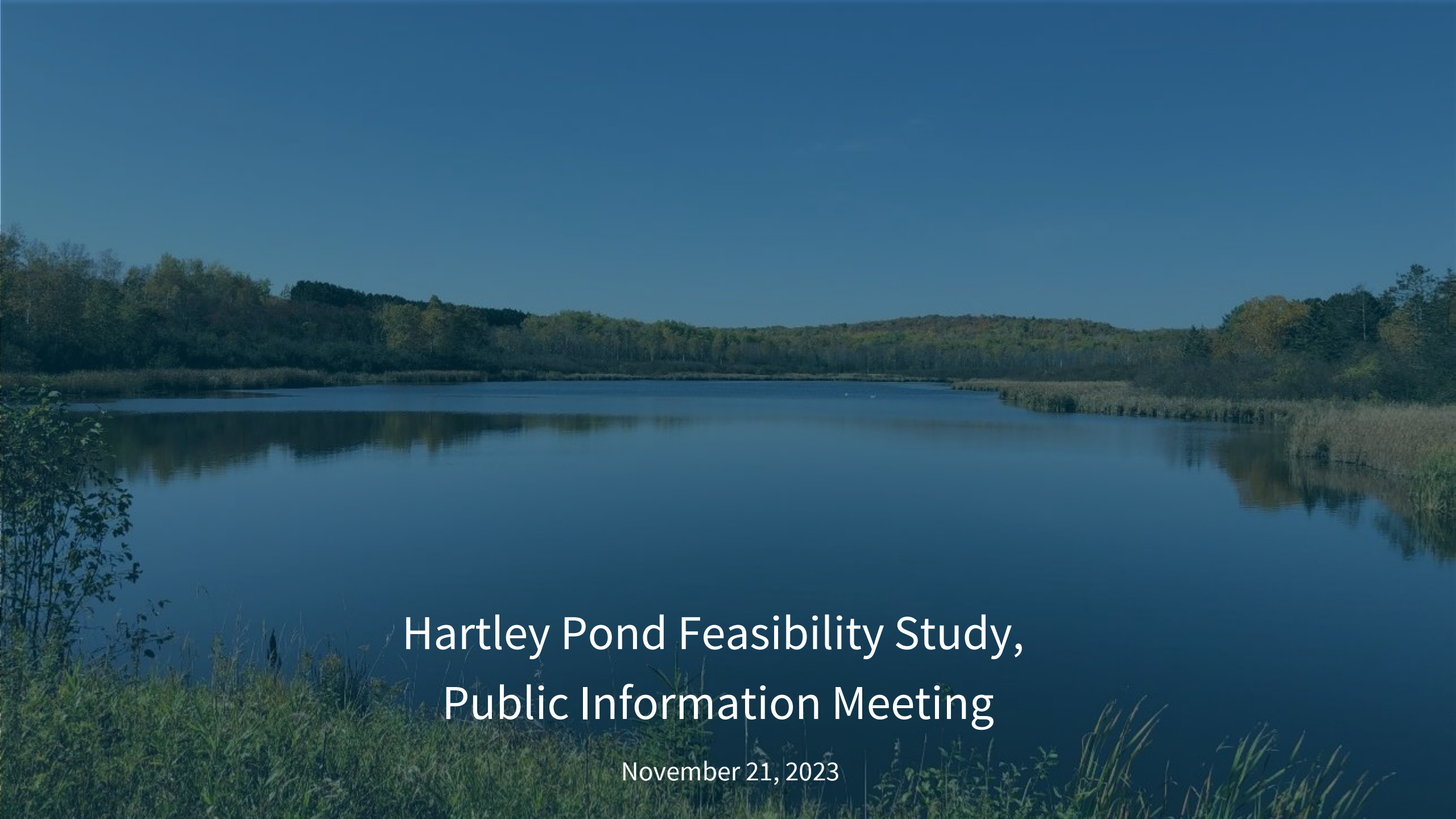


Hartley Pond Feasibility Study, Public Information Meeting

November 21, 2023

Welcome and Team Introduction

Presentation on the progress of the feasibility study and answering of questions.

Formal public input will be subsequently managed by the City of Duluth

- **City of Duluth – Kate Kubiak**
- **Minnesota Department of Natural Resources – John Lindgren**
- **GEI – Rob Peterson, Cole Webster**
  - Beaver River Consulting – Keith Anderson
  - River System Strategies – Rebecca Eiden

Hartley Park Management Plans

Hartley Duluth Natural Areas Program Management Plan, City of Duluth, 2019.

Hartley Park Mini-Master Plan, City of Duluth, 2014.

Essential Spaces: Duluth Parks, Recreation, Open Space & Trails Plan, City of Duluth, 2022

Restoration Strategy – Duluth Urban Area Watershed Restoration and Protection Strategy Document, MPCA, 2017.

Hartley Pond Feasibility Study is identified as an action item in Hartley Duluth Natural Areas Program Management Plan and Hartley Park Mini-Master Plan

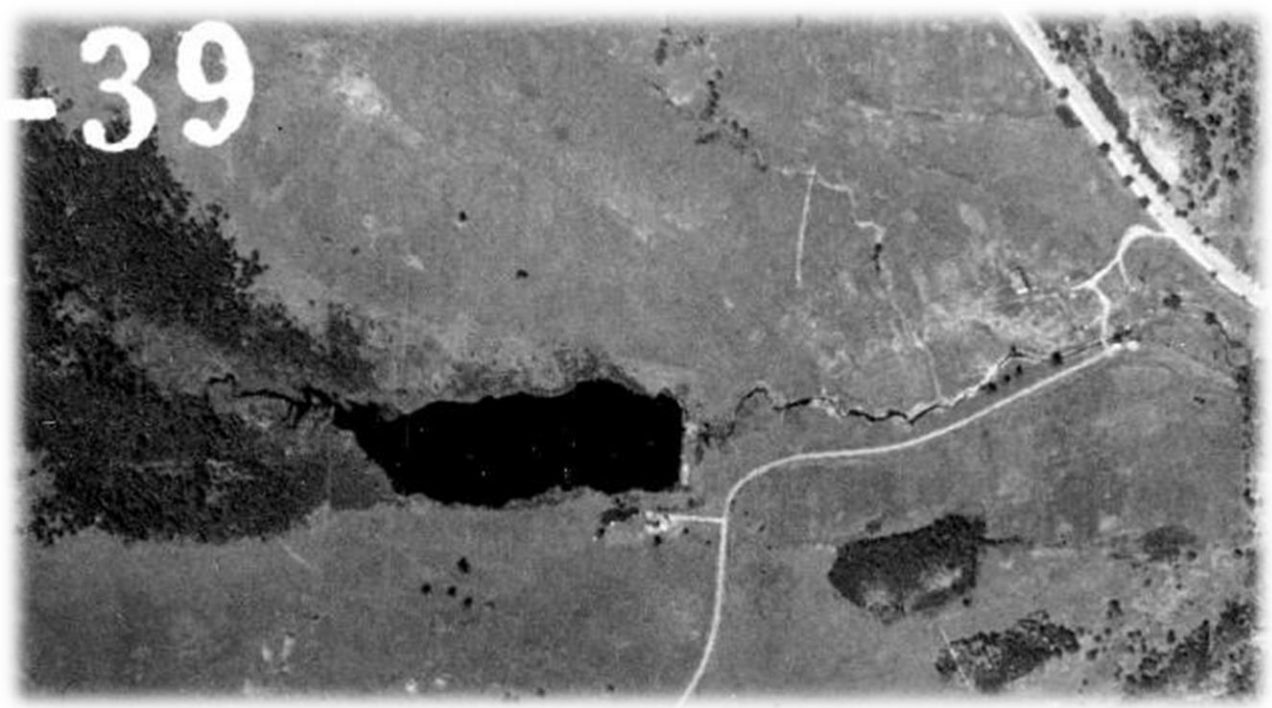
Feasibility Study

Assessment includes

- Historical conditions, existing surface and groundwater conditions assessments, existing fish surveys, and hydrologic and hydraulic modeling

Feasibility study is the first step in the decision-making process. **The City of Duluth will select an alternative** with additional considerations, including policy, economic, and social implications

Hartley Pond and Dam History


-39


1948


1972


1981

#2 9/18/85 WATER IN HARTLEY POND NEARLY DRAINED

#11 10/16/85 FACE OF SOUTH WALL AFTER INJECTION

#22 10/31/85 FORMS REMOVED

Class I Dam

- Although it is in satisfactory condition, Hartley Dam is classified as a *High Hazard* or Class I Dam by Minnesota Rule 6115.0340: Defined as, failure of dam would probably result in "loss of life or serious hazard, damage to health, main highways, high-value industrial or commercial properties, major public utilities, or serious direct or indirect, economic loss to the public. "
- 3% of the dams in Minnesota are classified as *High Hazard*
- This classification is made based on the potential for major consequences in the case of dam failure, rather than the likelihood of failure to occur

Value of Hartley Pond

Habitat for waterfowl such as ducks, geese and swans

Regularly used by anglers, although the quality of the fishery is poor

Used by the public for canoeing, kayaking, swimming, skating and dog swimming

It is considered pleasing to the public that recreates within the Park, but the aesthetic quality is degrading

Used by Hartley Nature Center and other local educational entities for environmental programming

Characteristics of Hartley Pond

Hartley Pond Max Depth: 7 feet

Average Depth: 1.8 feet

Hartley Pond Surface Area: 11 acres

Secchi depth: 5.2 feet

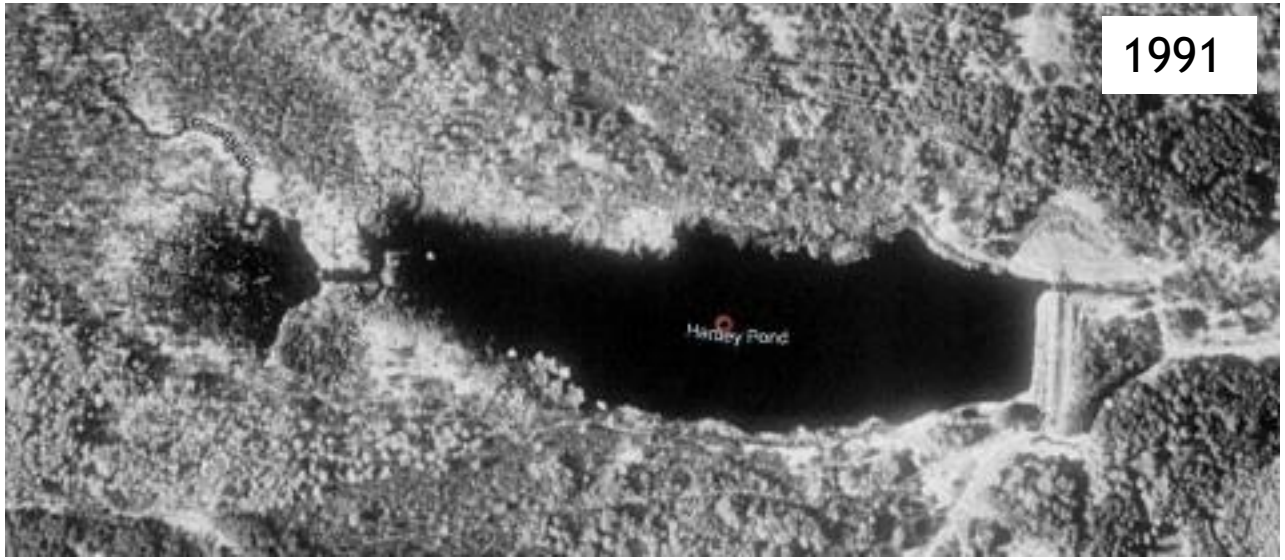
Field pH: 8.4

2009: black bullhead, golden shiner, largemouth bass, pumpkinseed, white sucker, yellow perch

meso to eutrophic (mid to high nutrient environment)

Aquatic Succession

Image credit: Gabe Buckley, Biology Dictionary

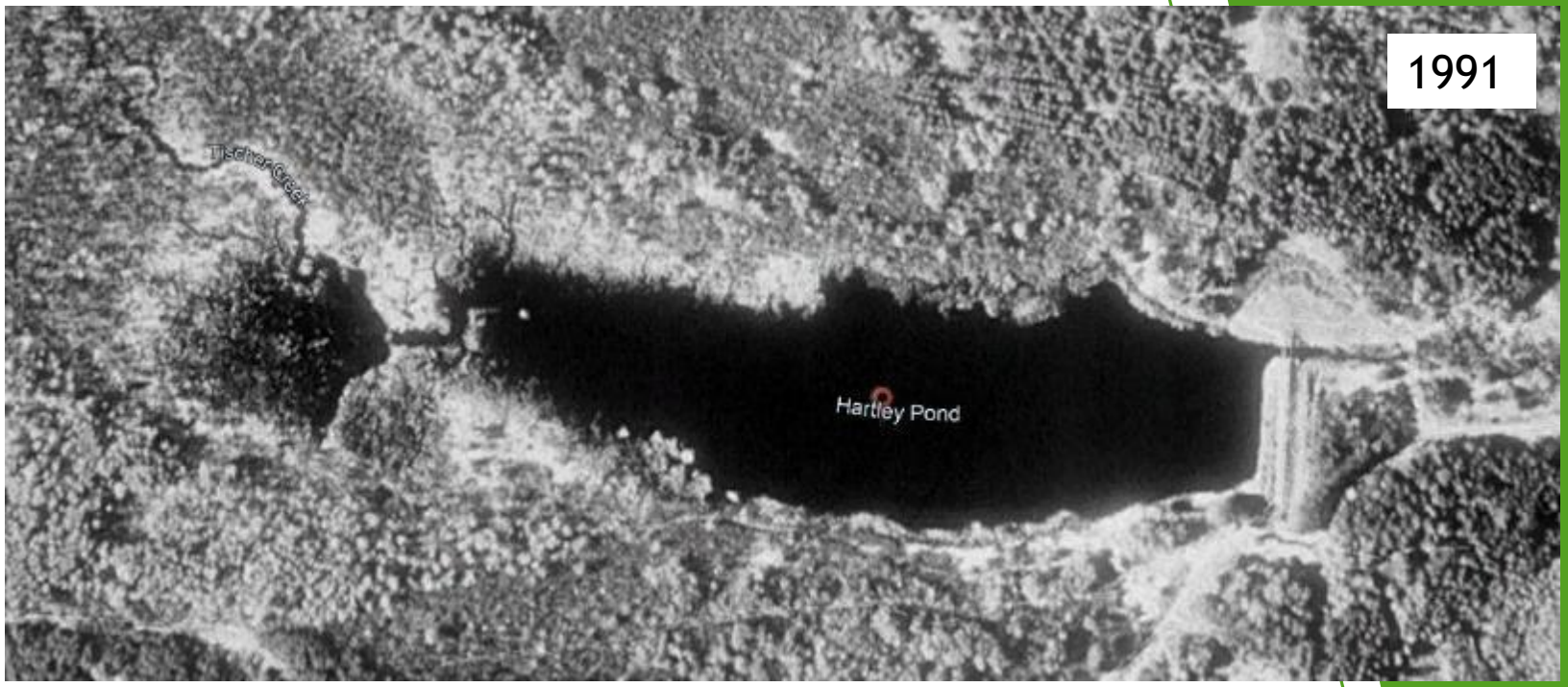


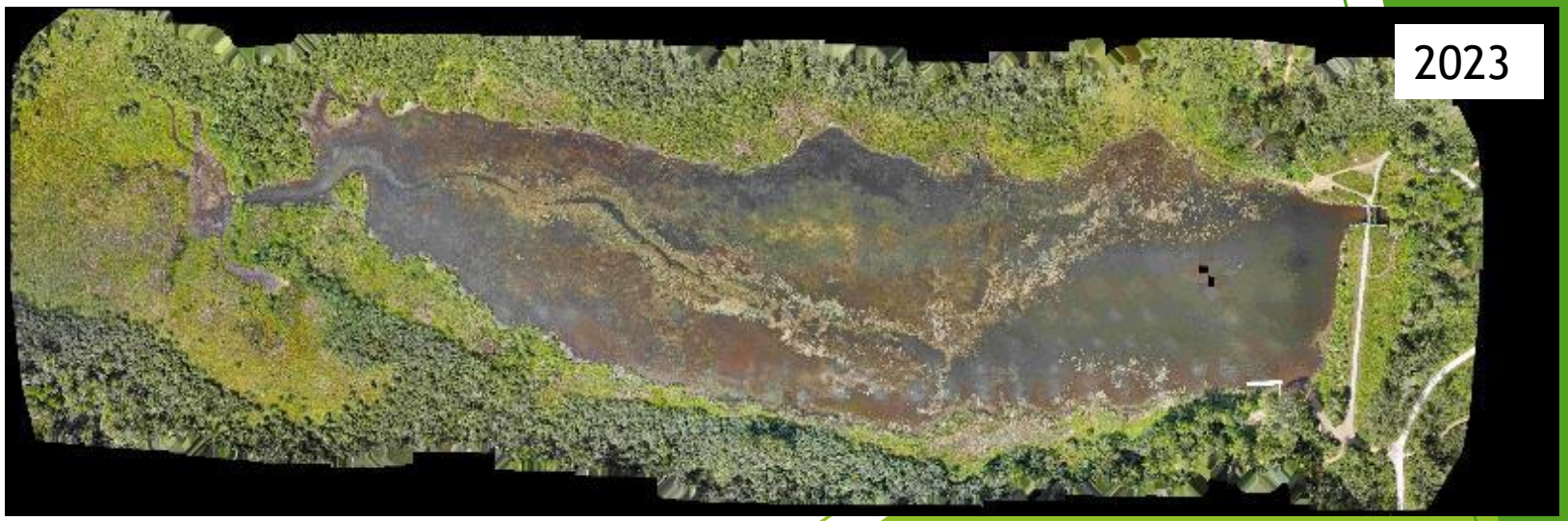
Evolution of Hartley Pond

- Maximum amount of open water and least amount of submerged aquatic vegetation after dam upgrade in 1974
- Sediment transported from upstream is deposited in Hartley Pond
- Fine sediments result in increased growth of submerged plants
- Yearly plant decay and additional deposit of sediment reduce depth
- Process accelerates as depth decreases
- At a critical minimum depth the habitat converts to an emergent marsh
- Hartley Pond is nearing the late stages of pond evolution

Man Made Barriers and Impoundments - Critical Issues

- Fish passage
  - Trout population isolation
  - Blocked access to upstream spawning/ refuge habitat
- Sediment transport
  - Increase stream erosion downstream
  - Filling of impoundments
- Temperature and Discharge

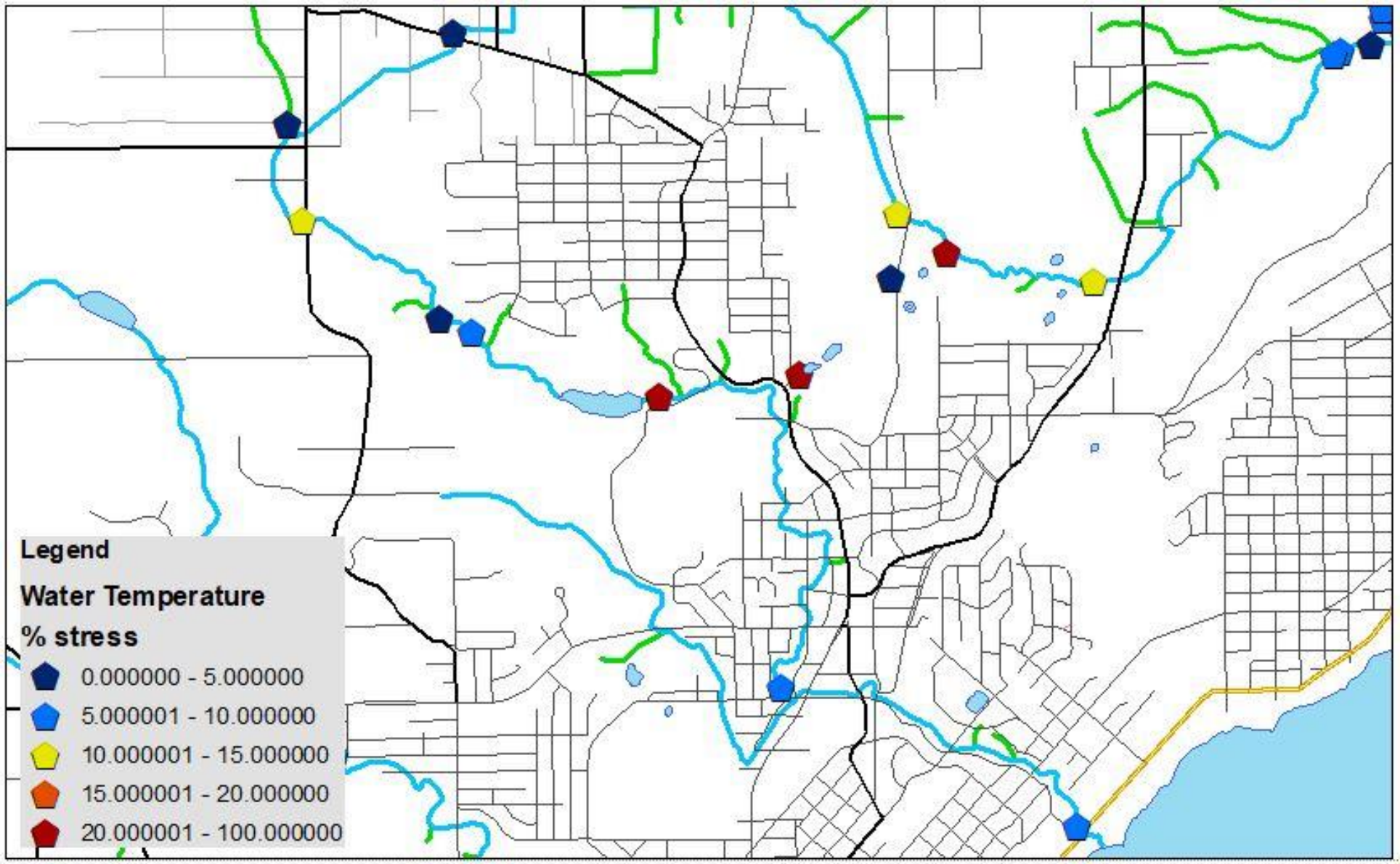




DEPARTMENT OF NATURAL RESOURCES

Stream summer temperatures

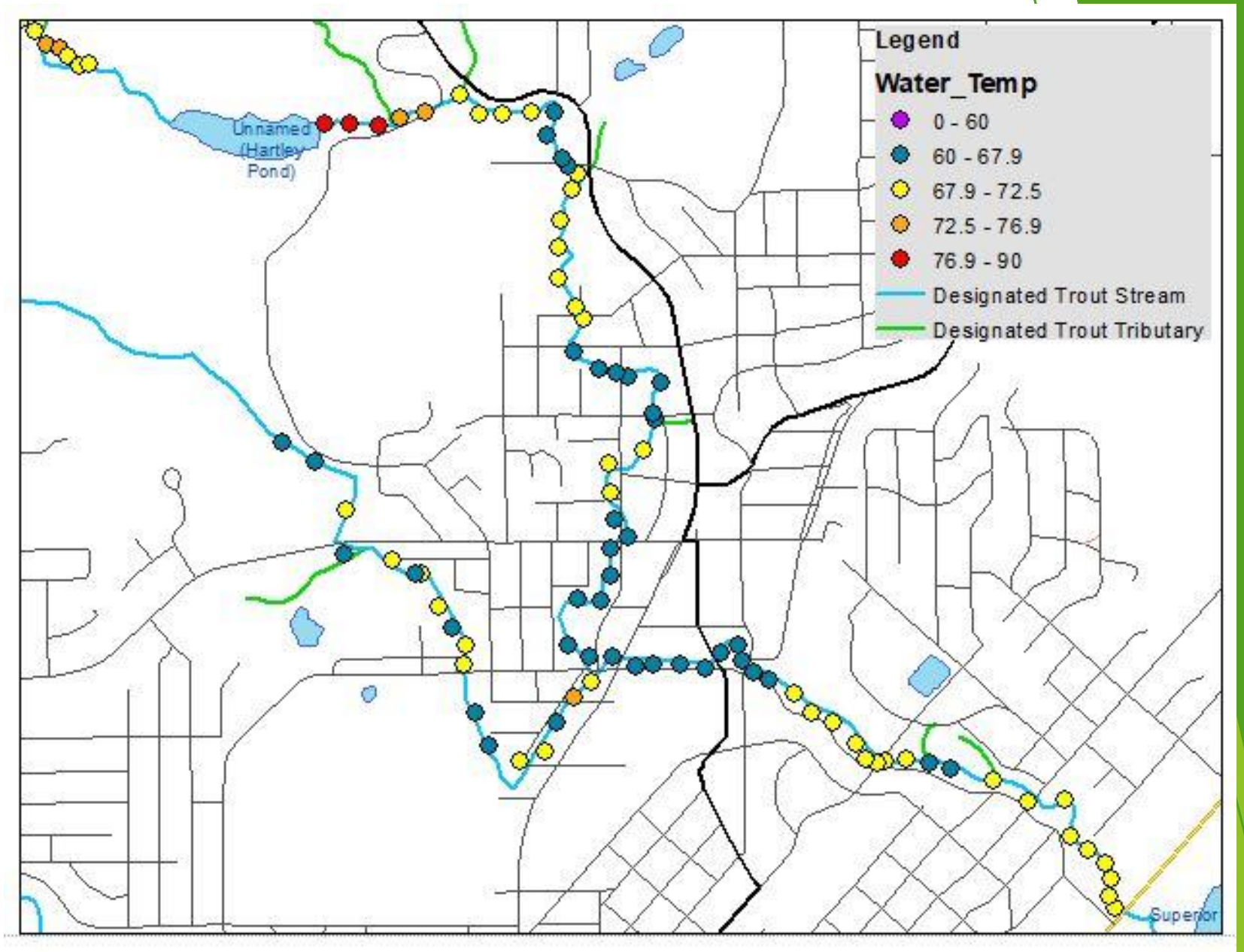
- Measure hourly from beginning of June through September
- Compare % of hours within stressful conditions for Brook Trout
  - Stress – 68°F-77°F
  - Lethal - >77°F



DEPARTMENT OF NATURAL RESOURCES

2021 Instantaneous Temperatures Below Hartley Pond

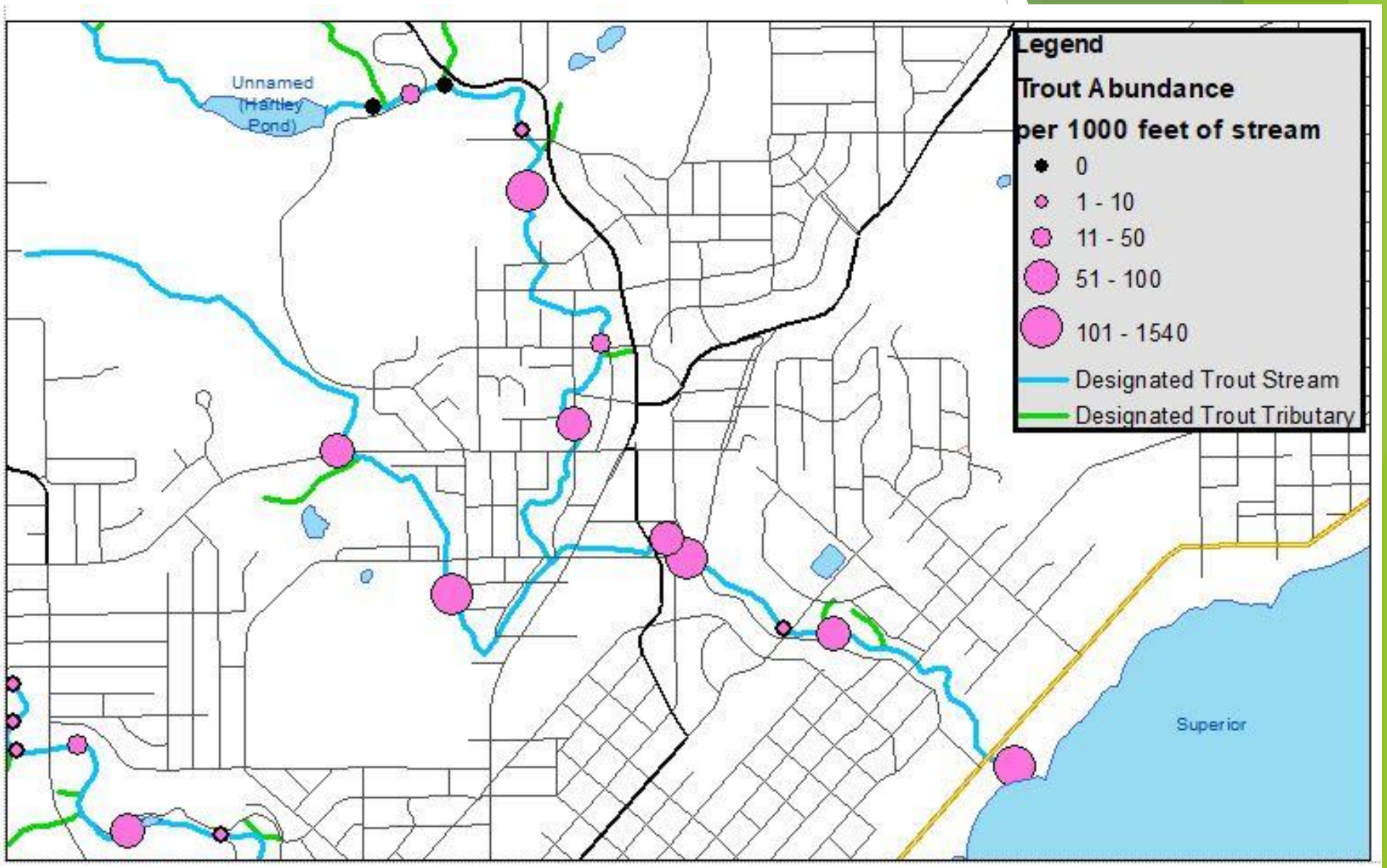
- Single measurement at peak heat within short period
- Identifies hot spots and cold spots (groundwater input)



DEPARTMENT OF NATURAL RESOURCES

Trout in Tischer Creek- below Hartley Pond

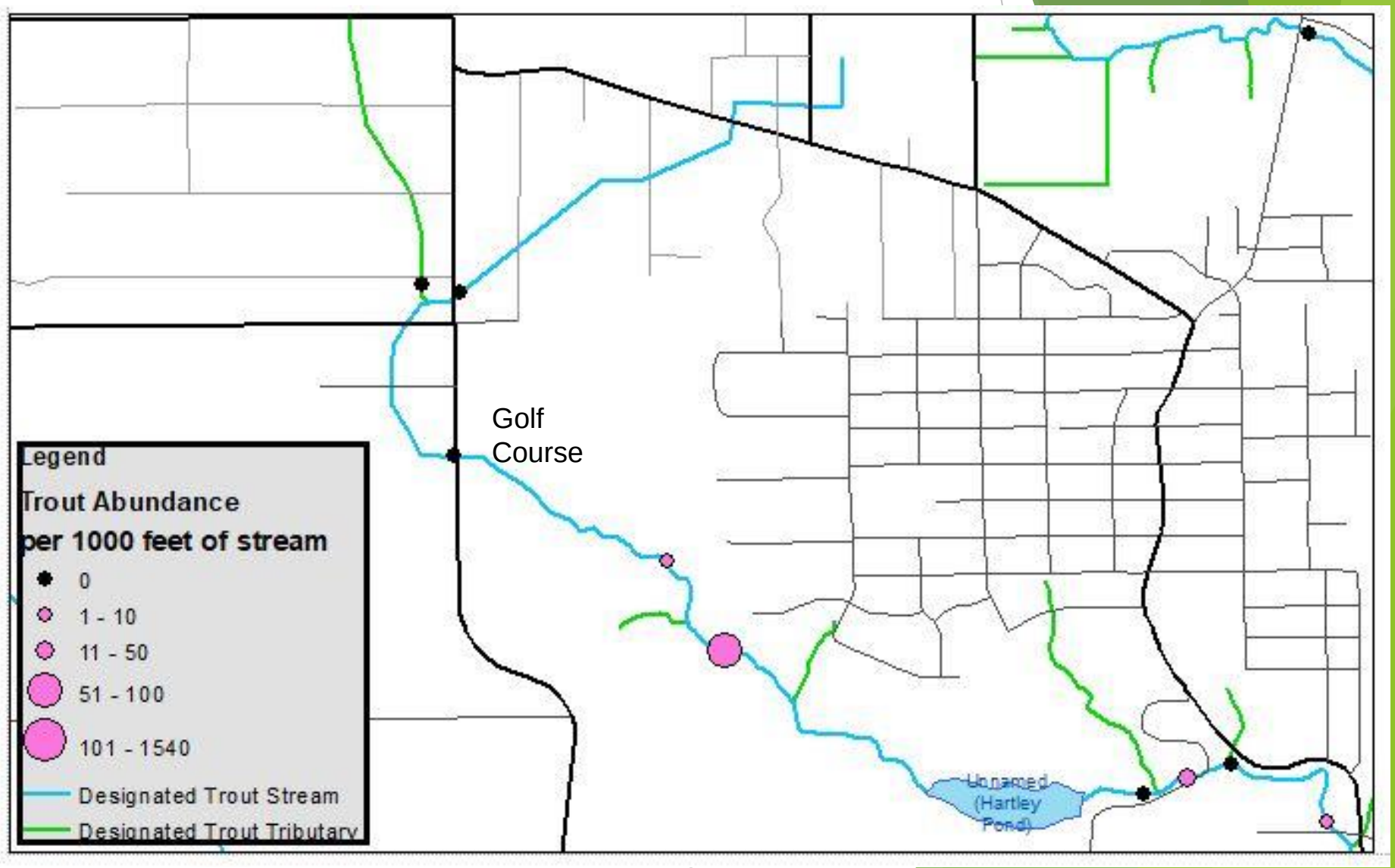
Generally good populations in lower stream reaches with few or no trout below Hartley Pond outlet (Hartley Park)



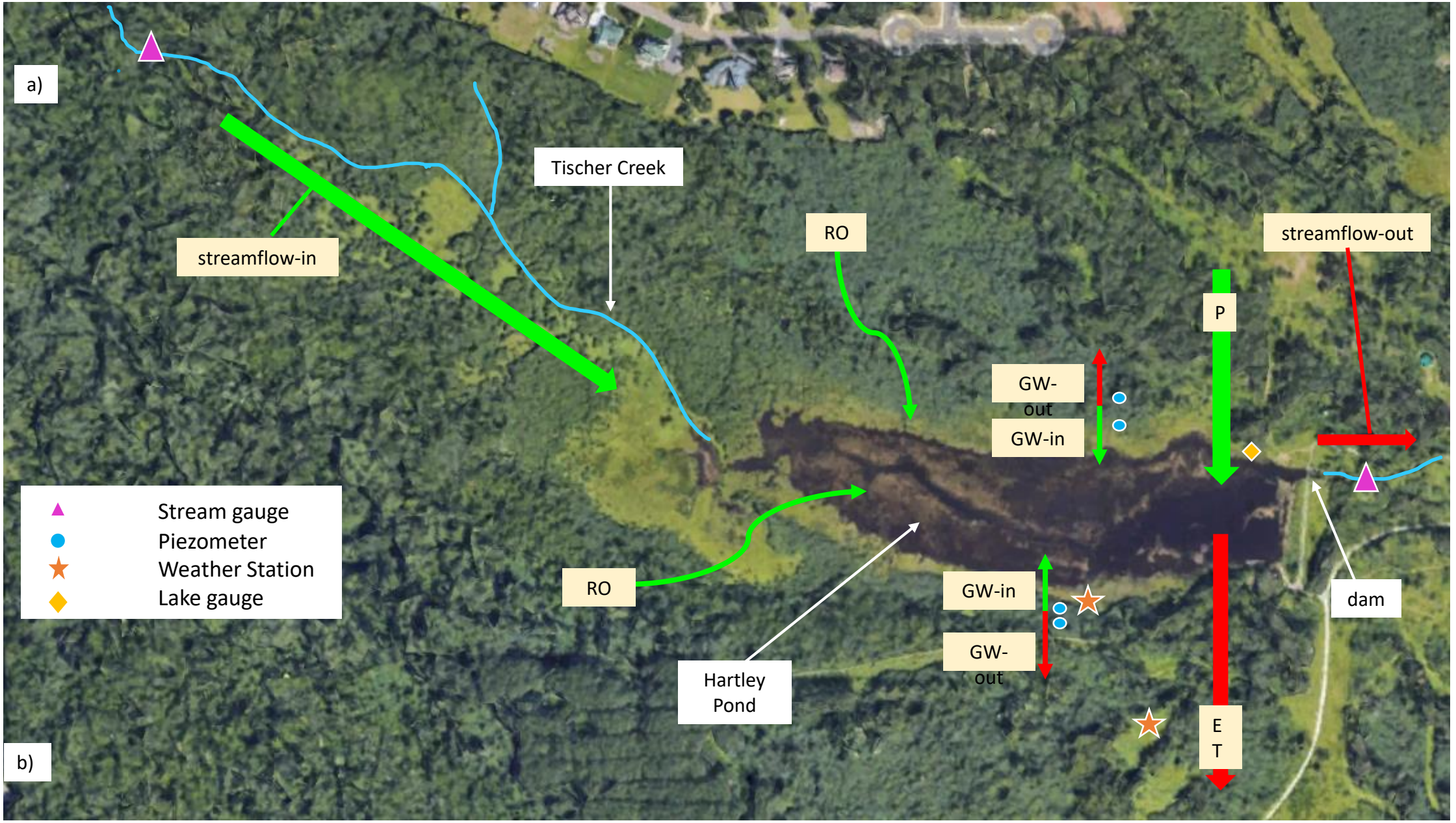
DEPARTMENT OF NATURAL RESOURCES

Trout in Tischer Creek- above Hartley Pond

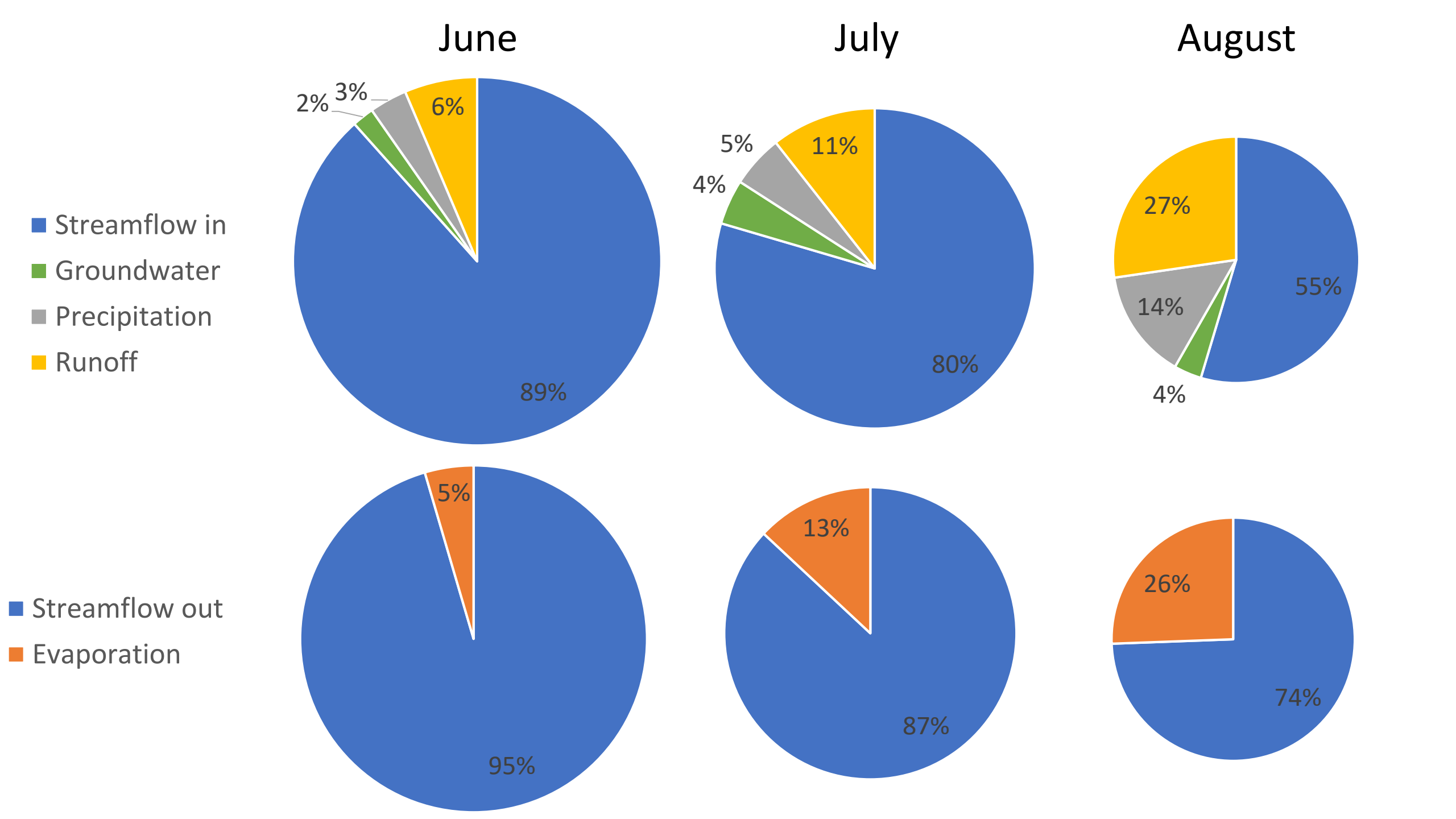
Mostly absent with small remnant population upstream of Hartley Pond



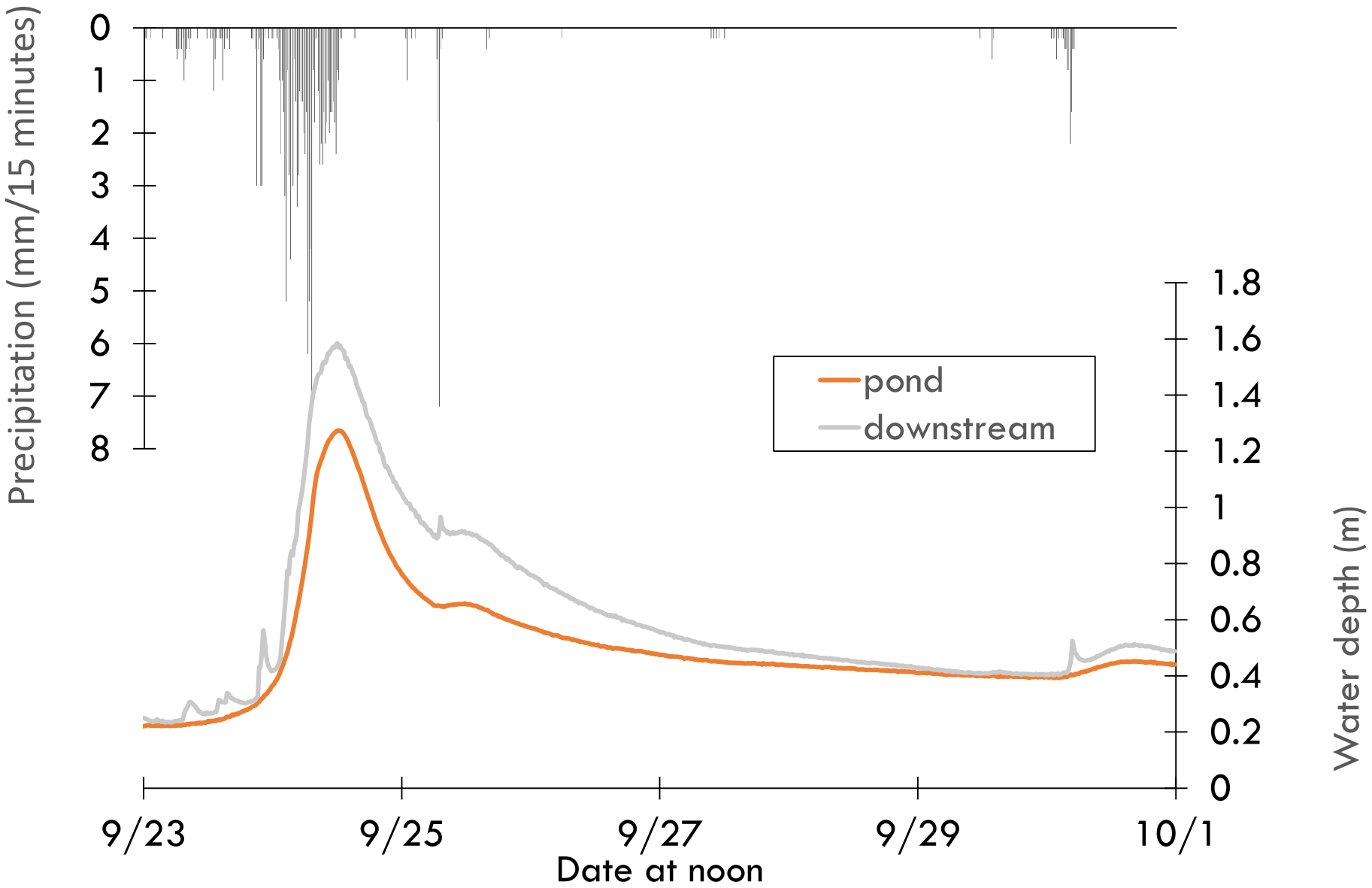
DEPARTMENT OF NATURAL RESOURCES



groundwater(in) + precipitation + streamflow(in) + runoff = groundwater(out) + evapotranspiration + streamflow(out) ± change in storage


June
July
August
Streamflow in
Groundwater
Precipitation
Runoff
2%
3%
6%
89%
5%
4%
11%
80%
27%
55%
14%
4%
Streamflow out
Evaporation
5%
95%
13%
87%
26%
74%

Hartley Pond and Tischer Creek Storm Responses



Proposed Alternatives

Alternative 1: No Action

Alternative 2: Leave dam in place, route a channel around the dam, and excavate small portion of pond

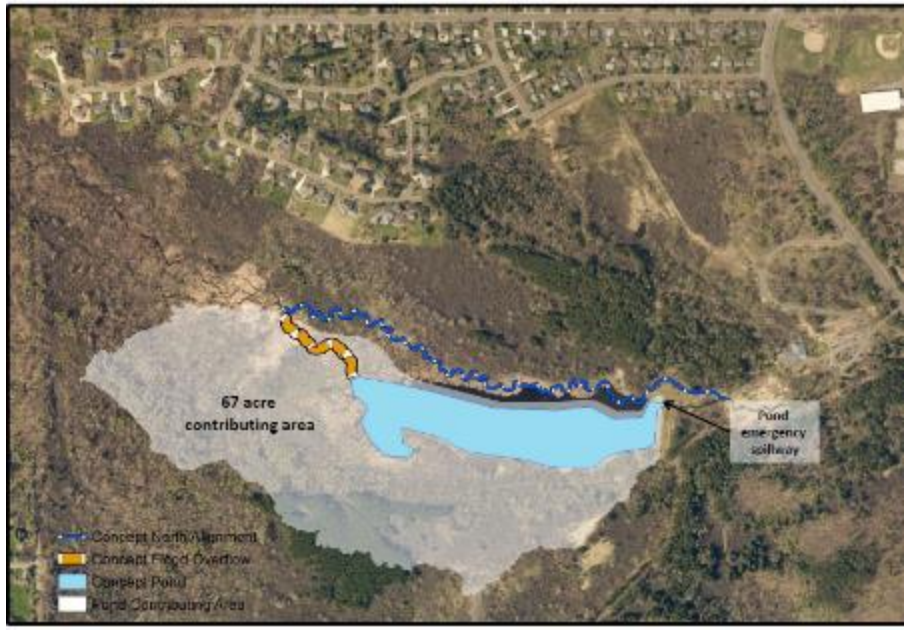
Alternative 3: Remove existing dam and restore stream channel in the original stream valley.

- Potential for offline pond

Alternative 4: Keep existing earthen berm, construct adjustable flood mitigation gate, and restore stream channel in the original stream valley. **Currently being evaluated**

- Potential for offline pond

~~***Alternative 5***: Construct rock arch rapids at outfall of dam~~



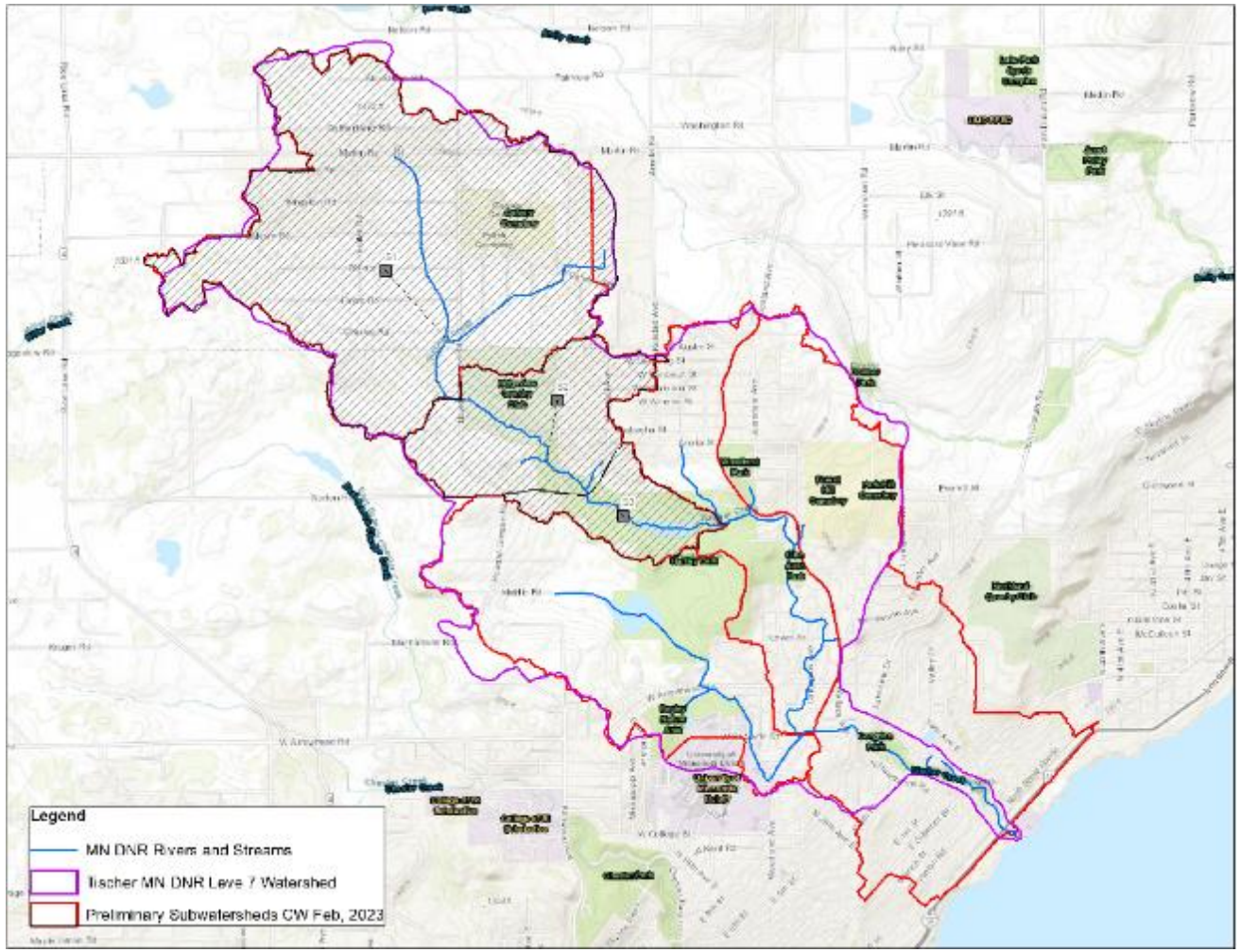
Hydraulically Modeled Alternatives

Alternative 1 - No Action (FEMA Floodplain and Dam with Flood Reduction)

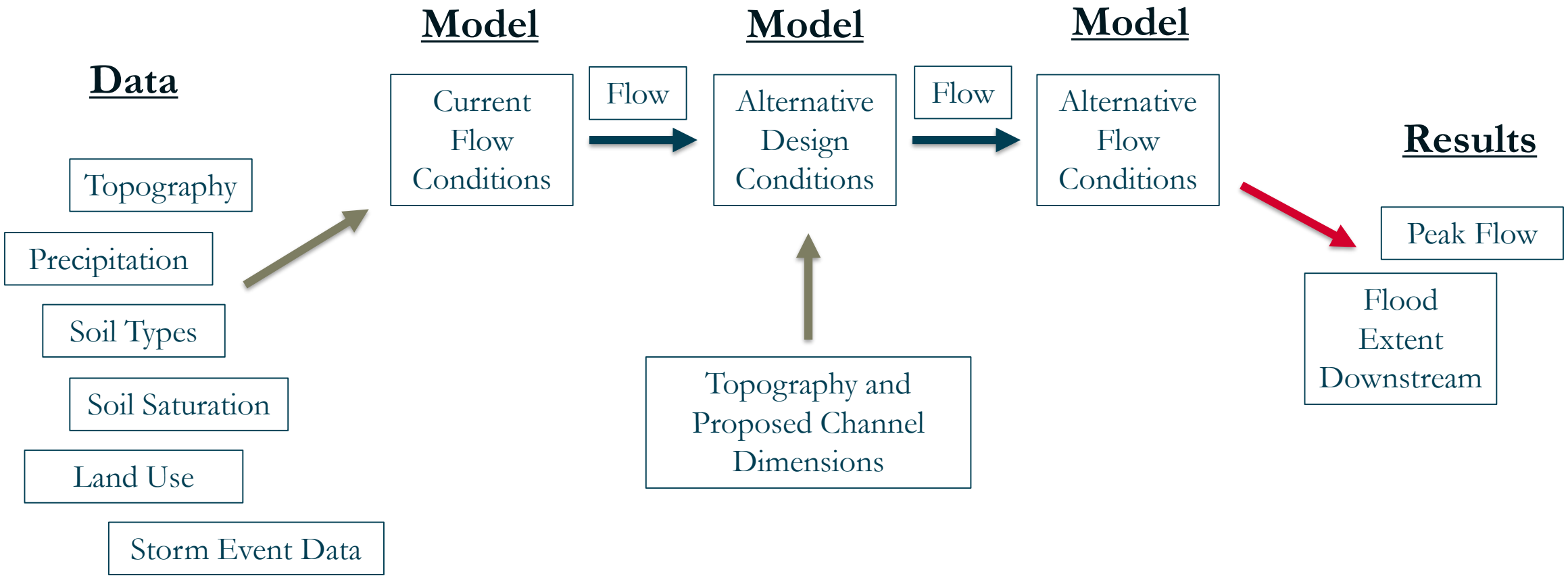
Alternative 2 - Stream Route-Around

Alternative 3 - Dam Removal

Purpose – evaluate flooding effects of each alternative



Hydrologic and Hydraulic Modeling



Alternative 1: No Action

Strengths

- Potential to reduce storm peak flows, probably not snowmelt peaks

Weaknesses

- Pond water quality is poor
- Blocks fish passage
- Traps sediment, stream stability problem
- Pond will eventually convert to an emergent wetland
- Temperature effects
- Changes natural flow pattern
- Ongoing maintenance costs
- Dam safety concerns

Unknowns

- Community acceptance
- Dam structural integrity in relation to climate change

Alternative 2: Stream Route Around Strengths and Weaknesses

Strengths

- Stream flowing around pond, reduce temperature issues
- Allow for fish passage
- Retain existing pond services
- Potential to reduce storm flows

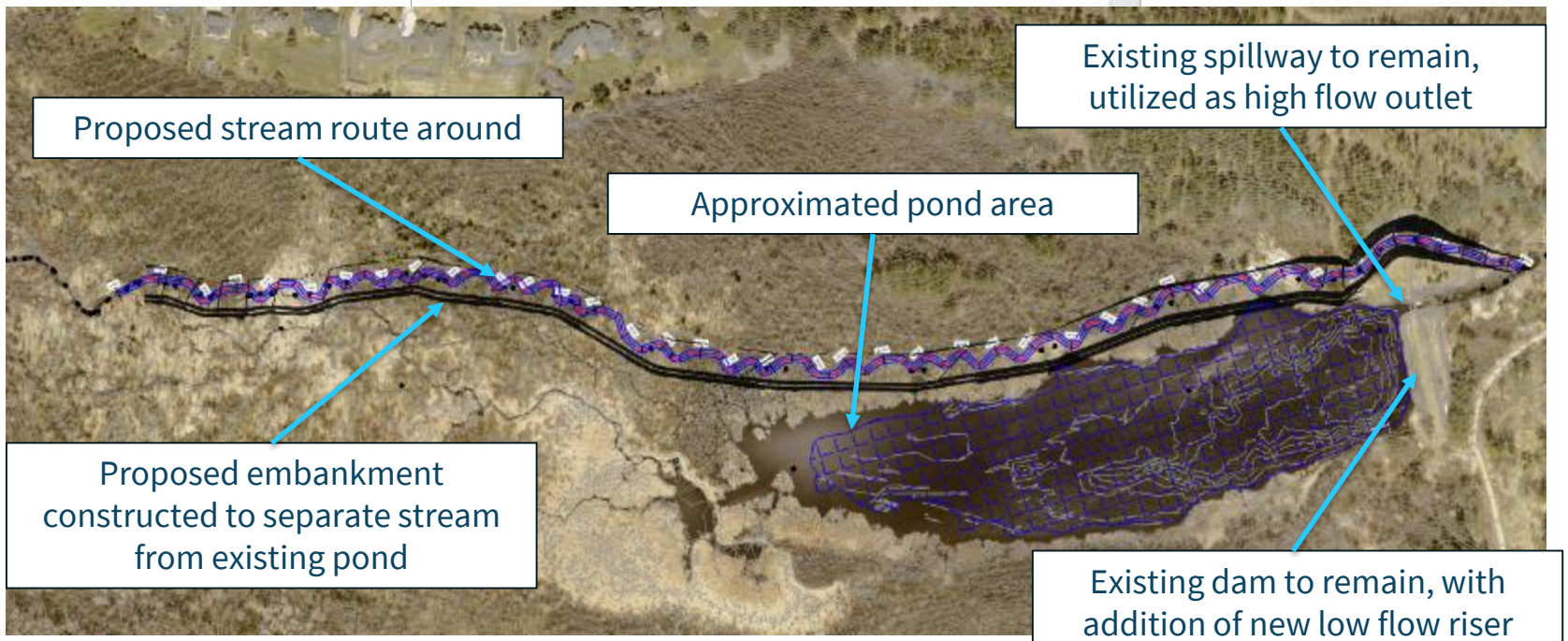
Weaknesses

- Maintain Class I dam
- Design is more complicated due to dam issues

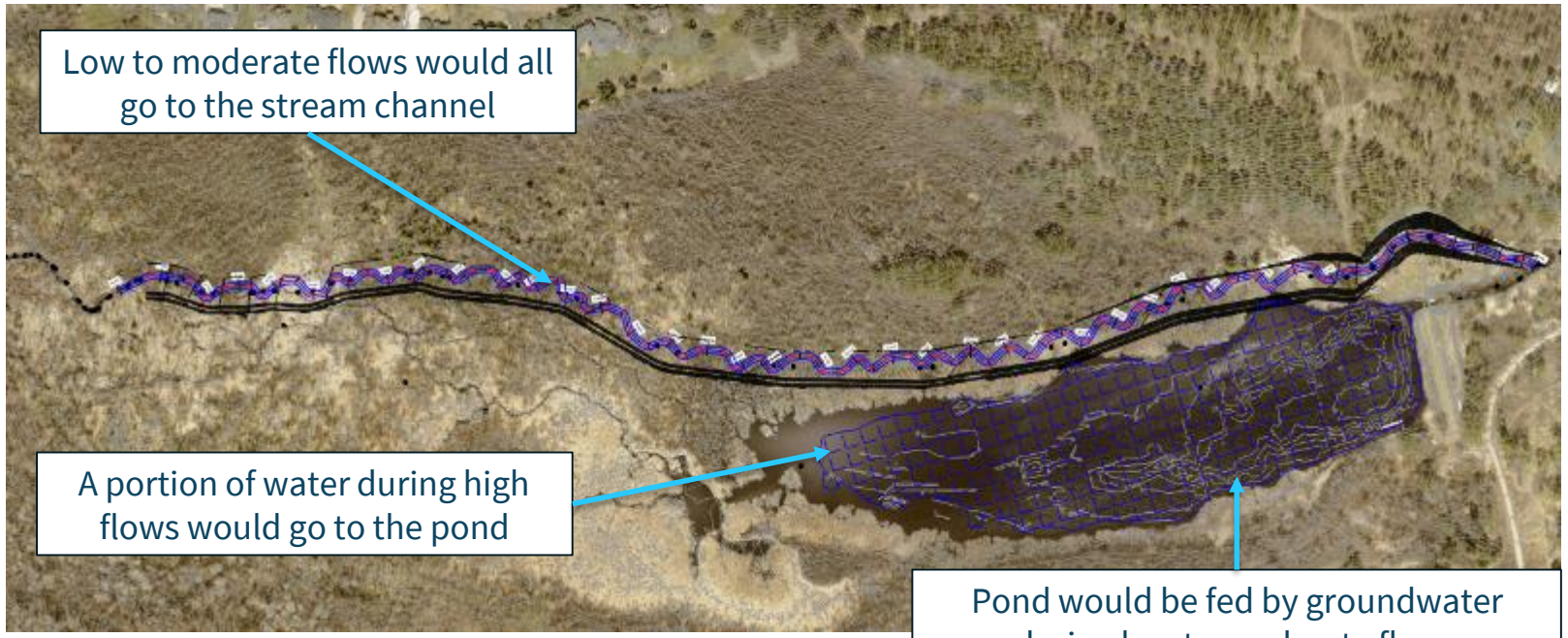
Unknowns

- Pond water quality long term, will increase retention time
- Stream/pond connection
- Community acceptance

Photo Courtesy of Kelly O'Brien Beaster,



Preliminary Modeling Results – Stream Route Around



Preliminary modeling estimates approximately 20% reduction of floodplain area compared to the current regulated floodplain

- The design would be optimized to match the flow reduction properties of the current dam/pond system
- This would require the downstream FEMA flood maps to be re-mapped through the regulatory process.

Alternative 3: Dam Removal Strengths and Weaknesses

Strengths

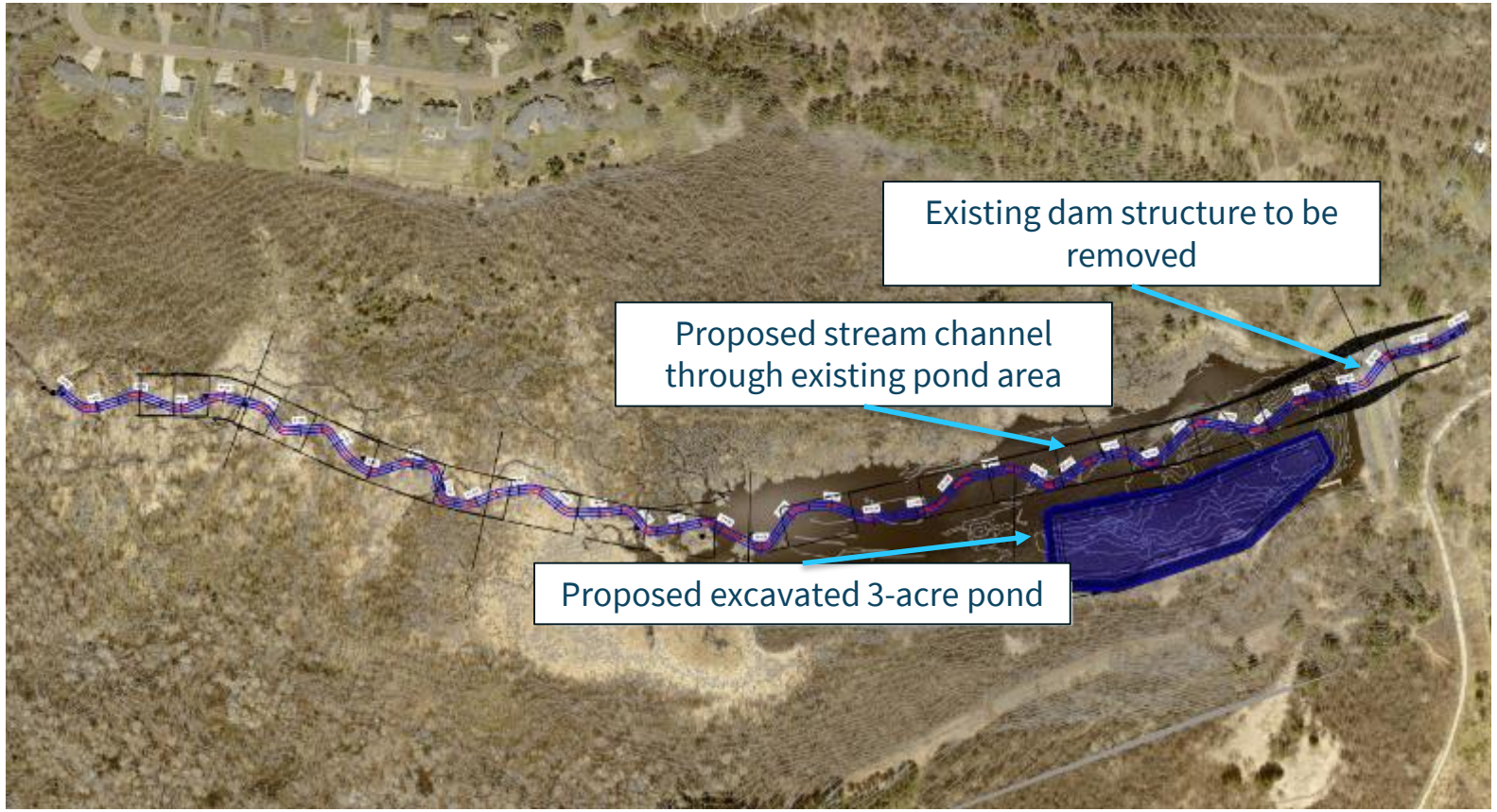
- Remove Class I, high hazard dam
- Remove warming effects of pond
- Construct stream in valley where it used to be
- Smaller pond below water table
- More straight forward design
- No dam maintenance

Weaknesses

- Storm peak flows not reduced
- May require EIS for removal of the Pond

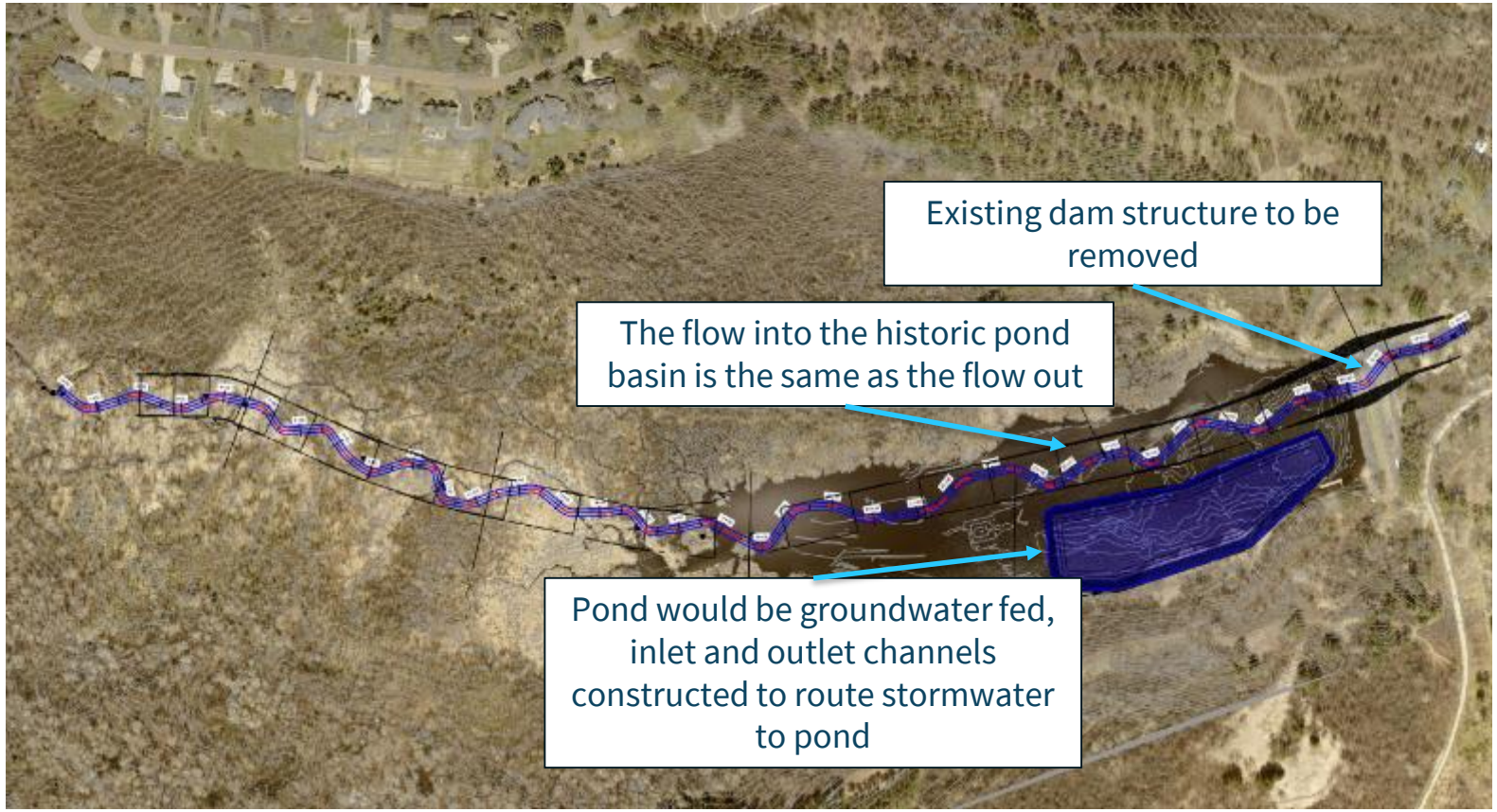
Unknowns

- Community acceptance



Preliminary Modeling Results – Dam Removal

Preliminary modeling estimates approximately 4% reduction of floodplain area compared to the current regulated floodplain



*There may be options to install a gate structure at the current dam location to reduce the flows during a large storm event

Currently being evaluated

Report and Recommendations

- Report Findings and Approach
  - Report on the above related issues and findings
  - Modeling results
  - Schematics of each alternative
  - Establish baseline for final design work of selected alternative
- City Process
  - Public input
  - Final recommendation, pending input
  - Review findings and report
- MNDNR process and Review
  - Permitting
  - Flood mapping

Photo Courtesy of Tim Beaster, South St. Louis SWCD

Public Input Process

City of Duluth Public input process to follow Feasibility Study

- Natural Resources Commission
- Parks and Recreation Commission
- Planning Commission
- Hartley Park Stewardship Committee and Hartley Board of Directors
- Duluth City Council

Project will be required to go through local, state, and federal permitting process

Thank You!
Questions?

Hartley Pond Feasibility Study

November 21, 2023