OUTDOORS

# Beginner's luck? First-time snagger pulls world-record paddlefish from Lake of the Ozarks

**Ryan Collingwood**
Springfield News-Leader

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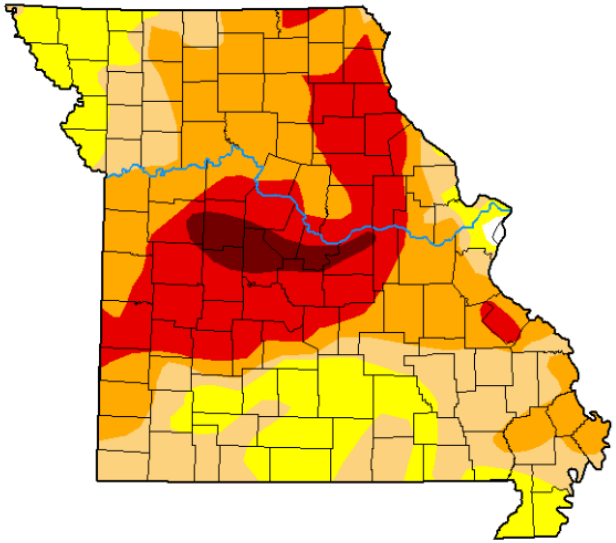
The Missouri Department of Conservation confirmed that a large paddlefish snagged at the Lake of the Ozarks on Saturday is the new world-record holder.

Olathe, Kansasresident Chad Williams reportedly caught a 164-pound, 13-ounce paddlefish, shattering the previous Missouri record of 140 pounds and edging out the previous world record of 164 pounds. State and world records are typically based on two categories, pole-and-line and an alternative method, which includes snagging.

Williams said Saturday was the first time he had ever snag-fished, a method in which a fisherman use hooks to pierce the outside of a fish, not its mouth.

## U.S. Drought Monitor
## Missouri



**July 11, 2023**
*(Released Thursday, Jul. 13, 2023)*
**Valid 8 a.m. EDT**

*Drought Conditions (Percent Area)*

| | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 |
|---|---|---|---|---|---|---|
| Current | 0.24 | 99.76 | 81.76 | 58.20 | 25.76 | 3.25 |
| Last Week 07-04-2023 | 1.26 | 98.74 | 80.14 | 54.14 | 24.34 | 0.00 |
| 3 Months Ago 04-11-2023 | 91.14 | 8.86 | 1.79 | 0.21 | 0.00 | 0.00 |
| Start of Calendar Year 01-03-2023 | 50.31 | 49.69 | 12.51 | 1.61 | 0.00 | 0.00 |
| Start of Water Year 09-27-2022 | 18.48 | 81.52 | 56.59 | 15.39 | 4.83 | 1.92 |
| One Year Ago 07-12-2022 | 37.41 | 62.59 | 40.51 | 2.37 | 0.00 | 0.00 |

*Intensity:*

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx*

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CPC/NOAA/NWS/NCEP

droughtmonitor.unl.edu

# Lake of the Ozarks Water Quality

Geosyntec consultants

LOWA Board Meeting

March 20, 2024

# Agenda

- Why monitor Lake of the Ozarks (LOTO) water quality?
  - 2020 303(d) List of Impaired Waters
    - 2018 Numeric Lake Nutrient Criteria
  - LOWA LOTO Watershed Management Plan Update/Expansion
    - 2021, 2022, and 2023 LOTO Volunteer Monitoring
- LOWA LOTO Volunteer Water Quality Monitoring
  - What, Where, and When
  - Water Quality Results
    - 2023 Headlines

# Numeric Lake Nutrient Criteria

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- USEPA approved on December 14, 2018
  - Aquatic life protection…10 CSR 20-7.031

***Measured at or near outflow of the Lake***

**Table L: Lake Ecoregion Chl-a Response Impairment Threshold Values (µg/L)**

| Lake Ecoregion | Chl-a Response Impairment Thresholds |
|---|---|
| Plains | 30 |
| Ozark Border | 22 |
| Ozark Highland | 15 |

**Table M: Lake Ecoregion Nutrient Screening Threshold Values (µg/L)**

| Lake Ecoregion | Nutrient Screening Thresholds | | |
|---|---|---|---|
| | TP | TN | Chl-a |
| Plains | 49 | 843 | 18 |
| Ozark Border | 40 | 733 | 13 |
| Ozark Highland | 16 | 401 | 6 |

**Five Eutrophication Factors**

1. Occurrence of eutrophication-related mortality or morbidity events for fish and other aquatic organisms.
2. Epilimnetic excursions from dissolved oxygen or pH criteria.
3. Cyanobacteria counts in excess of one hundred thousand cell per milliliter.
4. Observed shifts in aquatic diversity attributed to eutrophication.
5. Excessive levels of mineral turbidity that consistently limit algal productivity during the period May 1 – September 30.

# LOTO WMP Update

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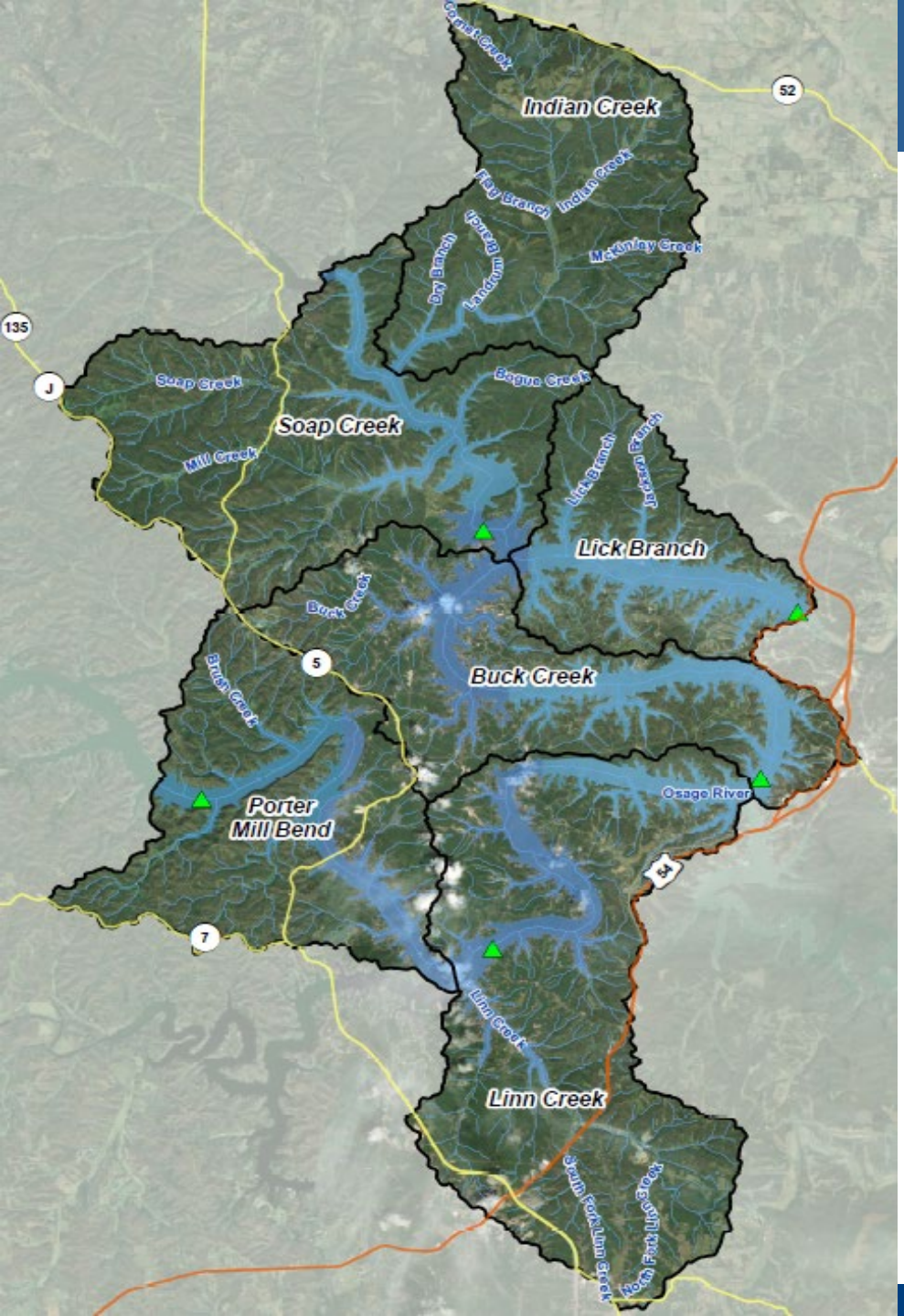


## 2010 WMP HUCS

Lick Branch
Buck Creek

## 2024 WMP HUCS

Lick Branch
Buck Creek
Indian Creek
Soap Creek
Linn Creek
Porter Mill Bend

# LOWA Volunteer WQ Monitoring

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- Weekly (22 events) during the summer season (May-September)
  - **2021**, **2022**, and **2023**

- LOTO locations
  - Bagnell Dam (1 mm), Gravois (6 mm), Grand Glaize (18 mm), Niangua (30 mm), and Background (42 mm)

**Monitoring**

- Total Nitrogen
- Total Phosphorus
- Chlorophyll-a
- Total Suspended Solids
- Secchi Depth (water clarity)

# Factors Influencing Lake Water Quality

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- Watershed Uses (nutrients, temperature)
  - Residential/Commercial
  - Agriculture (Pasture/Row Crop)
  - Waste Management
    - Point Sources
    - Non-Point Sources (Septic)
- Climate
  - Temperature
  - Waves wind/recreation
  - Lake cycling (inflow/outflow)
  - Sunlight
  - When it rains
  - How much it rains
  - Rain intensity

# Total Nitrogen (ug/L)

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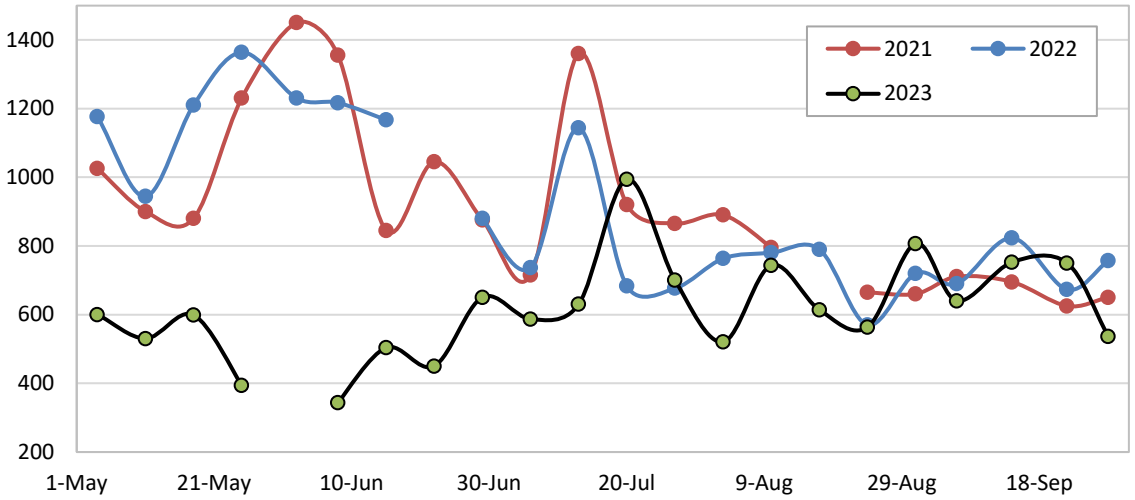
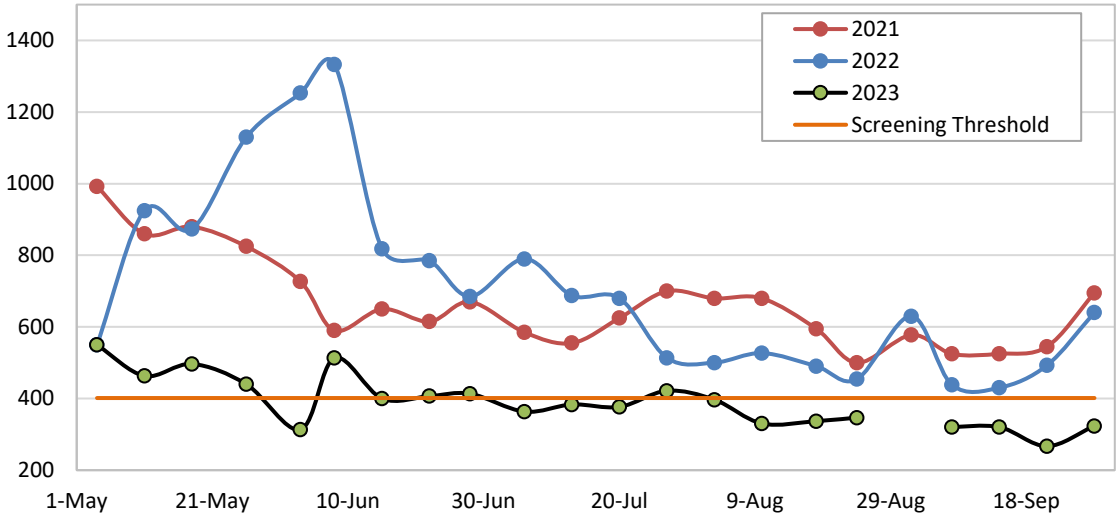
Background (42.0 mm)




| Year | Geometric Mean |
|---|---|
| 2021 | 883 |
| 2022 | 875 |
| 2023 | 598 |

Bagnell Dam (0.0 mm)




| Year | Geometric Mean |
|---|---|
| 2021 | 653 |
| 2022 | 671 |
| 2023 | **383 (401)** |

# Total Phosphorus (ug/L)

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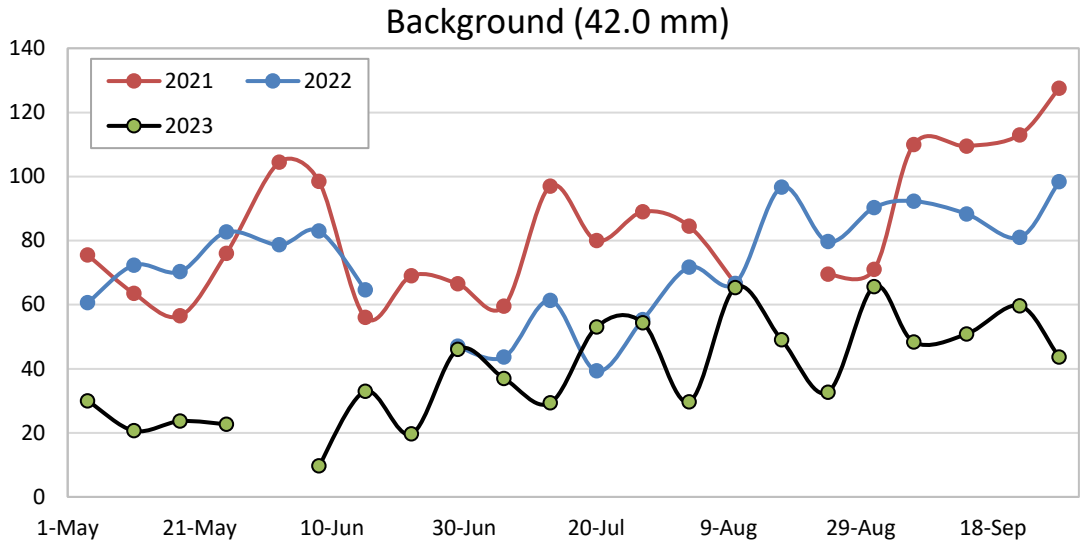
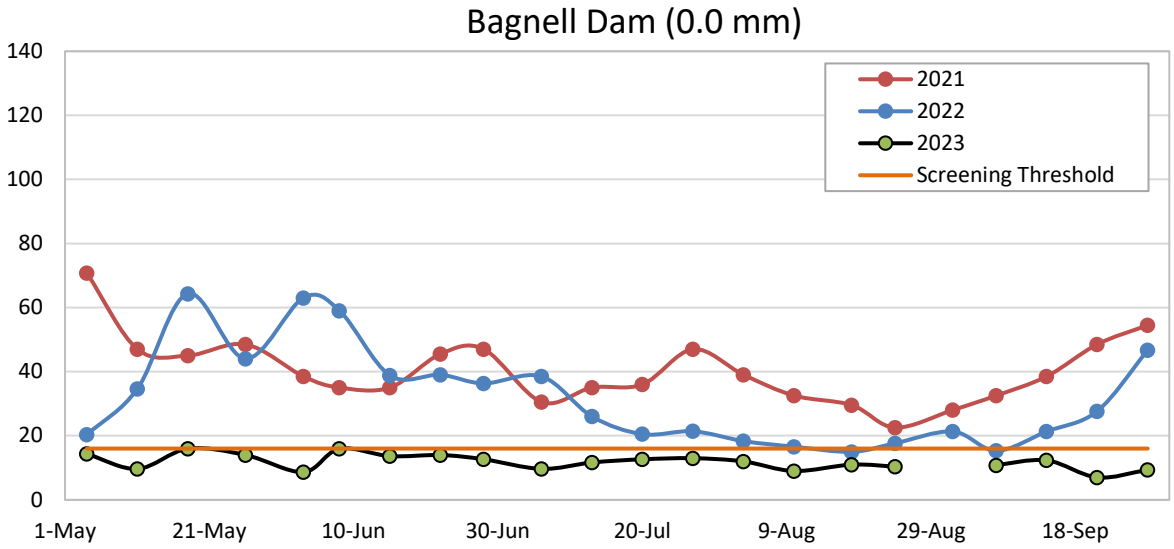



| Year | Geometric Mean |
|---|---|
| 2021 | 81 |
| 2022 | 70 |
| 2023 | 36 |

| Year | Geometric Mean |
|---|---|
| 2021 | 39 |
| 2022 | 29 |
| 2023 | **12 (16)** |



# Chlorophyll-a (ug/L)

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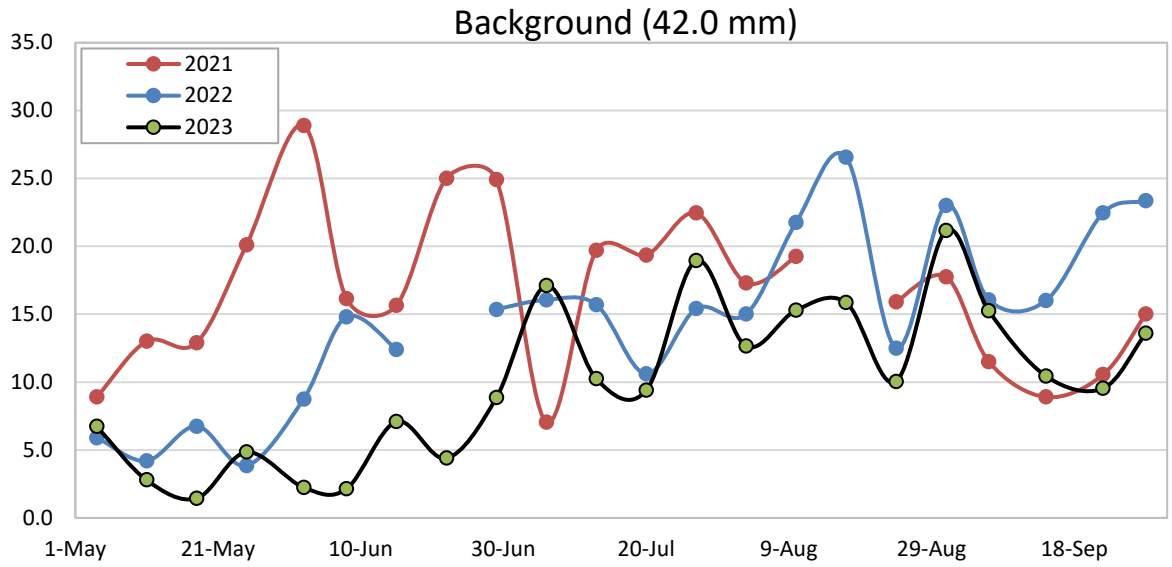
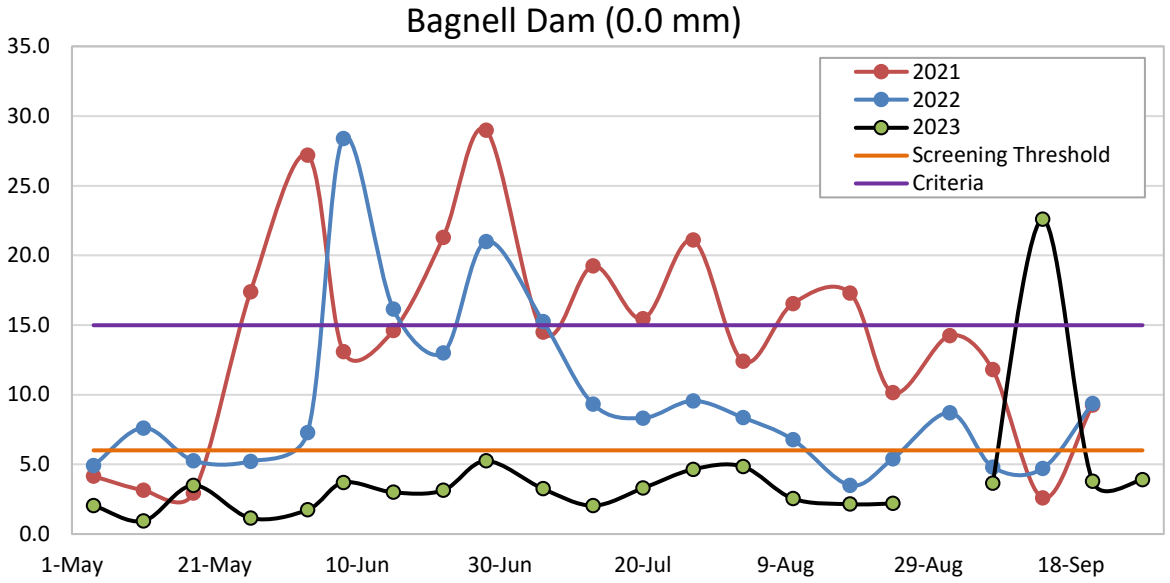



| Year | Geometric Mean |
|---|---|
| 2021 | 16 |
| 2022 | 13 |
| 2023 | 8 |

| Year | Geometric Mean |
|---|---|
| 2021 | 11 |
| 2022 | 8 |
| 2023 | **3 (6)** |



# Water Clarity (inches)

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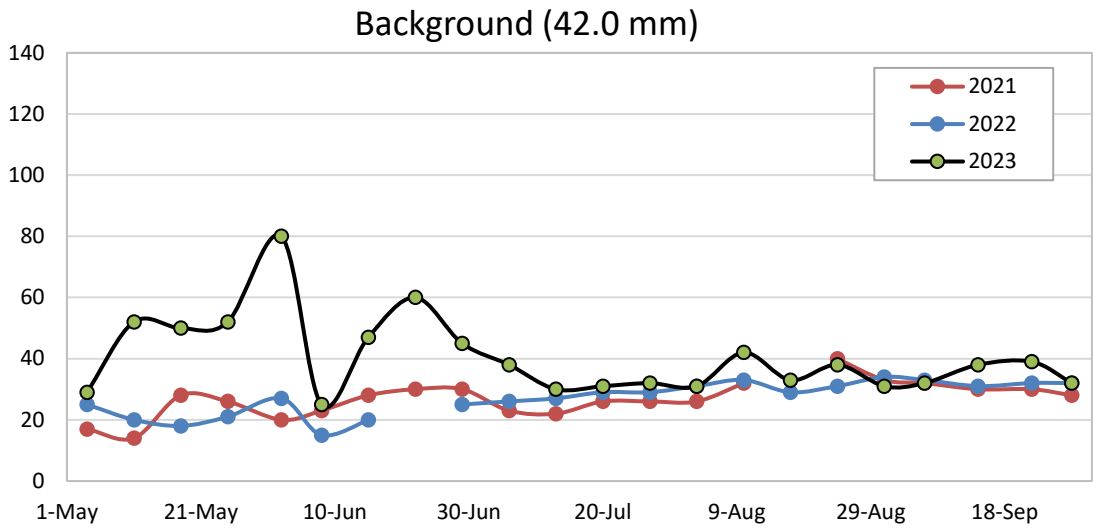
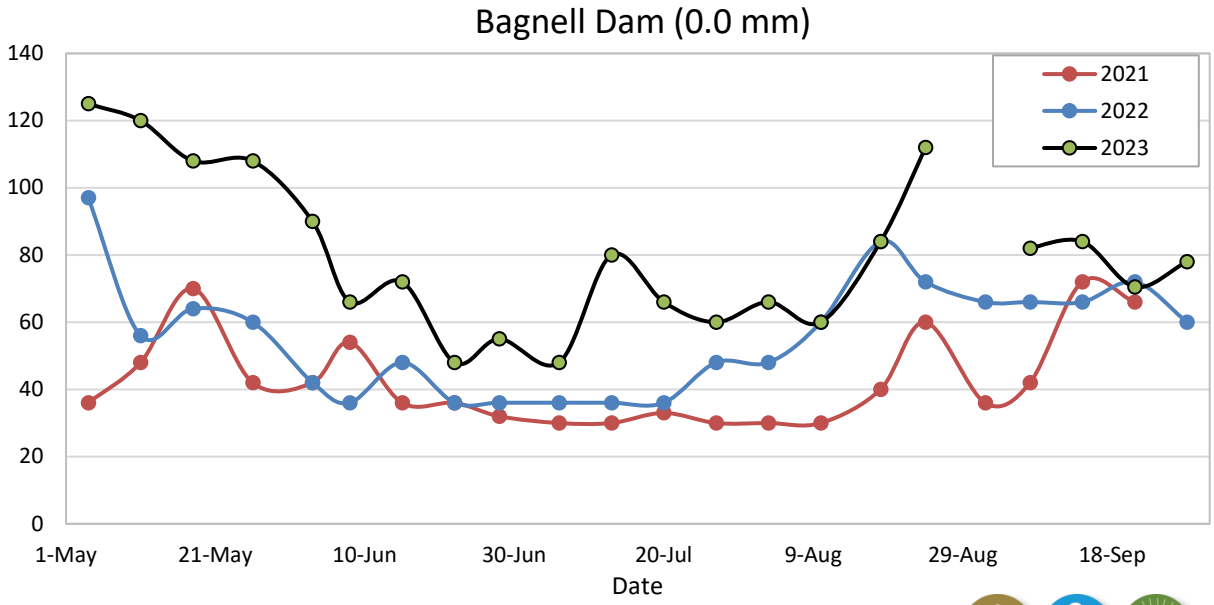



| Year | Mean |
|---|---|
| 2021 | 27 |
| 2022 | 27 |
| 2023 | 40 |

| Year | Mean |
|---|---|
| 2021 | 43 |
| 2022 | 56 |
| 2023 | 80 |



# Total Suspended Solids (mg/L)

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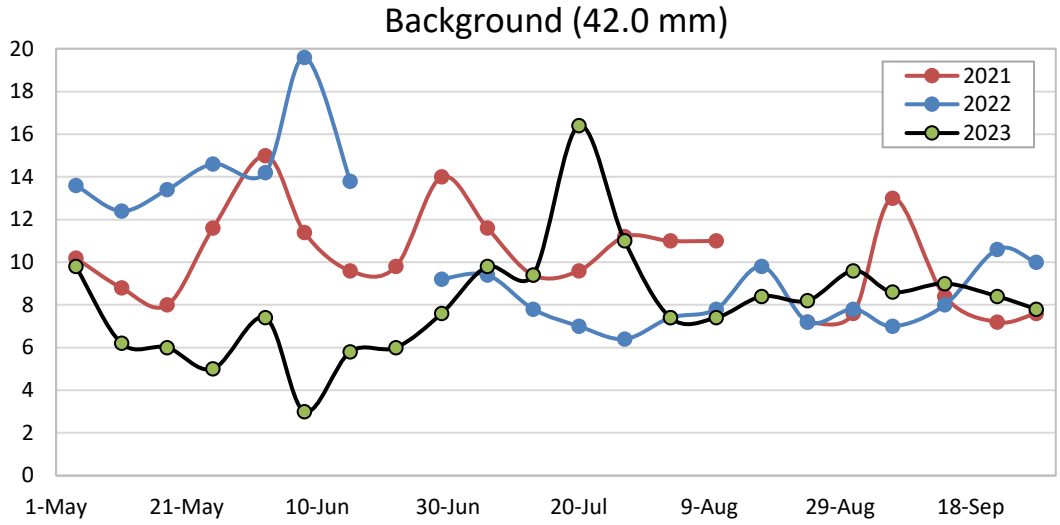
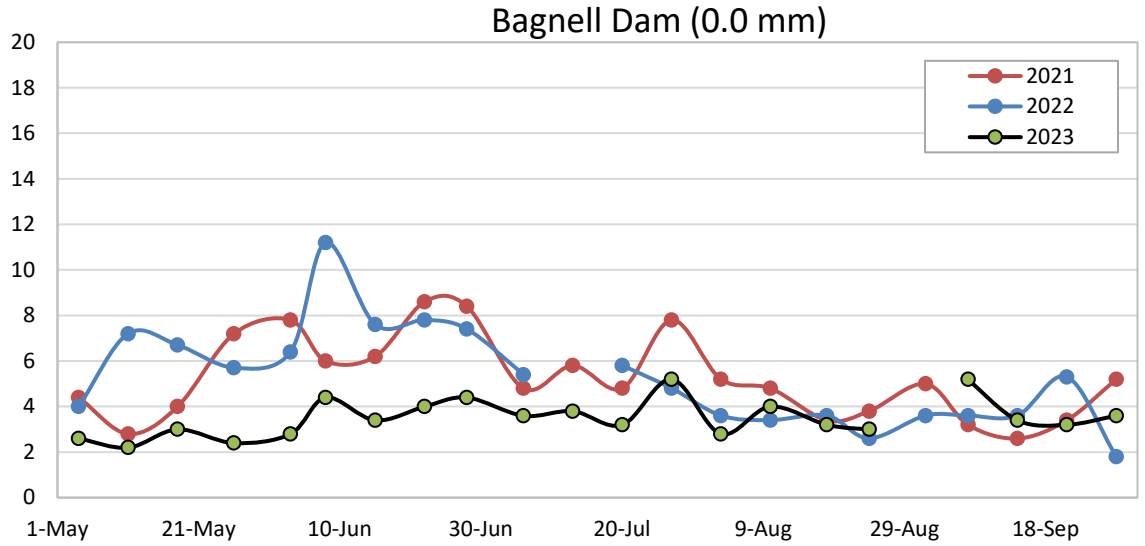



| Year | Mean |
|---|---|
| 2021 | 10.2 |
| 2022 | 10.3 |
| 2023 | 8.1 |

| Year | Mean |
|---|---|
| 2021 | 5.2 |
| 2022 | 5.3 |
| 2023 | 3.5 |



# Lake Stratification and Mixing

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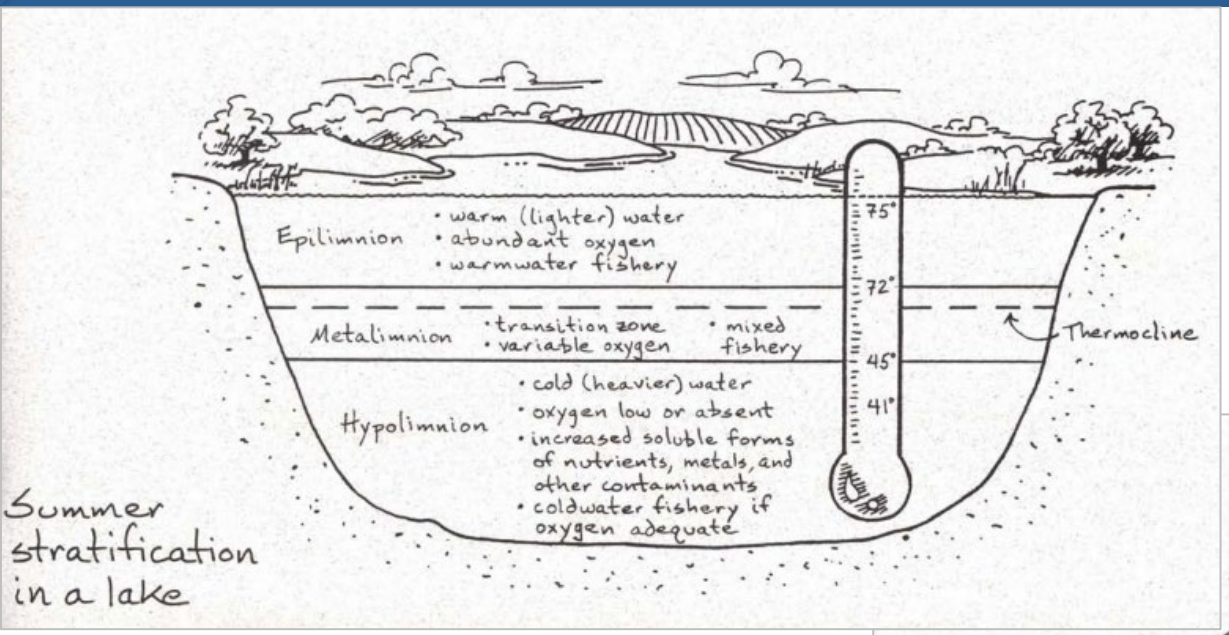
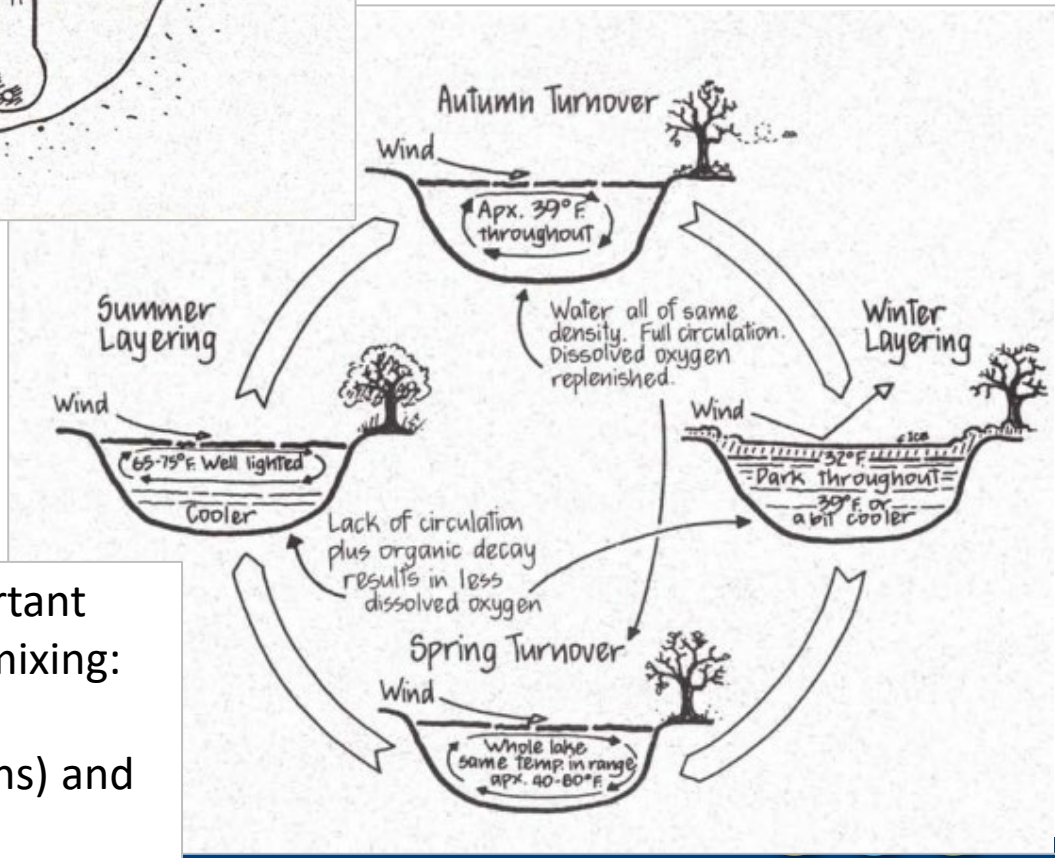



Information: IEPA, [Lake-Stratification (illinois.gov)]




IEPA most important factors of Lake mixing:
Waves (wind/recreations) and Inflow/Outflow

# Bagnell Dam Chl-a/Outflow Relationship

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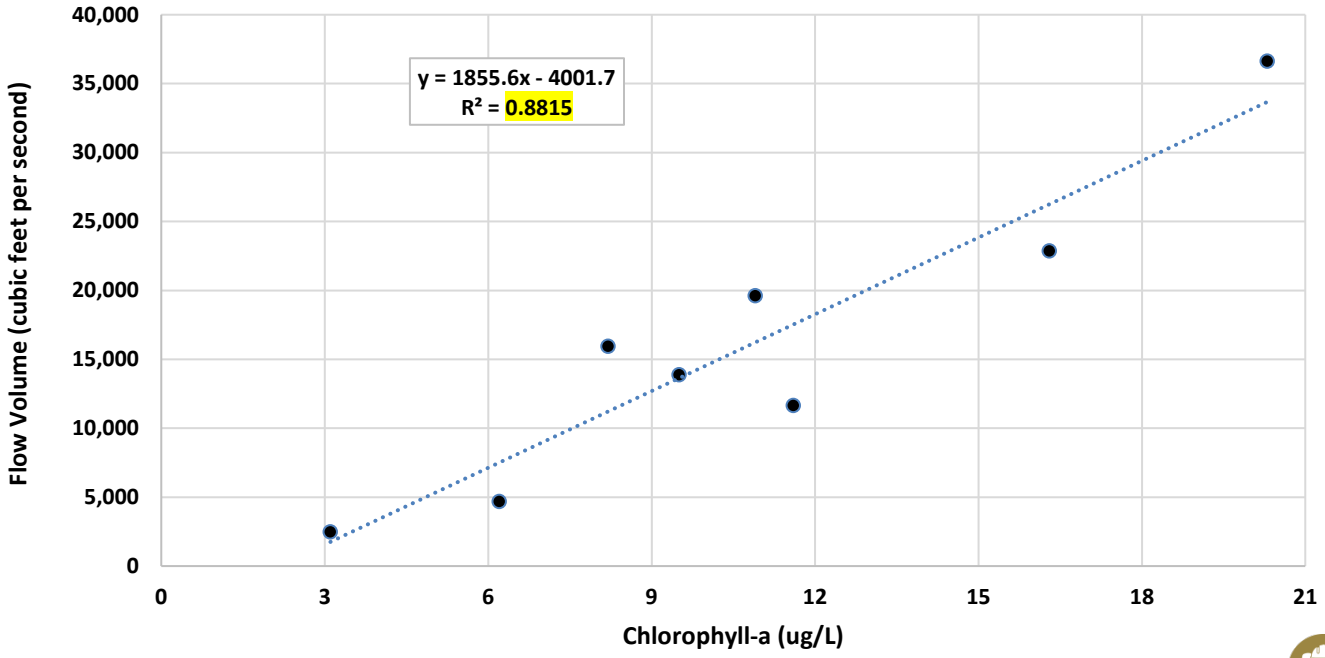
**May-Sept:** recreation season and LOTO has a relative constant water level

| Years (n=8) | Geometric Mean Chlorophyll-a (ug/L) | Average Bagnell Dam Outflow (cfs) |
|---|---|---|
| 2016 | 12 | 11,652 |
| 2017 | 16 | 22,858 |
| 2018 | 6 | 4,681 |
| 2019 | **20** | **36,647** |
| 2020 | 10 | 13,880 |
| 2021* | 11 | 19,611 |
| 2022* | 8 | 15,941 |
| 2023* | **3** | **2,488** |

* LOWA Data



# 2023 Headlines

- 2023 Summary
  - Lowest lake cycling (outflow) of 2,488 cfs in decades
    - 2012 (4,175 cfs) and 2014 (3,655 cfs)
  - Very low TN, TP, TSS, and Chl-a
  - Increased water clarity

# Summary

- Nutrients are highest in concentration at Background location (upstream Truman Reservoir source)
  - LOTO is acting as a nutrient sink
- Annual Variability (Climate and Land Use Changes)
  - Importance of continued monitoring
    - Potential 303(d) Delisting