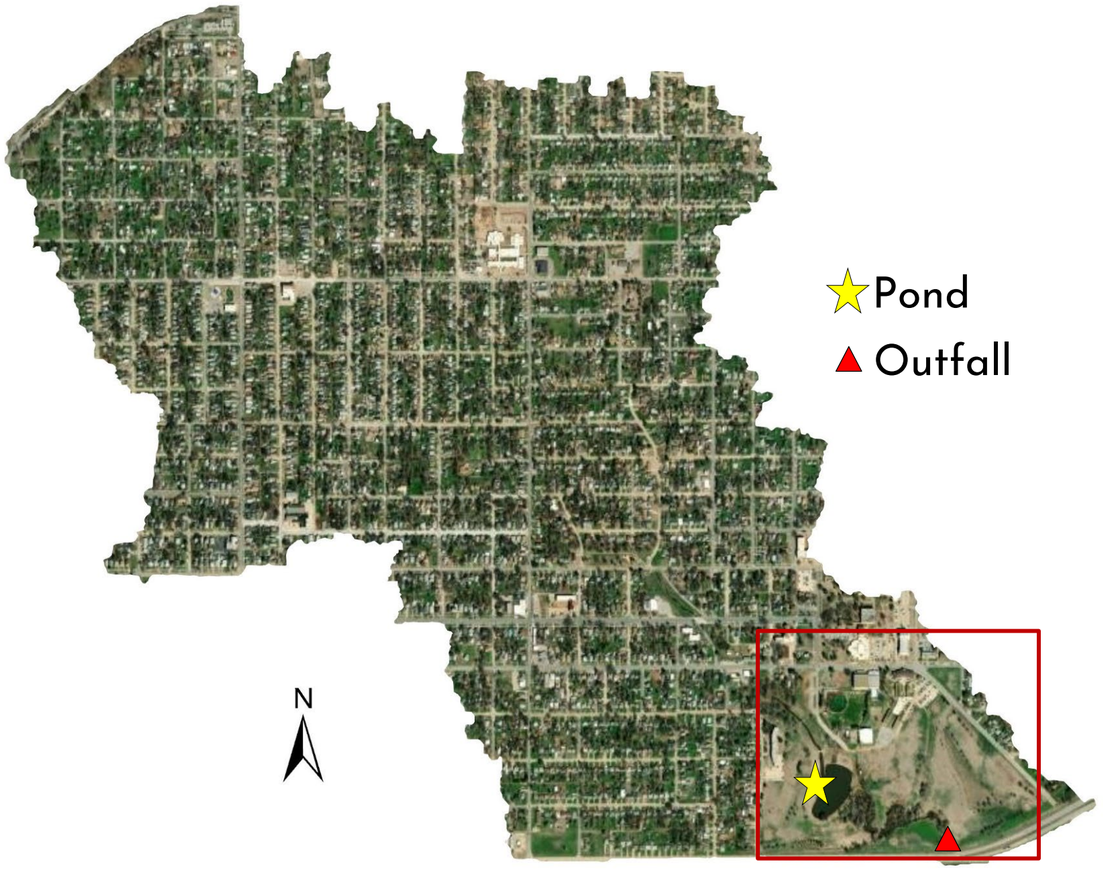
Community-Driven Revitalization of an Urban Stormwater Pond and Green Space on the NOC Campus

Megan Ryan
Nisha Bhatta
Jaime Schussler, Ph.D., P.E.

NOC Enid Campus Pond and Greenspace



- 917 acres contributing watershed
- Mostly residential area

Pond and Green Space History

Archived historic photo of NOC pond (n.d.)

Pond and Greenspace Evolution

NOC Pond 1937

NOC Pond 1954

NOC Pond 2008

NOC Pond 2013

NOC Pond 2017

NOC Pond 2021

Early photos display an established walking path, boat house and larger inlet stream

Current Condition

Algal bloom and trash deposition in the pond

Downstream of the pond with extreme signs of stream degradation

Algal bloom on the channel upstream of the pond

Project Goal

To develop a community-engaged master plan for the NOC pond and greenspace that incorporates a sustainable stormwater management plan to enhance ecosystem services.

TSET
TOBACCO SETTLEMENT ENDOWMENT TRUST

Funded by the TSET built environment grant which supports infrastructure improvements to increase recreation and physical activity in communities.

Community Survey

25 question survey distributed to NOC and Enid community

Demographic

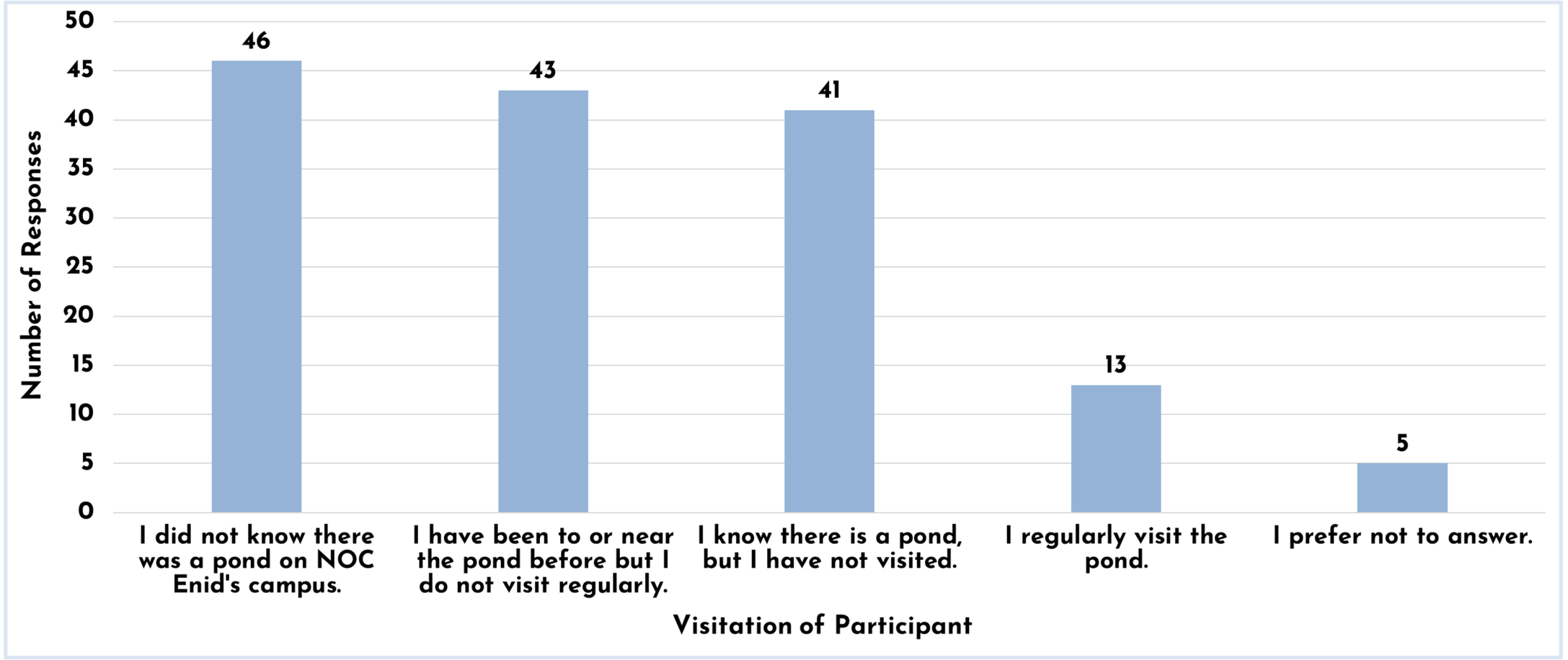
Current Recreational Use

Community Involvement and Satisfaction

Desired Use and Improvements

Survey Response

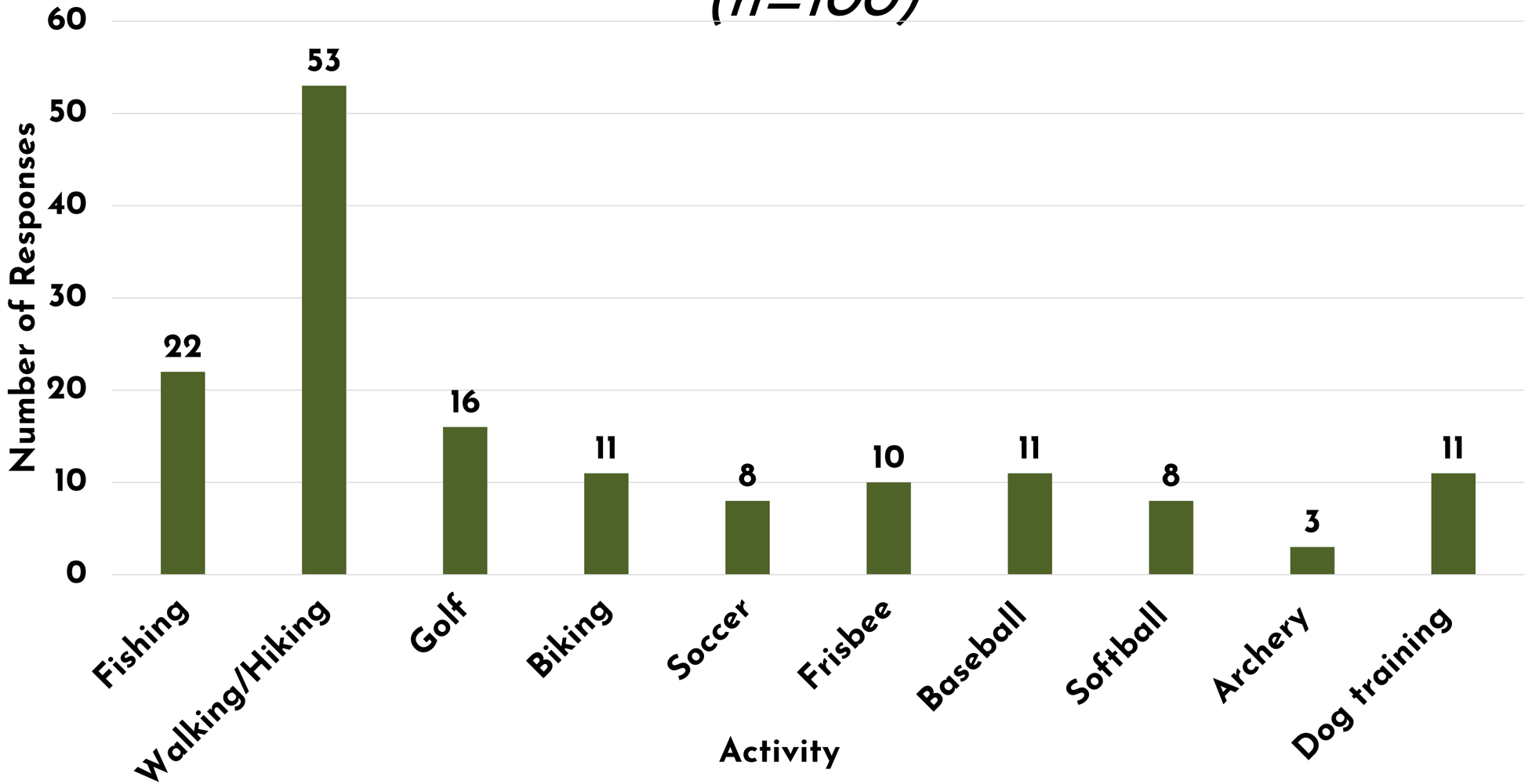
How often do you visit the NOC Pond? (n=148)



qualtrics XM

Survey Response

If you or someone you know, currently uses the pond or area surrounding the pond, what activities have you participated in? (n=100)

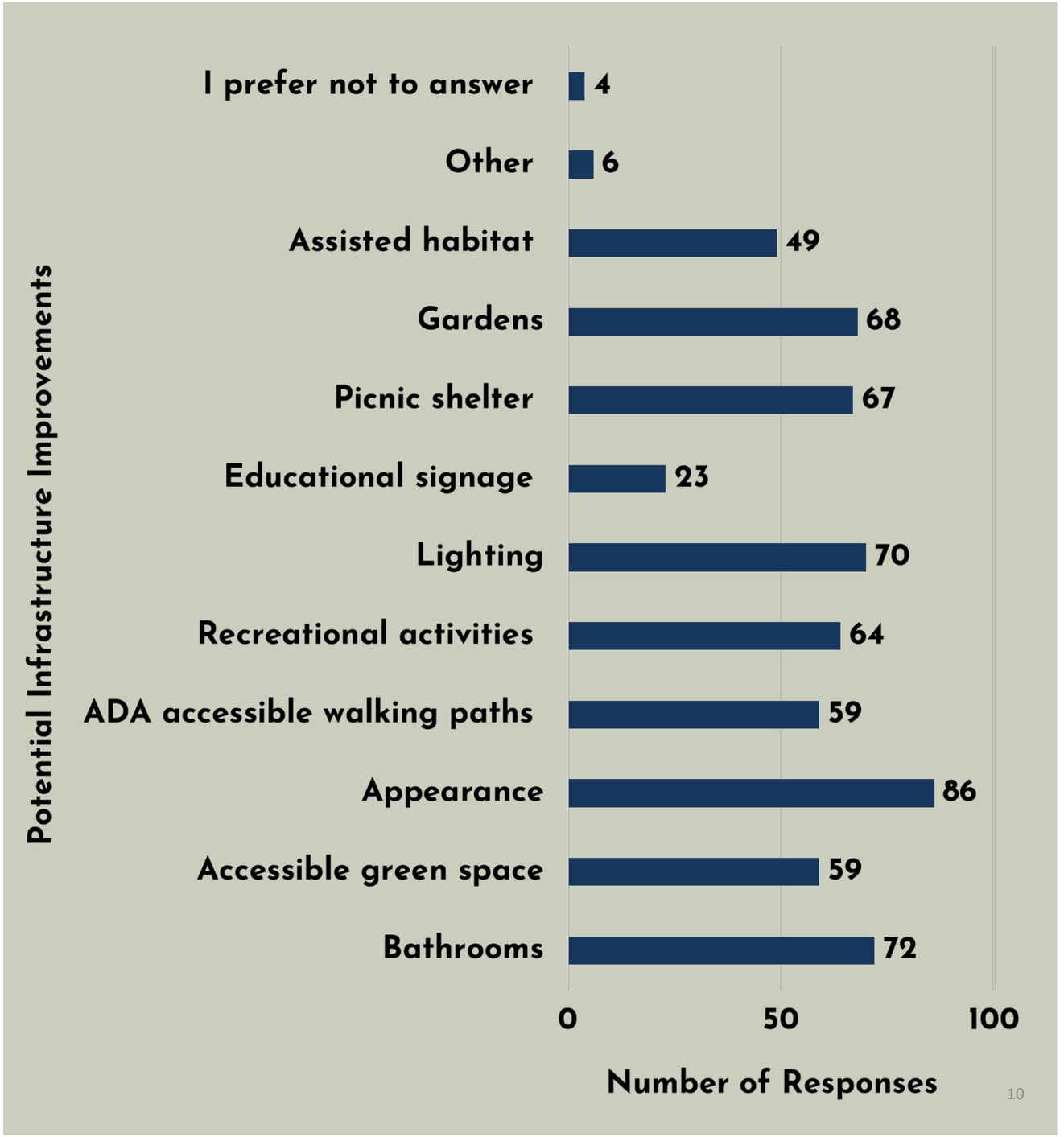


Survey Response

In your opinion, what infrastructure would improve the NOC pond and surrounding area? (Select all that apply) (n=123)

Needs Improvement:

- Appearance
- Bathrooms
- Lighting
- Gardens
- Picnic Shelter



Environmental Parameters Assessed

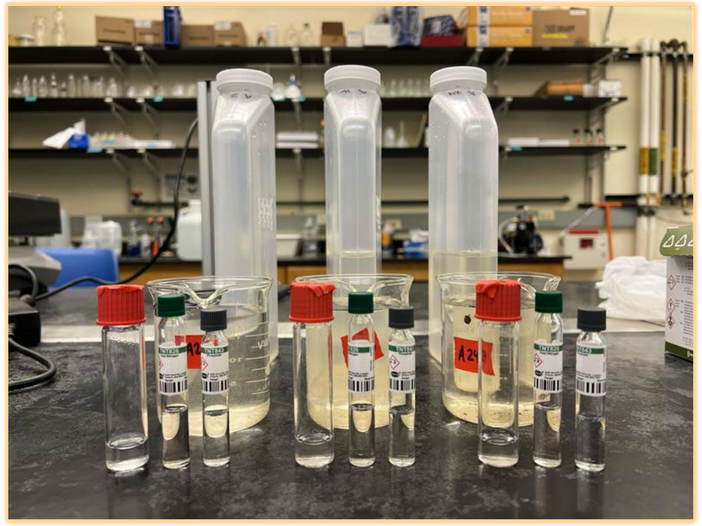
Water Quality and Quantity Sampling Locations

Camera Locations

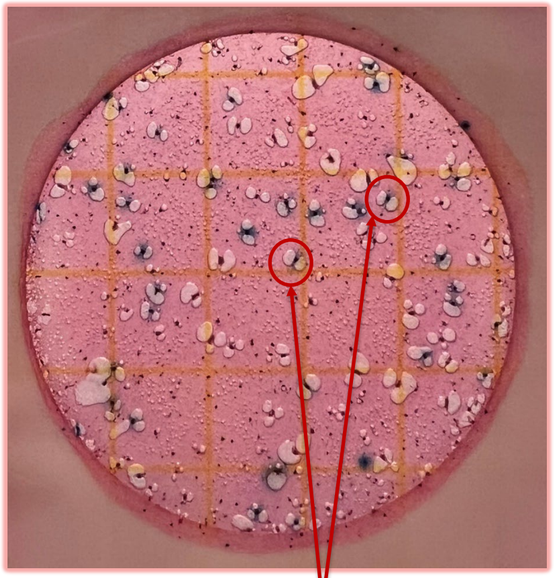
Bird Activity recorded

Aquatic Invertebrate sampling locations

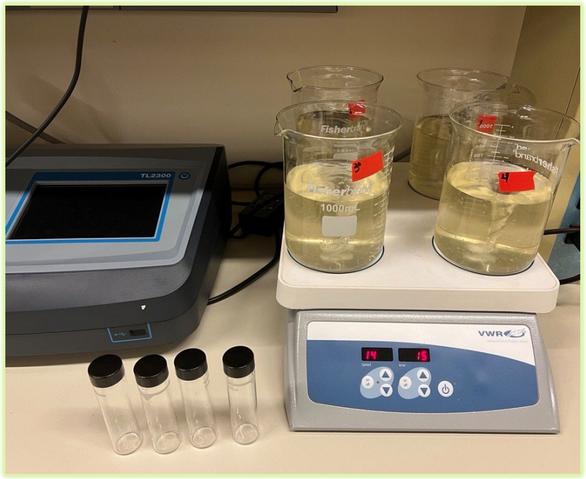
Water Quality Assessment

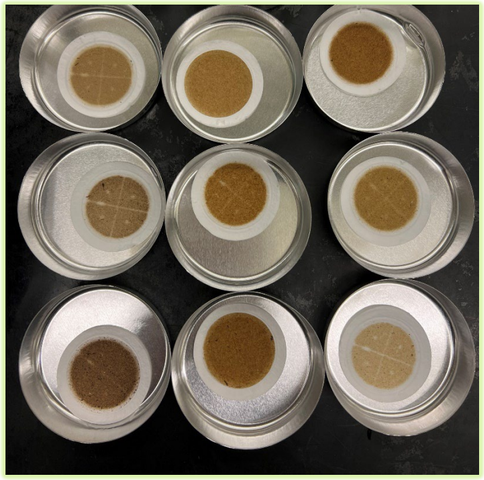


- Total Nitrogen
- Total Phosphorous



Escherichia Coli

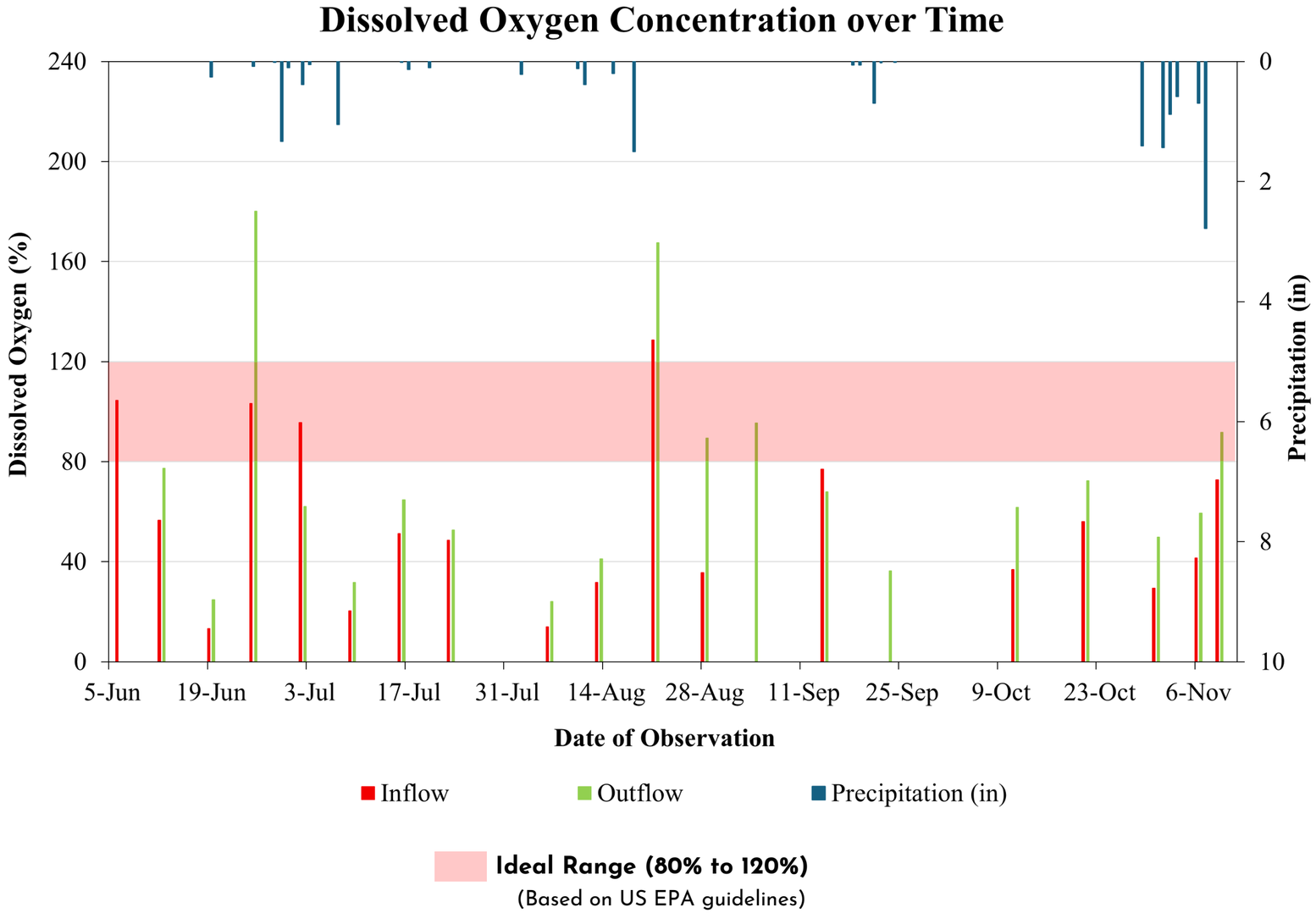




Turbidity and Total Suspended Solids

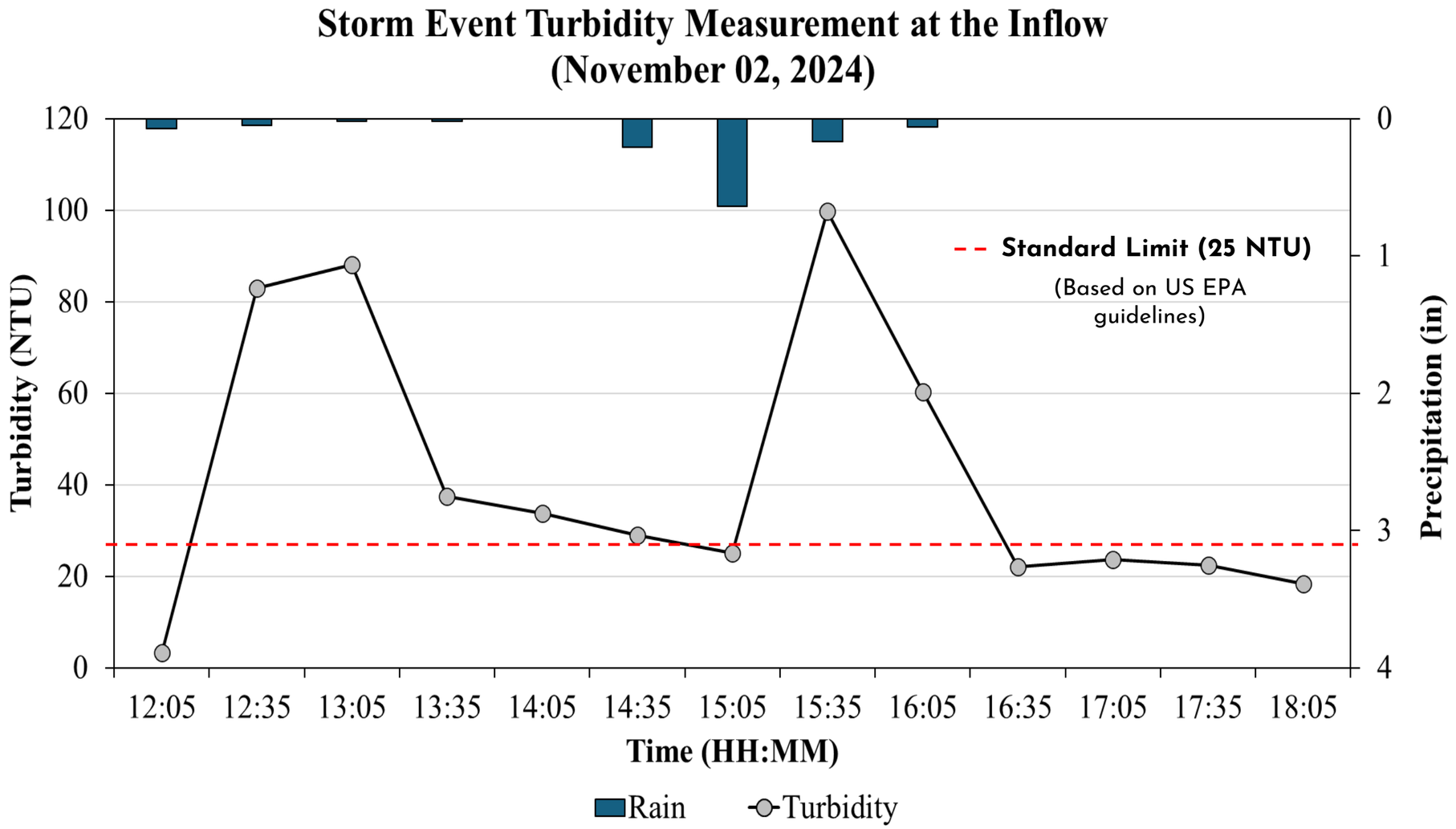
- pH
- Nitrate
- Temperature
- Dissolved Oxygen

Water Quality Parameters of Major Concern



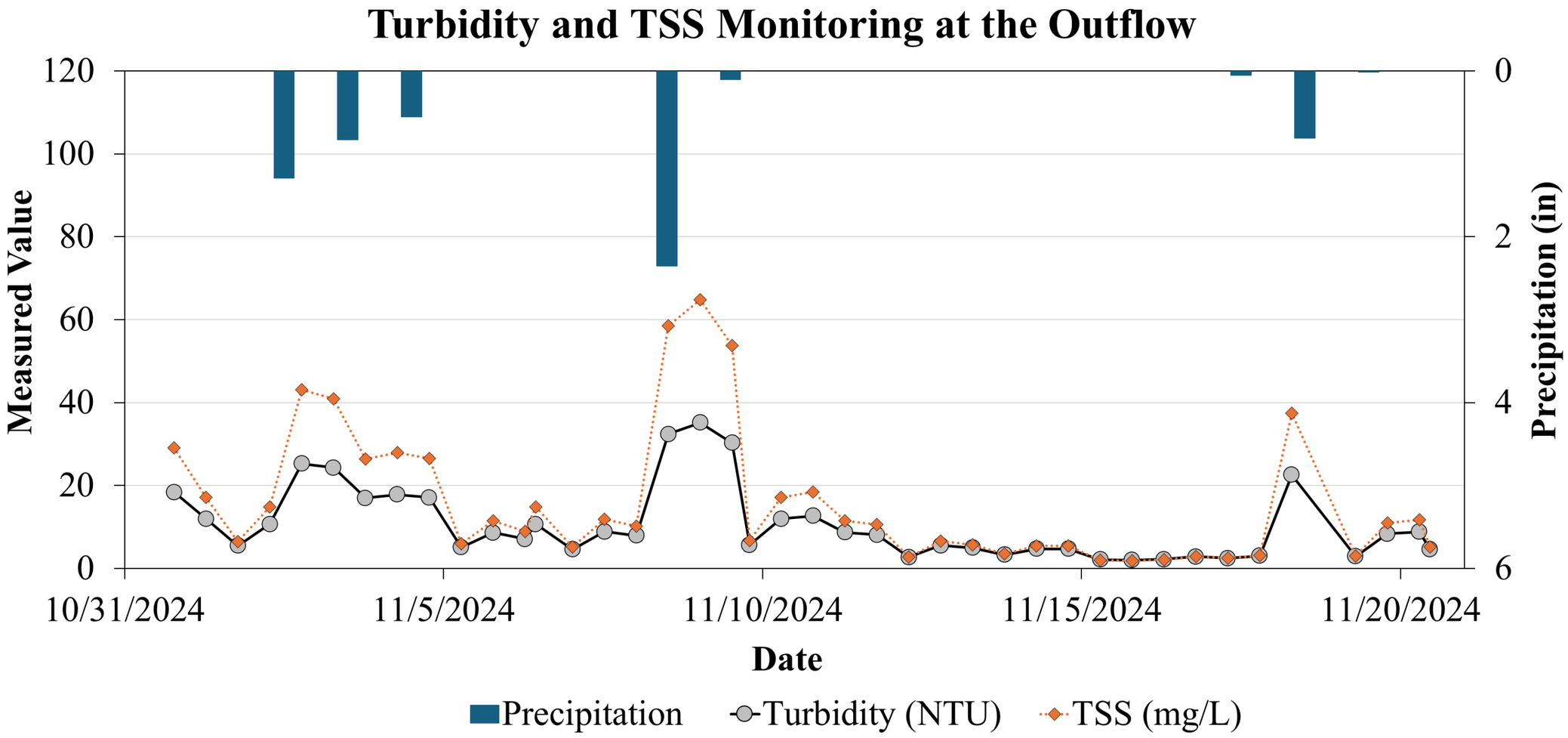
- Low DO level recorded
- DO level at the outflow higher compared to the inflow
- Higher DO concentration during the day

Water Quality Parameters of Major Concern

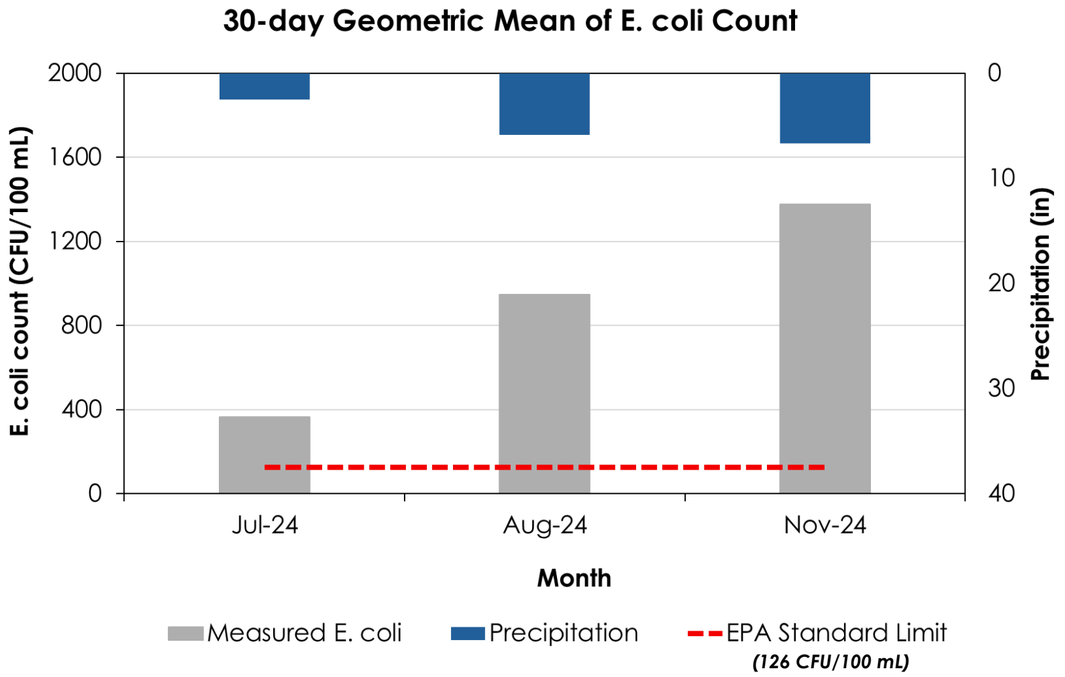


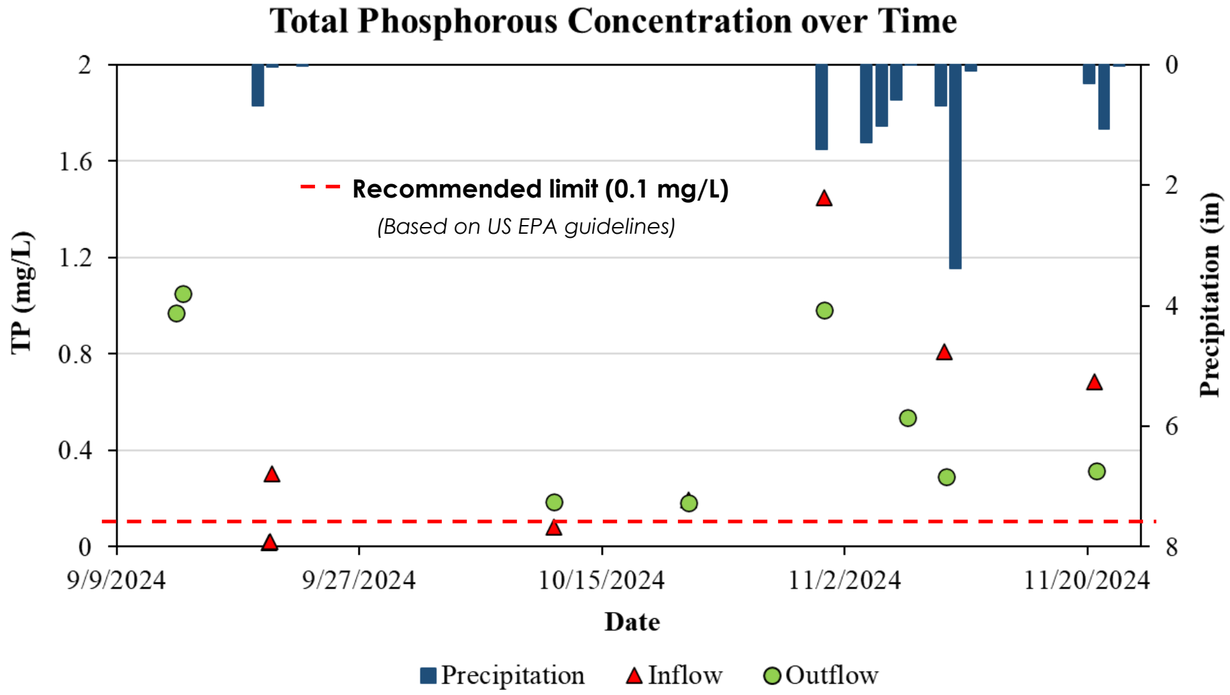
- Rising trend in Turbidity for storm events

Water Quality Parameters of Major Concern



Water Quality Parameters of Major Concern





- Missing *E. coli* data for September and October due to unavailability of enough data
- TP concentration showed rising trend with storm events

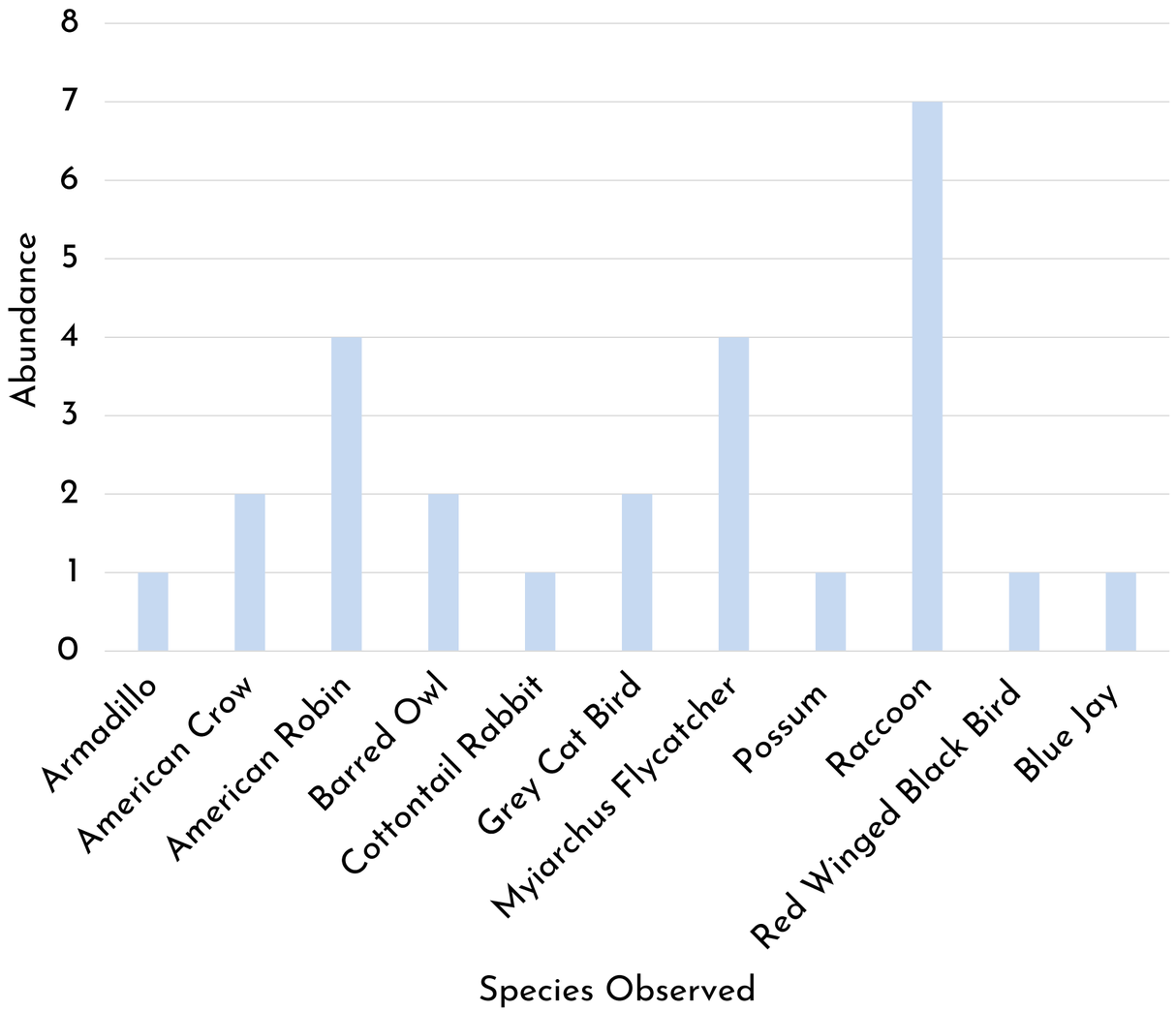
Biological Parameters

Game Cameras

Bird Activity recorded

Kick Net Method

Wildlife Assessment



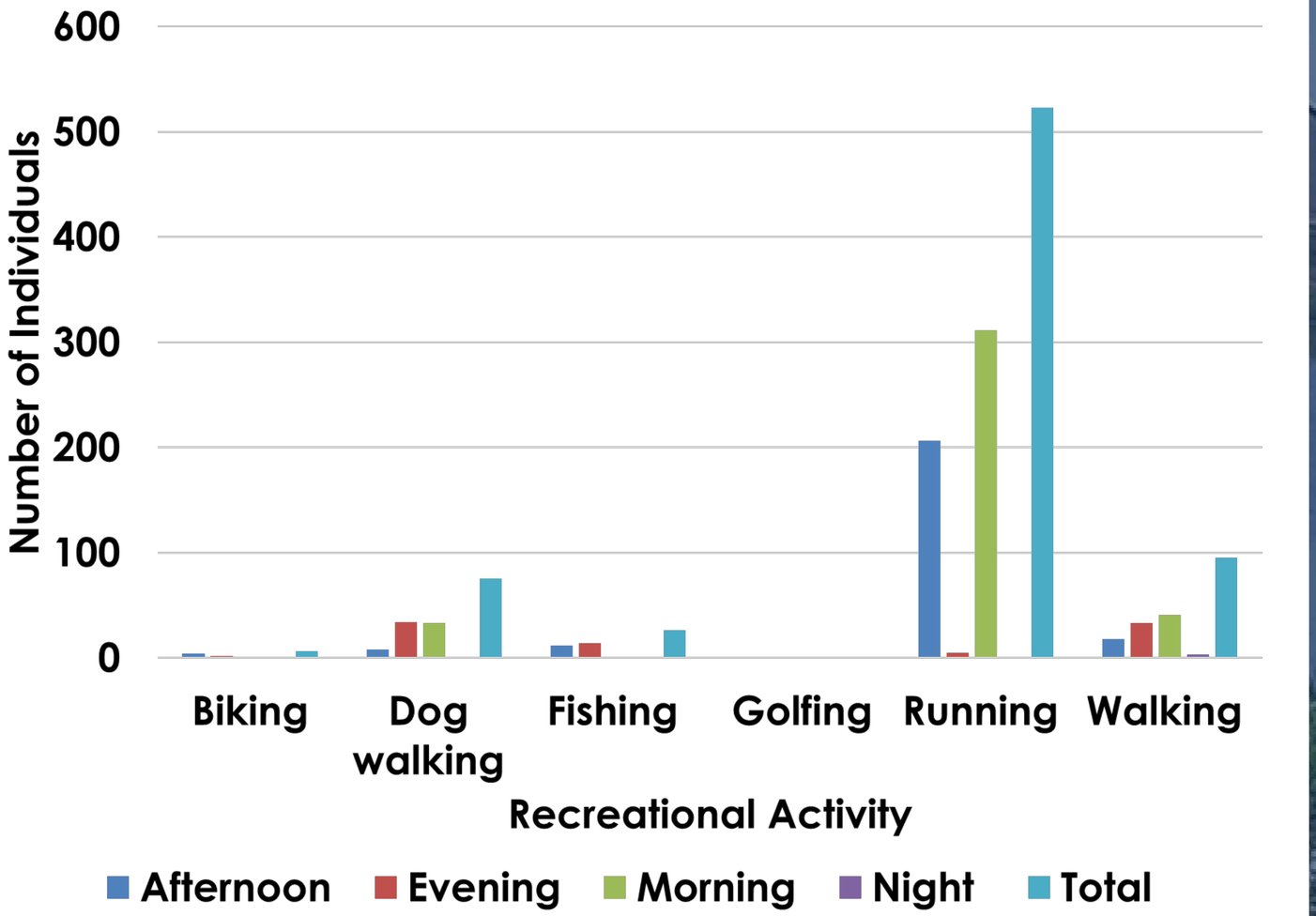
Camera captured 11 different species with a calculated Shannon Weiner biodiversity index of H′ = 2.14 (normal range: 1.5-3.5)

Downstream Spillway at High Flow vs. No Flow

Spillway with no outflow

Spillway with high outflow

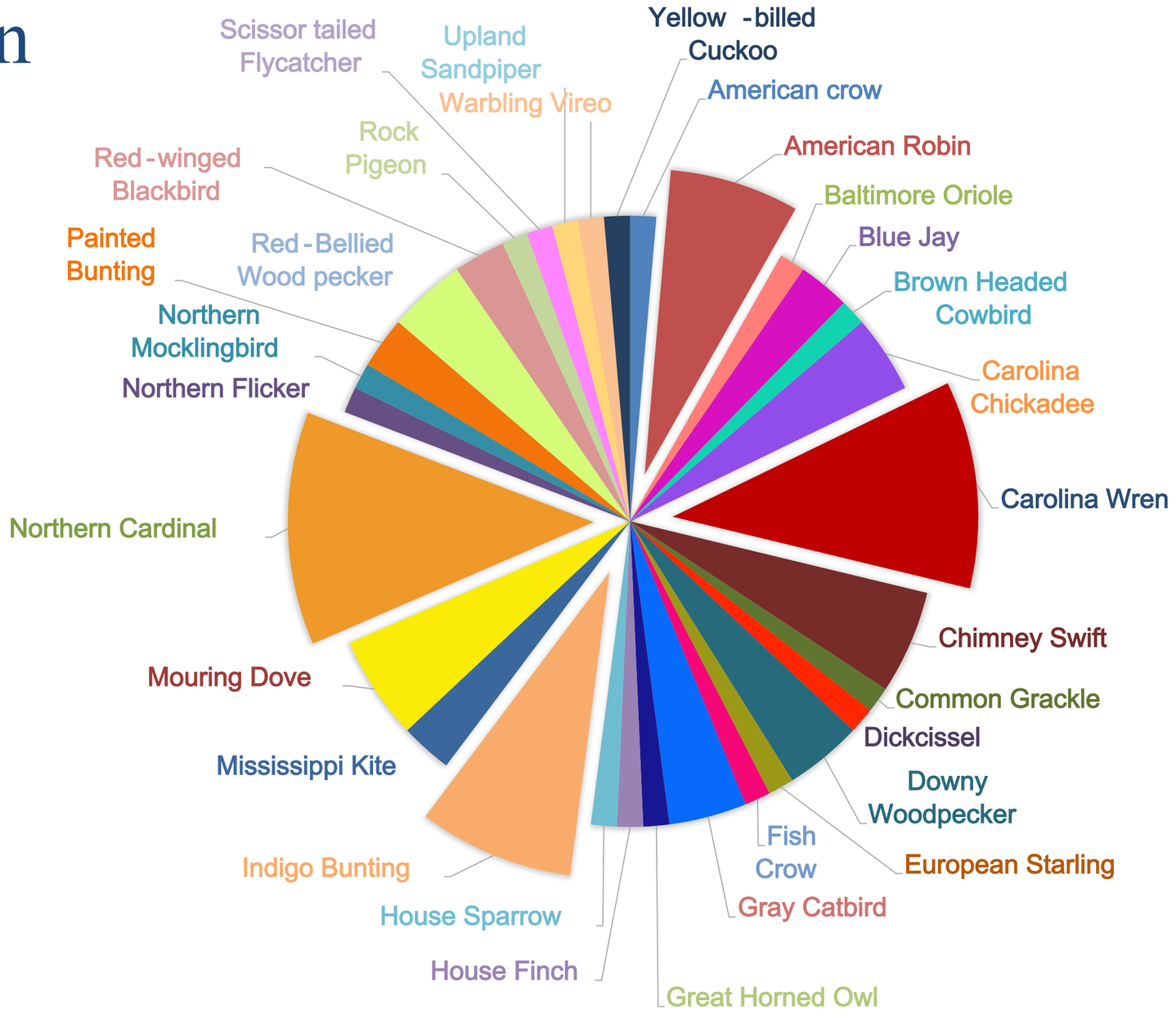
Recreational Use



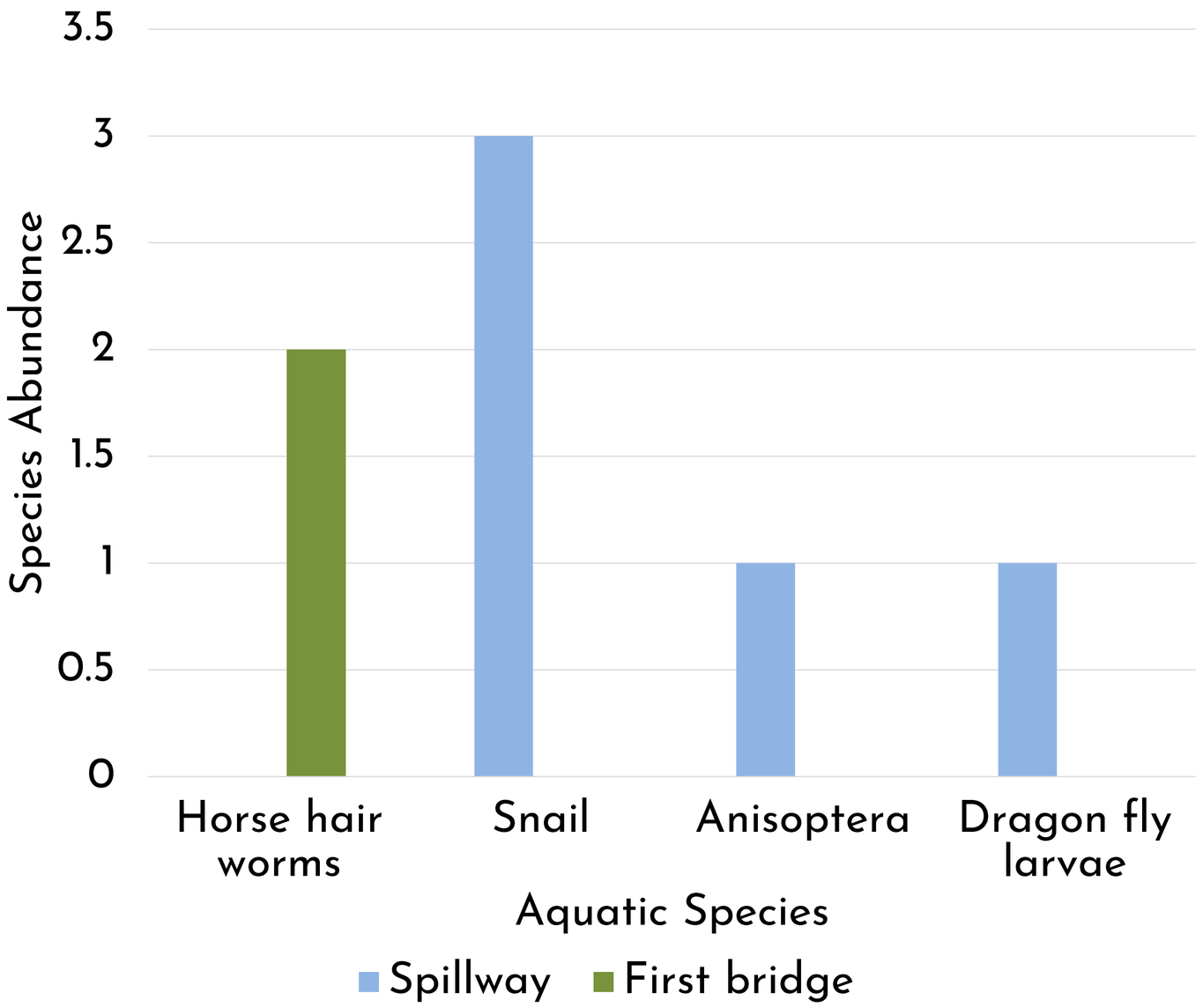
- Activity recorded from June 6th to Sept 2nd 2024.
- Most common activity was running followed by walking.
- Most activity occurred in the morning between 5:00am and 12:00pm.
- A total of 726 instances of recreation captured

Bird Population

- Bird songs recorded for 30 min each site visit
- 31 species recorded
- H' = 3.13 *(normal range: 1.5-3.5)*
- Most frequent species: Northern Cardinal, Carolina Wren, Indigo Bunting and the American Robin.

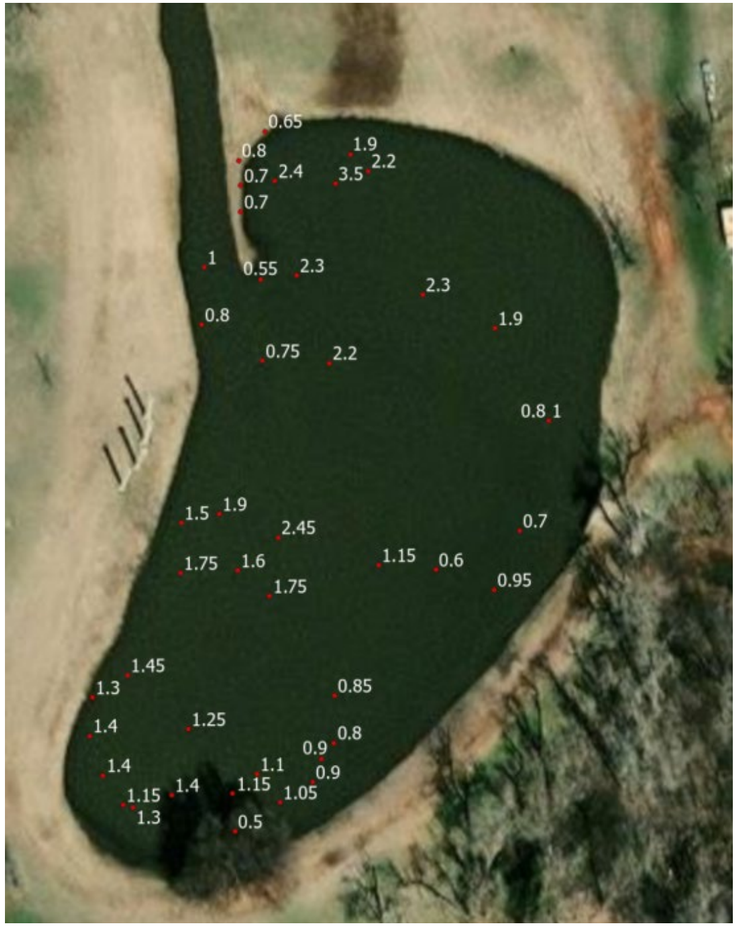


Aquatic Macro Invertebrate Sampling



Shannon Weiner Biodiversity Index of H' = 1.28 (Normal range: 1.5-3.5)

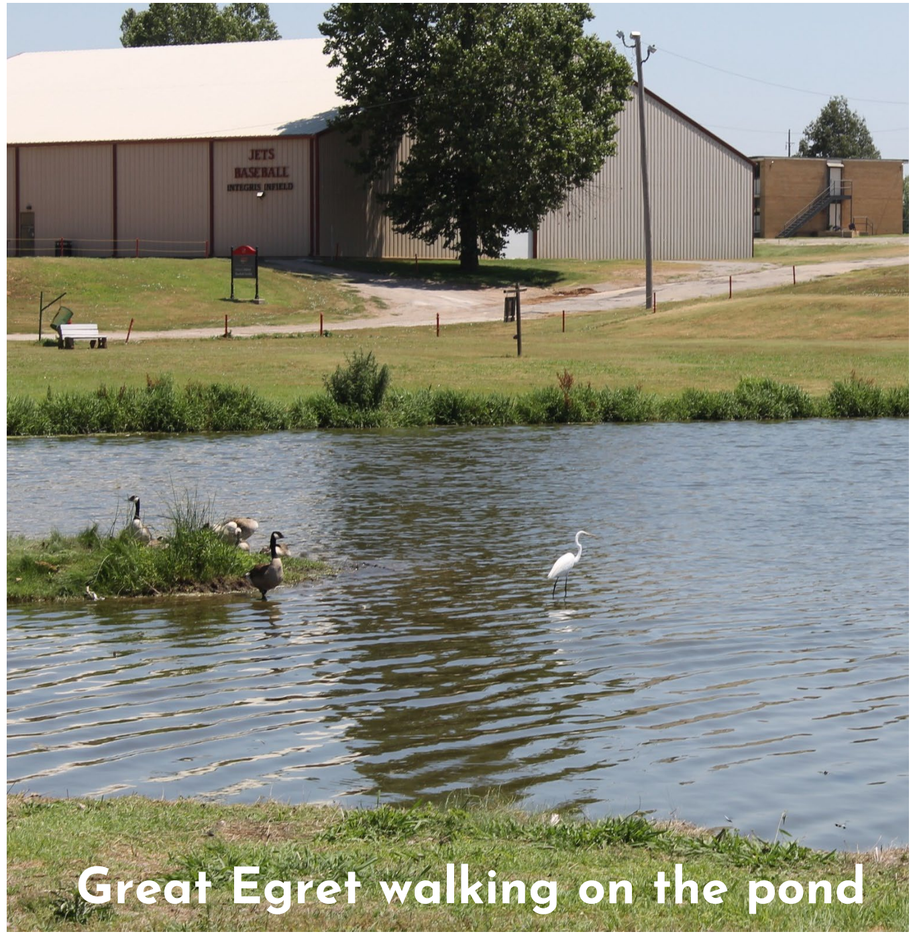
Pond Bathymetry



Maximum water depth = 2.45 feet
Average water depth = 1.28 feet

- Last dredged in 2005 -

"Believed to be 5 to 6 feet deep in the late 80s"



Great Egret walking on the pond

Proposed Master Plan

Completed

- ☑ Riparian Buffer
- ☑ Lawn Height

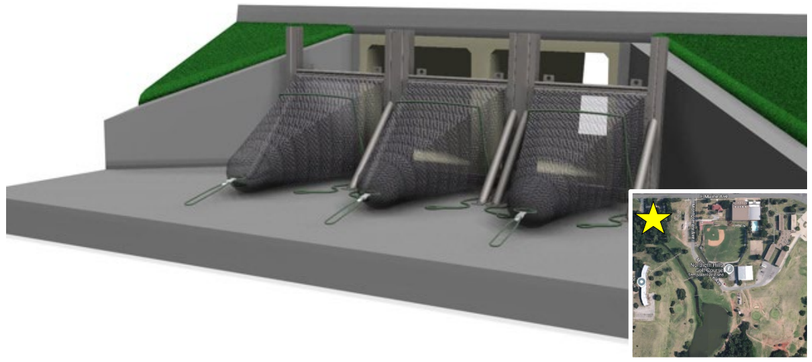
Phase I
Restoration

- Pond dredging
- Trash rack
- Aeration
- Dewatering structure

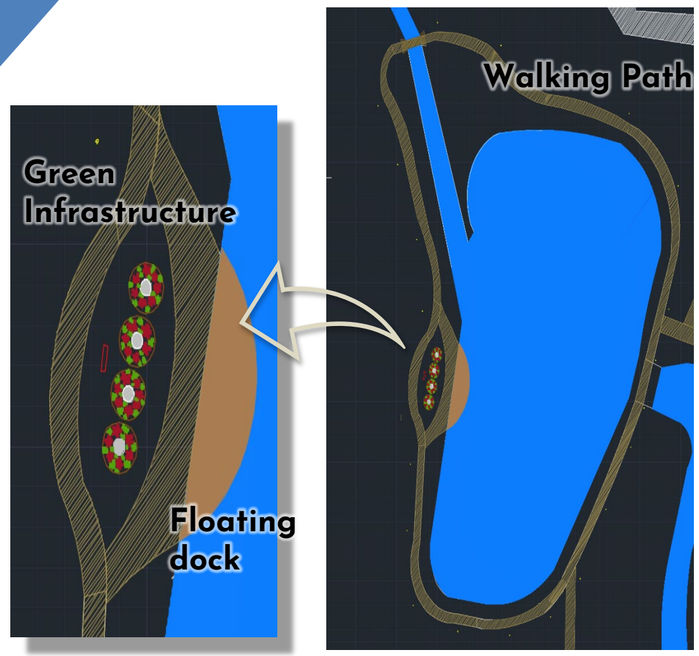
Phase II
Environmental & Recreational Improvements

- Floating dock
- Green infrastructure
- Educational, ADA-compliant walking path
- Picnic & seating areas

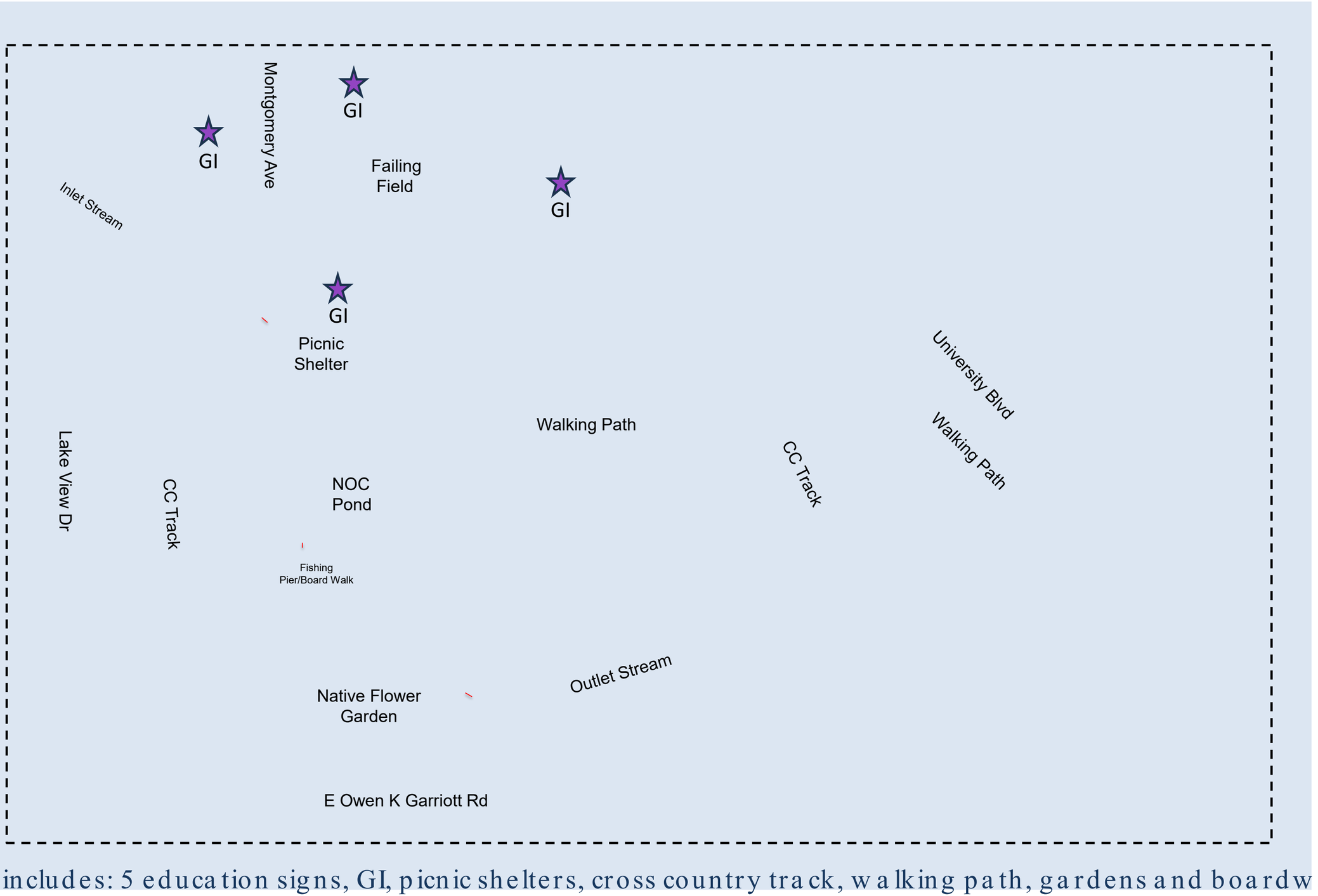
Riparian Buffer - NOC Pond



Proposed Trash Rack at inflow channel
urbanassetsolutions, 2023

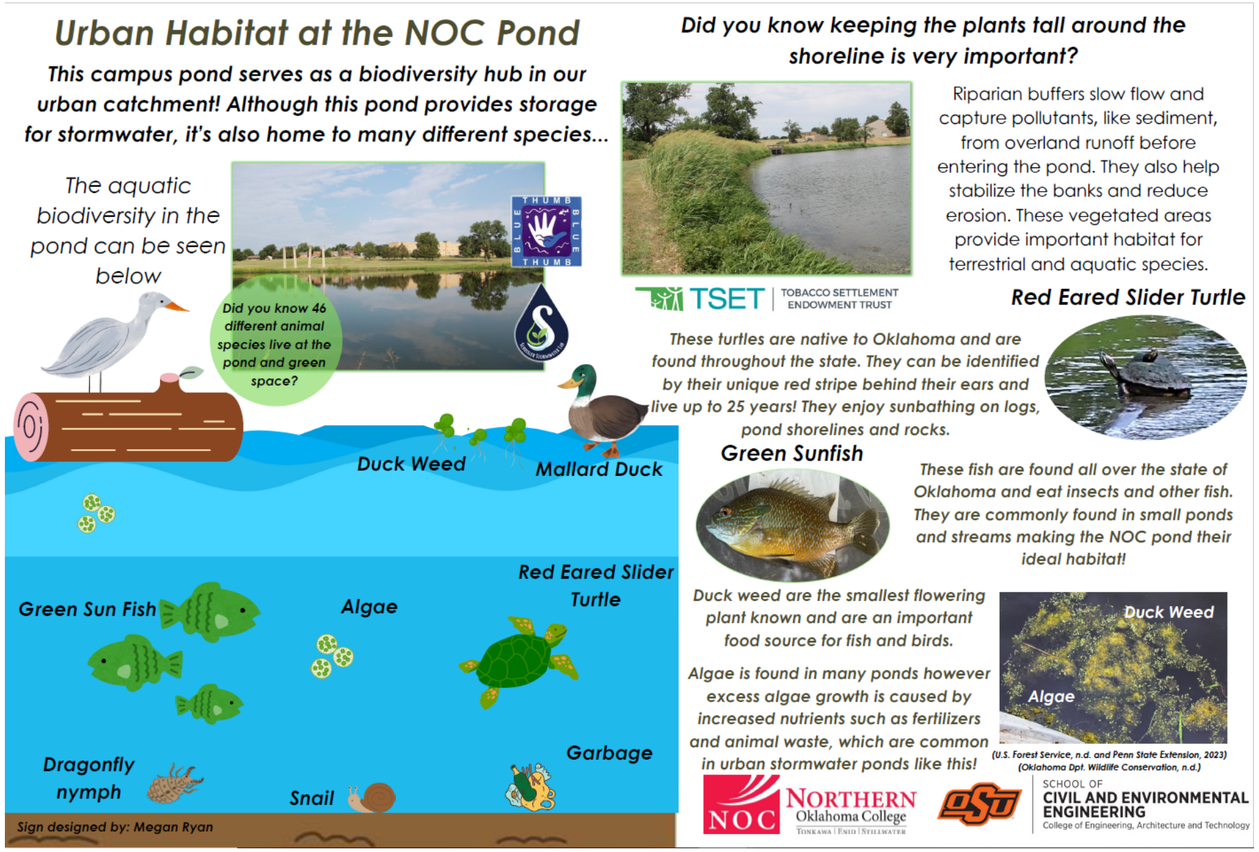


Site Design



Site design includes: 5 education signs, GI, picnic shelters, cross country track, walking path, gardens and boardwalk

Next Steps



- Install the first educational sign at the pond.
- Dredge the pond when funding is received.
- Implement features such as aerations and trash racks

Feel free to reach out:

jaime.schussler@okstate.edu
megan.m.ryan@okstate.edu