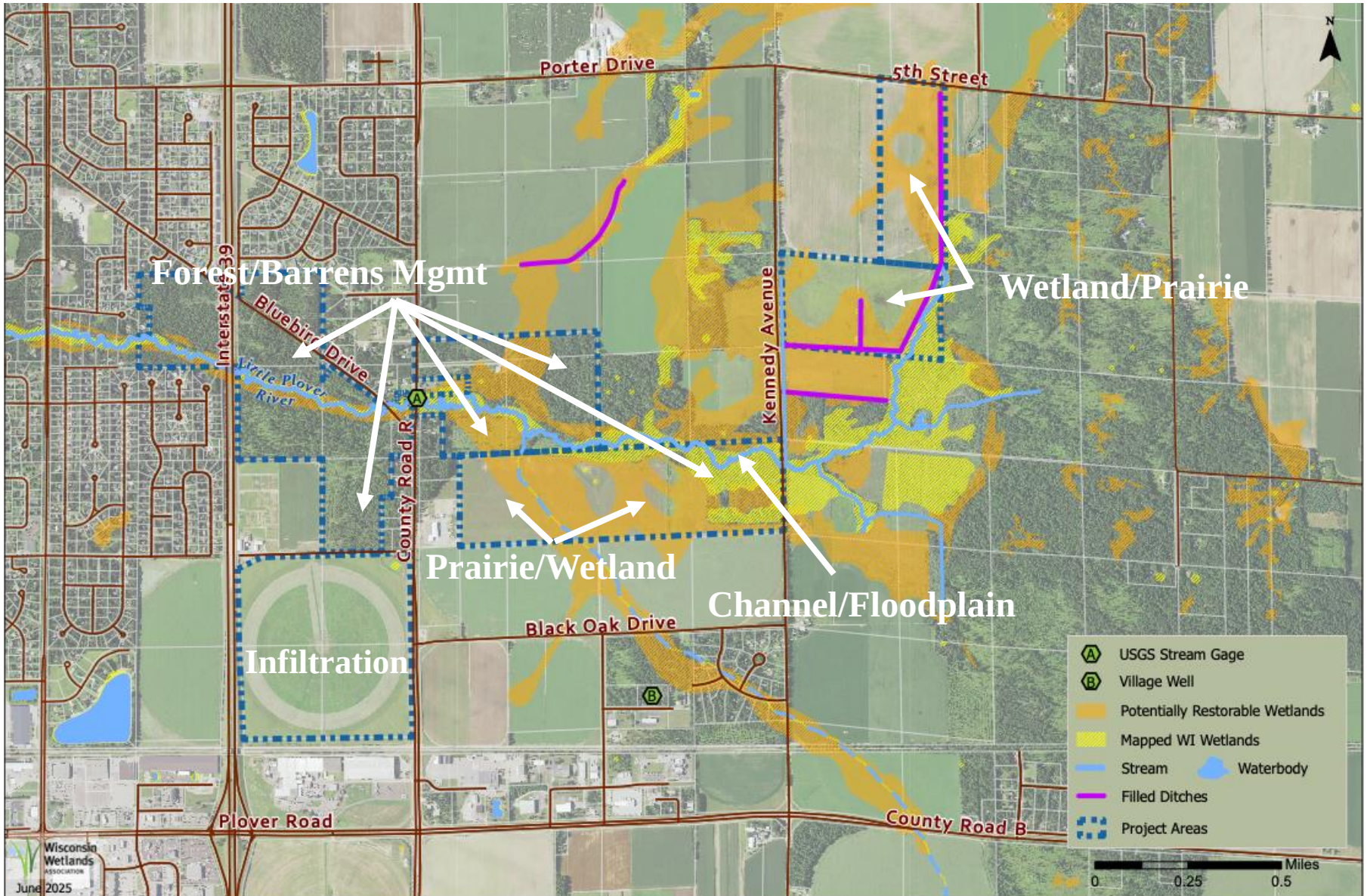
- Drainage ditch construction
- Wetland loss and degradation
- Grassland and forest alteration
- Channel alteration
- Floodplain disconnection
- Irrigation development

Implementation - Funding

- NRCS – RCPP/EQIP
- Knowles-Nelson Stewardship Fund
- WI Wetlands Conservation Trust
- WI Wildlife Habitat Partnership Program (P-R Funds)
- USFWS Partners for Fish and Wildlife
- DATCP Producer-led Watershed Group
- UWSP & Conservation Groups Volunteers
- LPRWEP Partner Contributions
- Portage County Wetland Mitigation Bank

- WI River Grant
- EPA Wetland Program Develop. Grant
- Village of Plover Dept. of Works

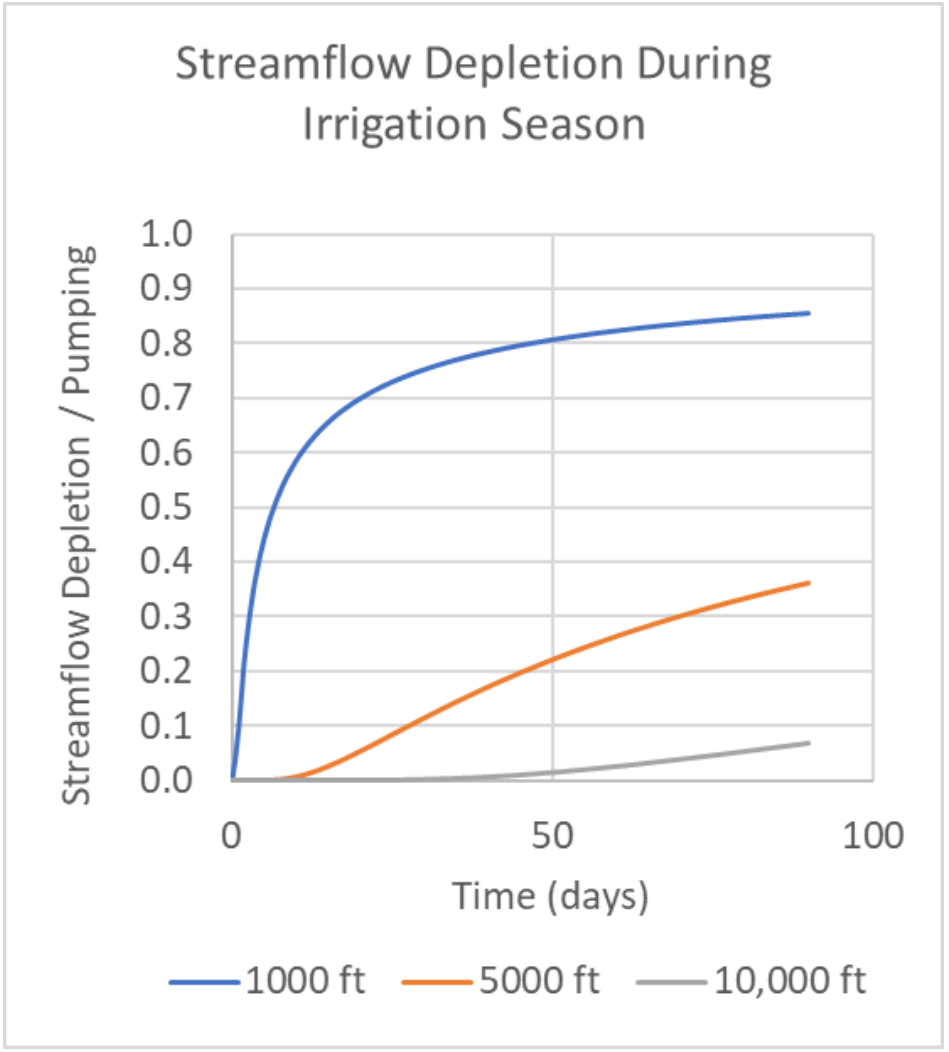
Initial Landscape Projects



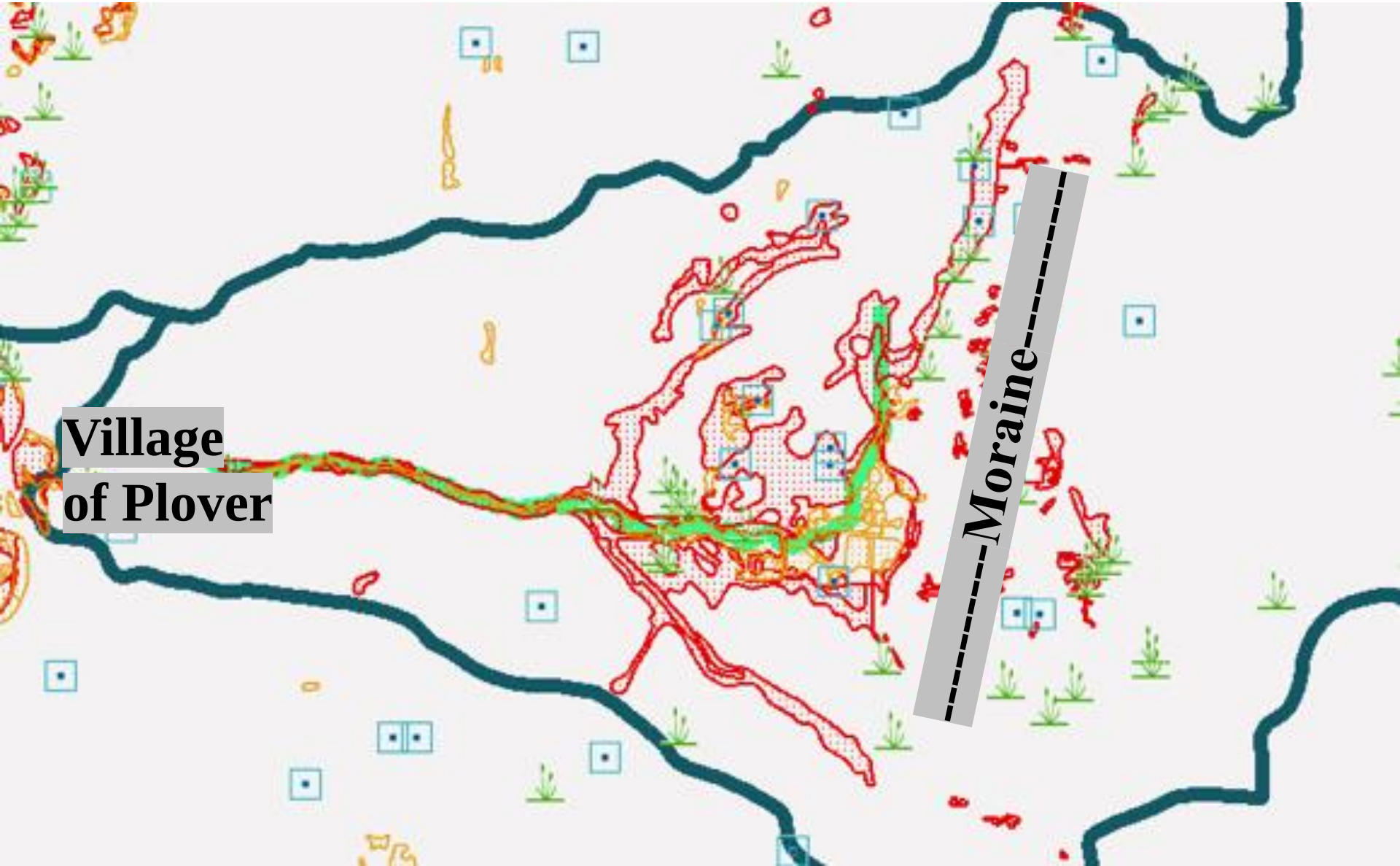
Water Conservation

Water Use Reductions

- Cluster Analysis & ledger
- Retirement of irrigated fields near river
- Work with growers to apply research on irrigation reductions (WPVGA, UW, Producer-led group)
- Village municipal pumping change
- Water delivery upgrades
- Del Monte recharge
- Emphasize seasonality



Wetlands



Wetland Restoration

Headwater & Floodplain Wetlands

- Spring-fed
- High groundwater
- Store groundwater & release slowly
- Infiltrate more snowmelt & runoff
- Excellent biodiversity & habitat

Permitting – Wetland Statewide General Permit to Restore or Enhance a Wetland,
Construction Site Storm Water Runoff GP,
Stream Habitat Improvement GP

Wetland Restoration

Tannins visible in creek channel during low water times - June 2021

Ditch Removal

- Divert groundwater to headwater reach – increased flow in upper mile of LPR
- Raise groundwater elevation – store more water
- Reduce flashiness of runoff
- Trout managers toured site during planning

Ditch Fill Stats:

- Soik ditch - 4,150 ft filled
- Feltz ditch ~1,200 ft filled in 2024
- North Soik ditch ~1,000 ft filled as part of the Portage County Wetland Mitigation Bank

Floodplain Reconnection

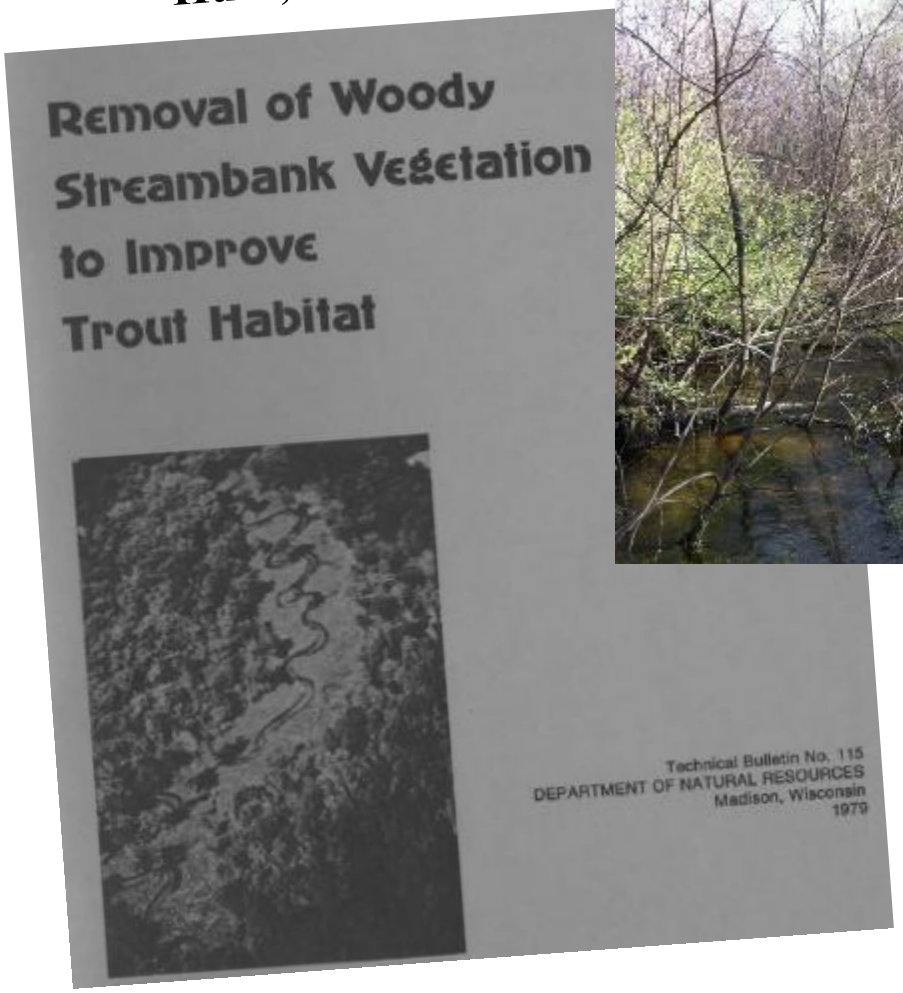
Tied closely to channel restoration and forest management

Floodplain Forest Management

Alder and buckthorn removal, hardwood thinning – increases sunlight

Channel Restoration

Hunt, 1979



Wide and Shallow

Narrow and Deep

Channel Restoration - Before

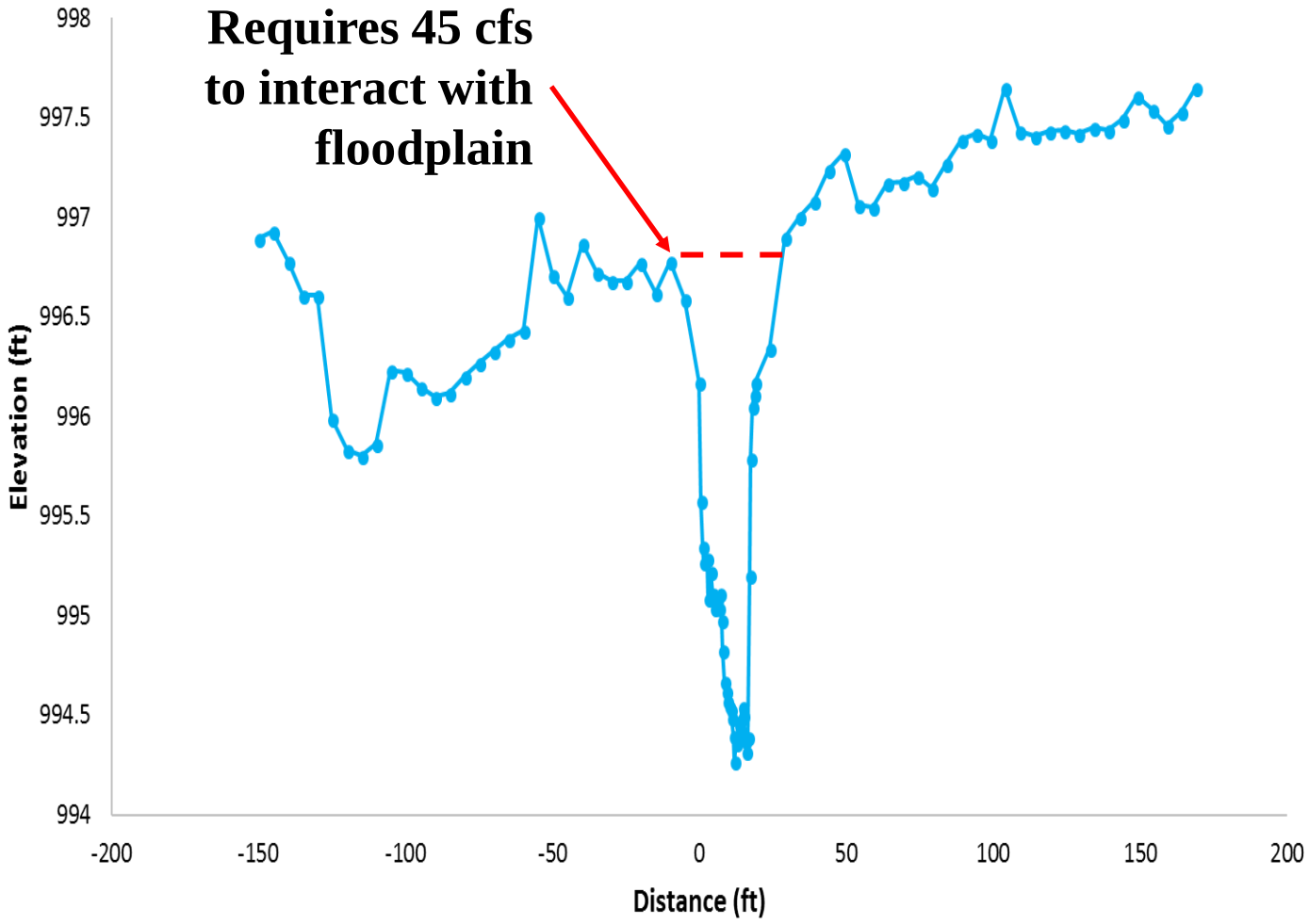
After brush removal and forest thinning, but before bundling

Channel Restoration - After

Brush bundles placed during volunteer workdays

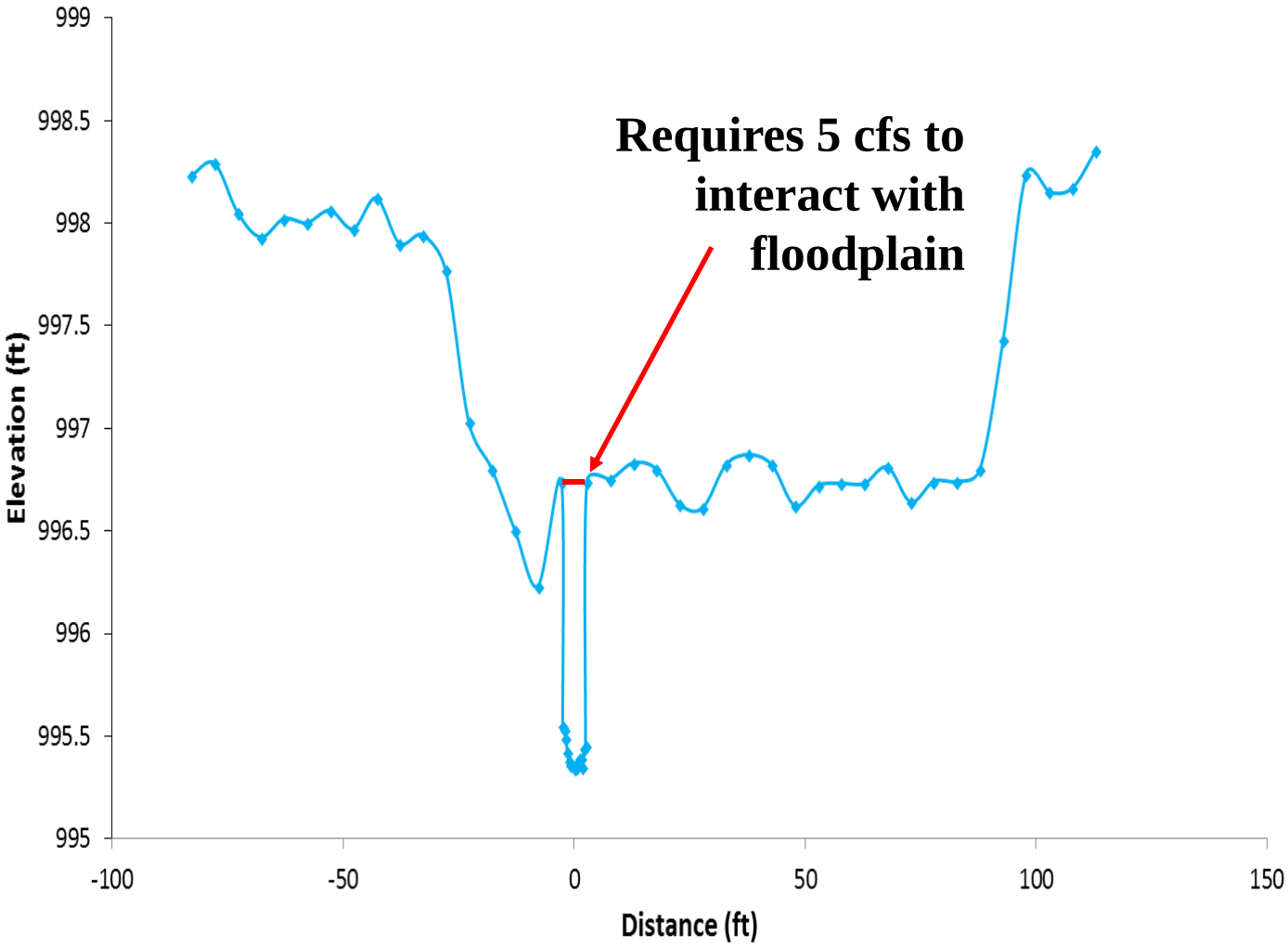
Floodplain Connection - Before

Cross section of channel before restoration



Floodplain Connection - After

Cross section of channel after restoration

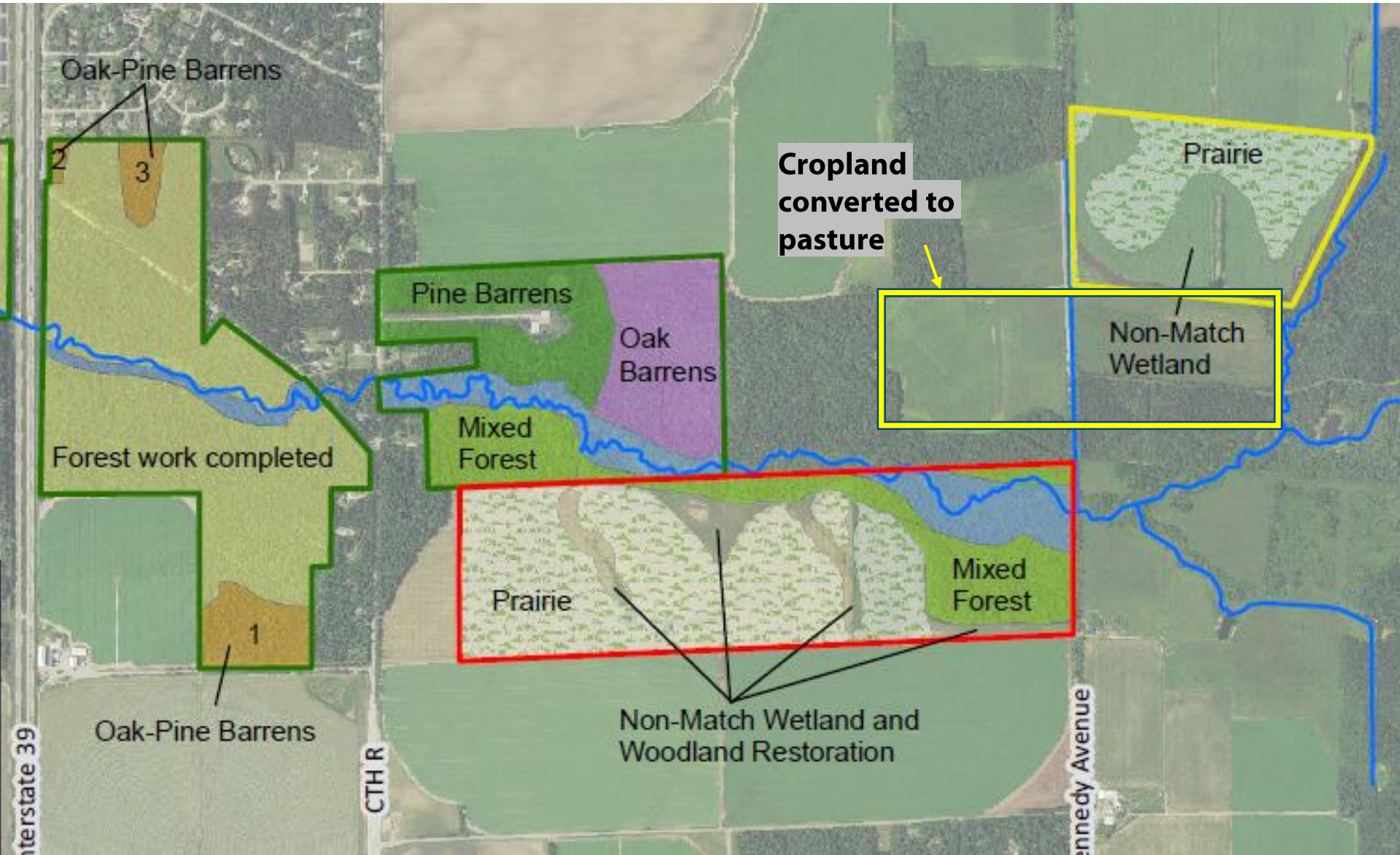


Summer Flows

July 21, 2023
2.57 cfs

July 10, 2025
7.67 cfs

Grassland Restoration



Pine and Oak Barrens

Monitoring/Management & Community Involvement

Monitoring

- Groundwater levels
- River flows
- Wetland vegetation
- Grassland vegetation
- Forest condition
- Trout population dynamics
- UWSP student research

Management

- Periodic burning
- Invasives control
- Periodic forest thinning
- Public access features

Takeaways

- Watershed-based
- Community-led
- Science-based
- Voluntary
- Simple Interventions
- Interdisciplinary
- Simple Permitting
- Public/Private
- Economically Beneficial
- Management/Monitoring
- Three Questions Approach

Thank You

https://www.ploverwi.gov/328/Little-Plover-River-Watershed-Enhancemen

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