# Yahara River Watershed
# USGS Water-Quality Monitoring Update
# Dec 16, 2025

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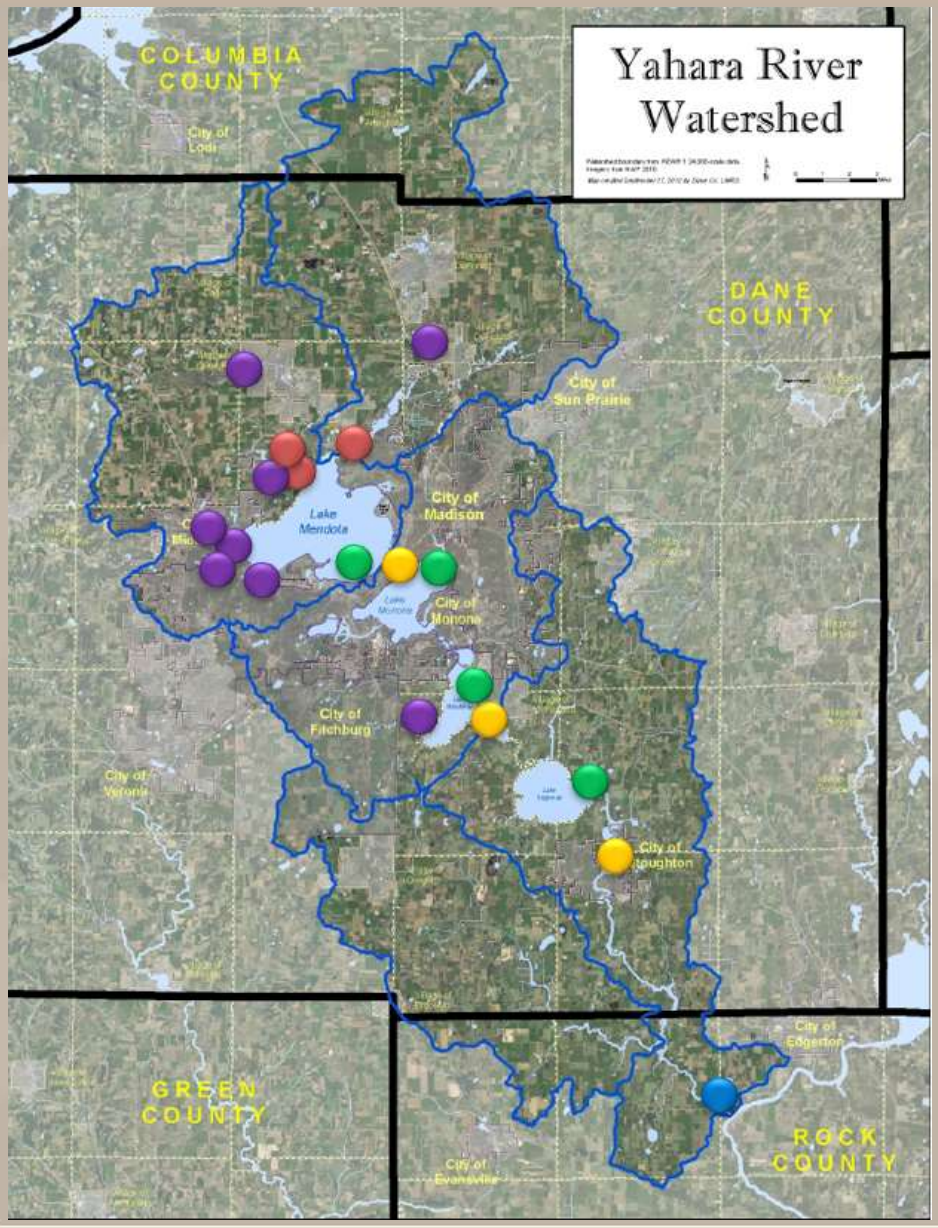
U.S. Geological Survey

# USGS “Dane County Monitoring” Project




## 2025 Status

- 8 streamflow (standard) and high-intensity water quality
- 3 streamflow (hydroacoustic) and high-intensity water quality
- 1 streamflow (standard) and fixed-interval water quality
- 4 lake-level
- 3 streamflow (hydroacoustic) only
- 19 long-term baseflow monitoring locations (on rotation)

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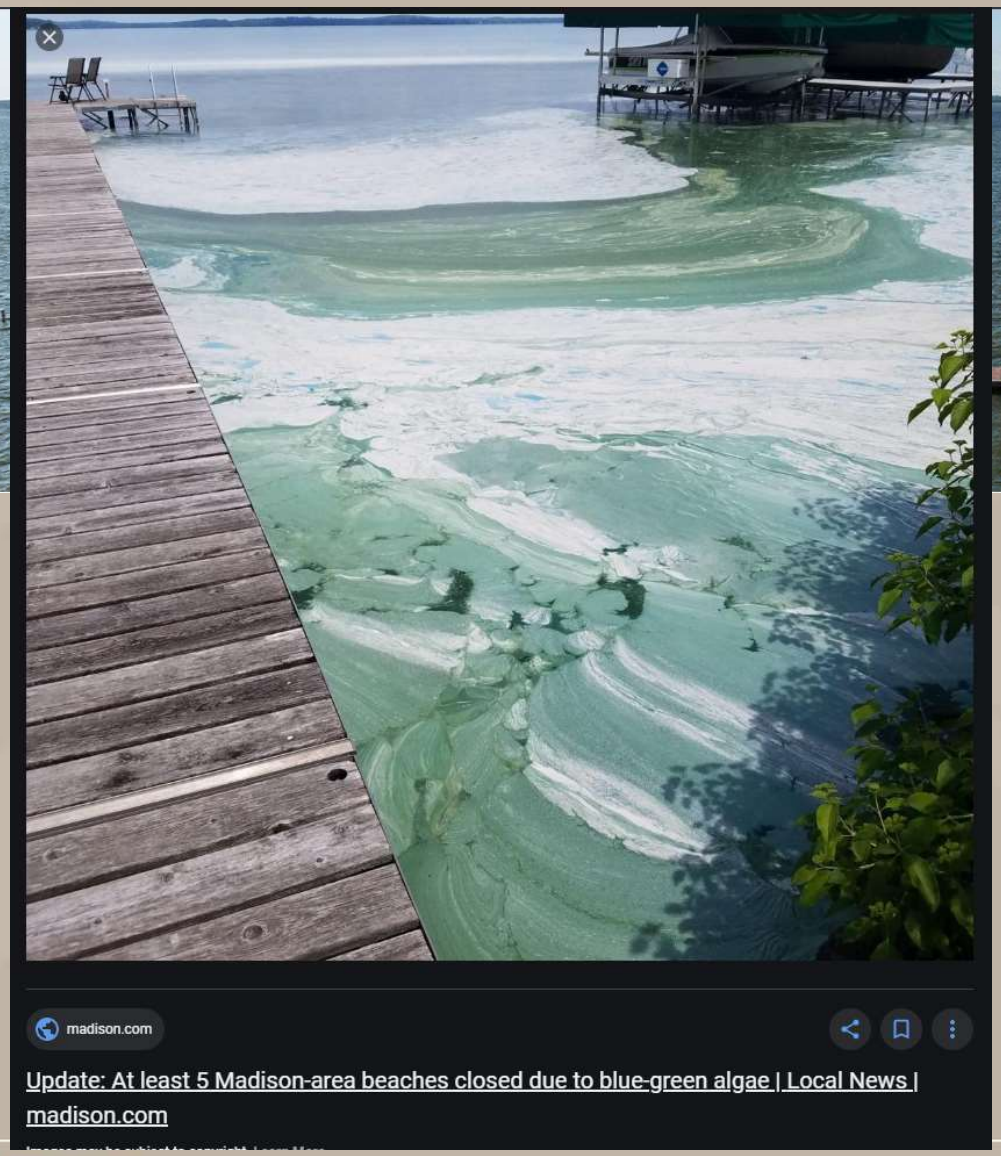
# USGS collaborators over the 30+ years

- CARPC
- Dane County
- DNR
- Madison, Middleton, Westport, Fitchburg
- MMSD, Yahara WINS
- Nature Conservancy
- NRCS
- Sand County Foundation
- Yahara Pride Farms
- Friends of Waubesa Wetlands
- Lake Waubesa Conservation Association

# What is the driving force behind

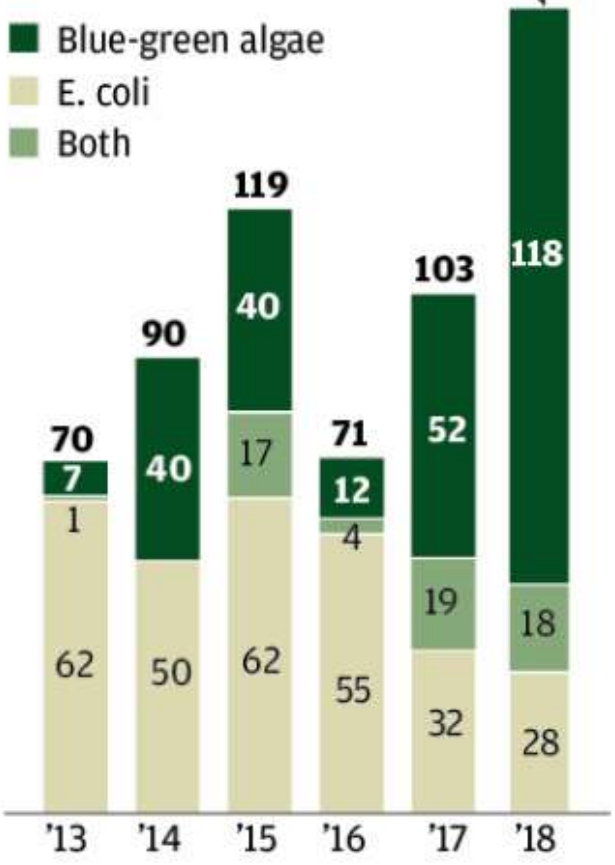



## Most beach closings in years

*Nutrient runoff helps fuel bacterial growths that forced a record number of Dane County beach closings this year.*

**Minimum number of beach days lost, by cause**

**164 days**
So far in 2018




SOURCE: Public Health Madison & Dane County

State Journal

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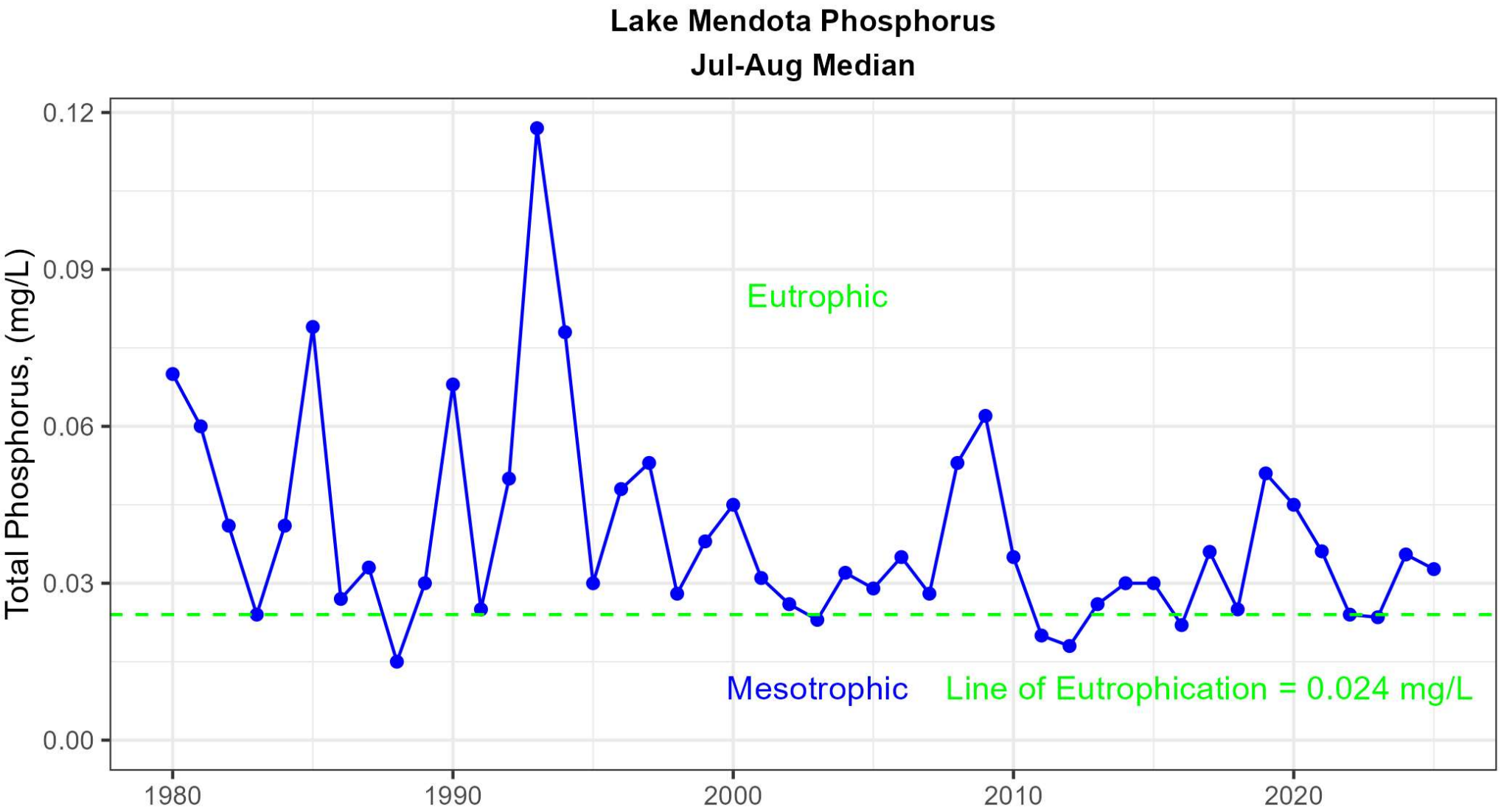
# Phosphorus and lake effects

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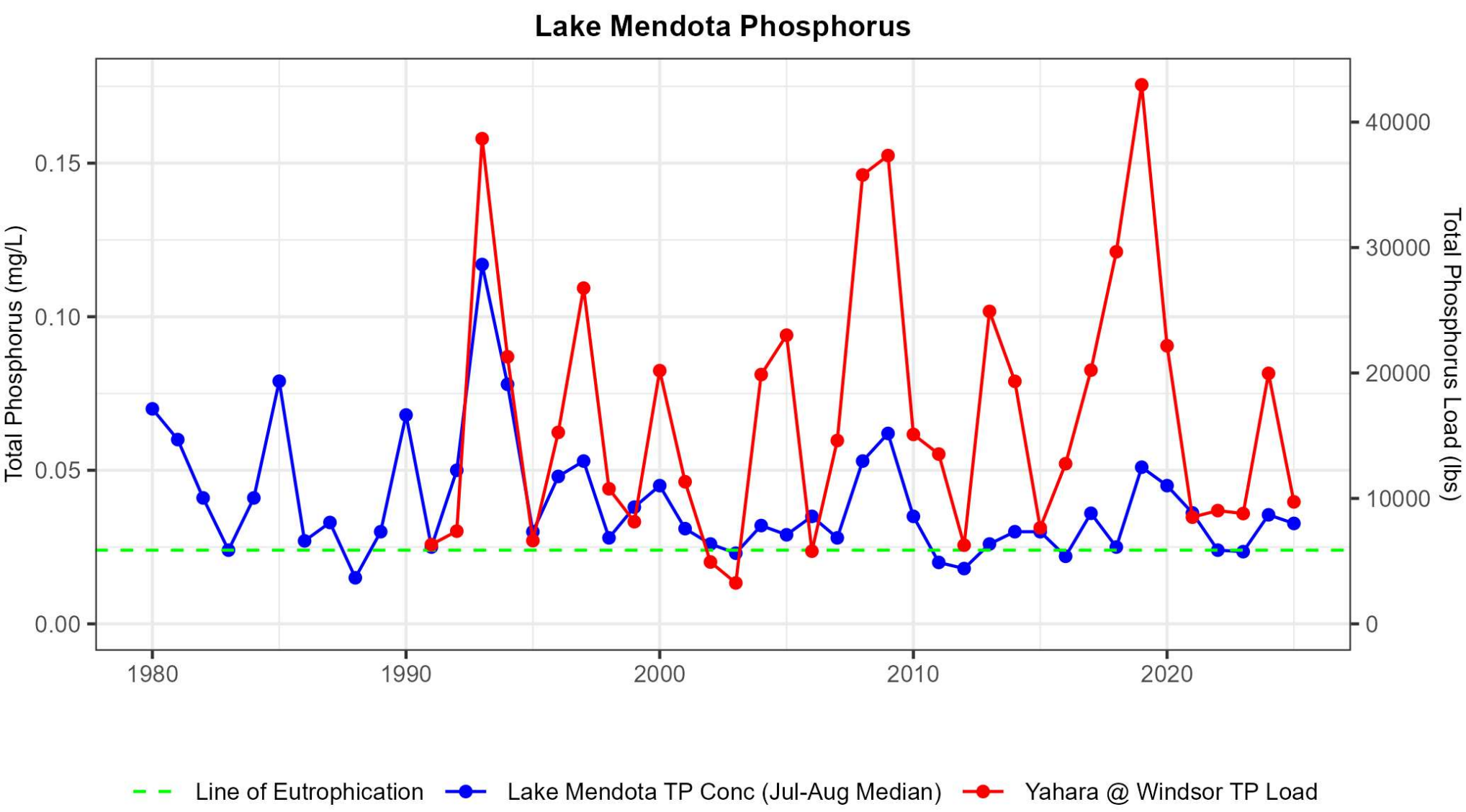
**Lake Mendota phosphorus data was collected by UW-Madison Limnology Department and summarized for this graph by Dick Lathrop.**

# Linkage between P inputs and lake water quality

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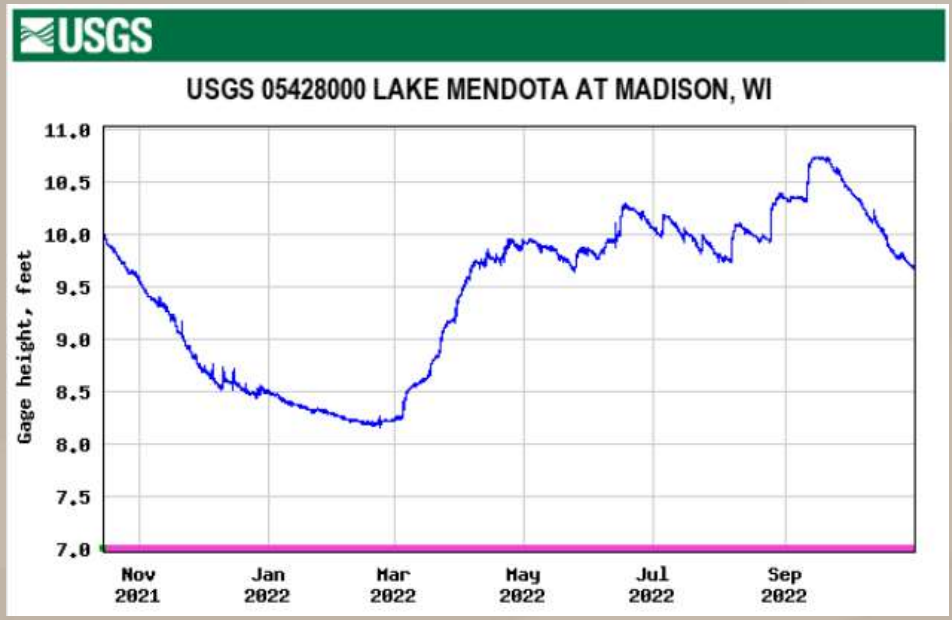
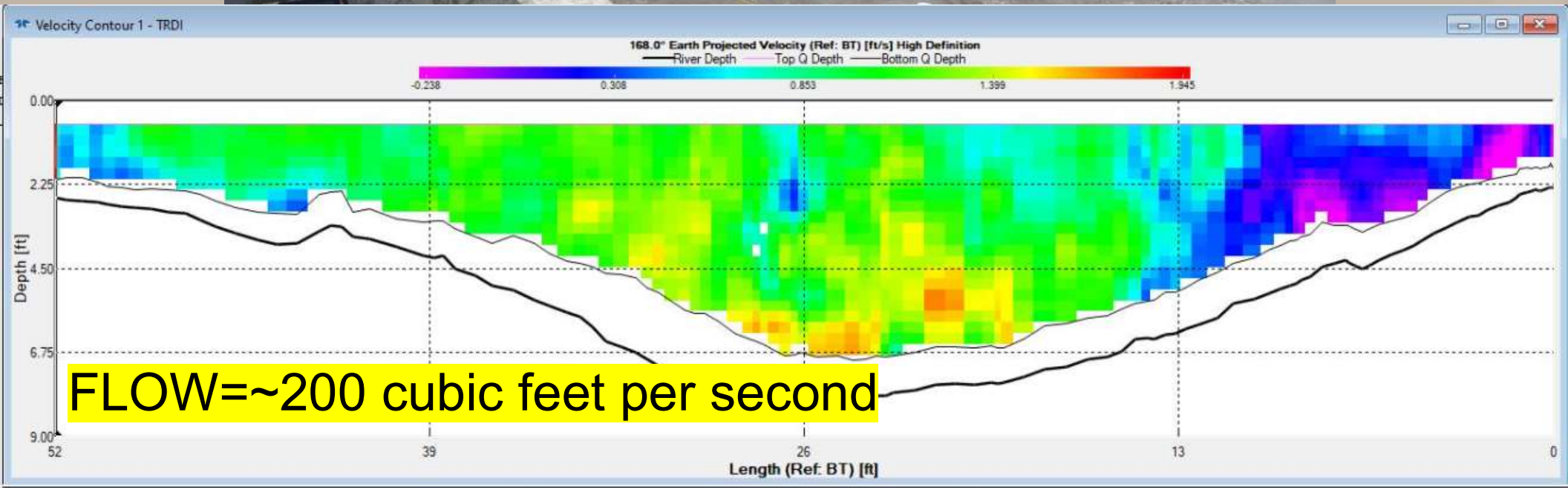
**Lake Mendota phosphorus data was collected by UW-Madison Limnology Department and summarized for this graph by Dick Lathrop.**

# What is being measured?

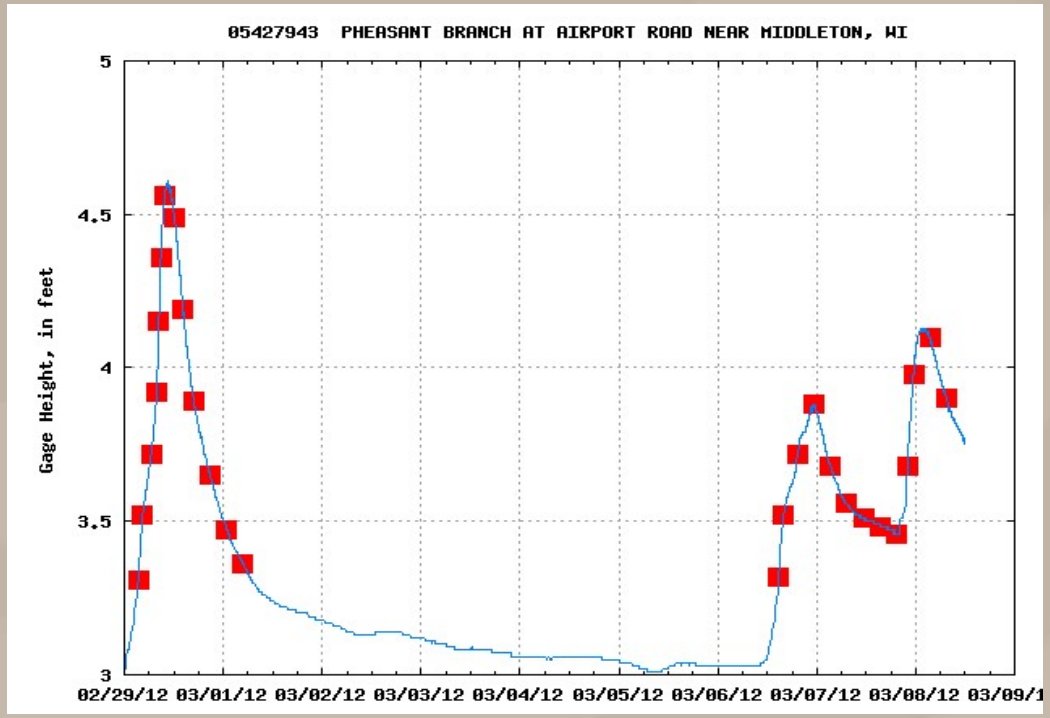
- Water level and/or streamflow
- Periodic water sample concentrations
  - Total Phosphorus (TP)
  - Dissolved Phosphorus
  - Suspended Sediment or Suspended Solids
  - Nitrogen (Ammonia, Nitrate, TKN)
  - Chloride

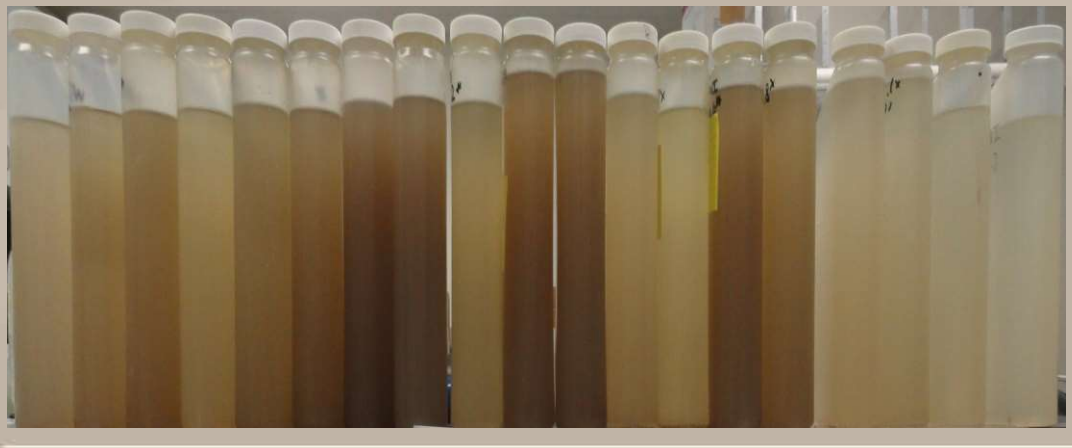



# Streamflow


Velocity Contour 1 - TRDI
168.0° Earth Projected Velocity (Ref: BT) [ft/s] High Definition
River Depth
Top Q Depth
Bottom Q Depth
-0.238
0.308
0.853
1.399
1.945
0.00
2.25
4.50
6.75
9.00
Depth [ft]
52
39
26
13
0
Length (Ref: BT) [ft]
FLOW=~200 cubic feet per second

# Water-quality sampling

Selected samples sent to lab(s) for analysis

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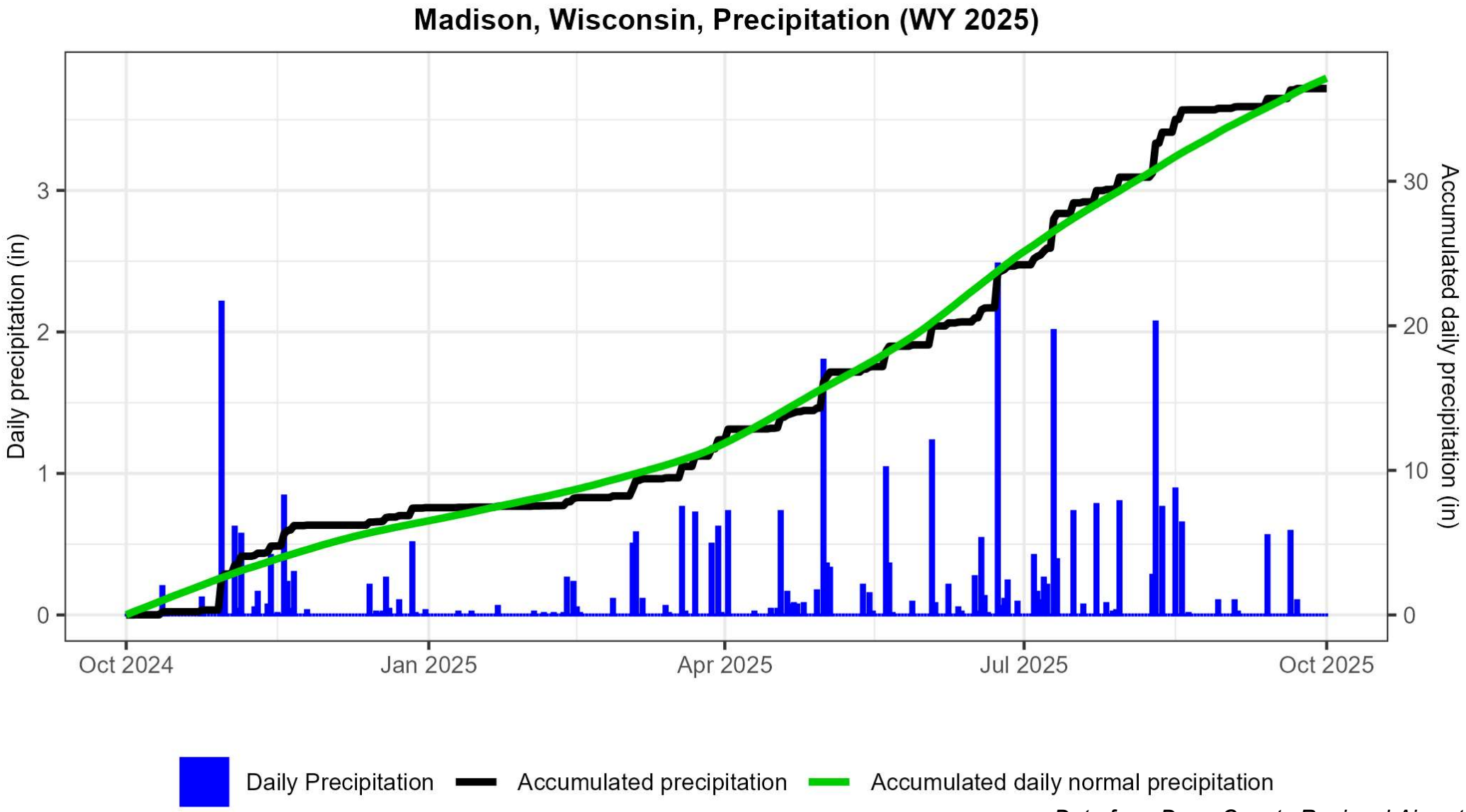
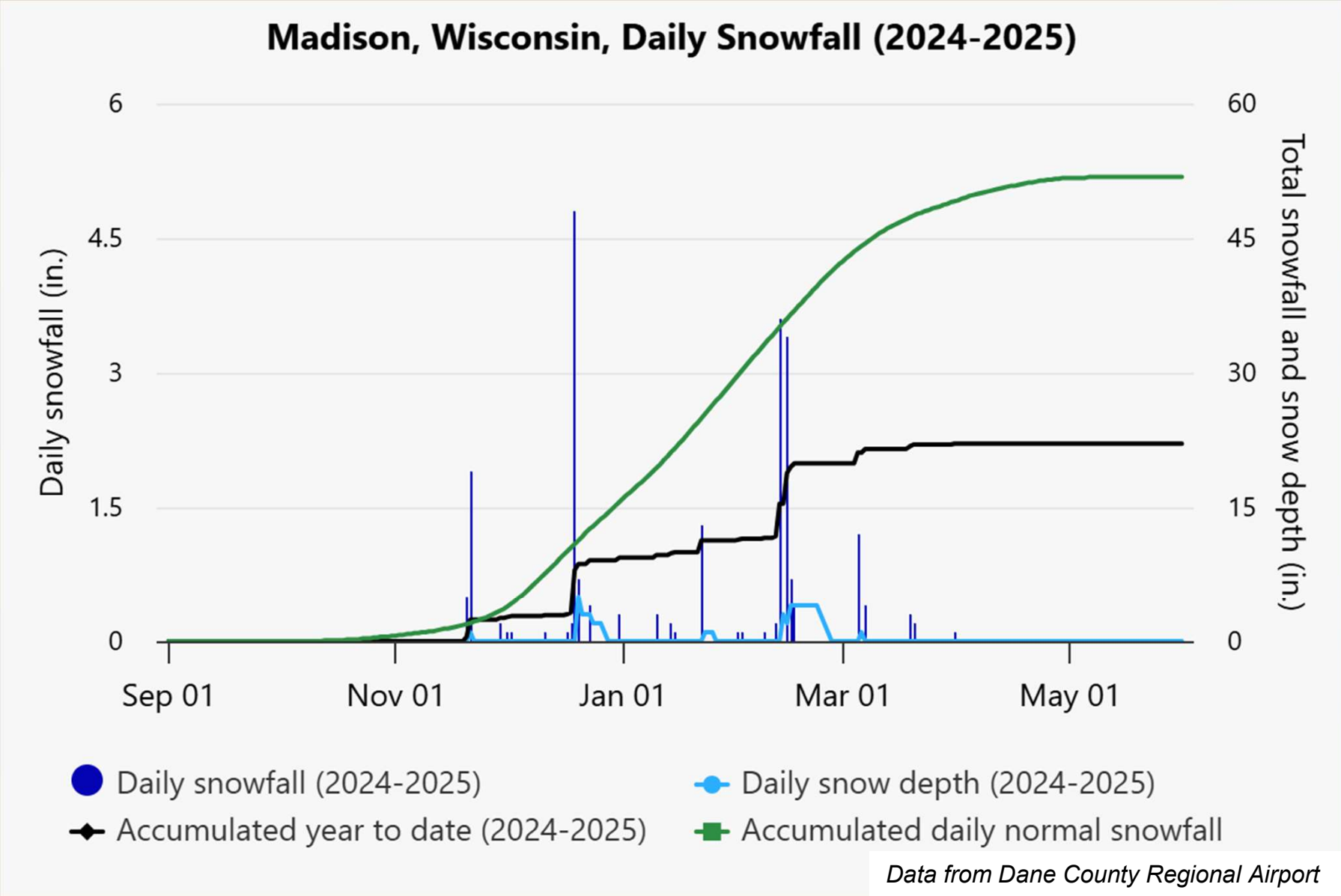
# WY2025 Precipitation



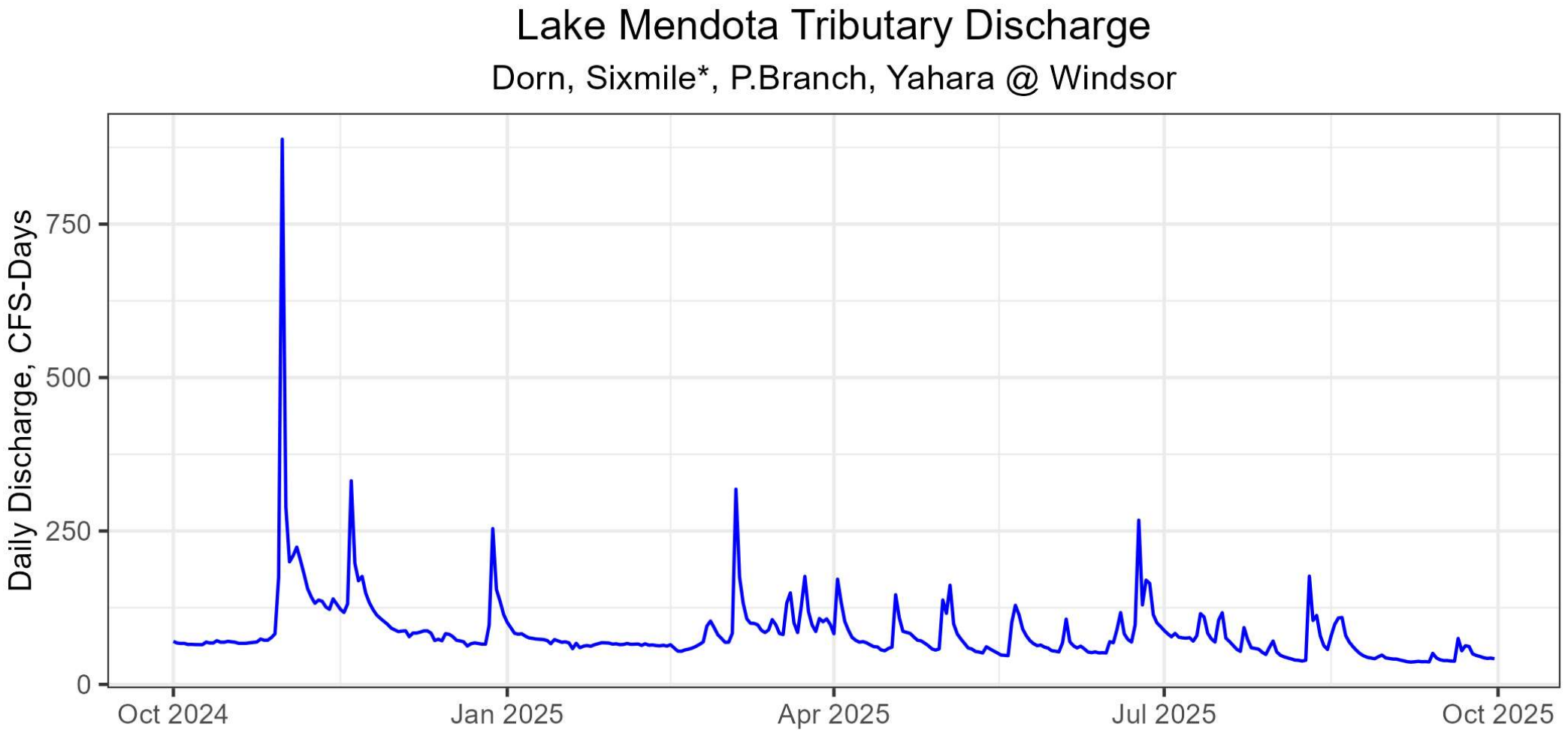

- WY25 Rainfall was about 36.4 in., average is 37.13
- Wet fall, dry winter, average spring/summer

# WY2025 Snowfall

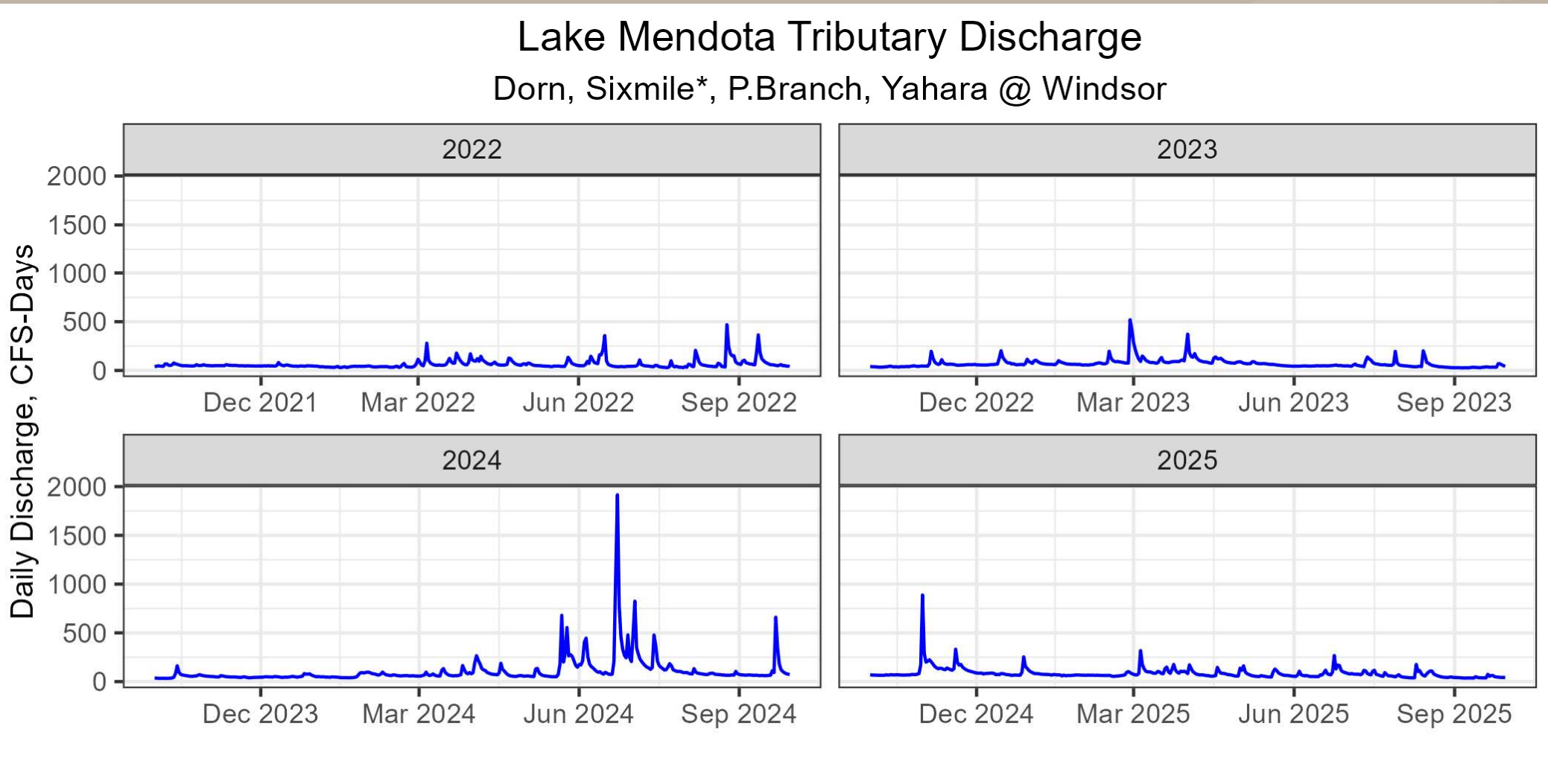



- Snowfall was ~22 in., average is 52 in.
- Least snowy season since 1967-1968

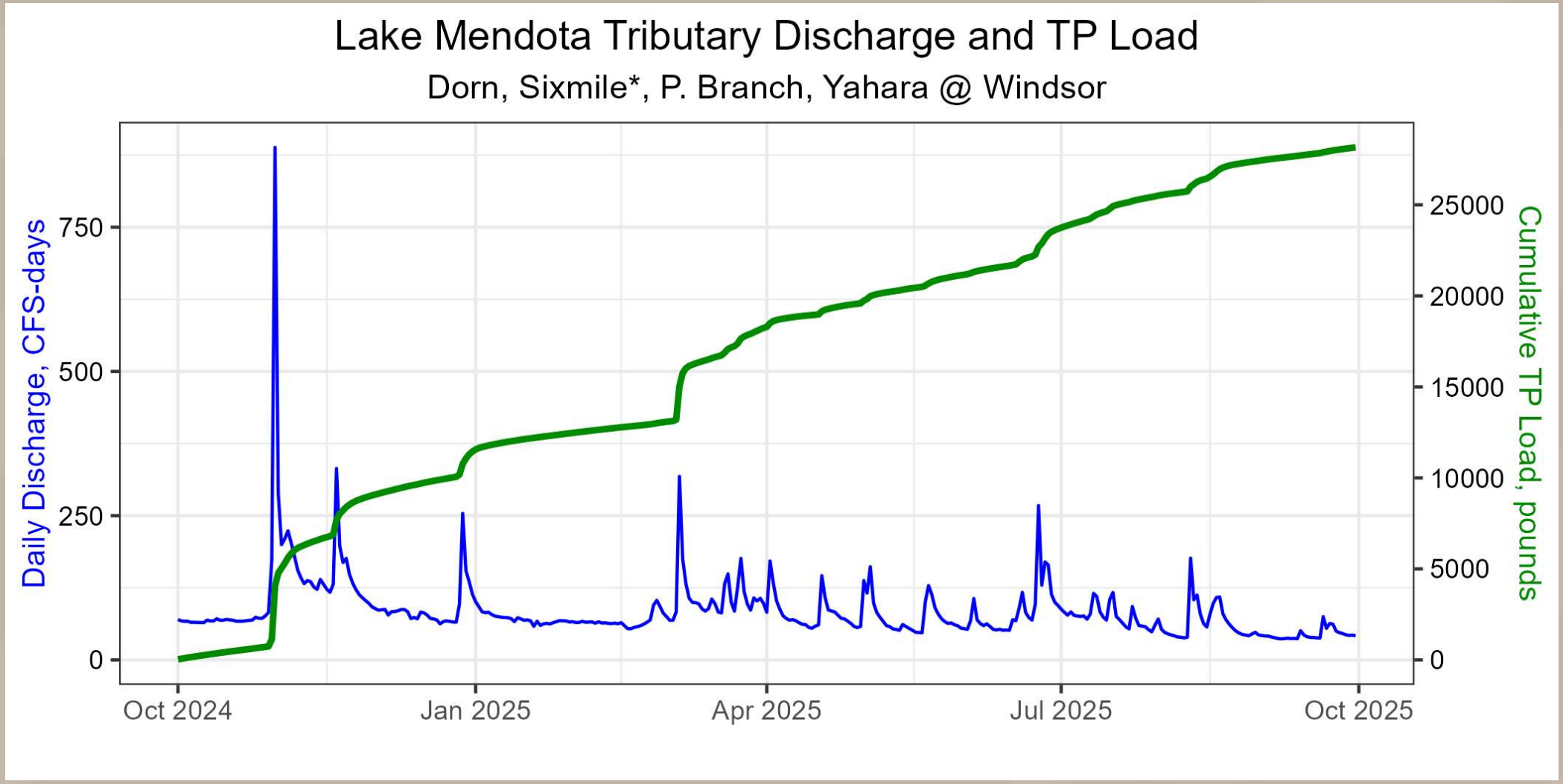
# Streamflow Water Year 2025



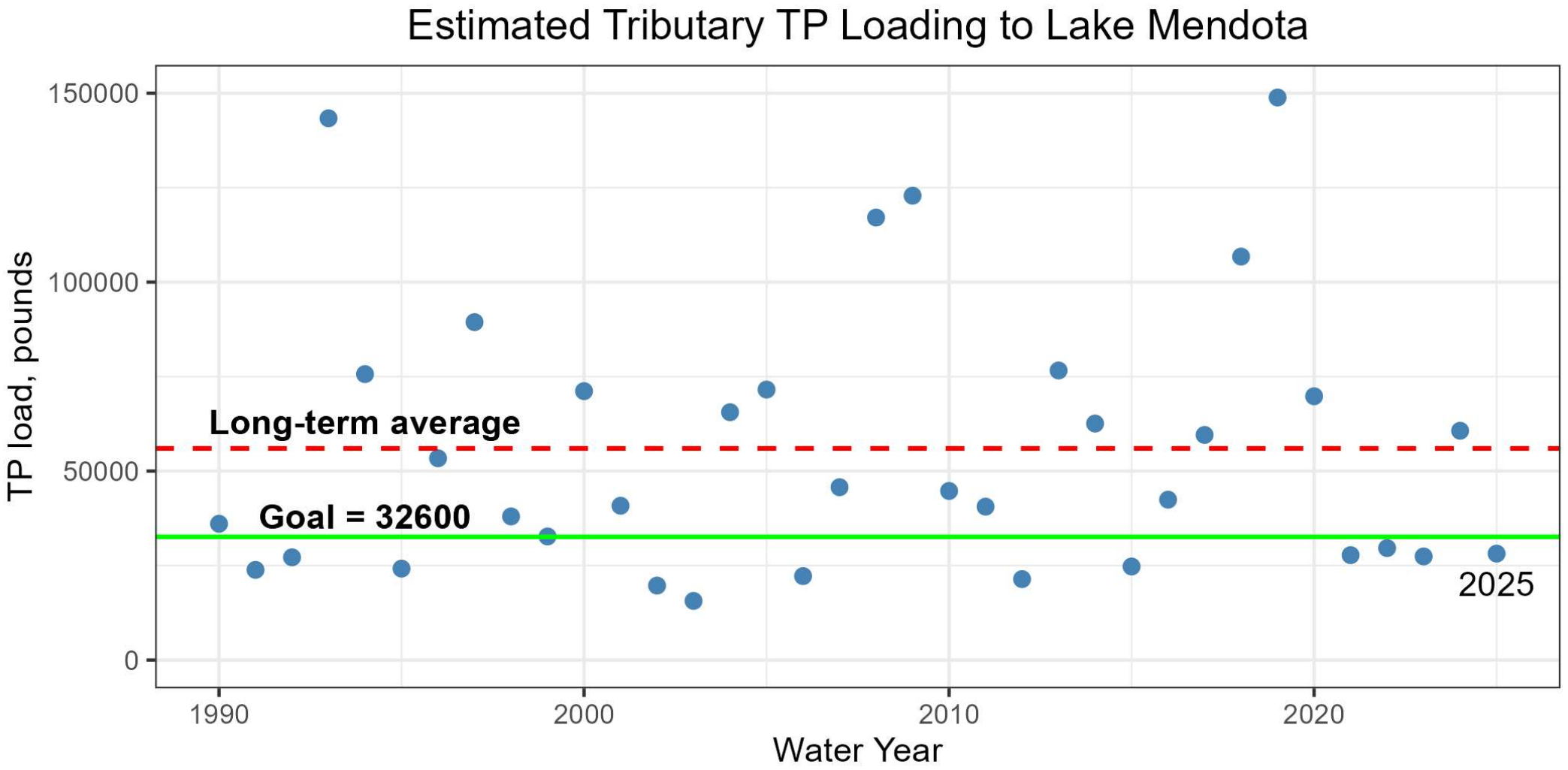
# Last 4 Years



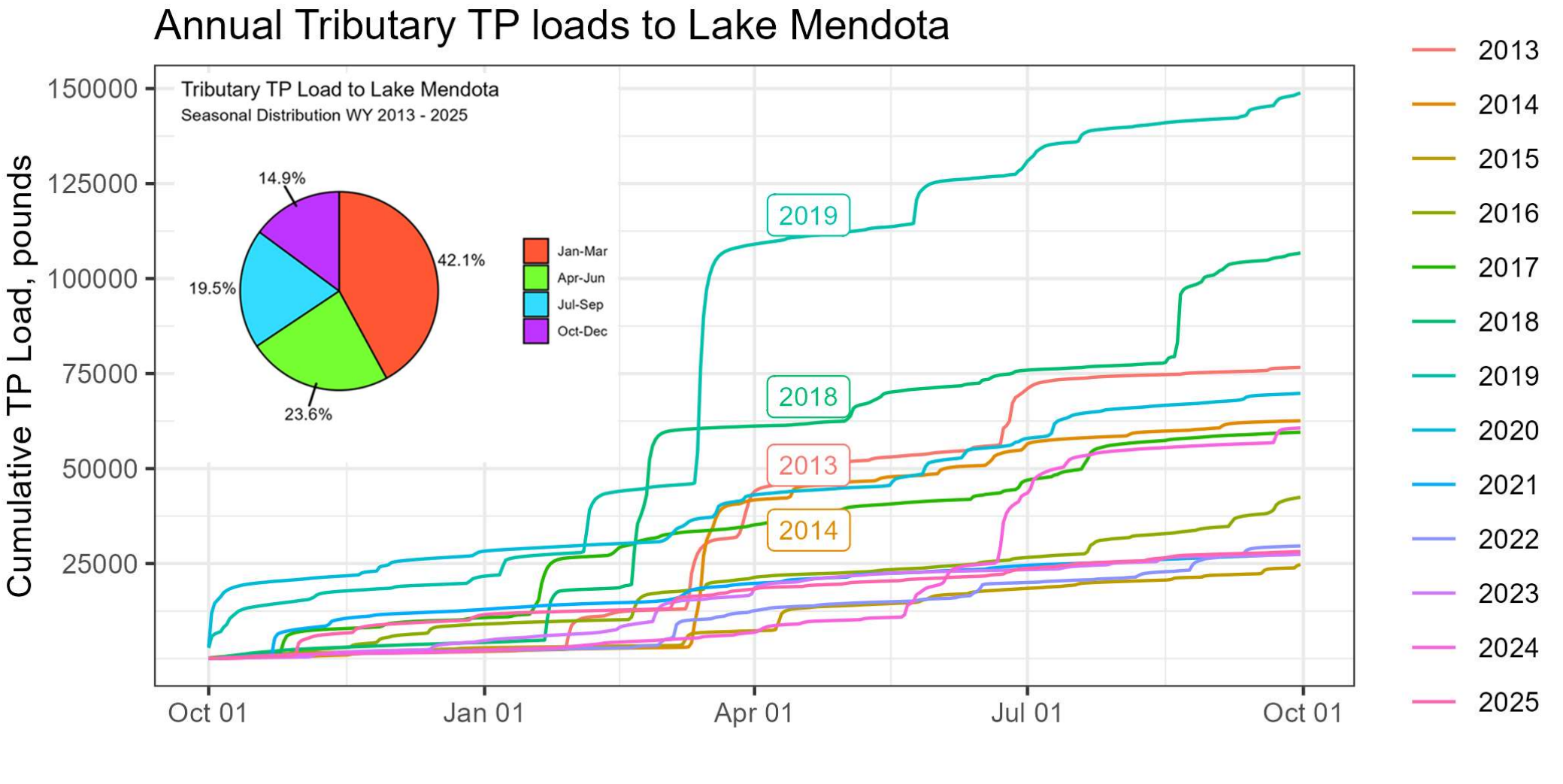
# 2025 P loads to Lake Mendota



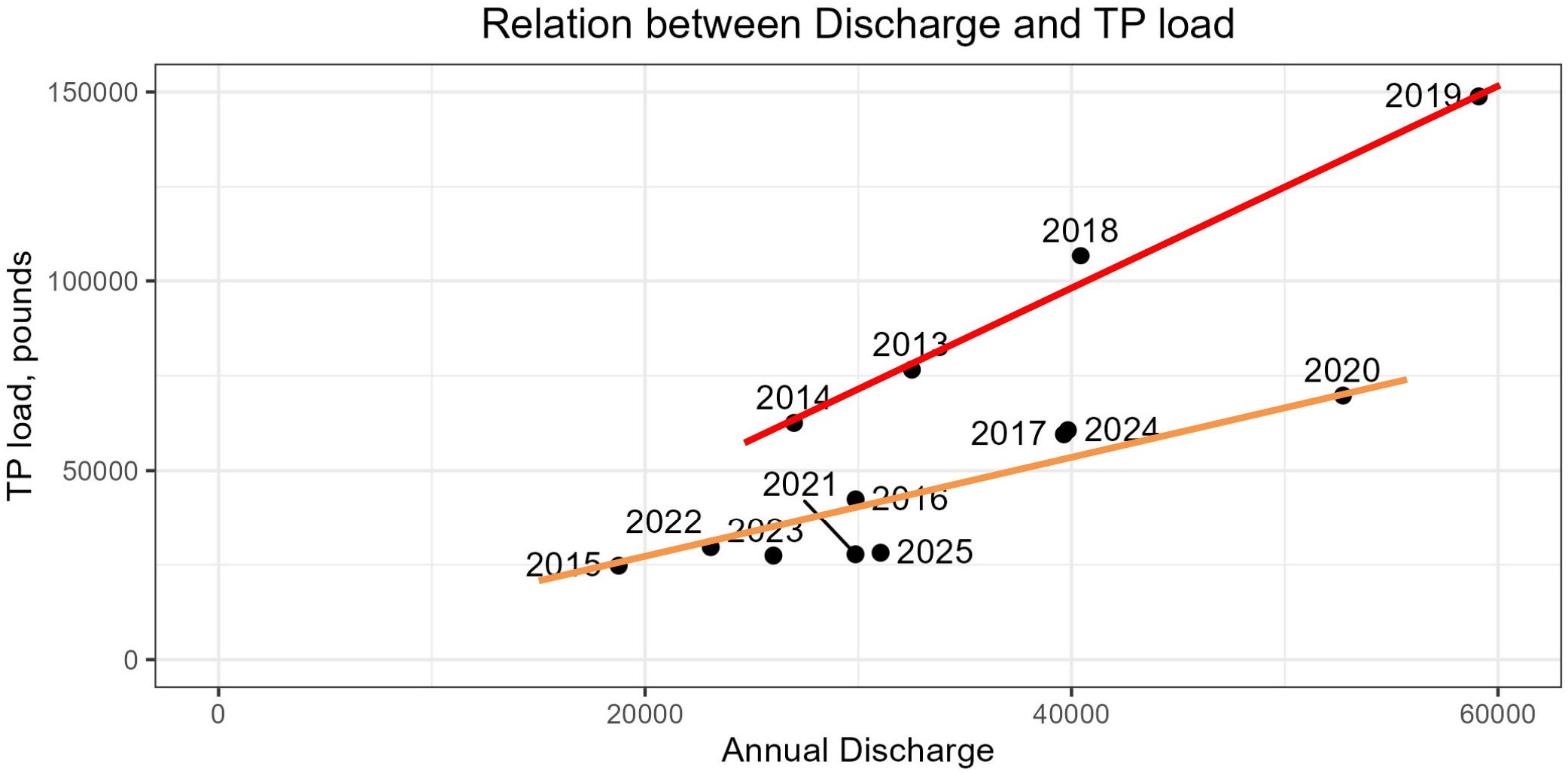
# What amount of TP loading is desirable?



# Historical P Loading (2013-present)



# Observations of TP in Winter Runoff (Snowmelt)




- This demonstrates that there is a higher TP concentration per unit runoff during snowmelt
- Potential to significantly lower annual P loading if snowmelt P concentrations are reduced

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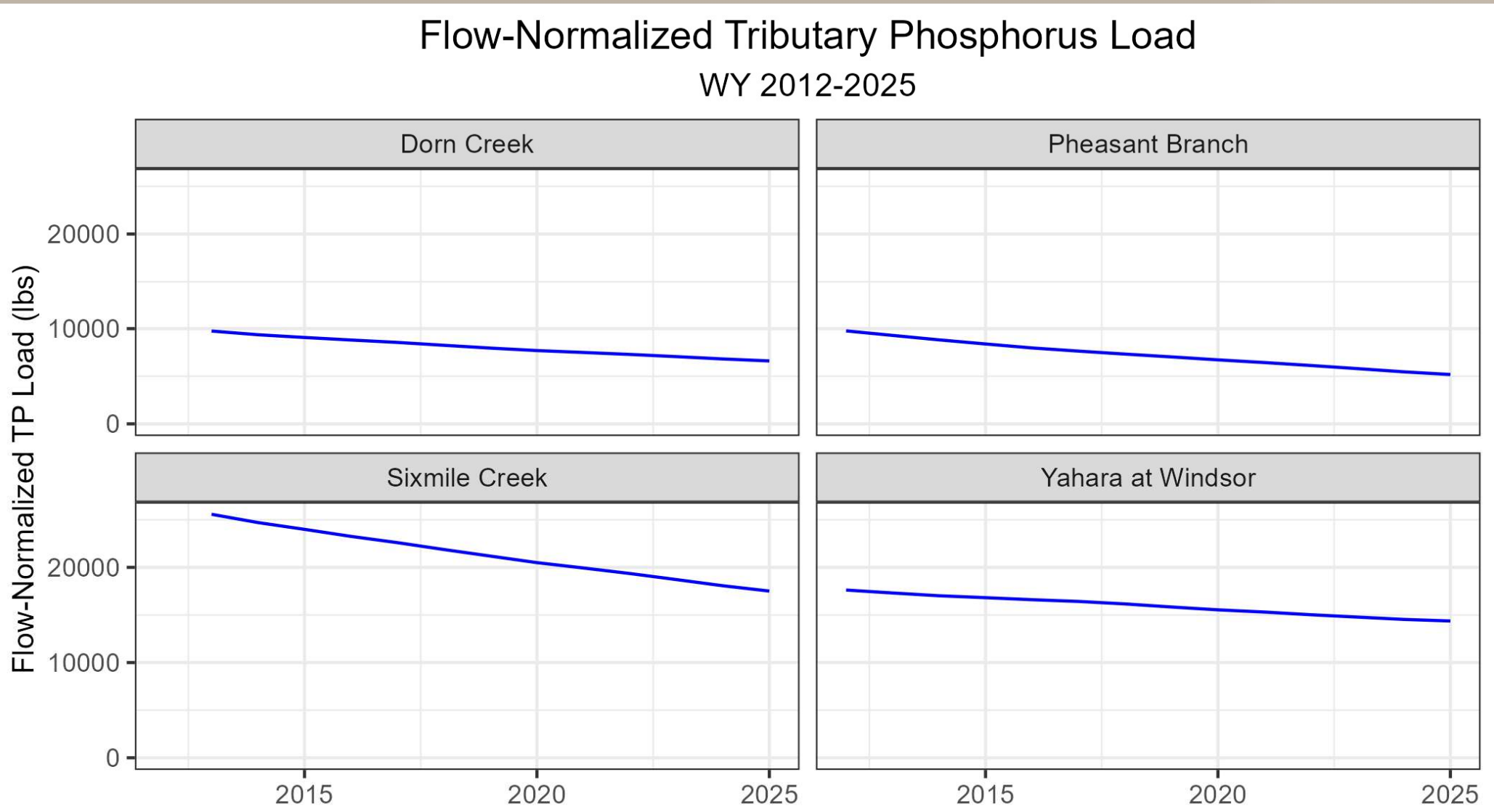
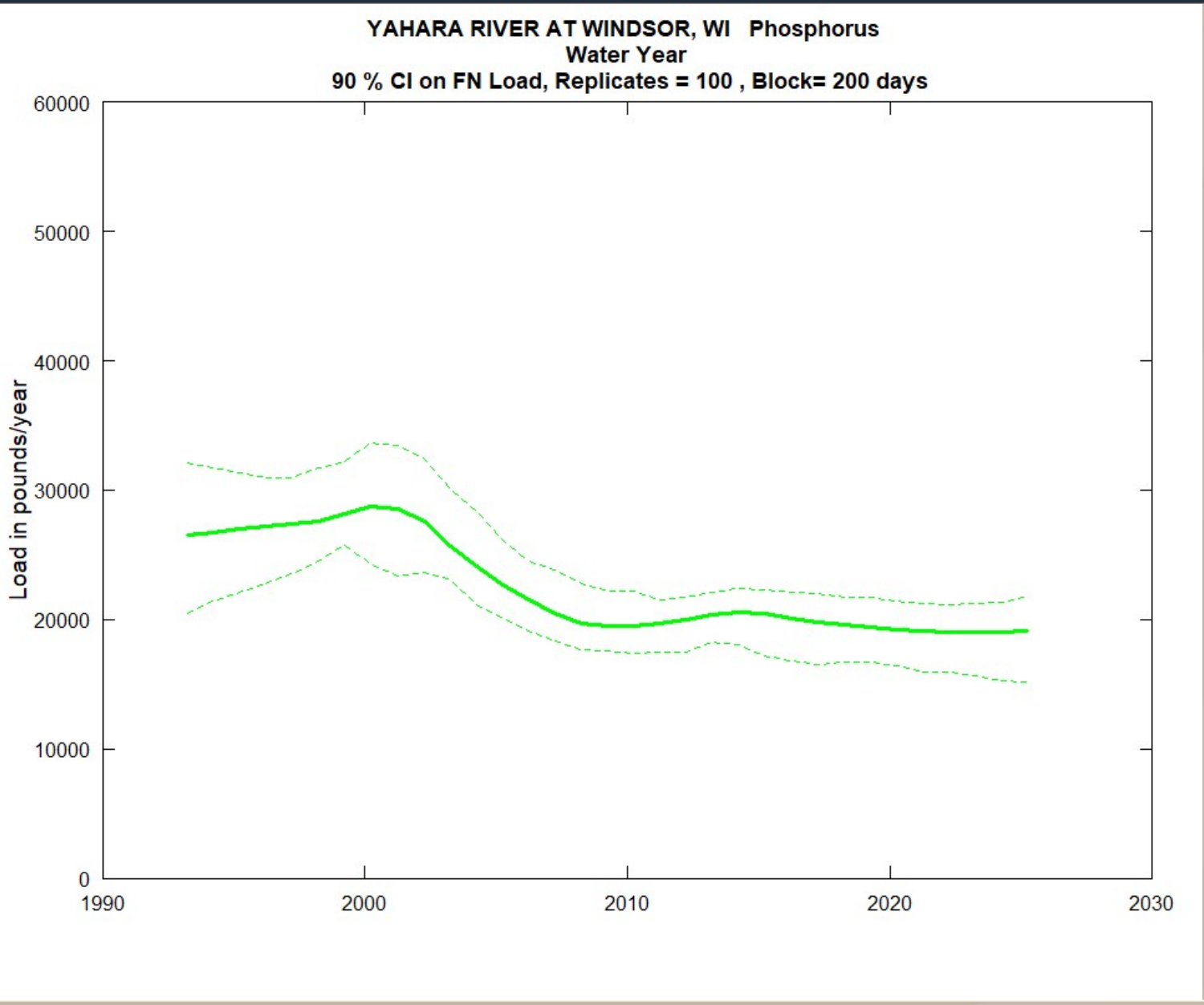
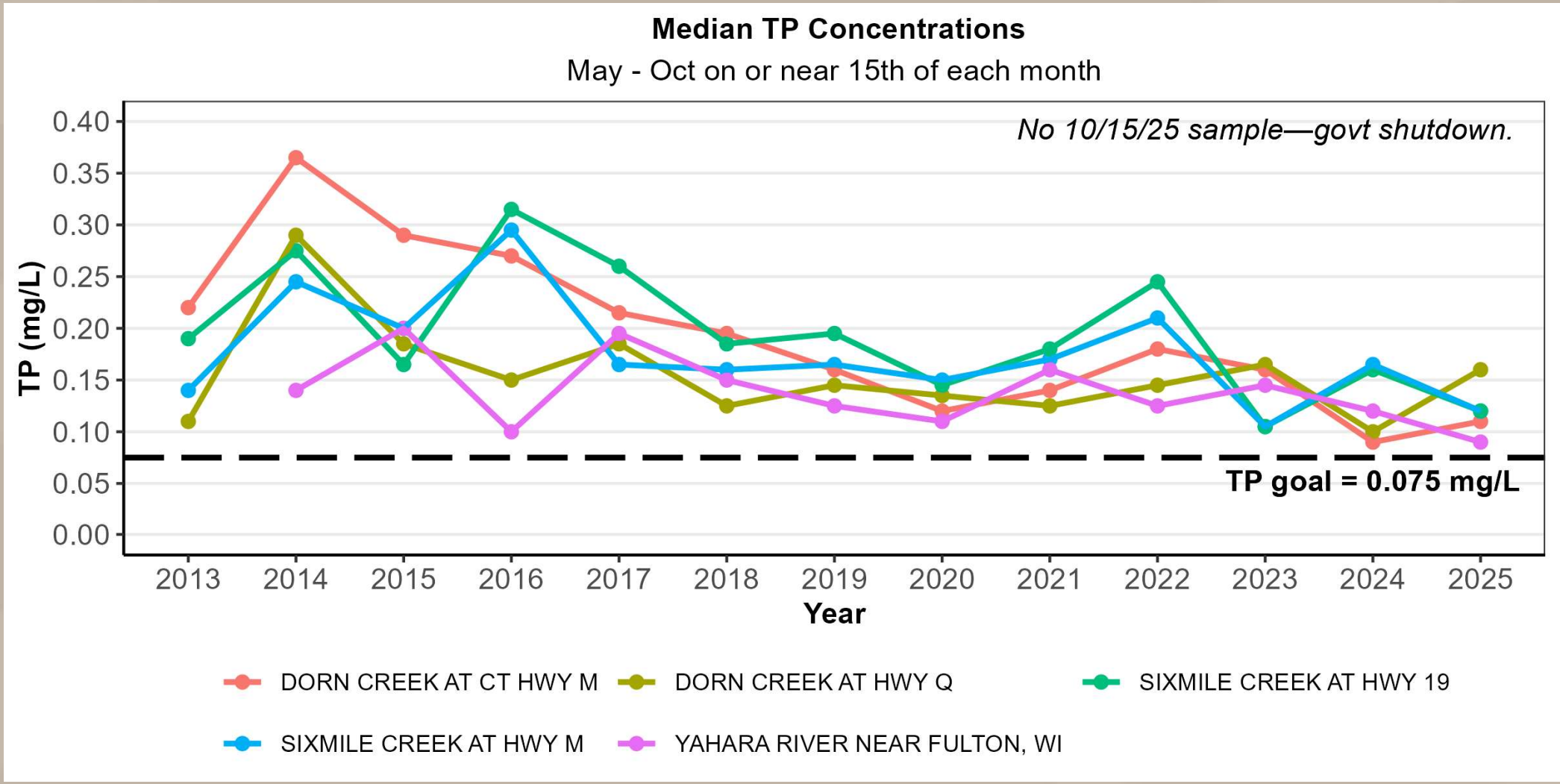
# Flow-Normalized P loads



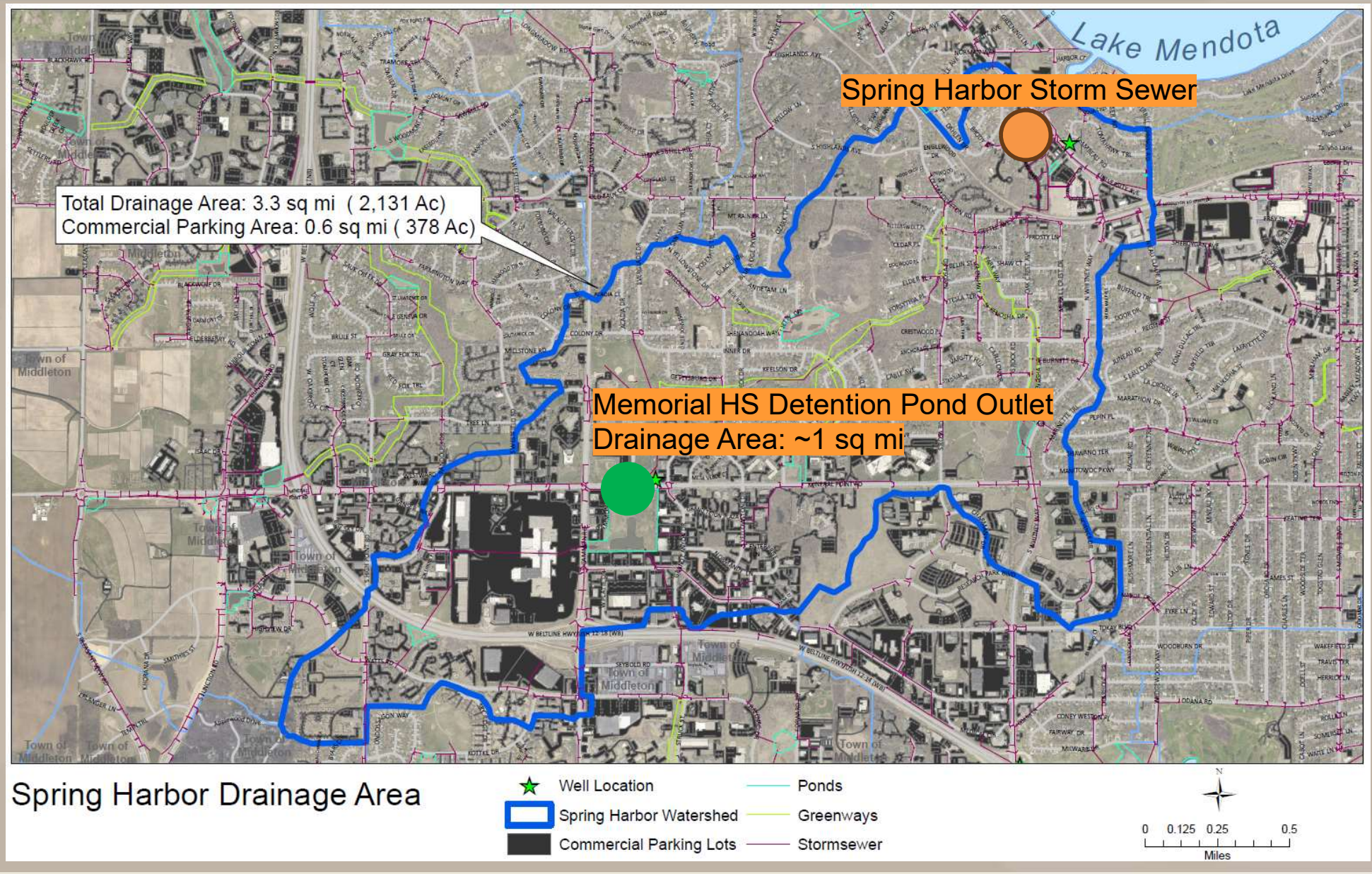
# Flow-Normalized P loads: long-term



# 15th of the Month Growing Season TP Concentrations



# Spring Harbor Chloride Monitoring Project

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# Spring Harbor Chloride Monitoring



## Workflow

- Measure continuous discharge (flow) at 1-minute or 15-minute intervals depending on conditions.
- Measure continuous conductance with a real-time probe (every 15 minutes).
- Autosampler collects water samples periodically during runoff events. Selected samples are sent to MMSD for chloride analysis.
- Determine relationship between conductance and chloride.
- Compute a continuous record of chloride concentration and load using the flow data and the conductance/chloride relationship.

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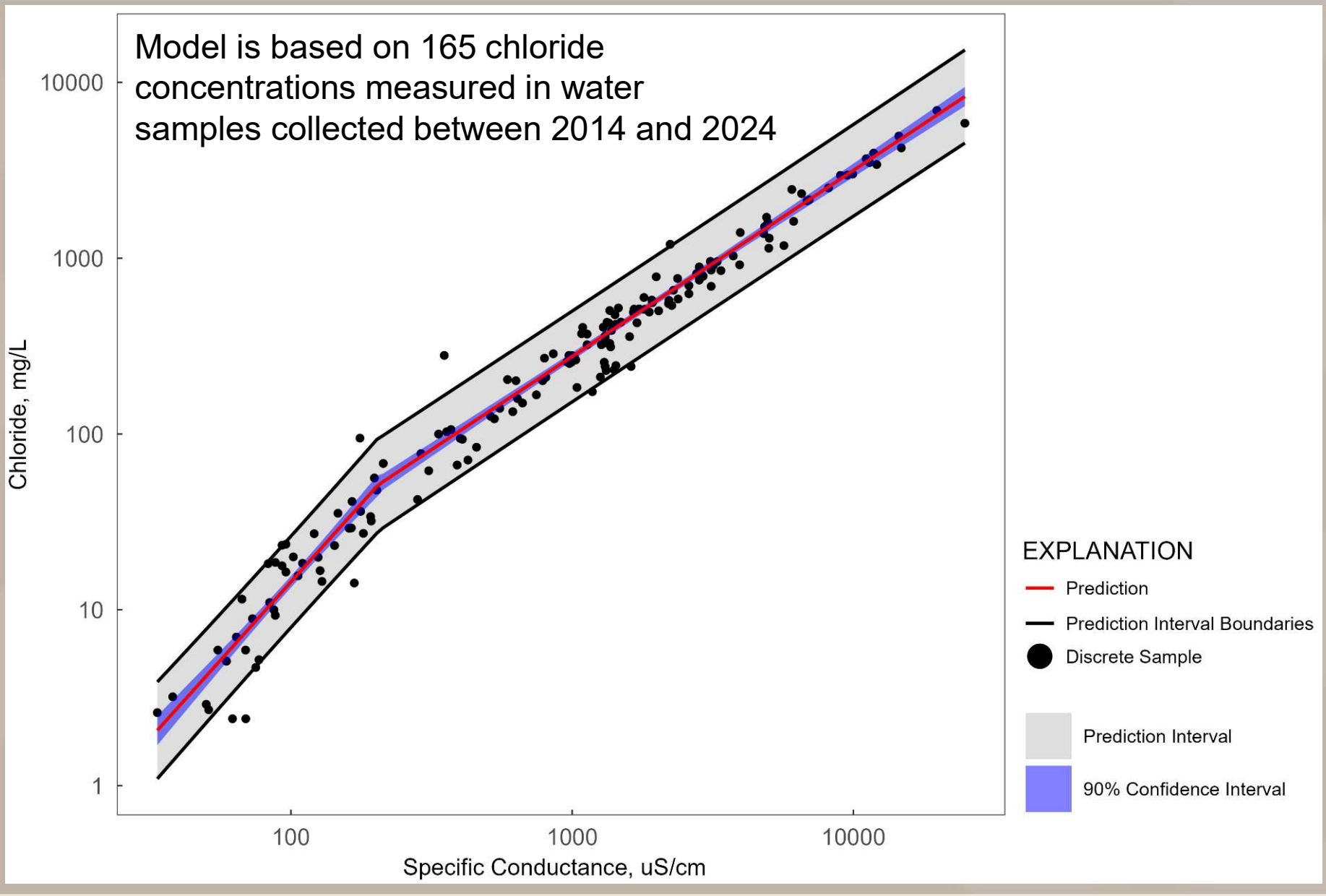
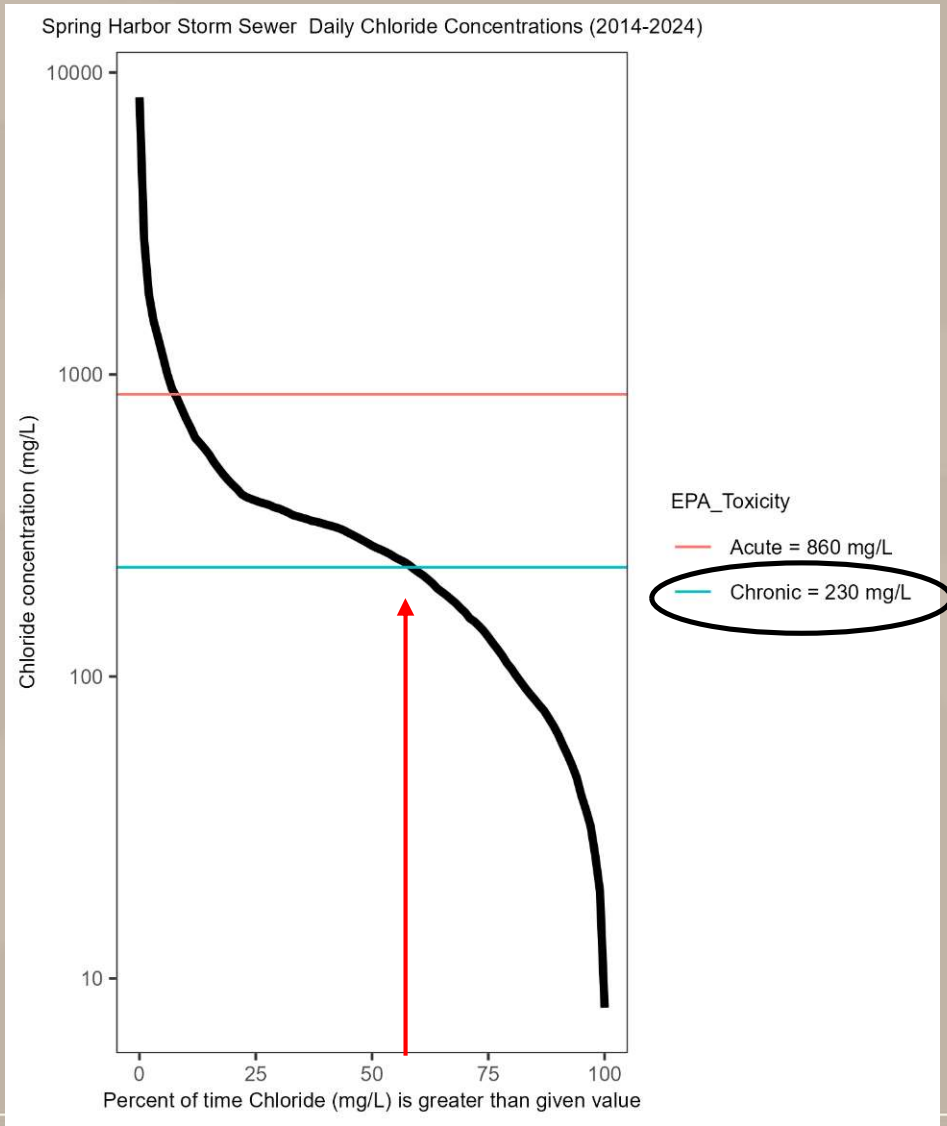
# Spring Harbor Storm Sewer: Relationship between conductivity and chloride

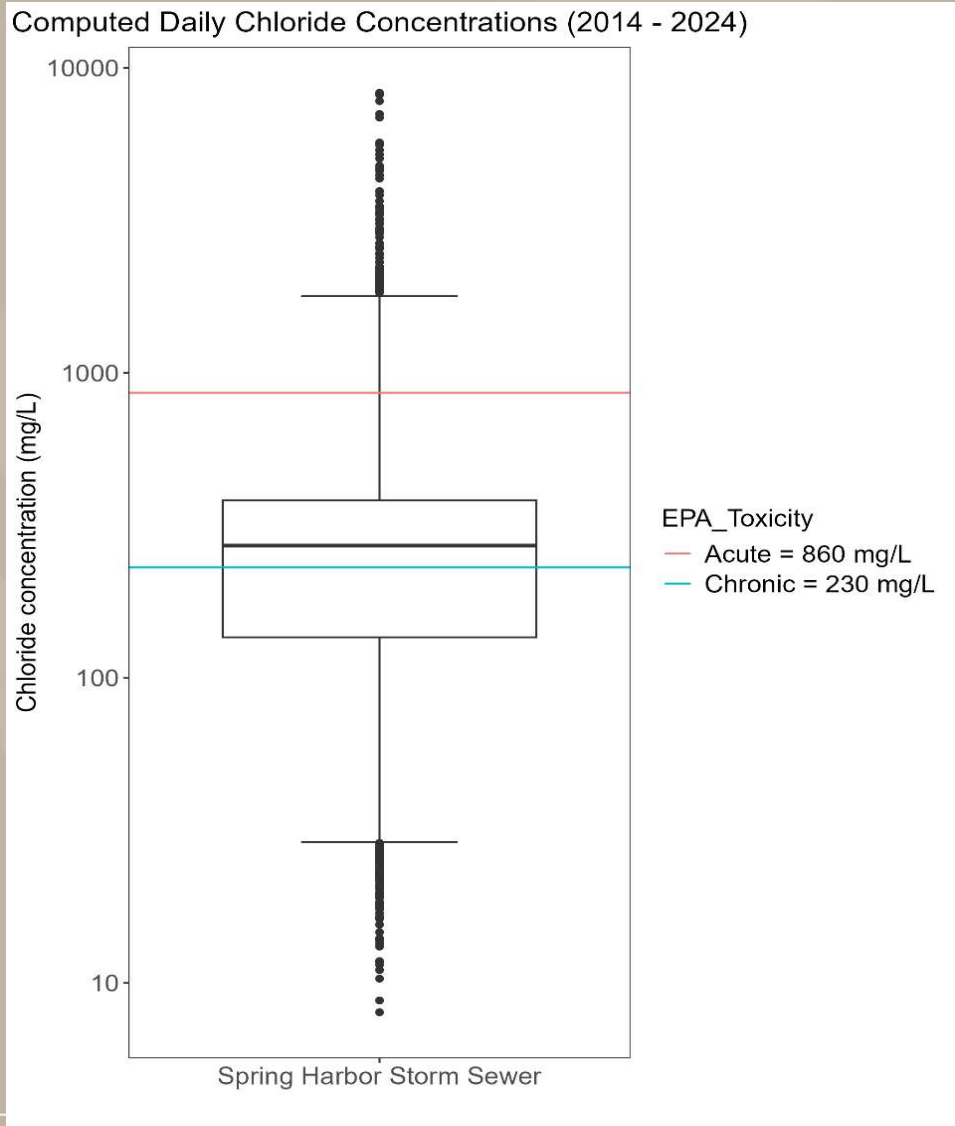


# Exceedance probabilities (2014-2024)

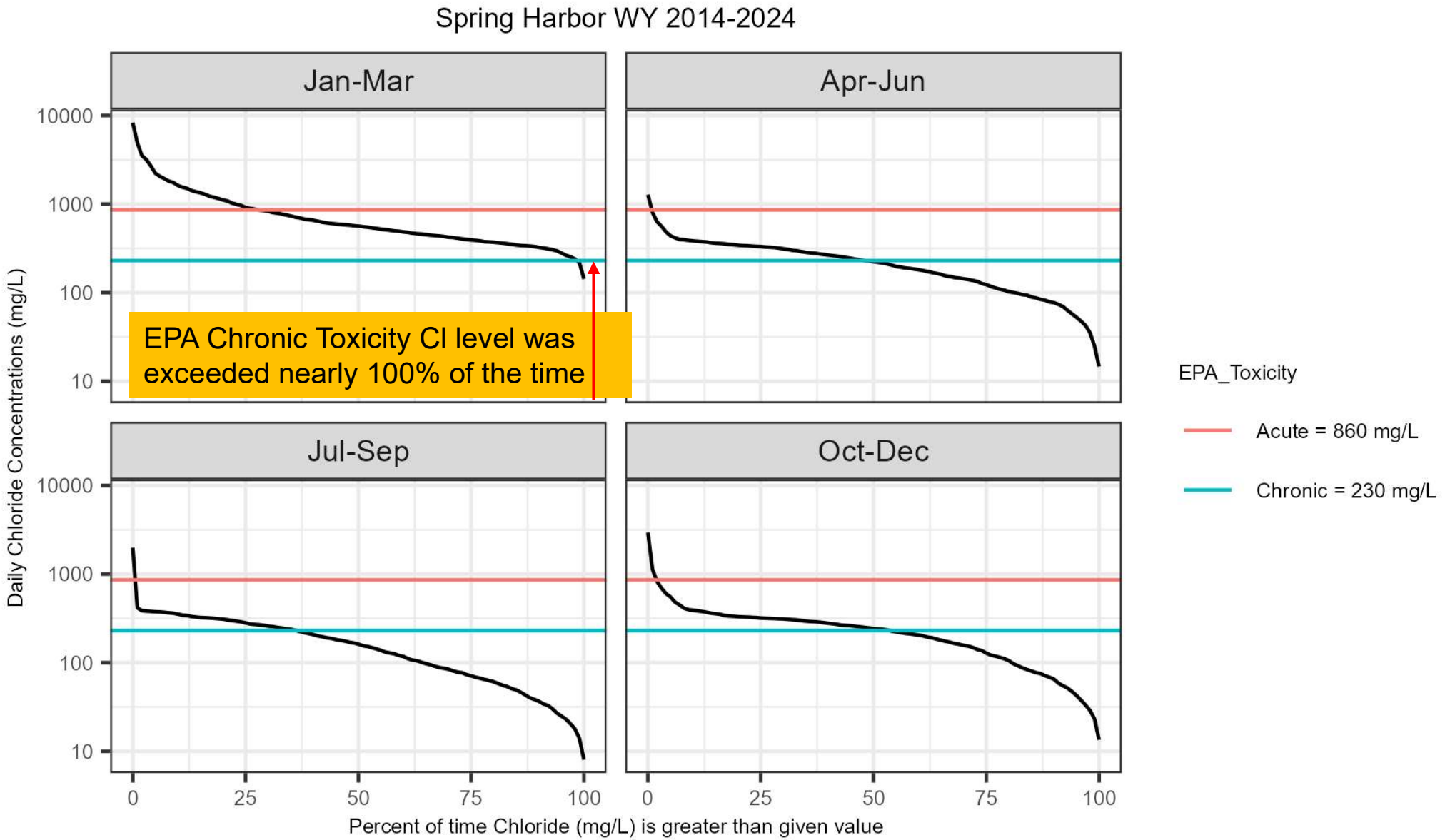
EPA Chronic Toxicity Cl level was exceeded about 60% of the time



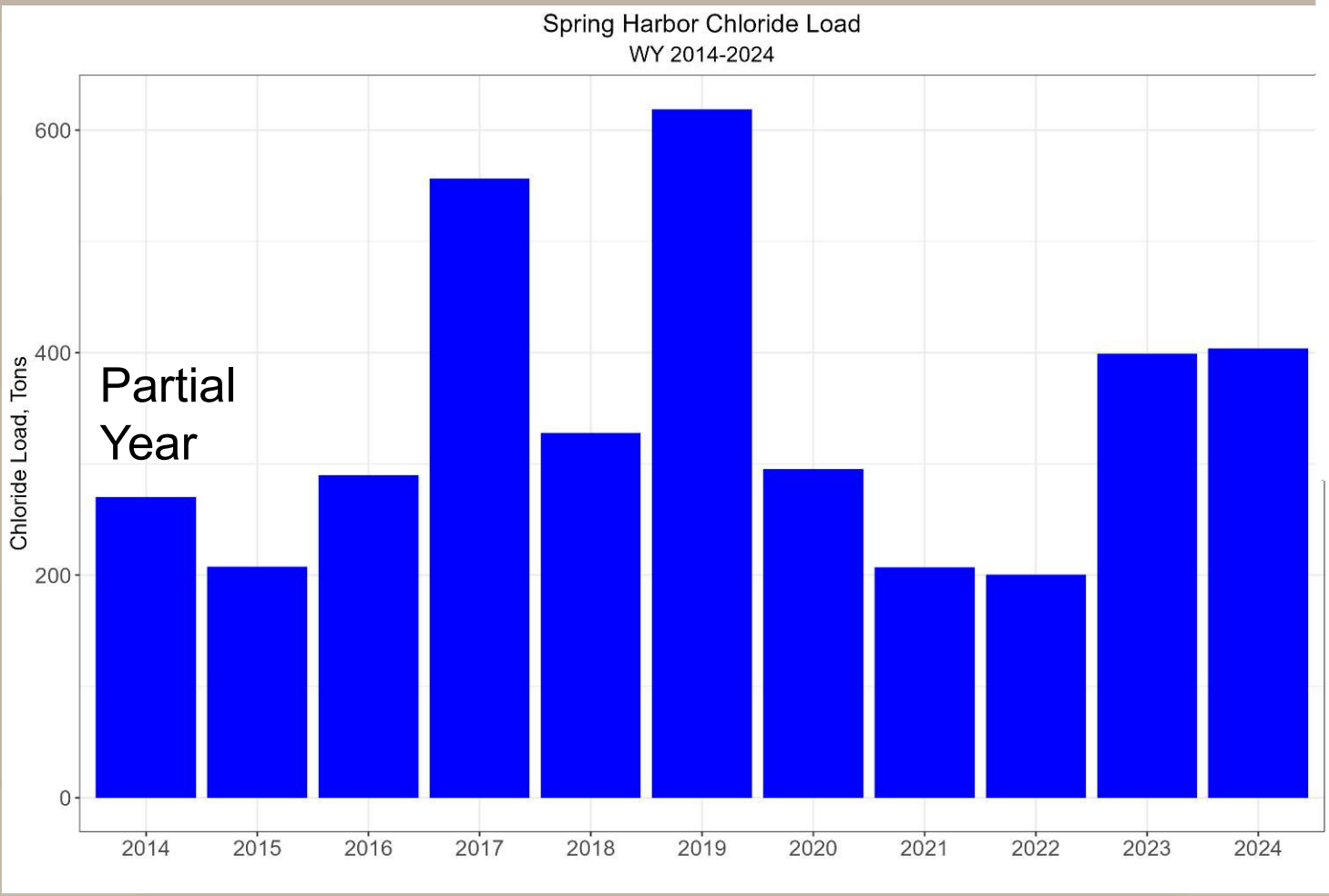

Median Cl concentration of 271 mg/L exceeds the EPA Chronic Toxicity level

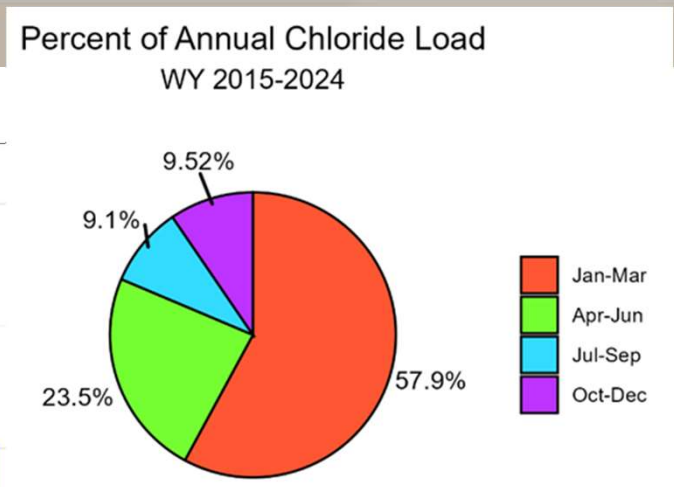


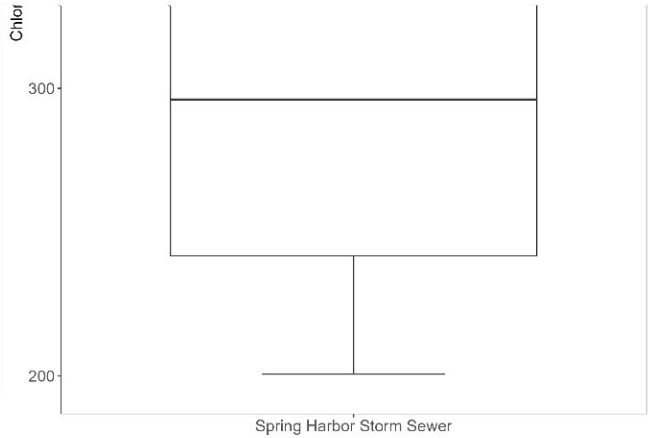
# Exceedance probabilities – seasonal (2014-2024)



# Spring Harbor chloride loads

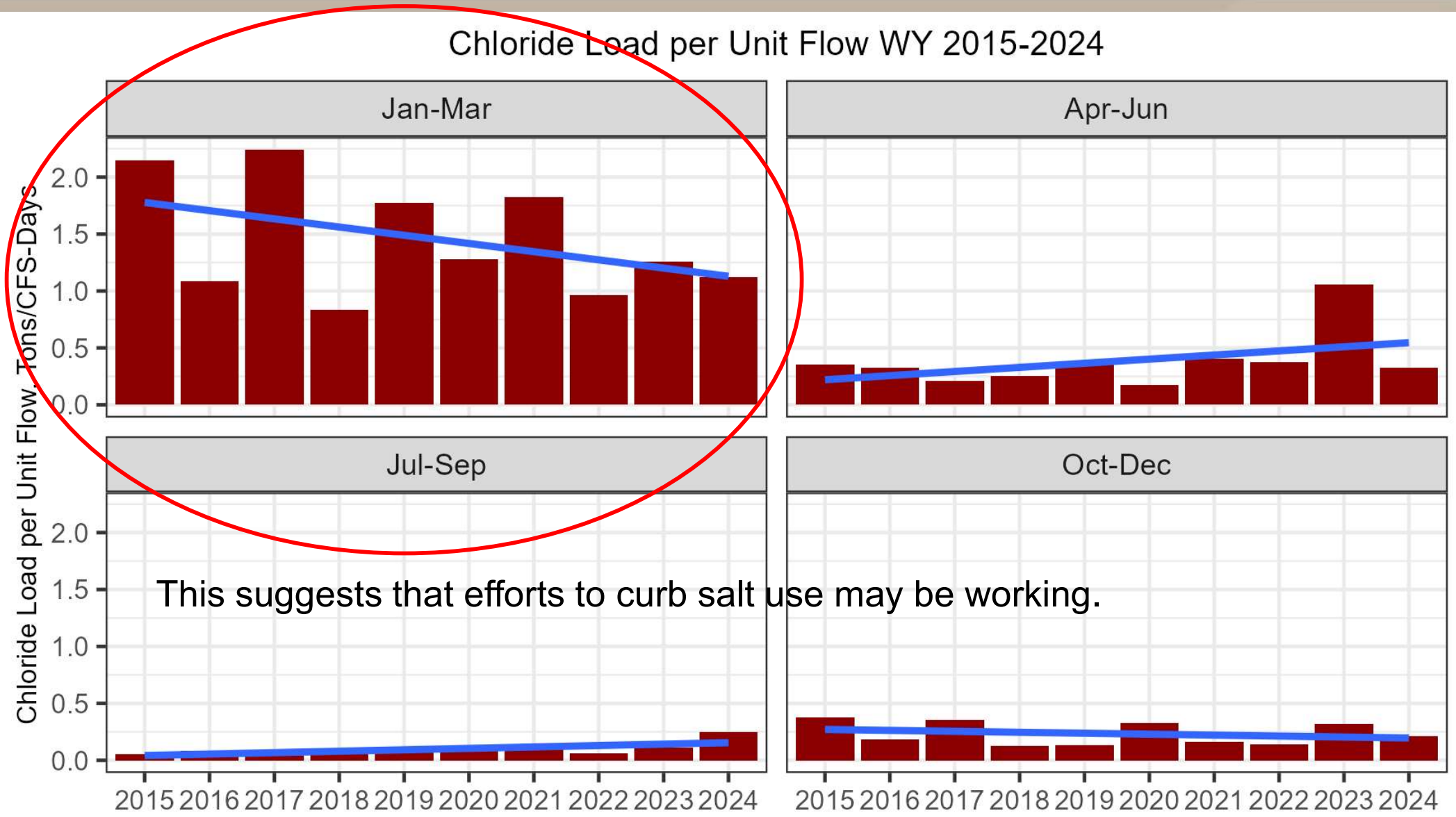



Annual Median = ~300 tons of Cl or 490 tons of salt (NaCl)
- About 58 dump truck loads of salt annually (assuming 8.5 tons/truck)

# Flow-normalized chloride loads




Questions?