



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.

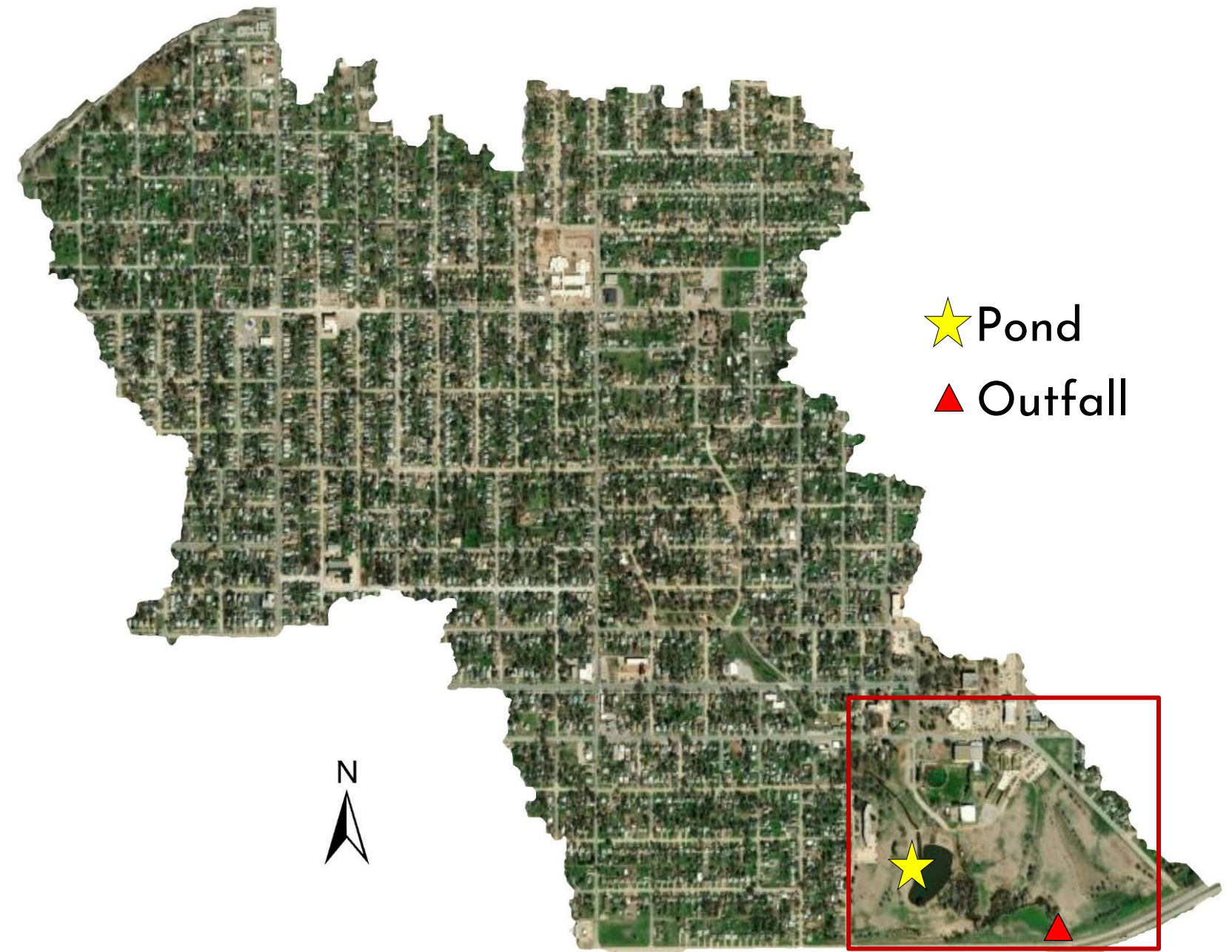


SCHOOL OF
**CIVIL AND ENVIRONMENTAL
ENGINEERING**
College of Engineering, Architecture and Technology



TOBACCO SETTLEMENT
ENDOWMENT TRUST

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.



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**



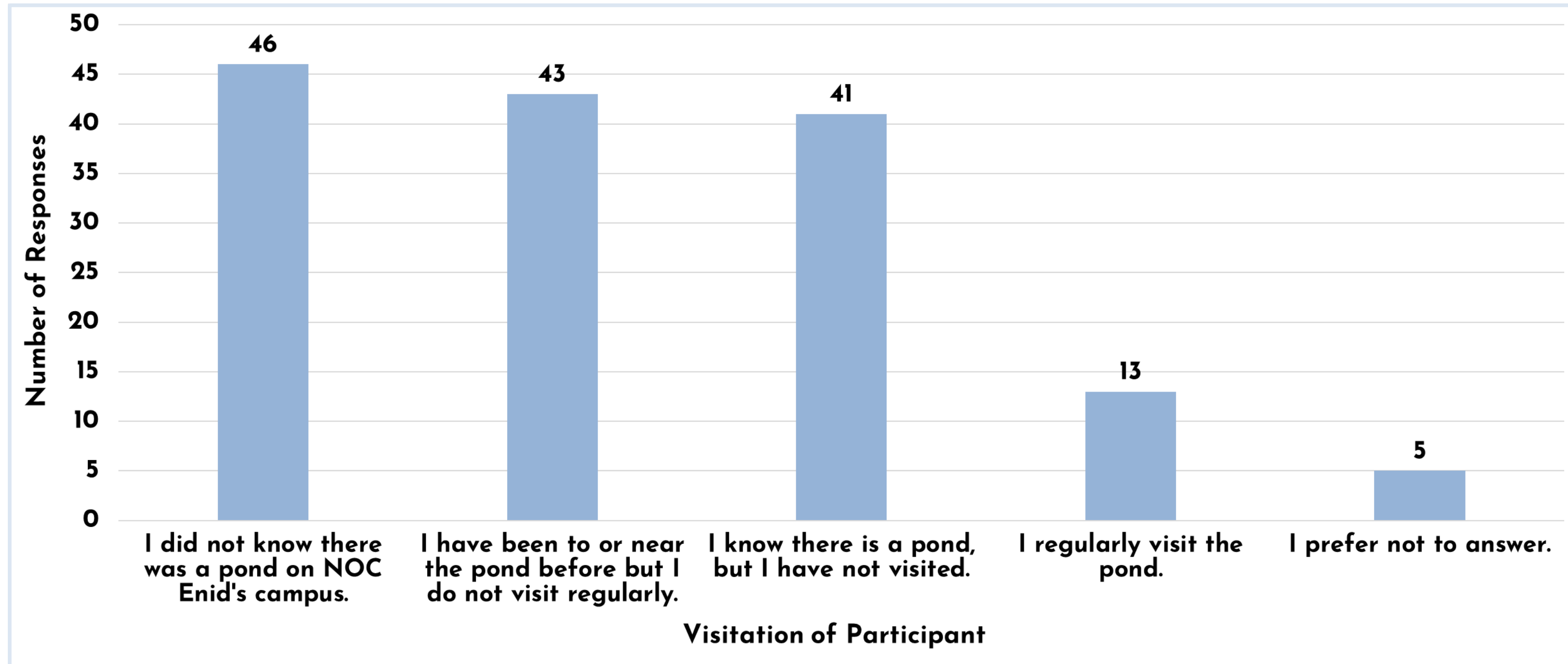
**Community
Involvement and
Satisfaction**



**Desired Use and
Improvements**

Survey Response

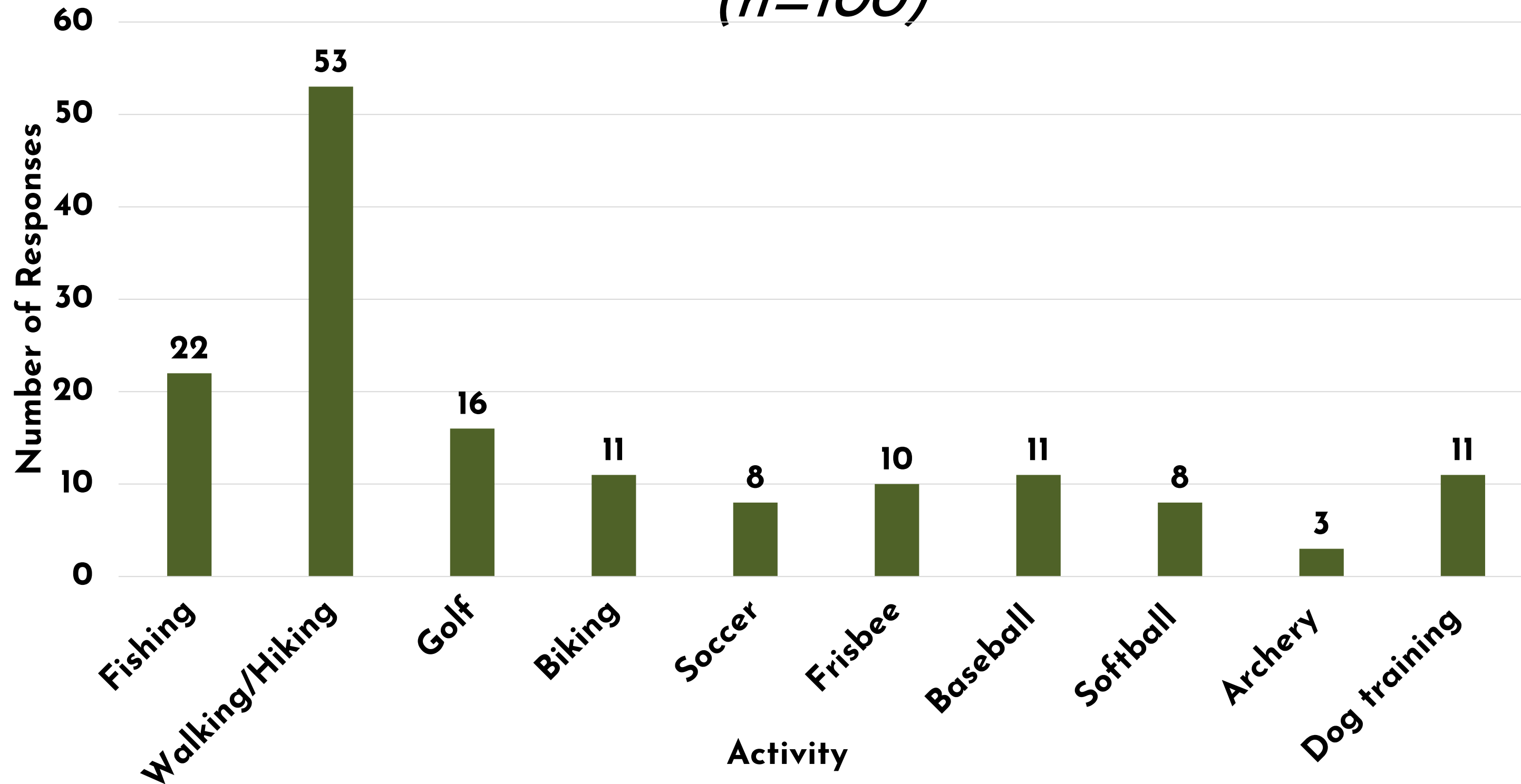
How often do you visit the NOC Pond? (n=148)



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)



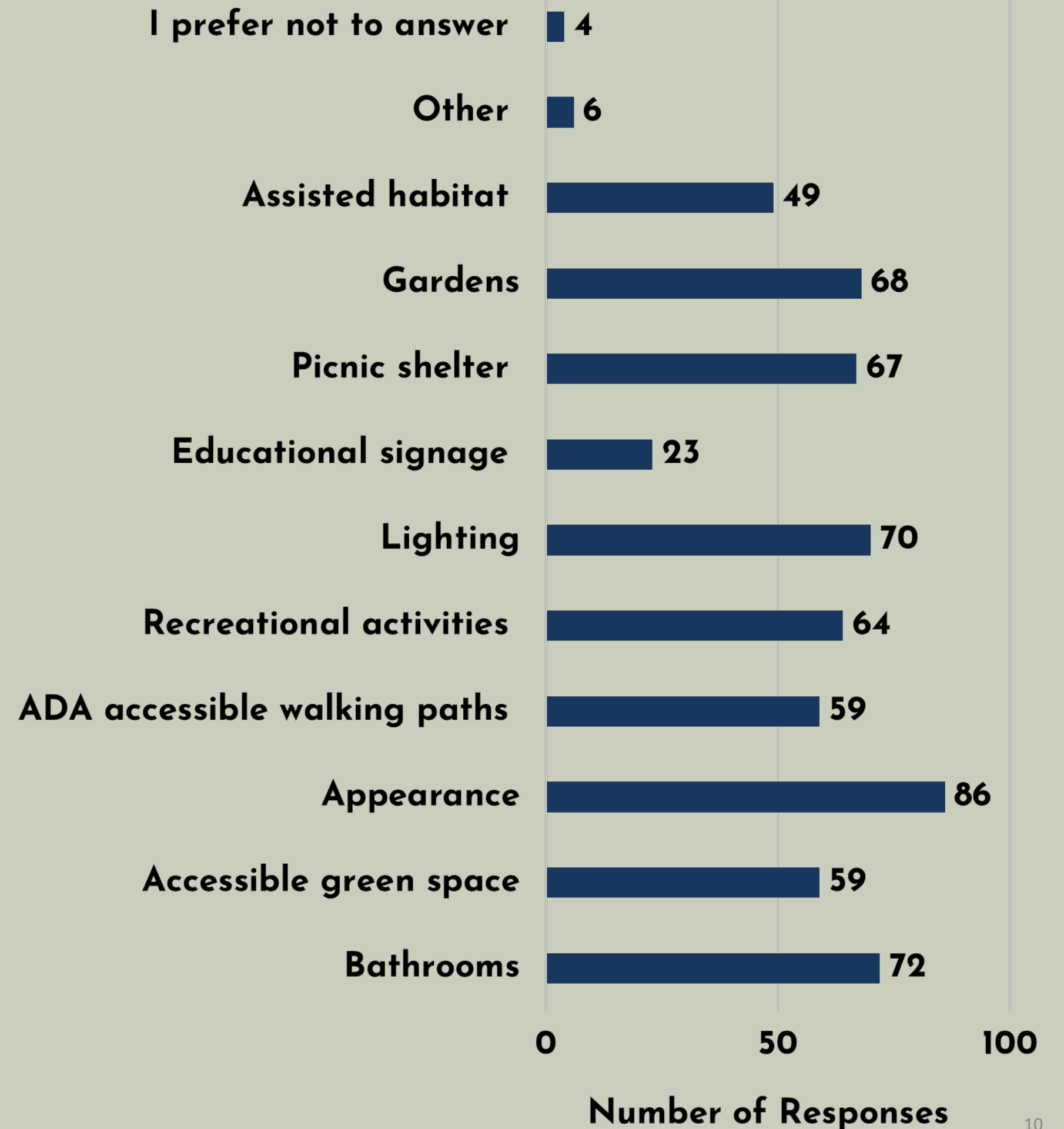
Survey Response

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

Potential Infrastructure Improvements

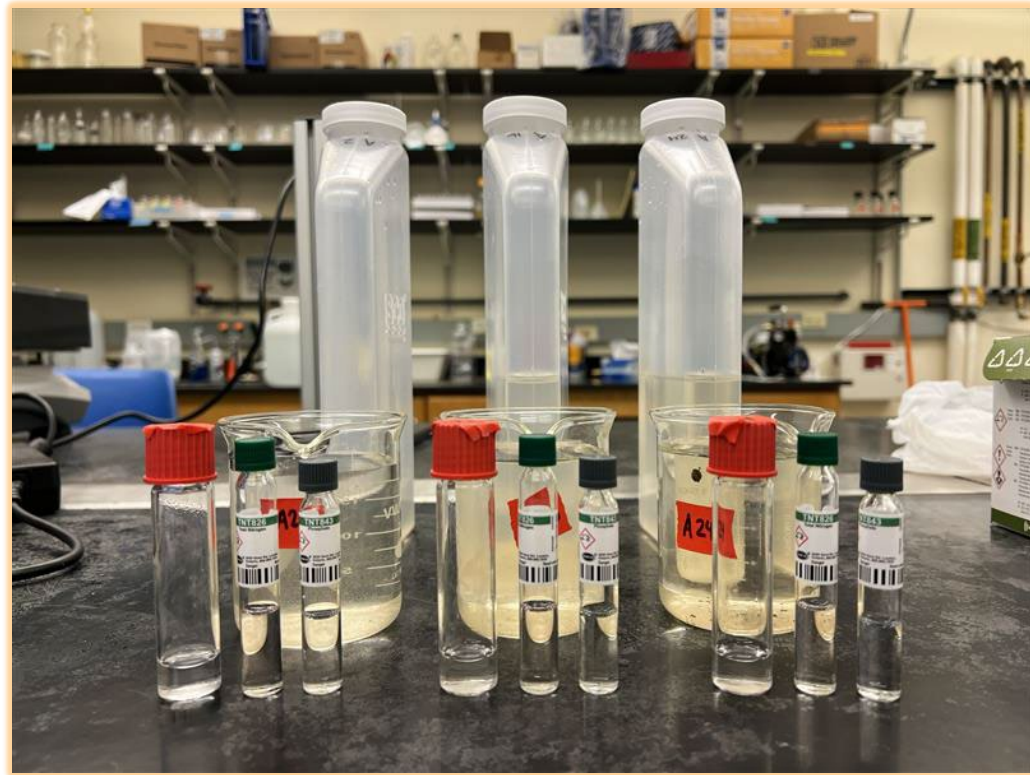


Environmental Parameters Assessed

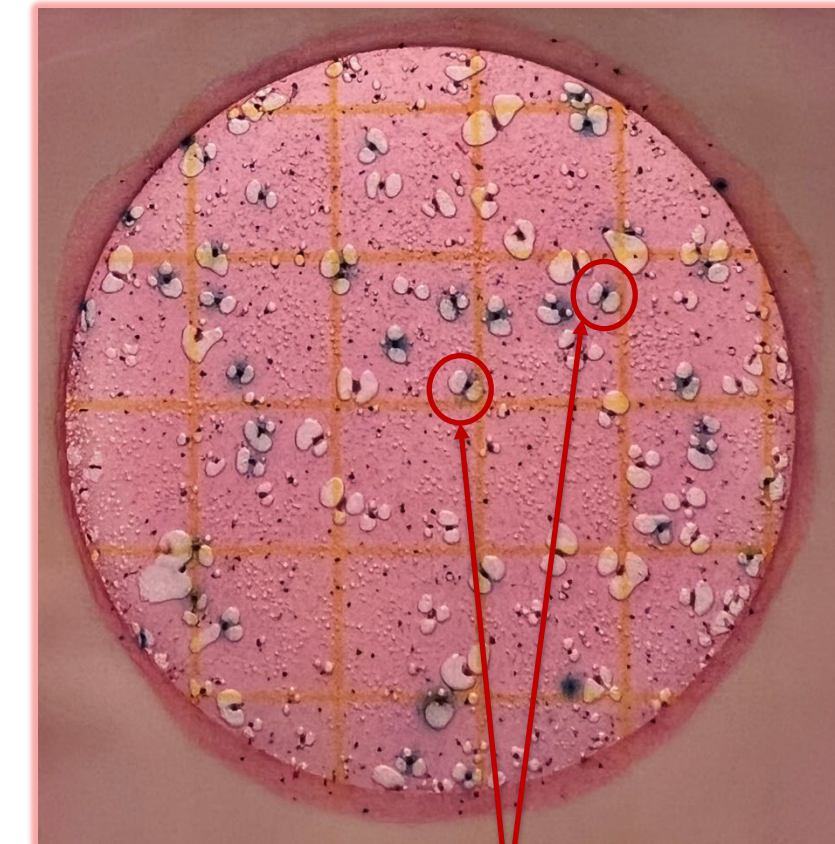
- ★ Water Quality and Quantity Sampling Locations
- ★ Camera Locations
- ★ Bird Activity recorded
- Aquatic Invertebrate sampling locations



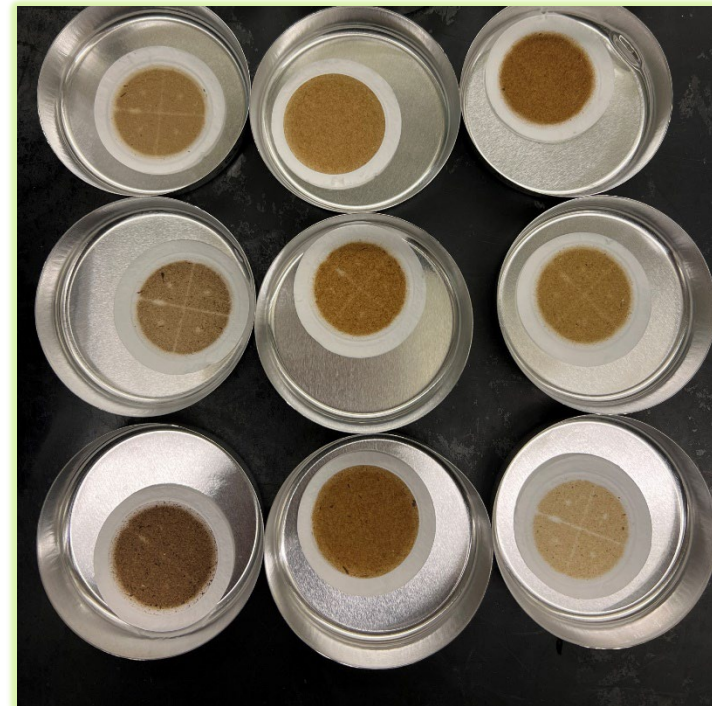
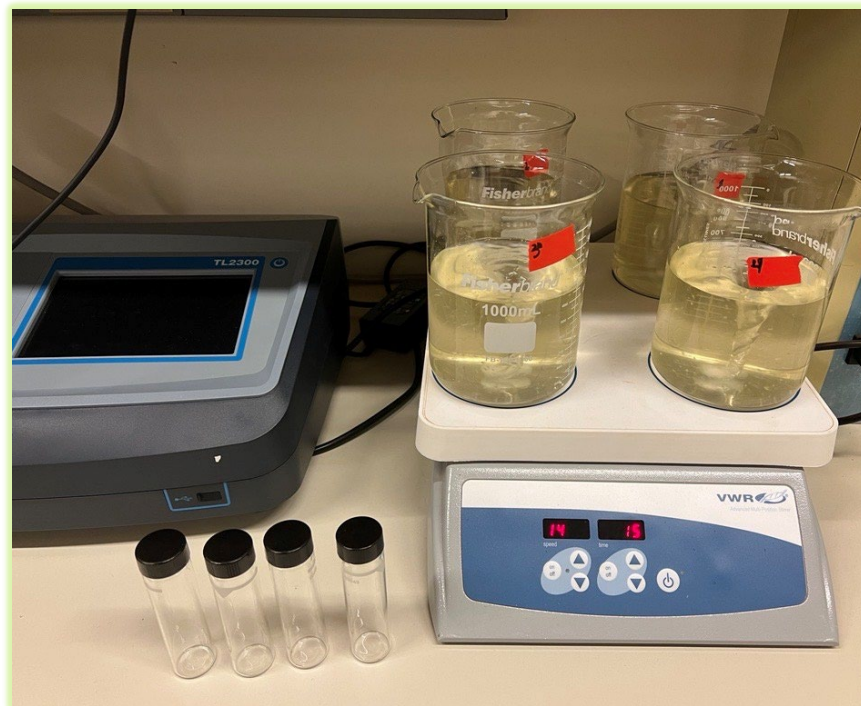
Water Quality Assessment



- Total Nitrogen
- Total Phosphorous



Escherichia Coli

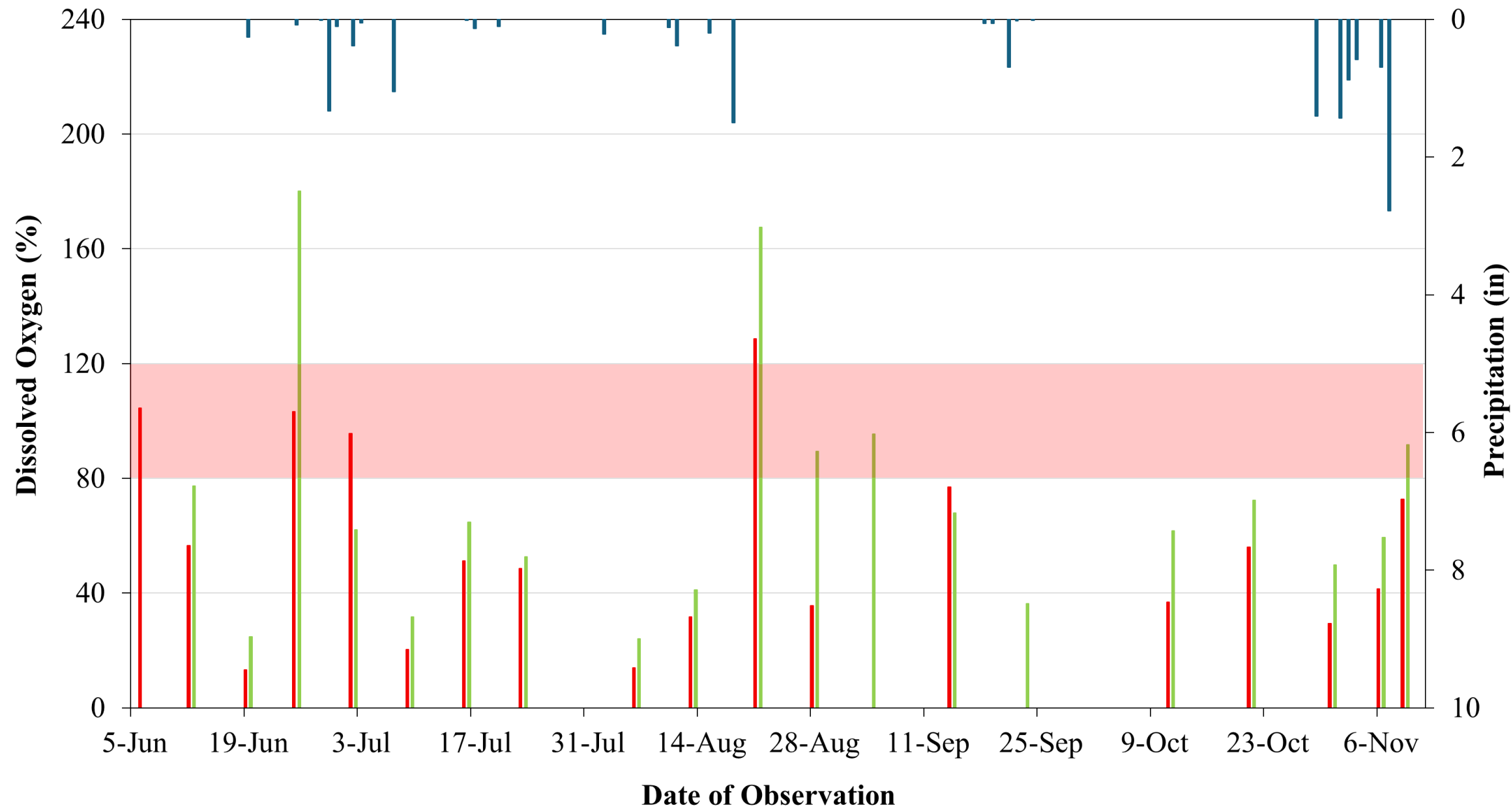


Turbidity and Total Suspended Solids

- pH
- Nitrate
- Temperature
- Dissolved Oxygen

Water Quality Parameters of Major Concern

Dissolved Oxygen Concentration over Time



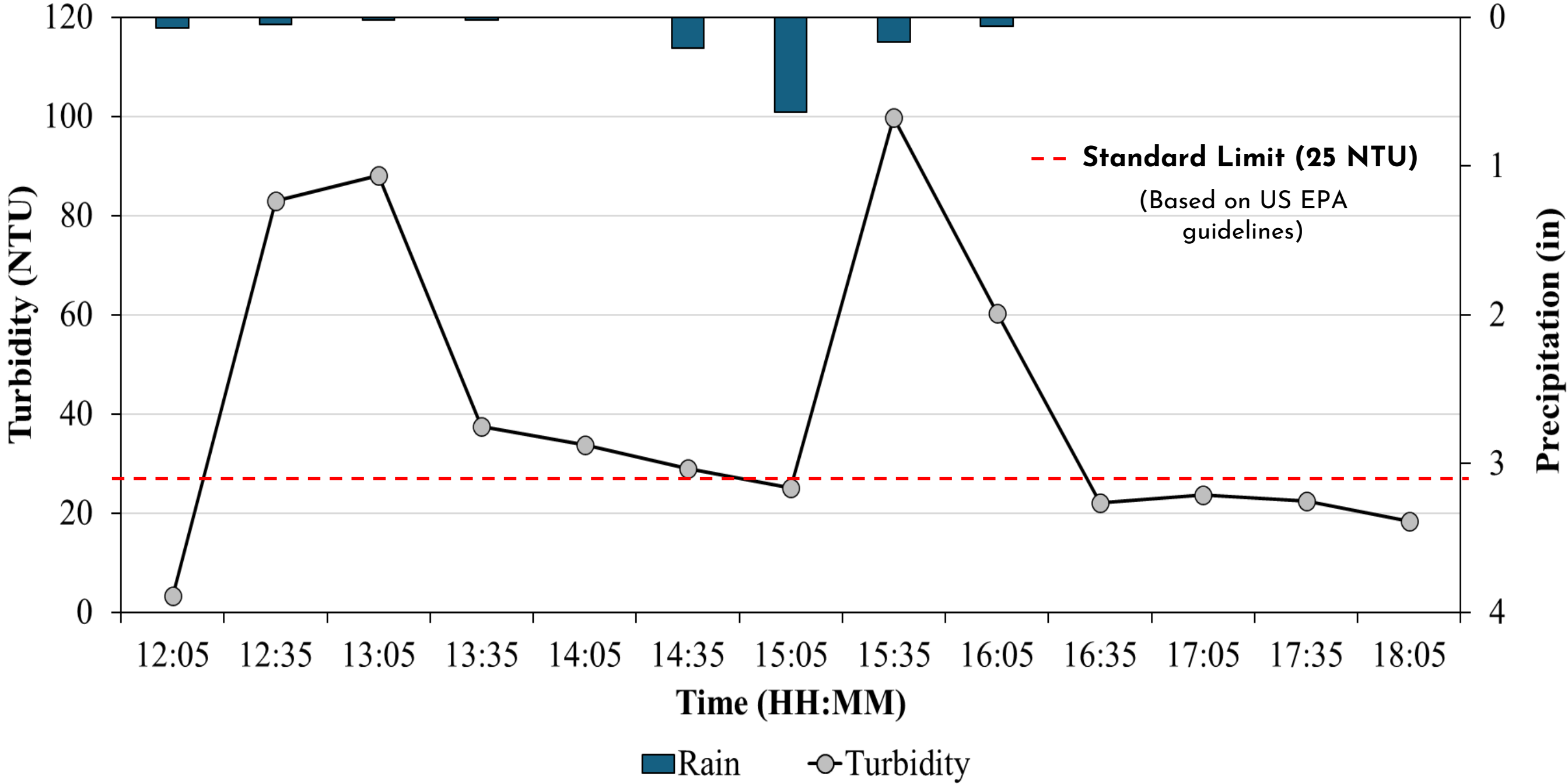
■ Inflow ■ Outflow ■ Precipitation (in)

Ideal Range (80% to 120%)
 (Based on US EPA guidelines)

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

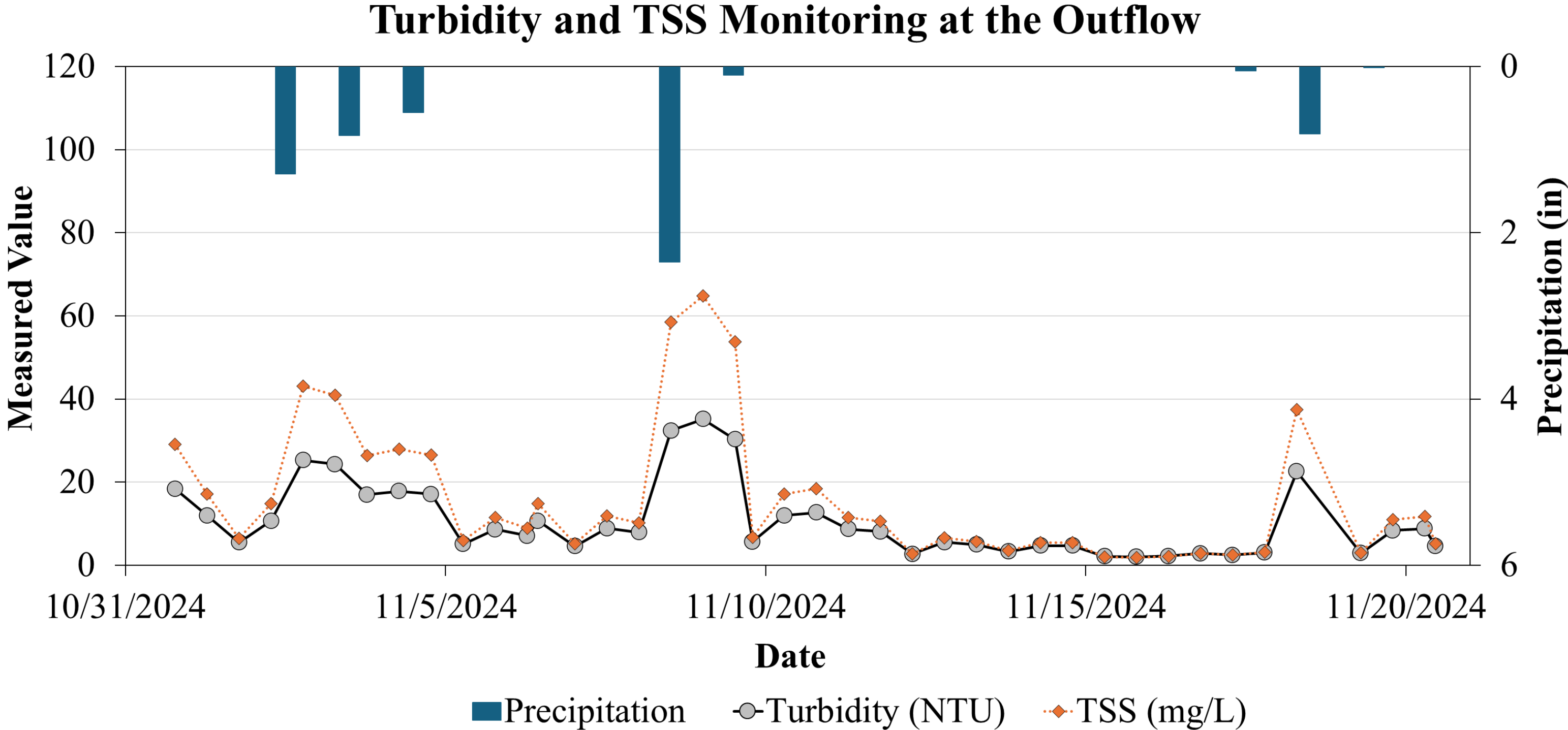
Water Quality Parameters of Major Concern

Storm Event Turbidity Measurement at the Inflow (November 02, 2024)



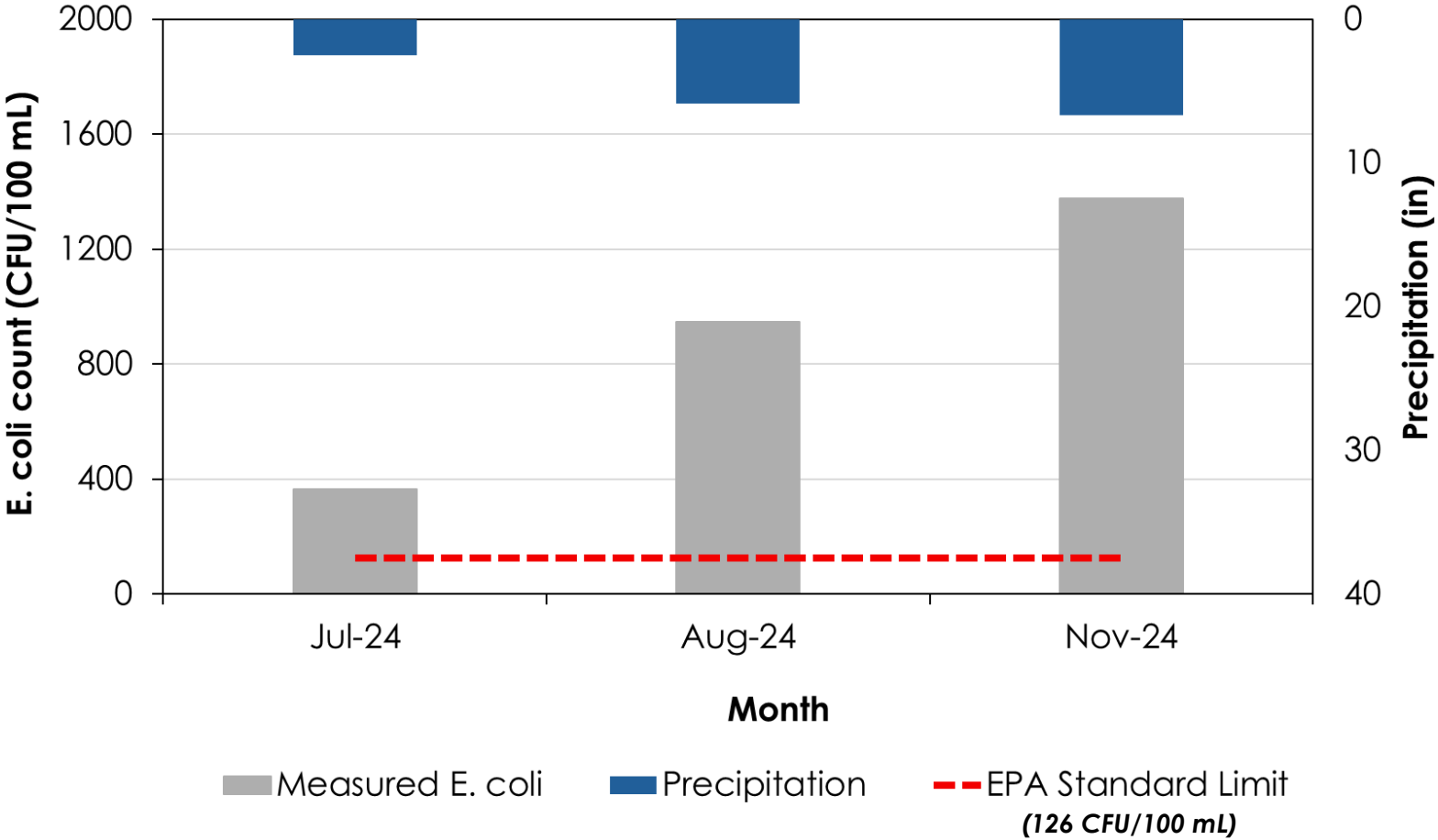
- Rising trend in Turbidity for storm events

Water Quality Parameters of Major Concern

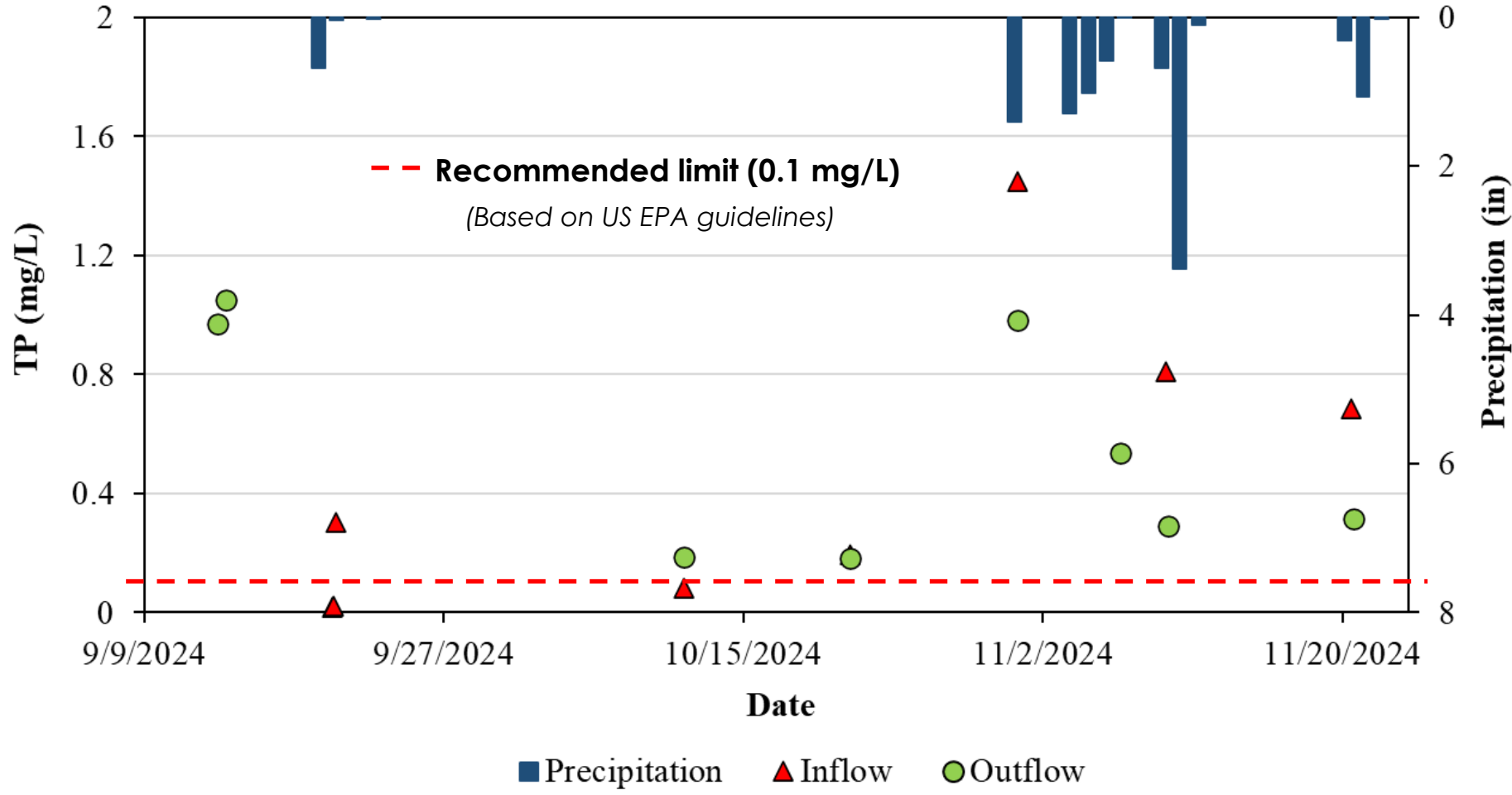


Water Quality Parameters of Major Concern

30-day Geometric Mean of E. coli Count



Total Phosphorous Concentration over Time



- 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

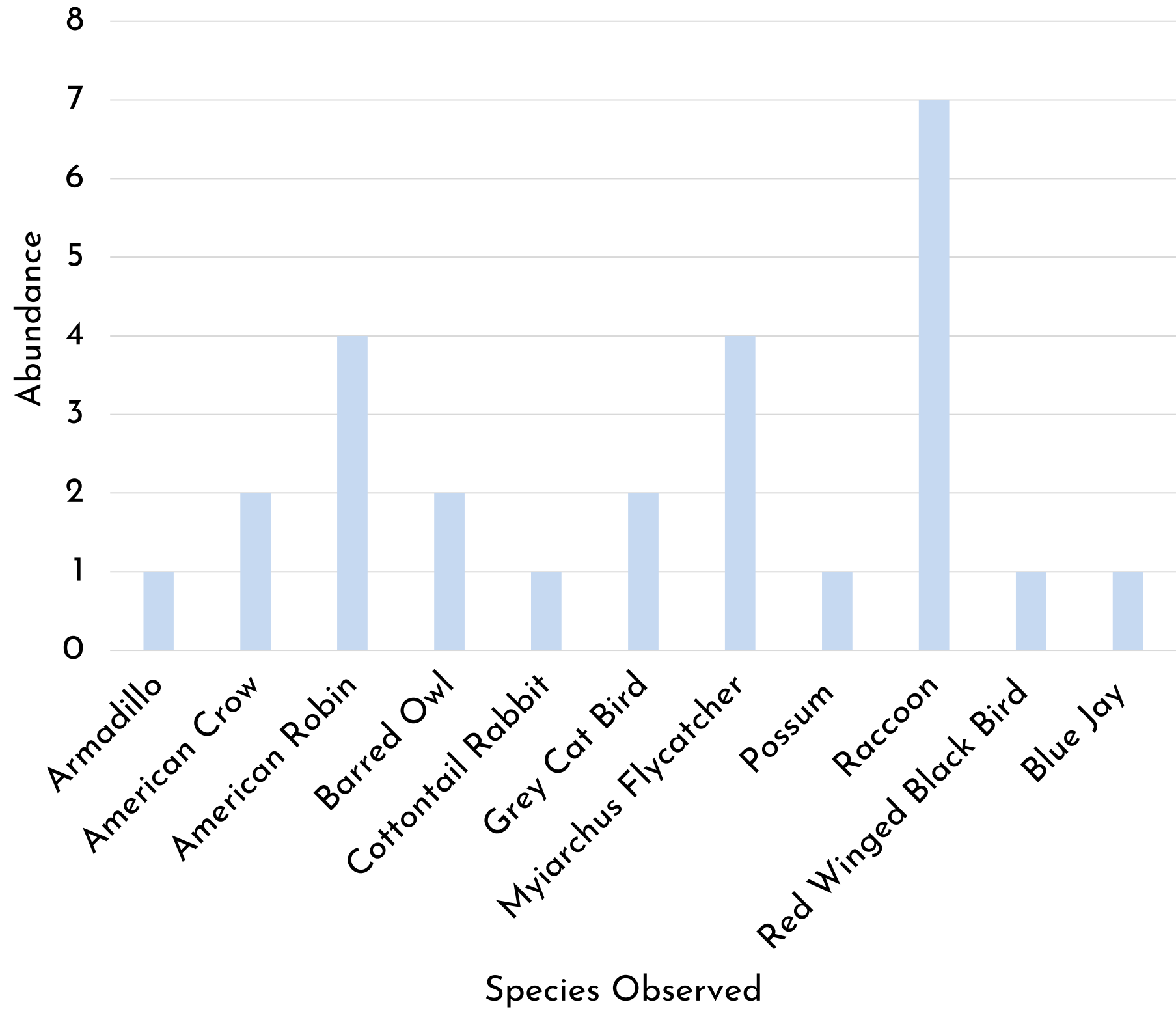


Kick Net Method





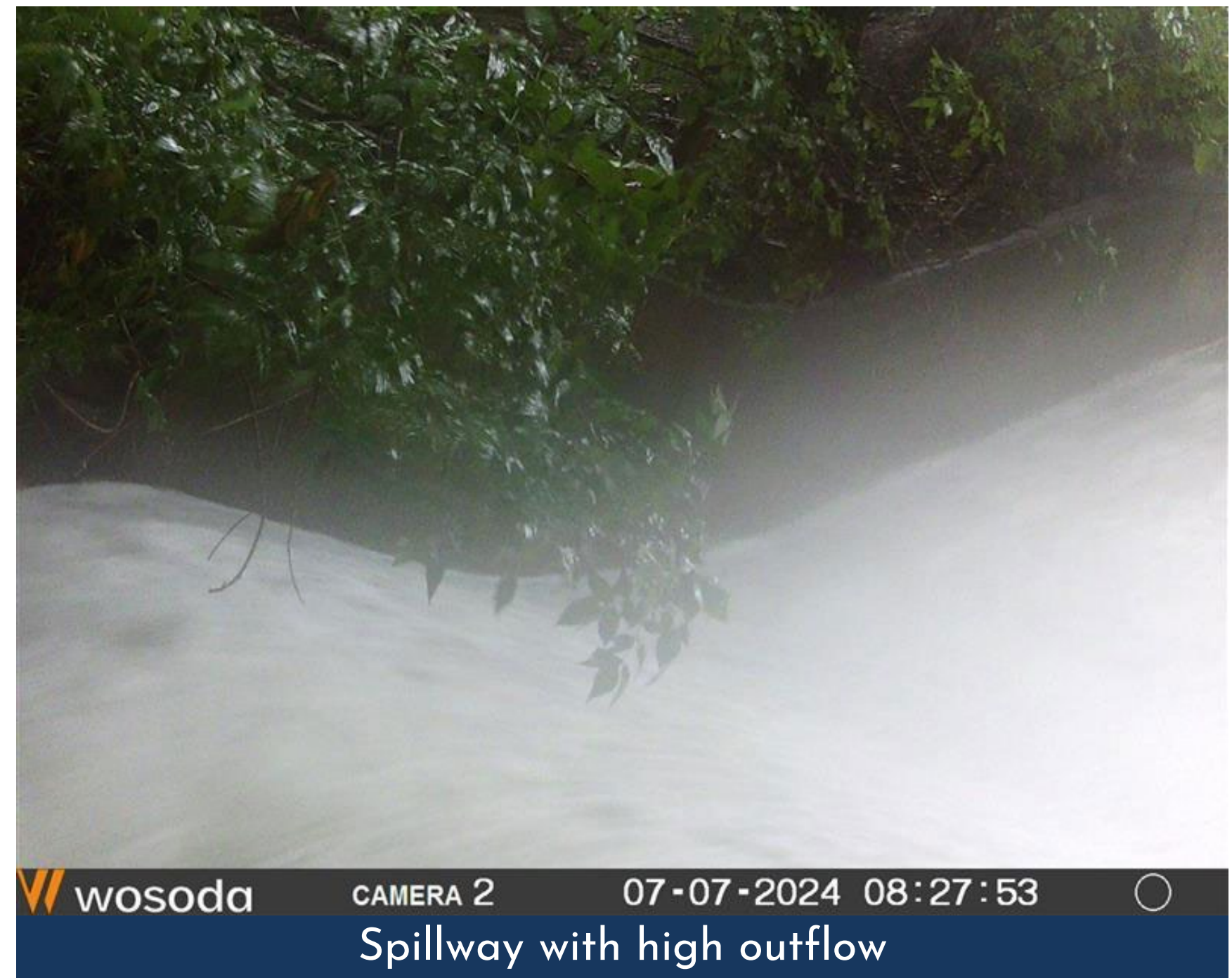
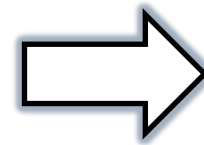
Wild life Assessment



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

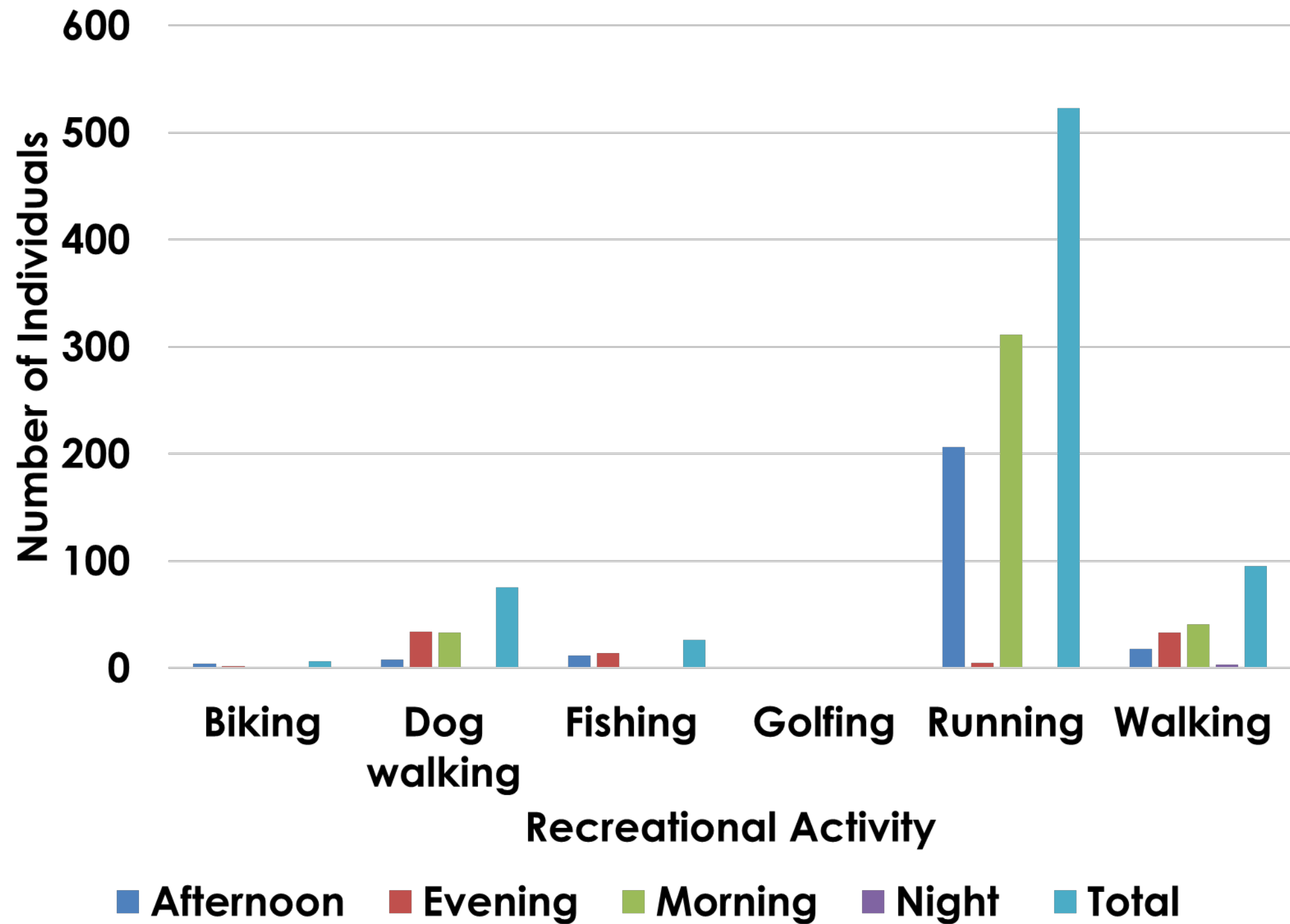


Downstream Spillway at High Flow vs. No Flow





Recreational Use

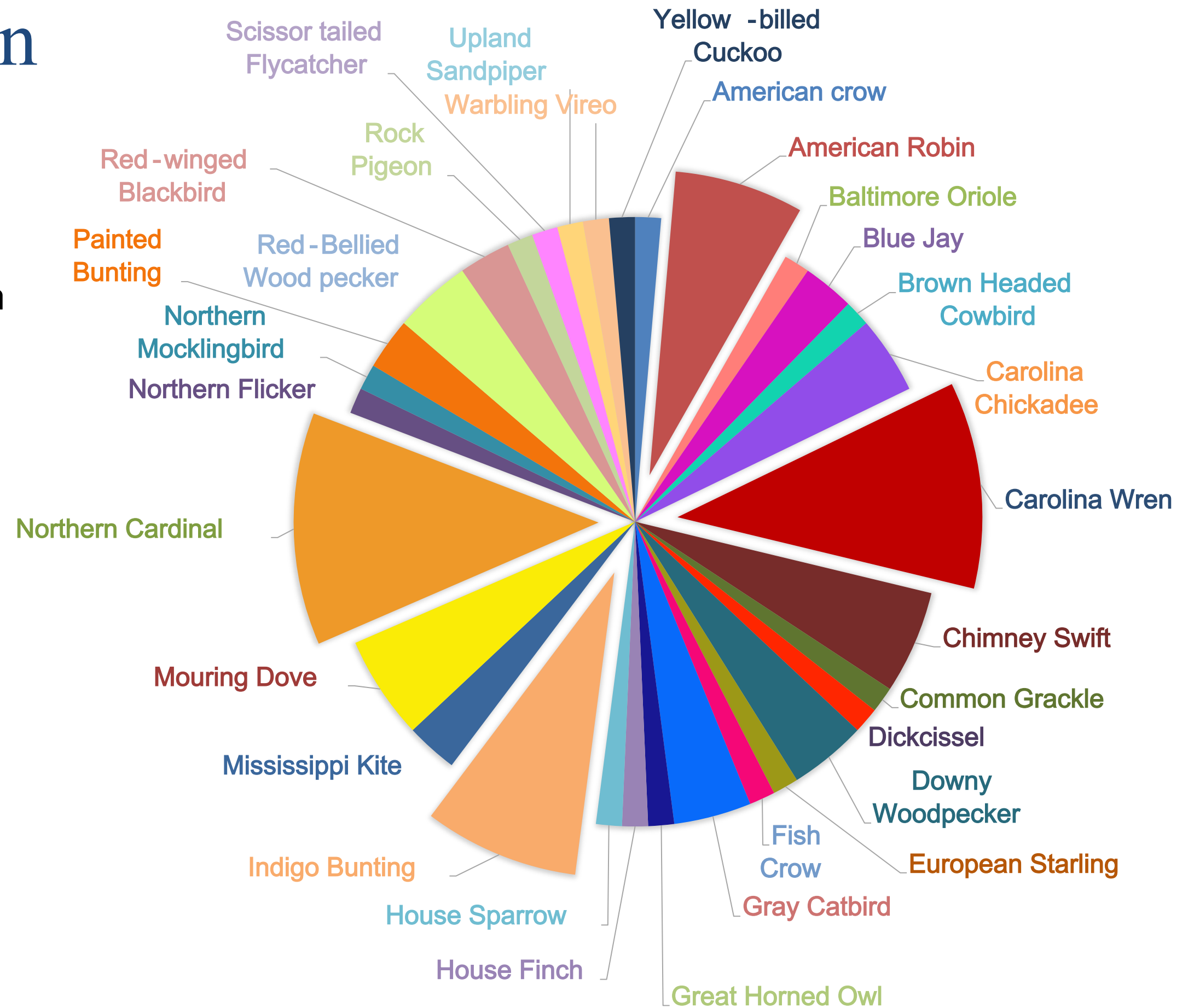


- Activity recorded from June 6th to Sept 2nd 2024.
- Most common activity was running followed by walking.
- Most activity occurred in the morning between 5:00am and 12:00pm.
- A total of 726 instances of recreation captured

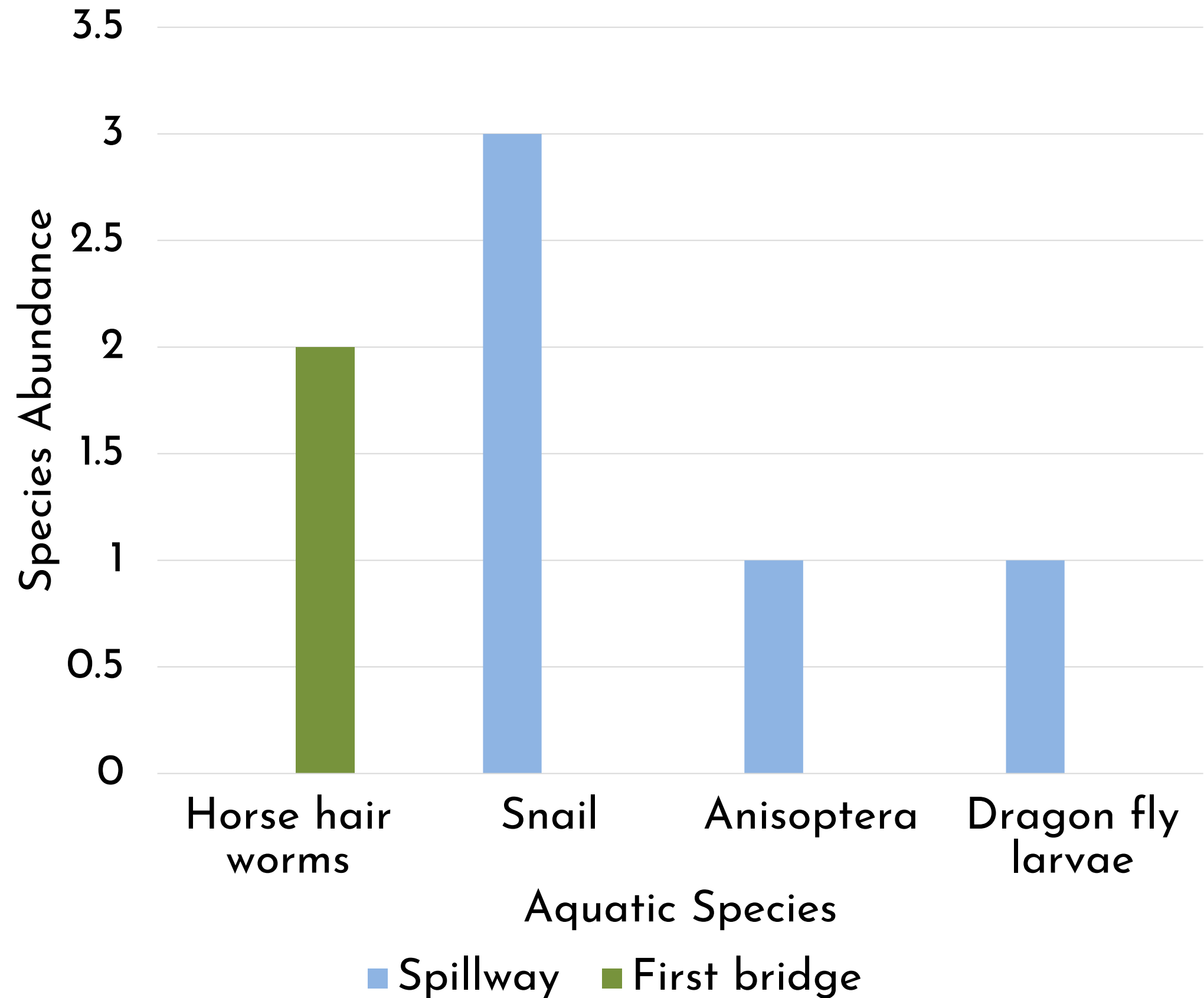


Bird Population

- 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

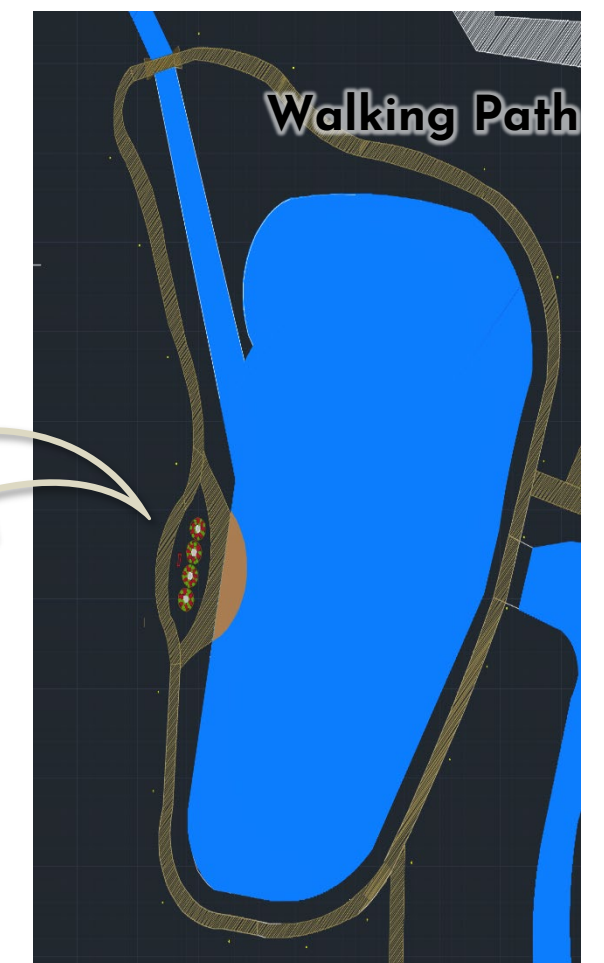
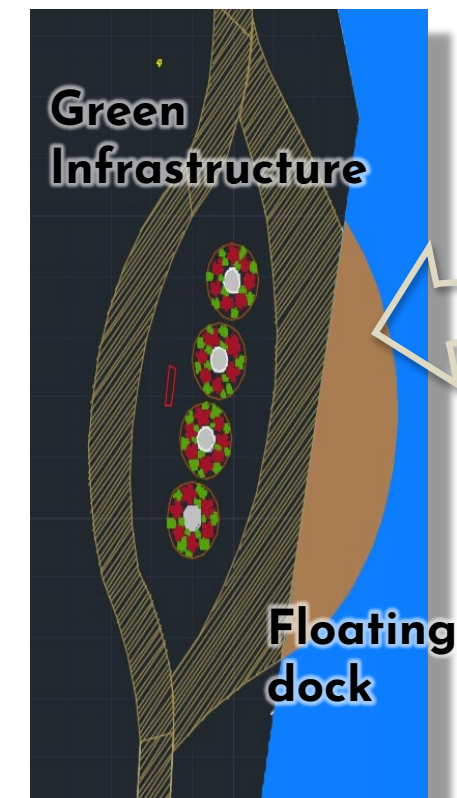
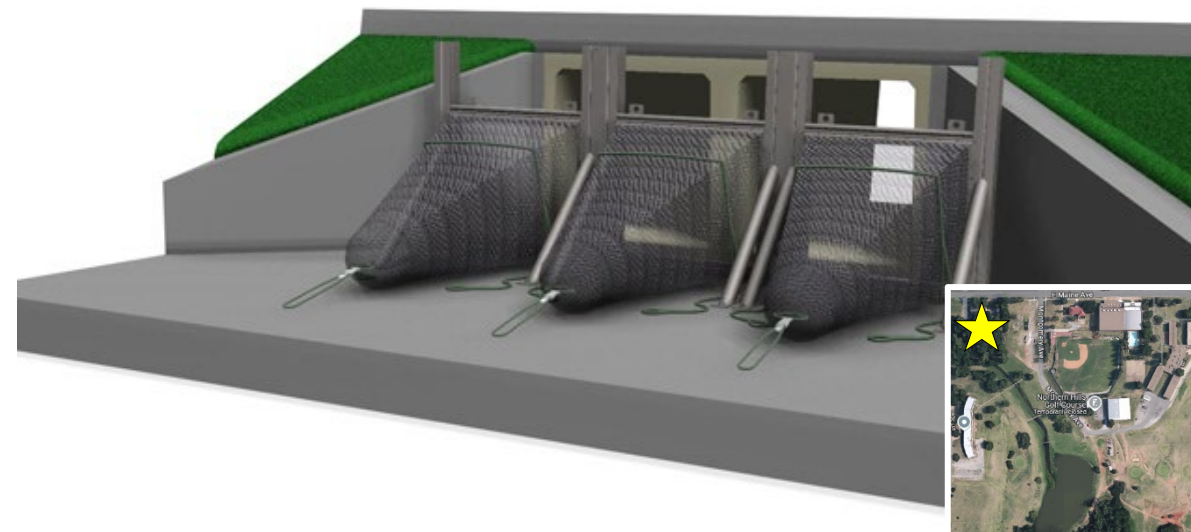
- Riparian Buffer
- Lawn Height

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



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

Urban Habitat at the NOC Pond
 This campus pond serves as a biodiversity hub in our urban catchment! Although this pond provides storage for stormwater, it's also home to many different species...

The aquatic biodiversity in the pond can be seen below

Did you know 46 different animal species live at the pond and green space?

Red Eared Slider Turtle
 These turtles are native to Oklahoma and are found throughout the state. They can be identified by their unique red stripe behind their ears and live up to 25 years! They enjoy sunbathing on logs, pond shorelines and rocks.

Green Sunfish
 These fish are found all over the state of Oklahoma and eat insects and other fish. They are commonly found in small ponds and streams making the NOC pond their ideal habitat!

Duck Weed
 Duck weed are the smallest flowering plant known and are an important food source for fish and birds.

Algae
 Algae is found in many ponds however excess algae growth is caused by increased nutrients such as fertilizers and animal waste, which are common in urban stormwater ponds like this!

Sign designed by: Megan Ryan

NOC | NORTHERN Oklahoma College | TONKAWA | ENID | STILLWATER

TSET | TOBACCO SETTLEMENT ENDOWMENT TRUST

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Feel free to reach out:

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