DEPARTMENT OF NATURAL RESOURCES

North and East Metro Groundwater Update

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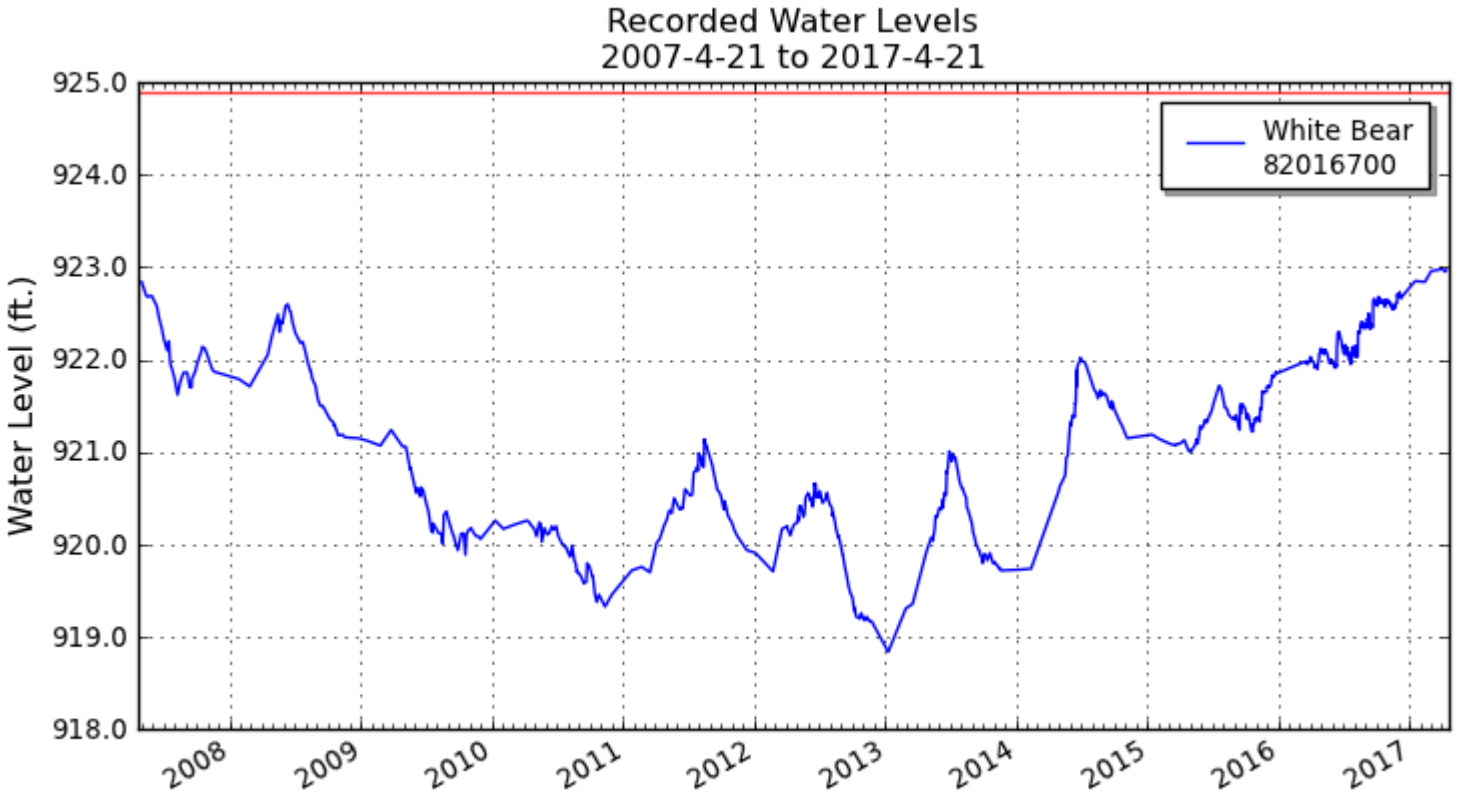
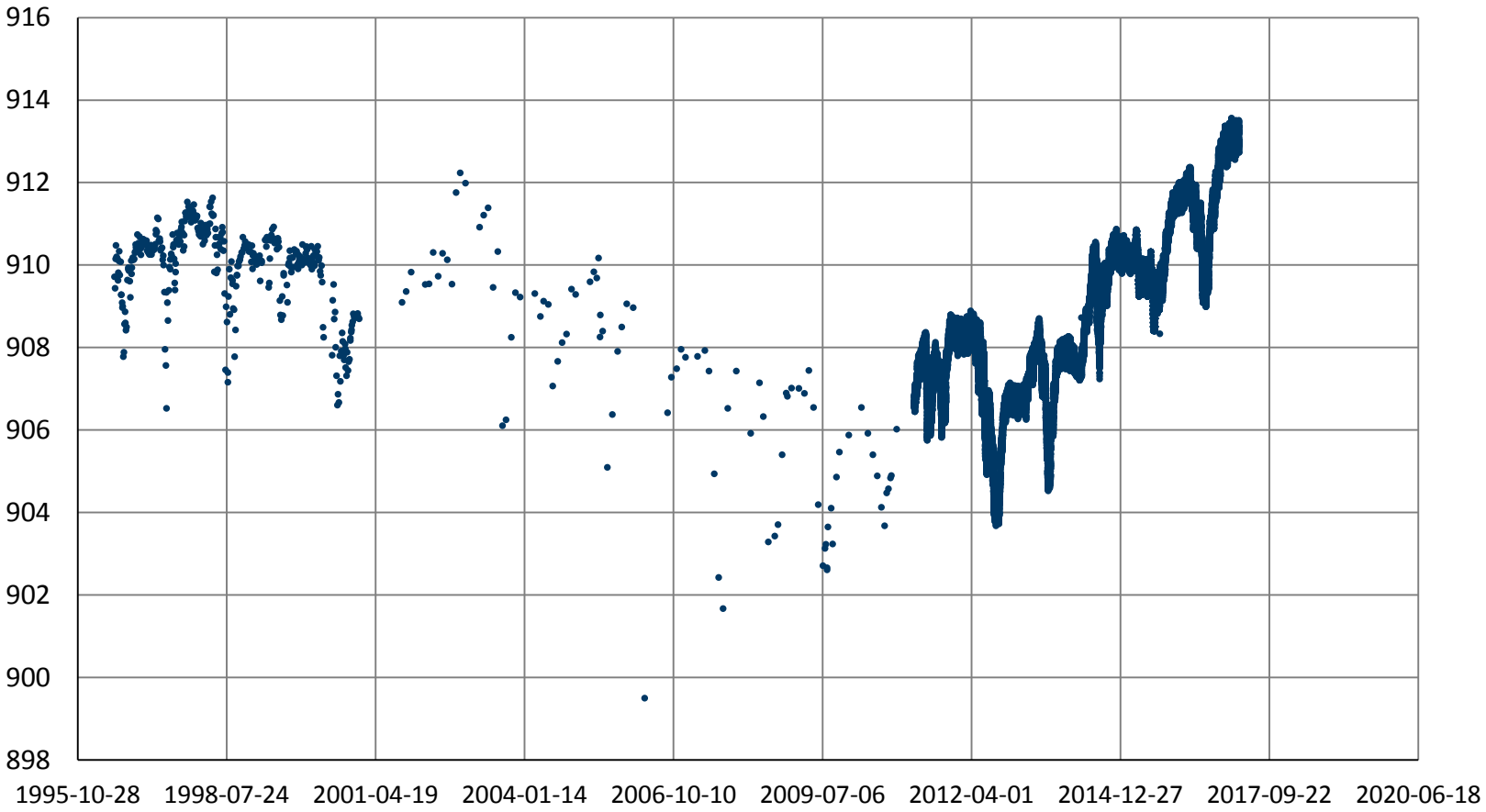
White Bear Lake Water Levels



Aquifer Levels Next to White Bear Lake



Transient Analysis

- Analytical tool that tracks changes over time in months and years
- Will allow us to analyze a variety of different scenarios to evaluate effects of changes in pumping on lake levels and streamflow
- Working on a contract to have this completed by the end of summer 2017

Determining a Protective Elevation

103G. 285 Subd. 3… During the determination of the protective elevation, the commissioner shall consider:

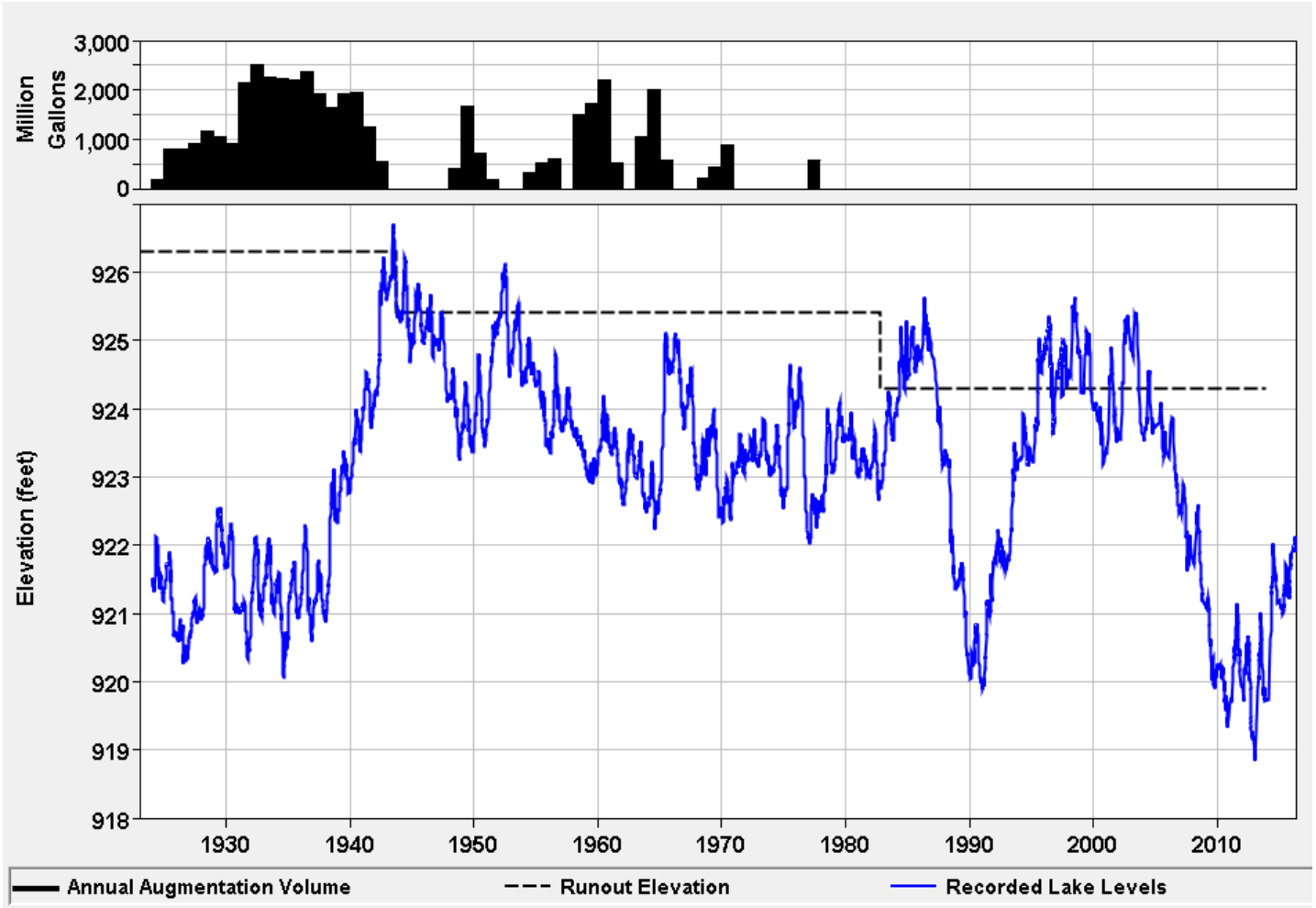
1. the elevation of important aquatic vegetation characteristics related to fish and wildlife habitat;
2. existing uses of the water basin by the public and riparian landowners; and
3. the total volume within the water basin and the slope of the littoral zone.

Summary of Technical Analysis

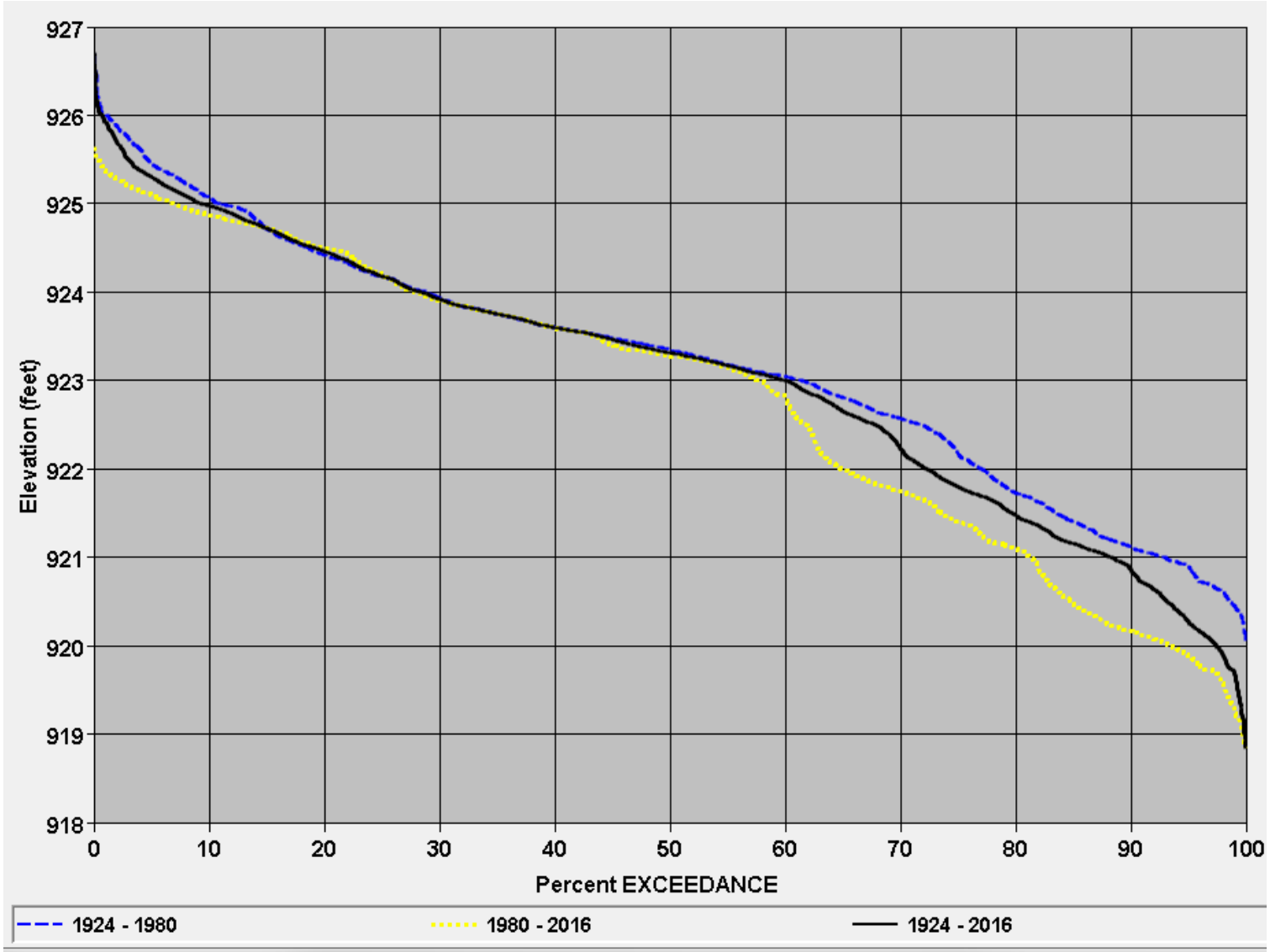
- Water levels - frequency analysis of historical record
  - Above 923’ about 58%
  - Above 922’ about 73%
  - Above 921’ about 90%
  - Lowest recorded 918.84’ in Jan 2013
  - Ordinary High Water (OHW) Level 924.89
  - Lake outlet – 924.3
- Emergent aquatic vegetation needs periodic lower levels to regenerate (between elevation 923’-922’)
- Fish habitat has benefited from diverse aquatic vegetation, especially nearshore emergent and floating leaf types
- Water quality and clarity not substantially related to water elevation
- Recreation
  - Dock extensions when below 923’
  - Navigation impacts (esp. sailing) below ~921.5’
  - Ramsey Cty Swimming beach closed ~921’
  - Bellaire and Mahtomedi beaches remained open
  - Boat access compromised below 920’


Shoreline & lake bottom survey
May – June 2016
Ramsey County Beach
Matoska Park
Bellaire Beach
Mahtomedi Beach
2010 FSA aerial photo

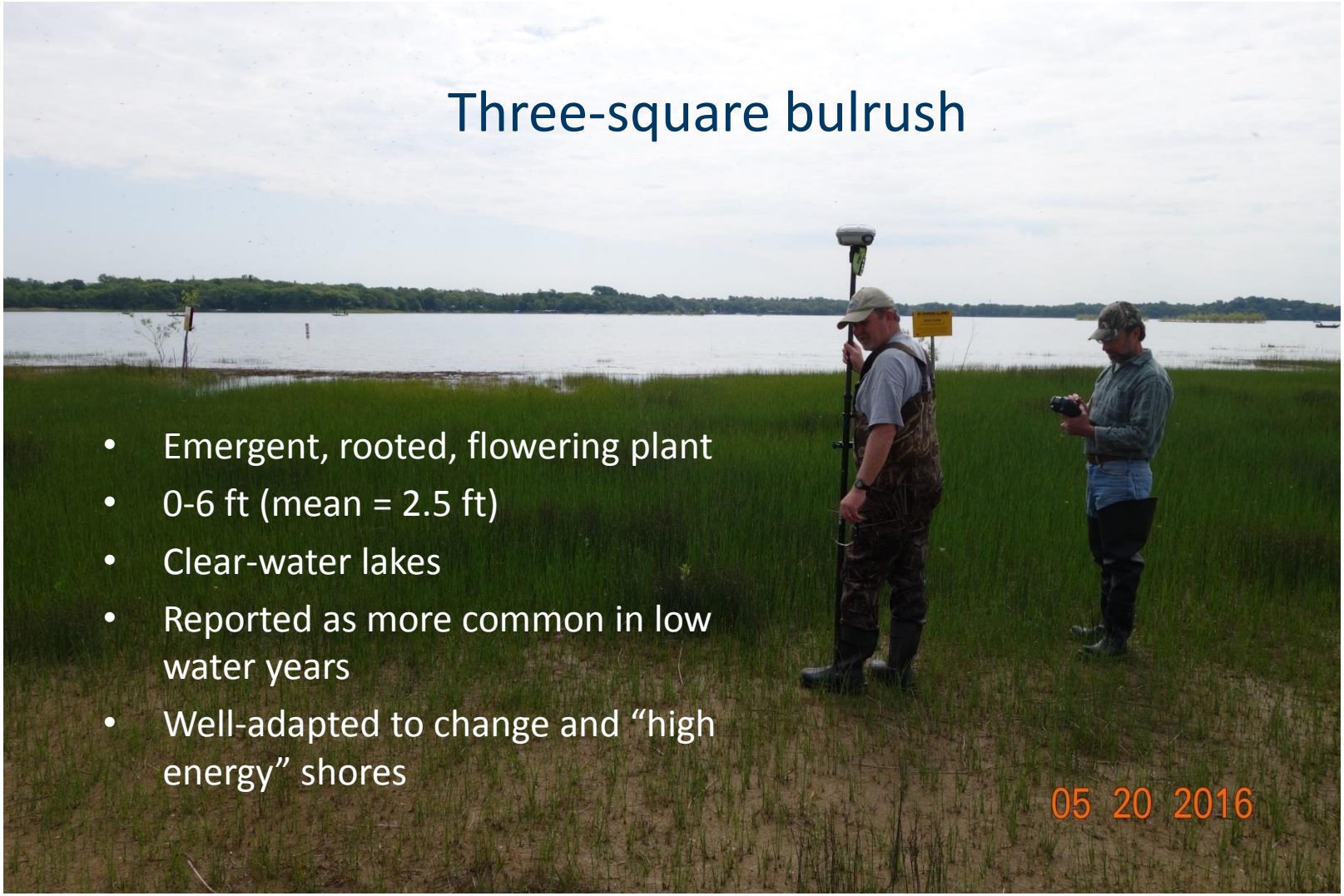
White Bear Lake Recorded Lake Level Data w/ Augmentation Volumes



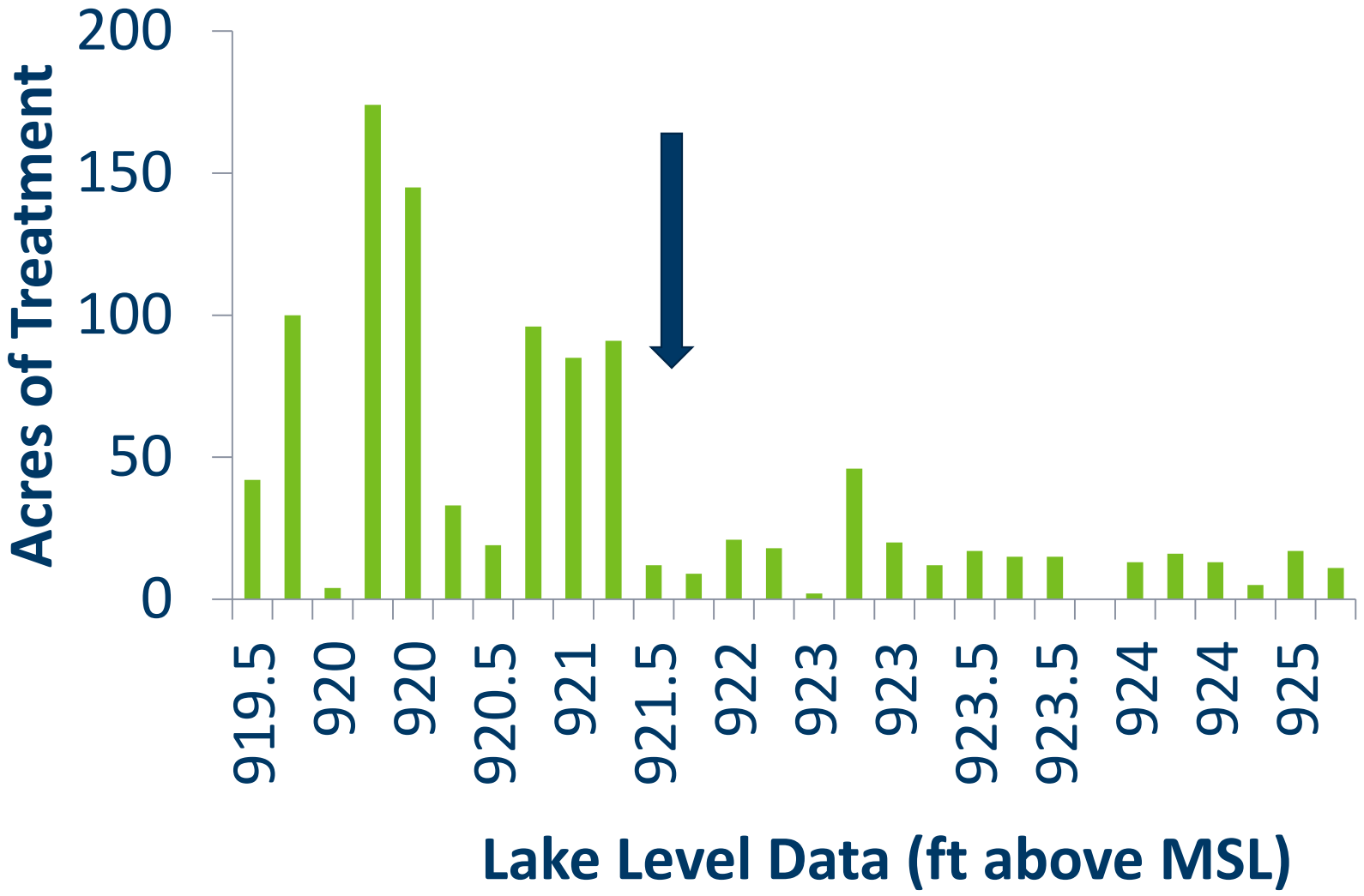
Lake Level Exceedance Curve



Lake Levels and Emergent Vegetation



Acres of Permitted Eurasion Water Millfoil Treatment (1998-2015)



Implications of a Protective Elevation

- Discussions with potentially affected communities:
  - Birchwood Village
  - Dellwood
  - Mahtomedi
  - White Bear Lake
  - White Bear Township

Implications of a Protective Elevation

- Discussions with potentially affected communities:
  - Water suppliers need to balance rates with utility costs—reducing water use will impact budgets
  - Need evidence of impact to lake before community imposes on residents
  - Public process must be followed for new ordinances adopted to accommodate protective elevation
  - Lack capacity to proactively enforce watering bans
  - Fairness is critical to residents' acceptance of watering bans

Augmentation Design-Build Proposal

- 2016 Legislation : $150,000 Clean Water Fund
- RFP Issued November 2016
  - Phase I - Qualifications
  - Phase II – Design-Build Proposal
- Proposal submitted on December 2, 2017
- Public Meeting on January 12, 2017
- Design-Build Proposal submitted on March 31, 2017
- Public Meeting on April 13, 2017

Project Team

- SEH Design | Build
- SEH
- Wenck Associates
- Geislinger and Sons, Inc.
- Minger Construction
- Magney Construction

SEH
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GEISLINGER & SONS INC.

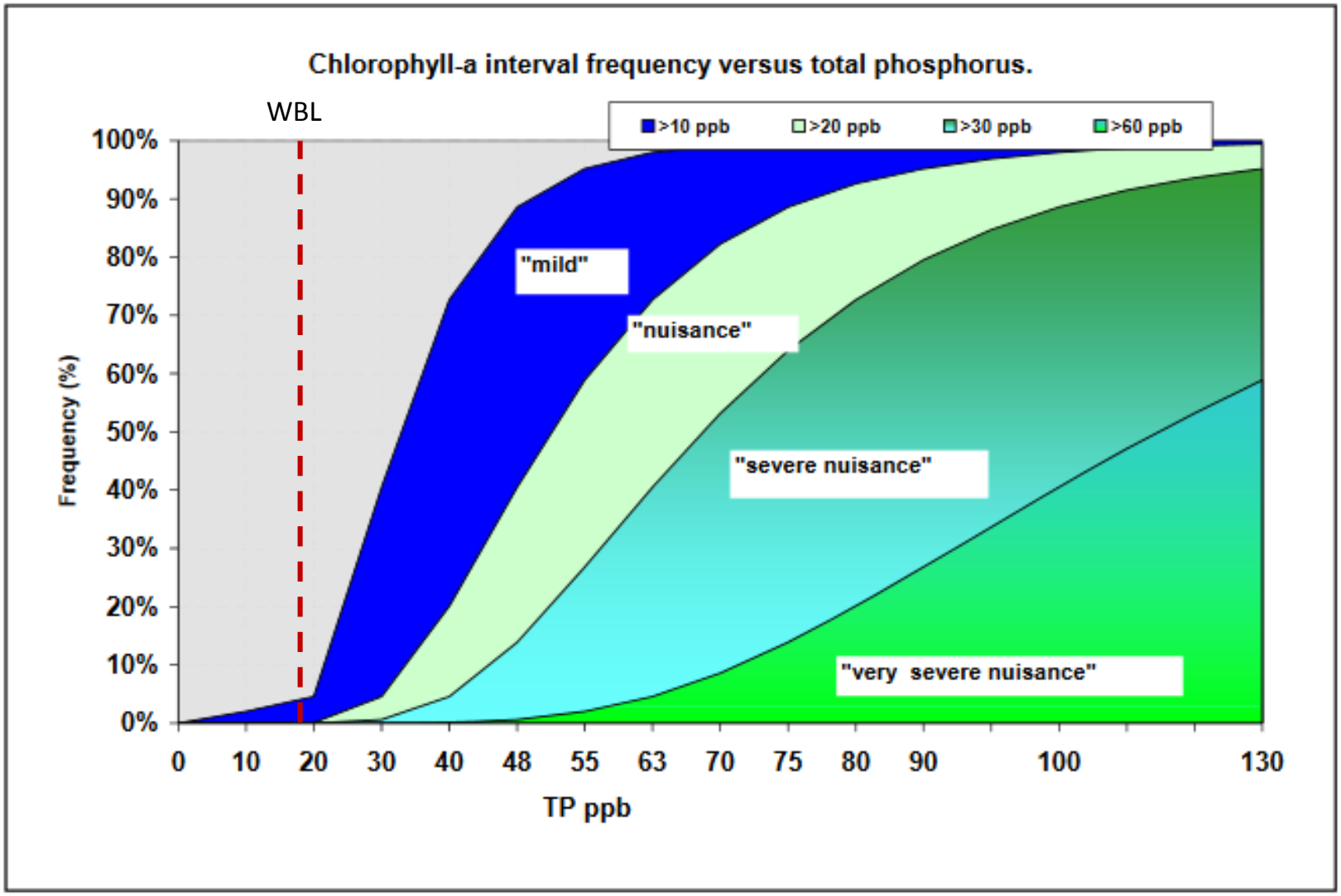
Minger Construction Co., Inc.

MAGNEY CONSTRUCTION

SEH Design Build Process

- Selected route
  - Contractors provided input on construction methods, alignment, tunneling
  - Utility Locate – Gopher State One Call
- Filtration Building Layout
  - Developed building layout and site
- Water Quality Analysis
  - Updated water quality analysis data with new sampling
  - Developed plan to address water quality goals
- Cost proposal
  - Contractors developed construction costs

Nuisance Algal Blooms



Project Costs

Item	Cost
SEHDB	
Stage 1	$2,478,000
Stage 2 (at midpoint of construction 2024)	$40,488,000
SEHDB Total:	**$42,966,000**
Environmental Review	$50,000 - $2,000,000
Easements/Permits	$350,000 - $2,000,000
Owner Legal/Admin	$1,000,000
Project Total:	**$44,366,000 - $47,966,000**

Schedule

Proposed Schedule

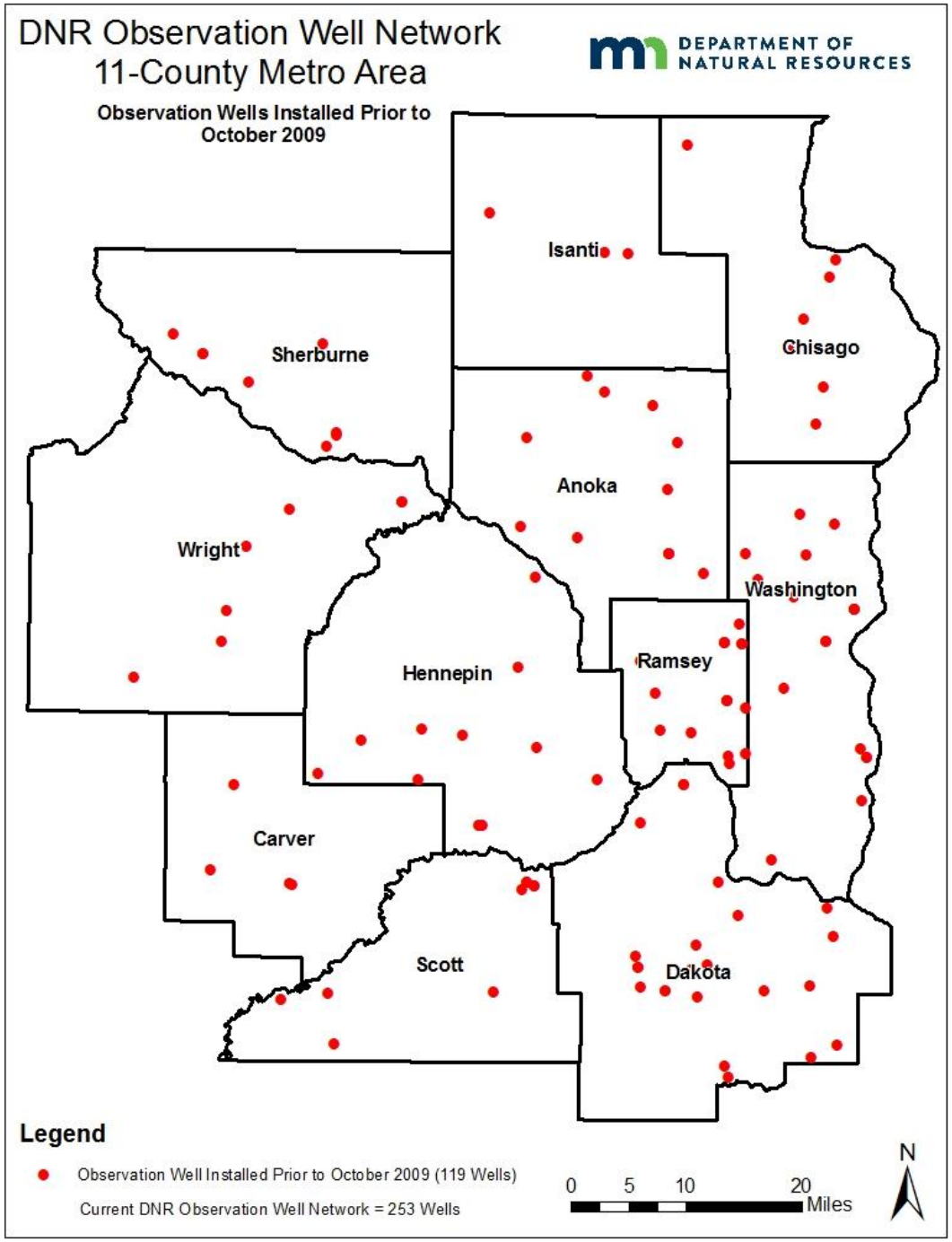
Task	Start - Completion Dates	2018	2019	2020	2021	2022	2023	2024	2025
Stage 1									
Water Quality Analysis	Jul 2018 - Dec 2020								
Environmental Review (by others)	Jan 2021 - Jun 2022								
Routing and Capacity Analysis	Jul 2020 - Dec 2020								
Preliminary Design	Jan 2021 - Dec 2021								
Final Design	Jul 2022 - Feb 2023								
Construction Price Proposal	Mar 2023 - Apr 2023								
Stage 2									
Construct Pipeline	May 2023 - Nov 2024								
Construct Filtration Building	Apr 2024 - Mar 2025								
Startup	Apr 2025 - May 2025								

DNR's Perspective

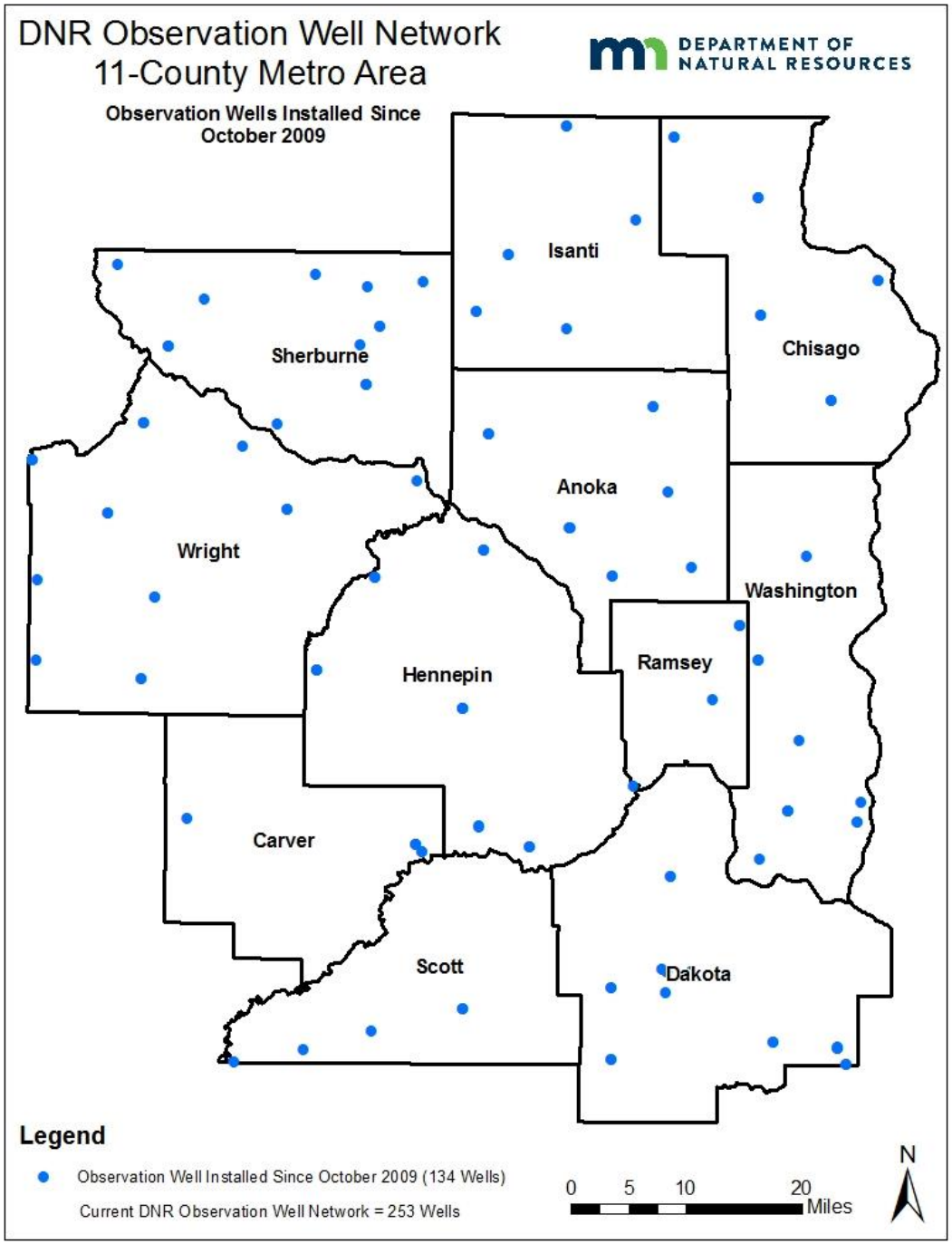
- DNR does not support or endorse construction of an augmentation system for White Bear Lake.
- DNR has serious reservations about the ecological impacts, efficacy, precedent and cost of such a system.
- White Bear Lake has been within its historic range and is an ecological system that benefits from fluctuation in water levels.
- No evidence that groundwater pumping is having a material impact on WBL but we are continuing to further evaluate.

Status of N&E Metro Groundwater Management Plan Implementation

- Significant progress on many proposed actions, notably:
  - Groundwater modeling and analysis
  - Setting protective elevation
  - Building out the monitoring network
  - Evaporation analysis (U of M)
  - Water supply plan updates
  - Water Conservation
  - Adjustment to some permits



Note: Many of these locations represent multiple monitoring wells in different aquifers



$5M in Clean Water Funds

Less than $1M remaining

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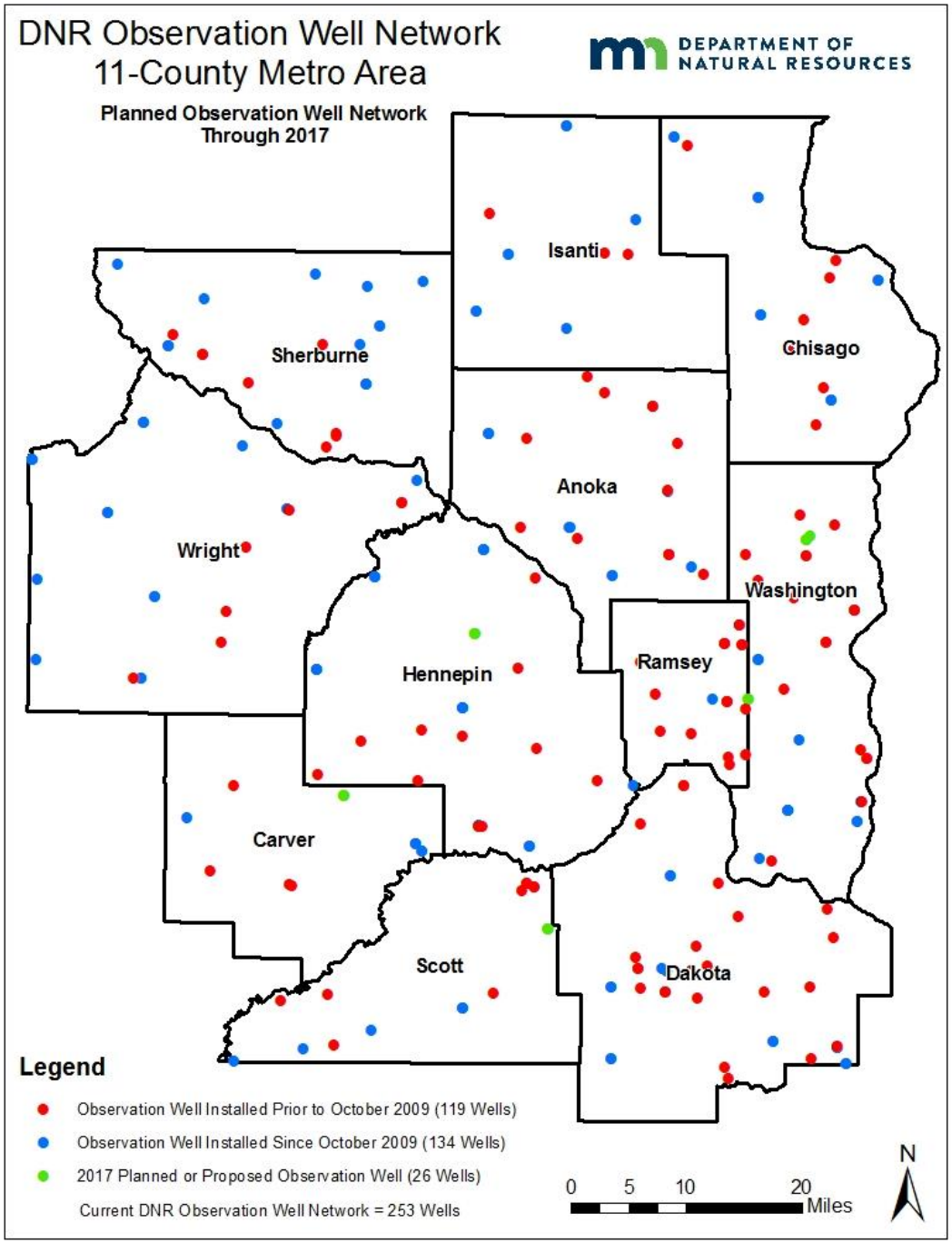

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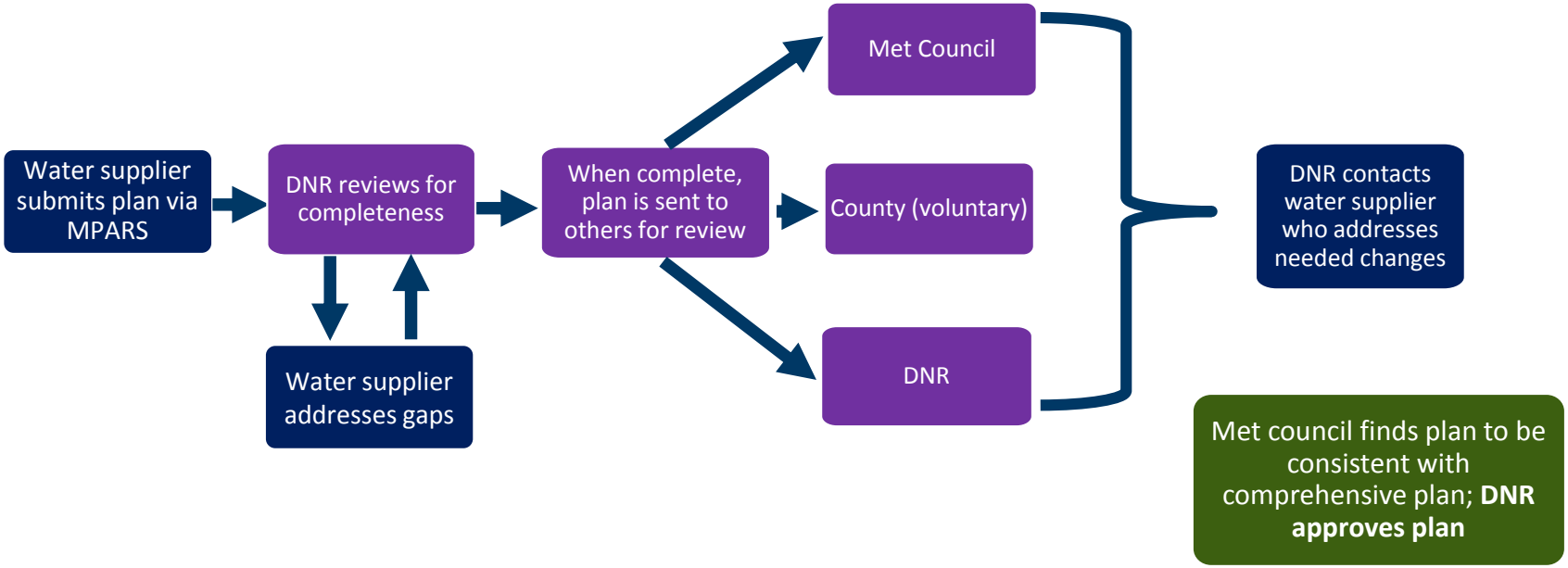
Water Supply Plans

All public water suppliers in Minnesota that operate a public water distribution system, serve more than 1,000 people and/or all cities in the seven-county metropolitan area, must have a water supply plan approved by the Department of Natural Resources (DNR).

Water supply plans are updated every ten years and the next updates will be due between 2016 and 2018. DNR will notify communities of their due date.

Water Supply Plan Process



Questions