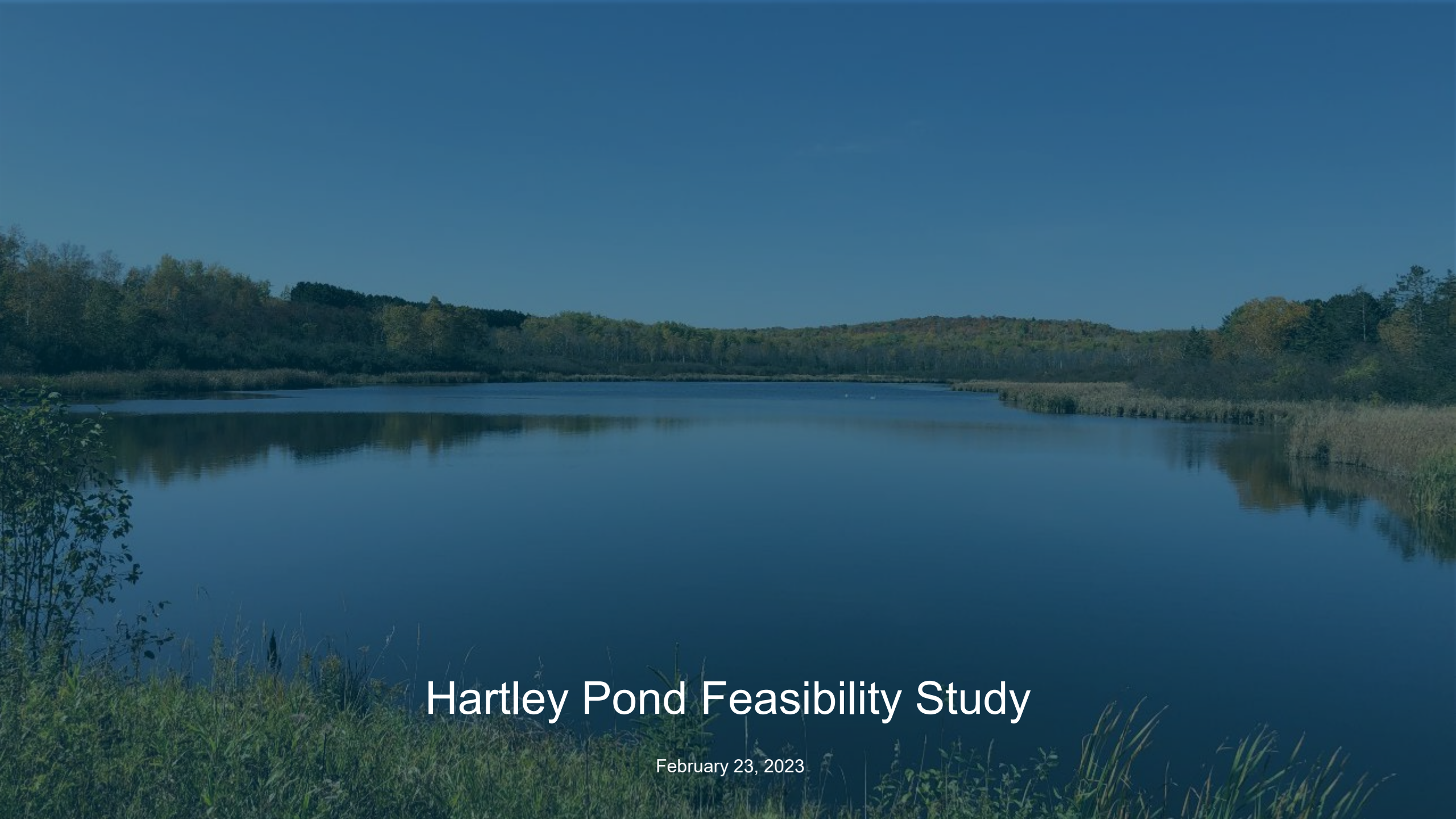


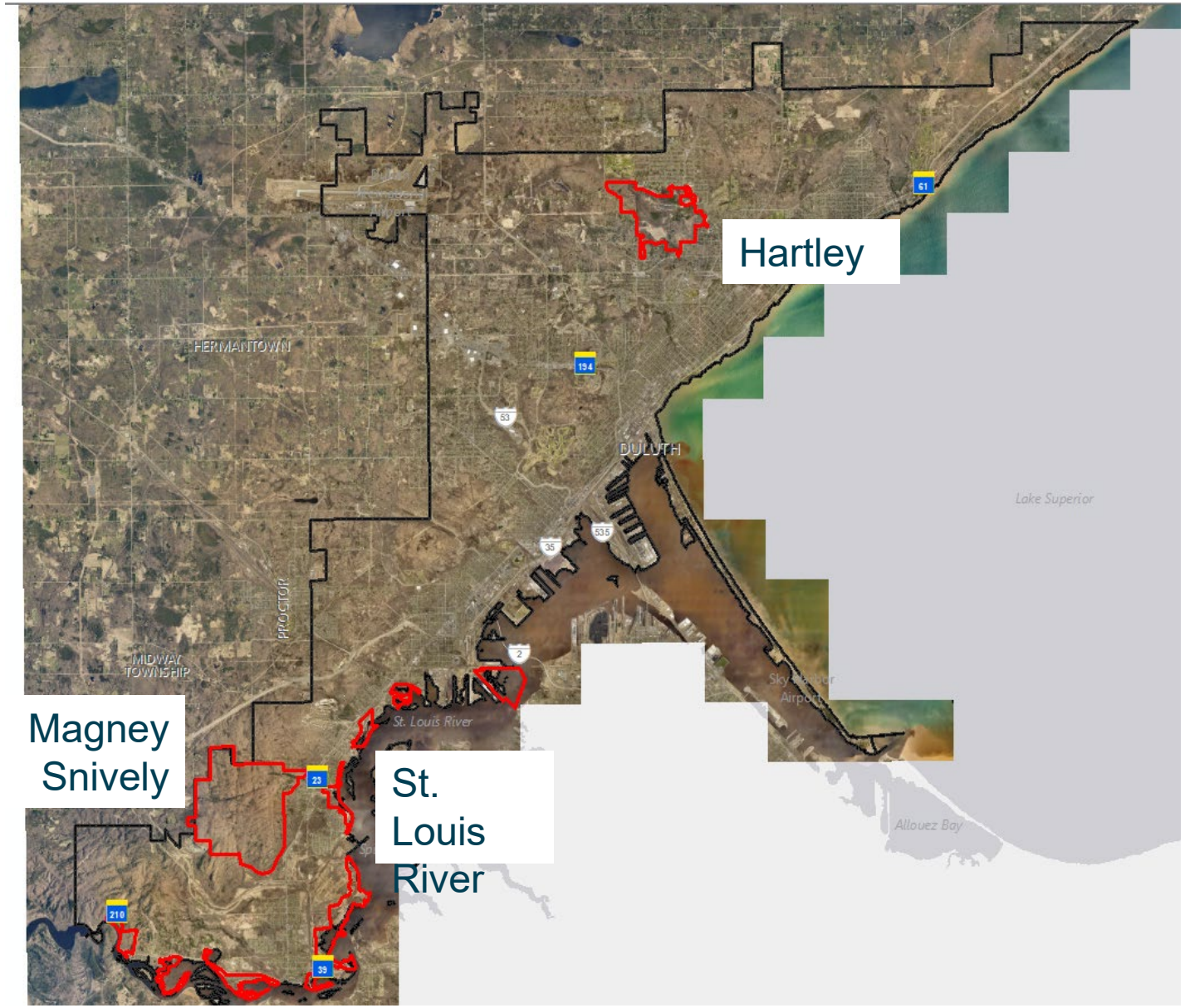
Hartley Pond Feasibility Study

February 23, 2023

Agenda

- Intro, DNAP Connection
- Water Temperature and Fish Data
- Feasibility Study
  - Historical background
  - Definition of a feasibility study
  - Proposed alternatives
  - Basic modeling information
- Next Steps

Duluth Natural Area Program Background



Duluth Natural Area Program

HARTLEY NATURAL AREA

DULUTH NATURAL AREAS PROGRAM

The Hartley Natural Area consists of over 600 acres in northeast Duluth. Its wooded hills, fields, designated trout streams, and wetlands provide a variety of habitats that have a rich diversity of flora and fauna. The natural area is a community focus point for nature appreciation, education, preservation, and restoration.

UNIQUE FEATURES

Native Plant Communities

- Northern hardwood forest, one of the largest remaining remnants of a sugar maple, basswood, and bluebead lily forest in the city and region
- Large wet meadow and willow swamp

Natural Water Features

- Headwaters of Tischer Creek, a designated trout stream
- Vernal pools, temporary pools of water that are important breeding grounds for northern amphibian species

Geological Landforms

- Rock formations that provide evidence of the geological formation of Duluth, including the Midcontinent Rift and glaciation of the Tettegouche Till Plain

THINGS TO DO

Explore, Relax, Get Healthy

- Hike, bike, snowshoe, and cross-country ski on the designated trails—including an accessible (ADA certified) trail
- Enjoy bird watching, fishing, photography, or painting

Volunteer

- Contact the Hartley Nature Center at 218-724-6735 for opportunities

HABITAT PRIORITIES

Management and restoration of human-induced impacts and invasive species control are important to long-term protection of Hartley's native plant and animal communities. Efforts will also focus on protection of Tischer Creek as a coldwater fishery.

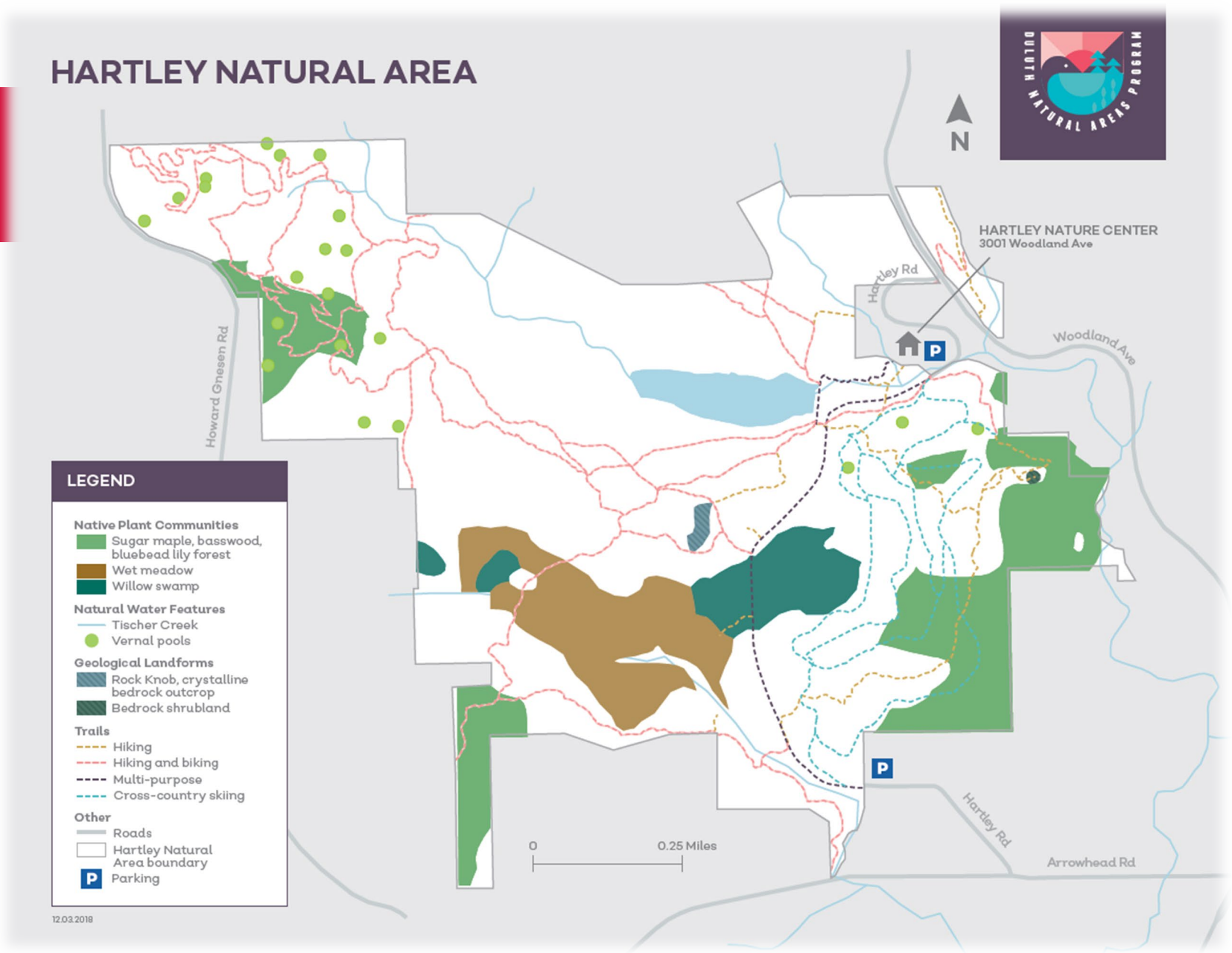
The Duluth Natural Areas Program enables the city to celebrate and sustain select open places that enrich the lives of all Duluthians by preserving and protecting the city's natural heritage.

Hartley Nature Center
www.hartleynature.org

Duluth City Parks
www.duluthmn.gov/parks

DNAP program website
www.duluthmn.gov/parks/parks-planning/duluth-natural-areas-program

HARTLEY NATURAL AREA



Hartley Park Management Plans

1. Hartley Duluth Natural Areas Program Management Plan, City of Duluth, 2019.
2. Hartley Park Mini-Master Plan, City of Duluth, 2014.
3. Essential Spaces: Duluth Parks, Recreation, Open Space & Trails Plan, City of Duluth, 2022
4. Restoration Strategy – Duluth Urban Area Watershed Restoration and Protection Strategy Document, MPCA, 2017.

Actions from Hartley DNAP Management Plan

Action	Cost	Responsible Parties	Target Completion Date
Tischer Creek/Hartley Pond Feasibility Study	$79,000	City of Duluth	2021
Tischer Creek/Hartley Pond Restoration	$320,000 to $1,400,000	City of Duluth; MNDNR	2025
Invasive Species Control in Priority Areas	$140,000 (funds secured)	Community Action Duluth; City of Duluth	2020
Develop Plant Community Management and Restoration Plan	$20,000	City of Duluth	2021
Conifer Plantation Conversion	None expected	City of Duluth	2027
Northwest Hills Trail and Forest Management	$20,000 (funds secured)	City of Duluth; COGGS	2020
Vernal Pool Identification and Mapping	$5,000	HNC	2021

Feasibility Study Timeline

Activity	Anticipated Date of Initiation	Anticipated Date of Completion
Populate Steering Committee and begin data review	September, 2022	October, 2022
Contractor works with Steering Committee to gather data, identify data gaps and finalize list of alternatives	September, 2022	March, 2023
Apply data and other information to evaluation of alternatives and develop concept plans	February, 2023	June, 2023
Develop and implement a public information and input process	February, 2023	September, 2023
Select preferred alternative, develop detailed plans and a cost estimate for design and implementation	September, 2023	October, 2023
Final Report submitted to MNDNR and City of Duluth / **NRC and Parks Commission Review**	October, 2023	December 2023

Stream Trout and Temperatures in Tischer Creek

Deserae Hendrickson

Minnesota Department of Natural Resources

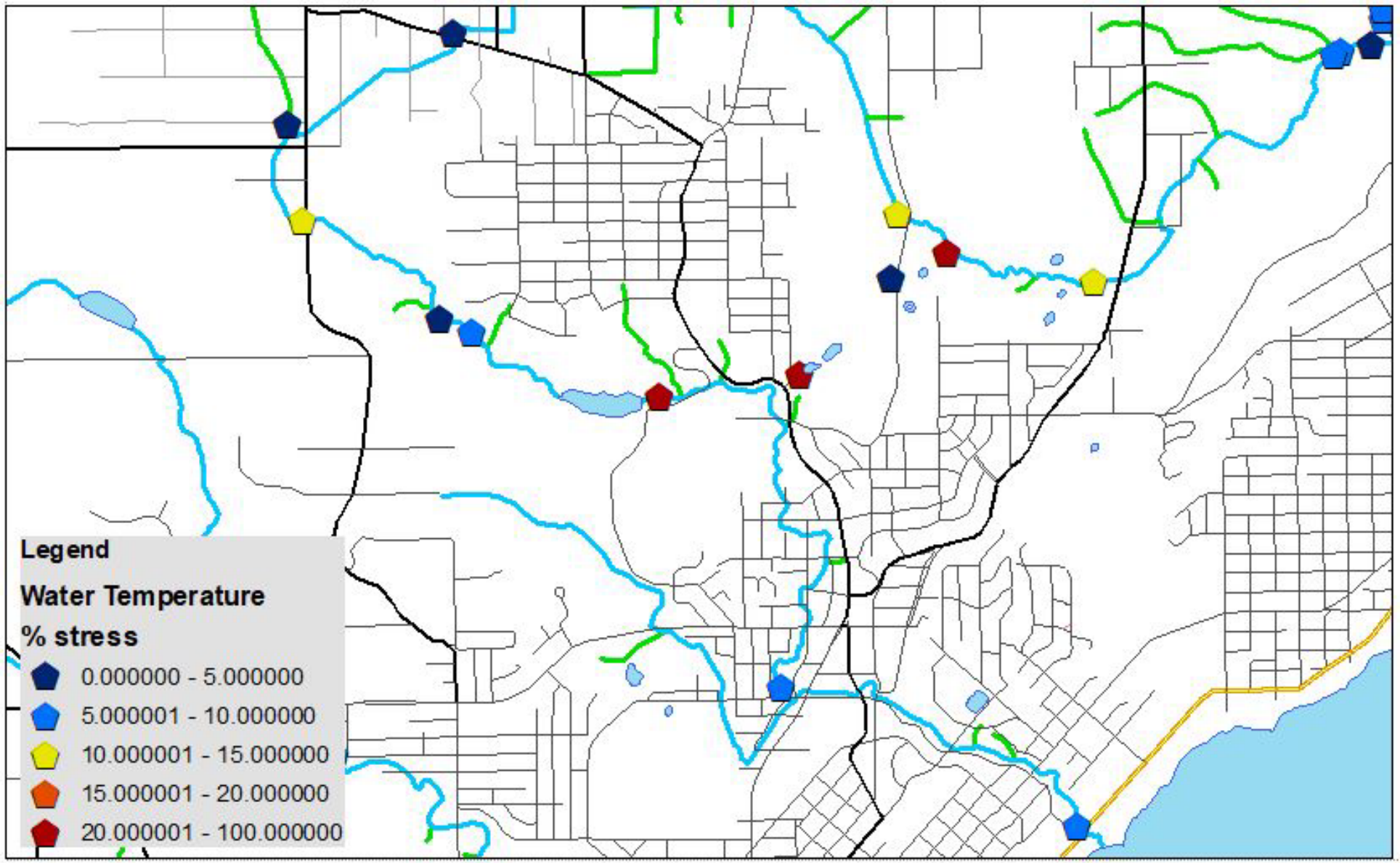
Duluth Area Fisheries Supervisor

DEPARTMENT OF NATURAL RESOURCES

SPORT FISH RESTORATION

Stream summer temperatures

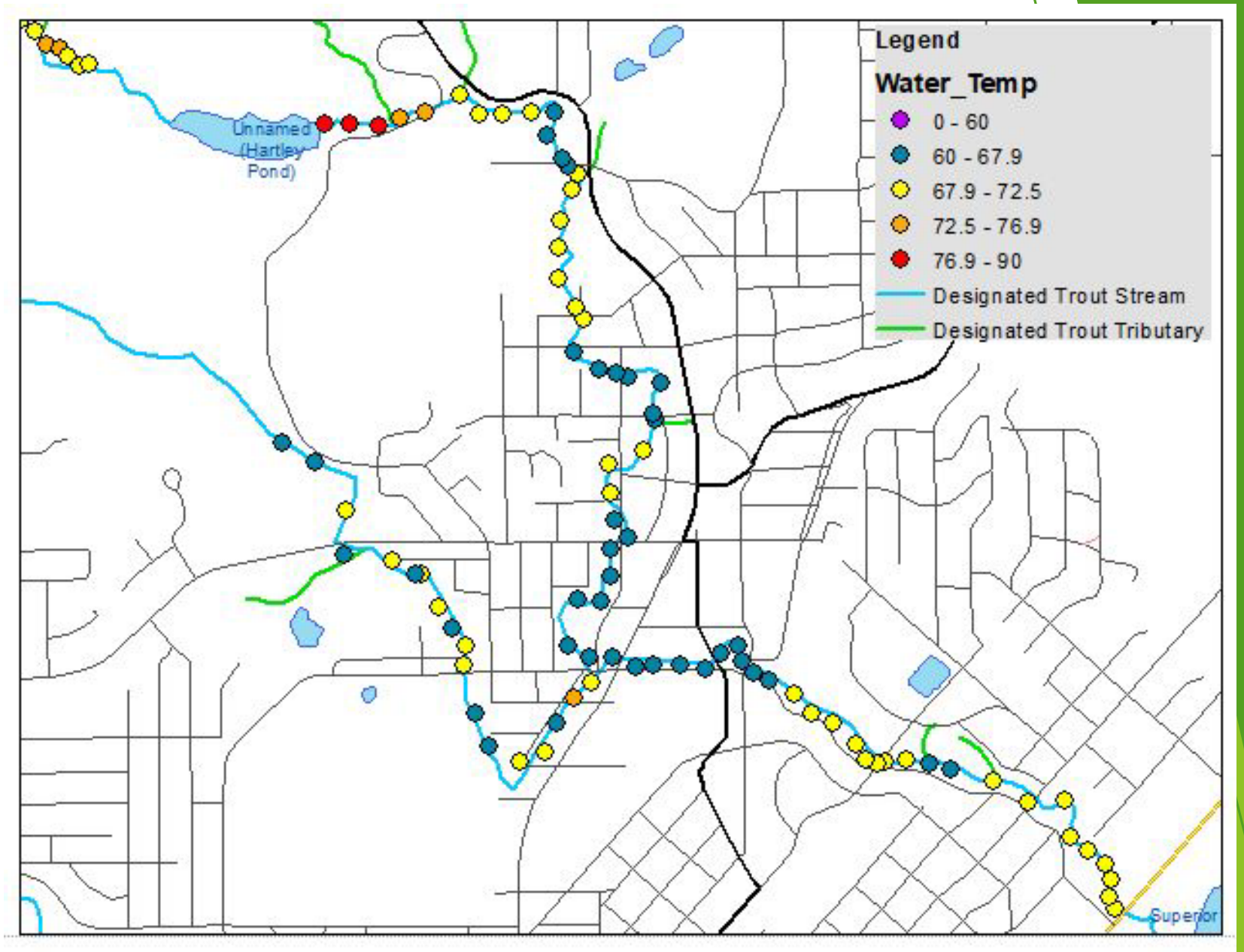
- Measure hourly from beginning of June through September
- Compare % of hours within stressful conditions for Brook Trout



DEPARTMENT OF NATURAL RESOURCES

2021 Instantaneous Temperatures Below Hartley Pond

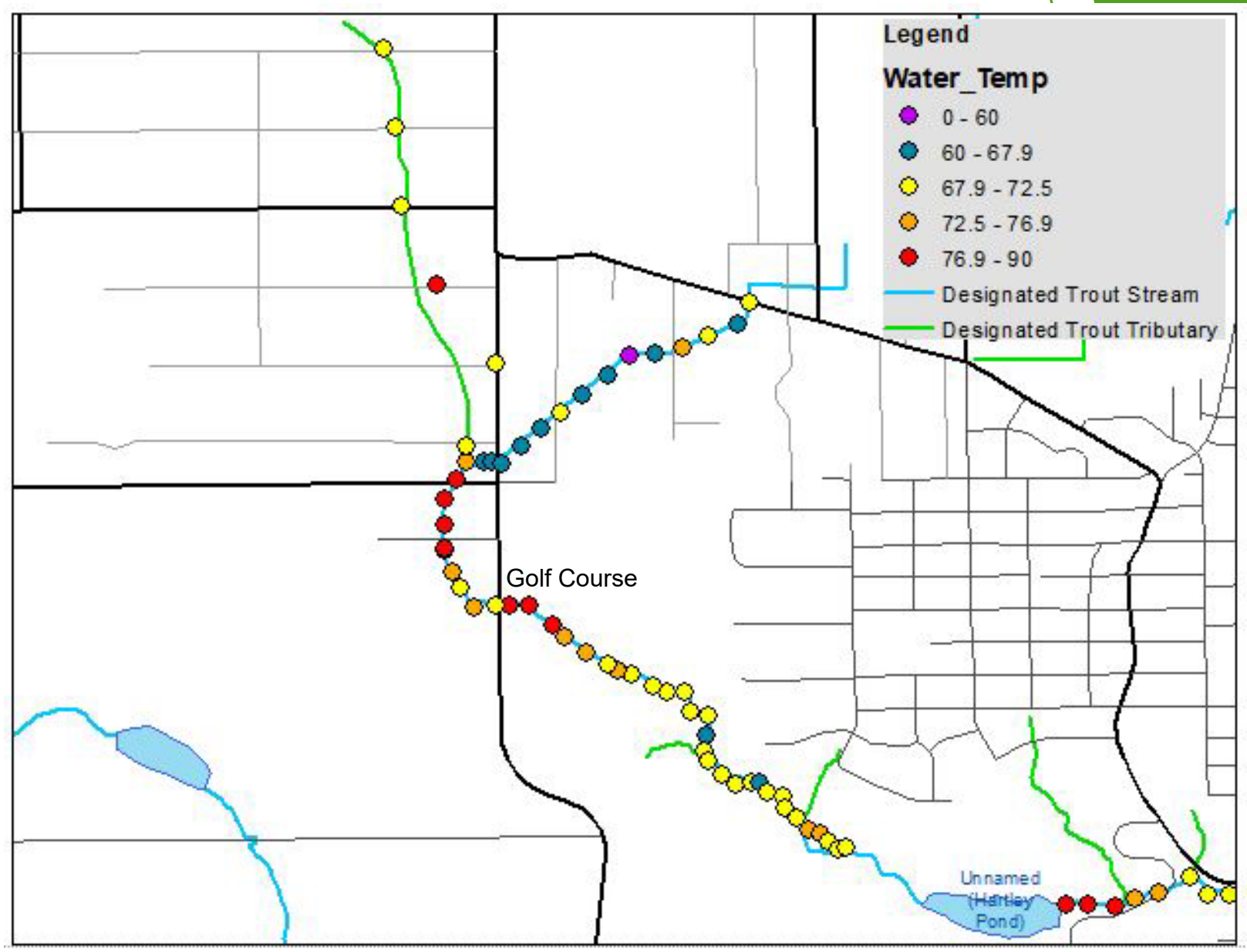
- Single measurement at peak heat within short period
- Identifies hot spots and cold spots (groundwater input)



DEPARTMENT OF NATURAL RESOURCES

2021 Instantaneous Temperatures Above Hartley Pond

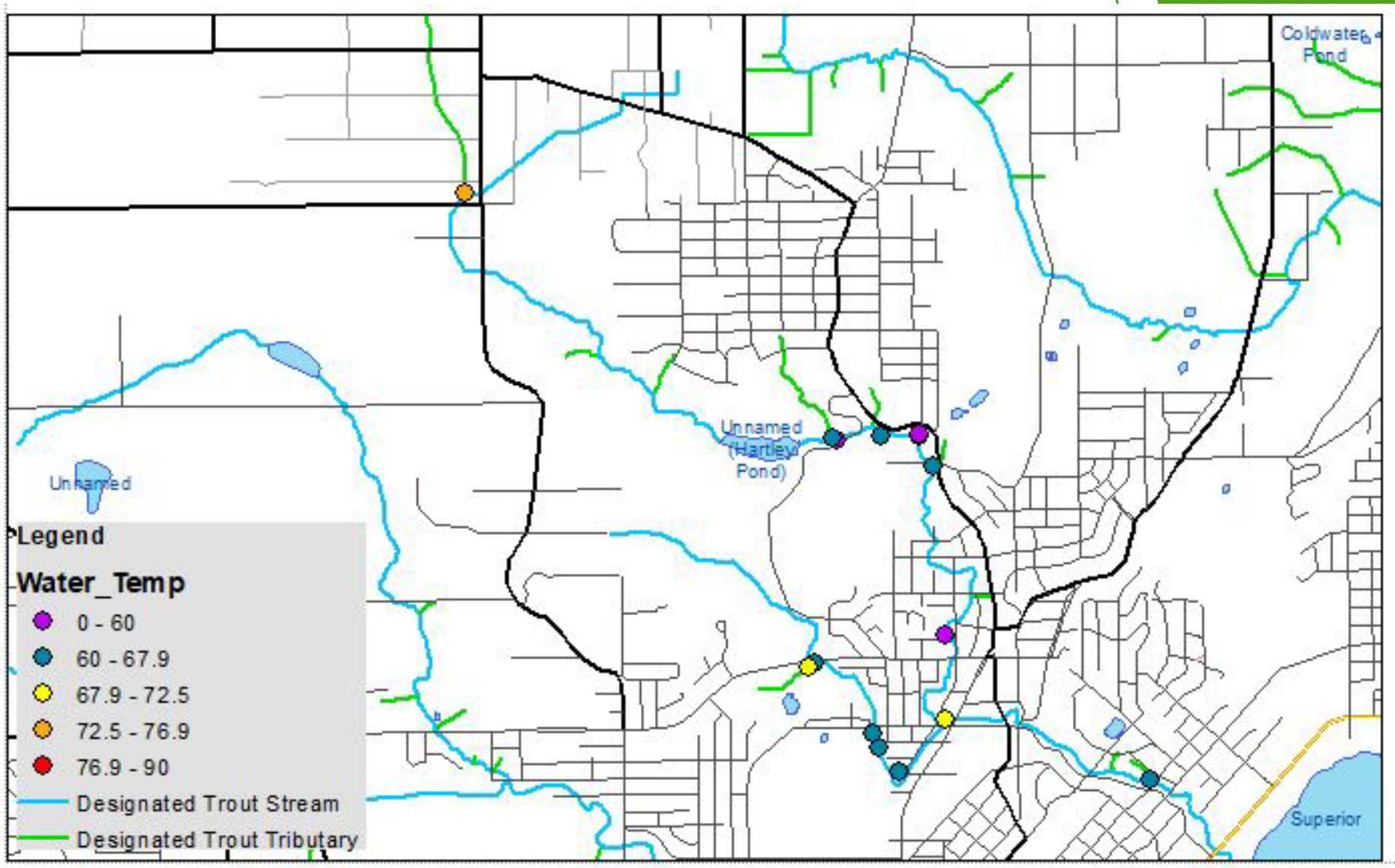
- Hot areas within open, channelized and wetland reaches
- Tributary 10 also contributing warm water



DEPARTMENT OF NATURAL RESOURCES

2021 Instantaneous Tributary Temperatures

- Most stream cooling attributable to cold tributaries or springs
- Heavy shading can also reduce temperatures



DEPARTMENT OF NATURAL RESOURCES

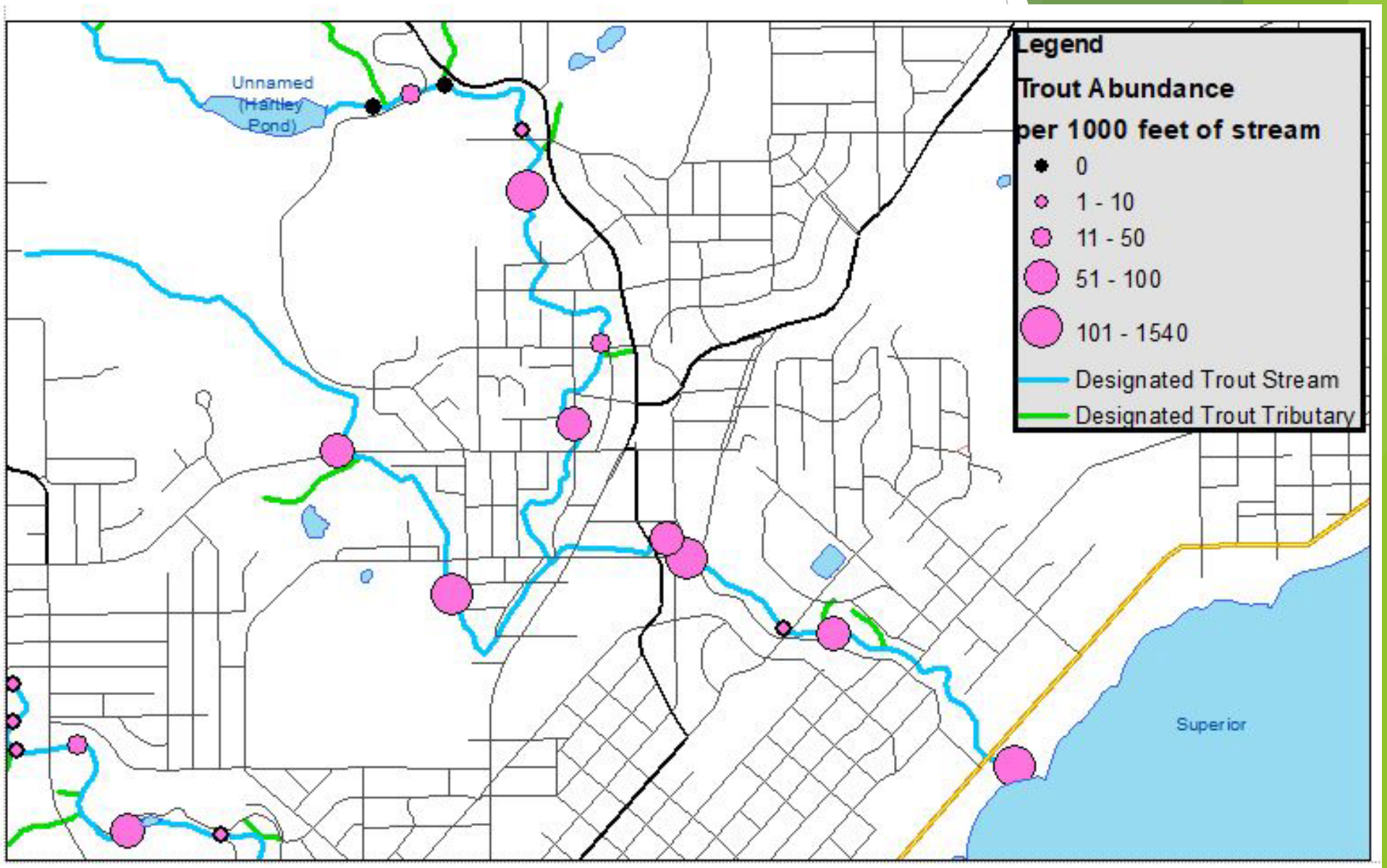
Trout in Tischer Creek- below barrier falls

- Barrier falls from Lake Superior 0.2 miles upstream of mouth
- Below barrier, stream used by anadromous fish
  - Brook Trout (coaster)
  - Rainbow Trout (steelhead)
  - Brown Trout

DEPARTMENT OF NATURAL RESOURCES

Trout in Tischer Creek- below Hartley Pond

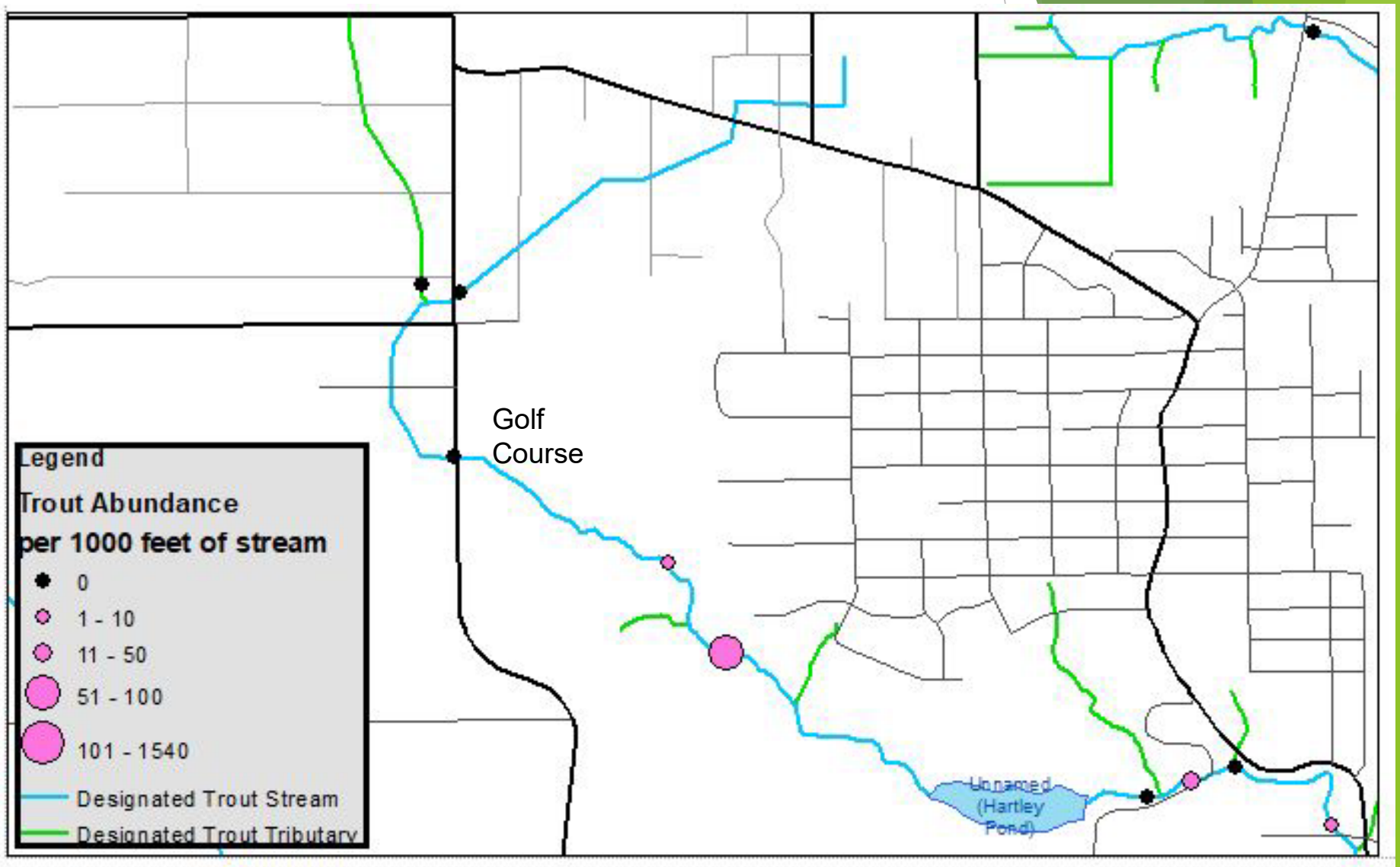
Generally good populations in lower stream reaches with few or no trout below Hartley Pond outlet (Hartley Park)



DEPARTMENT OF NATURAL RESOURCES

Trout in Tischer Creek- above Hartley Pond

Mostly absent with small remnant population upstream of Hartley Pond

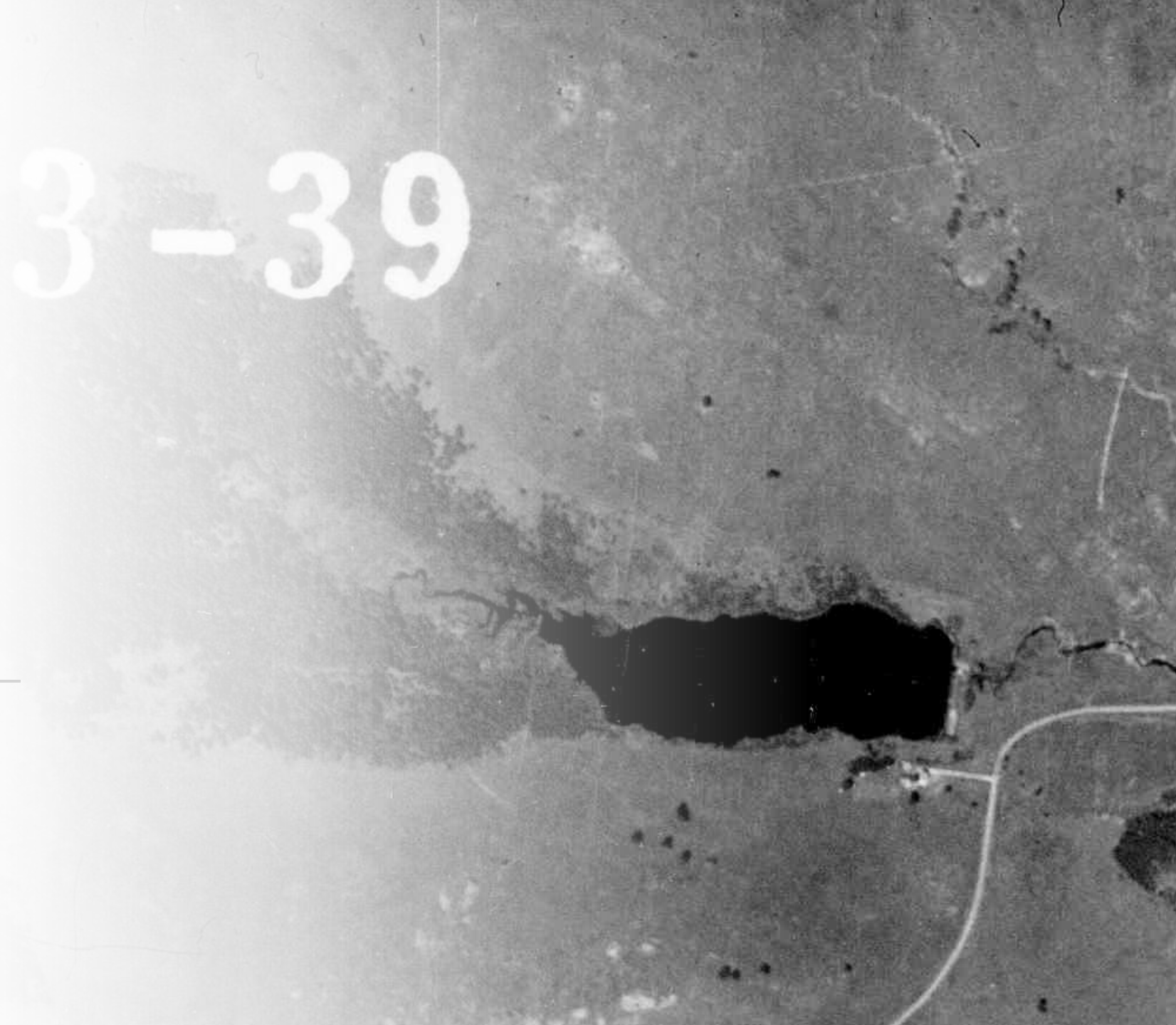


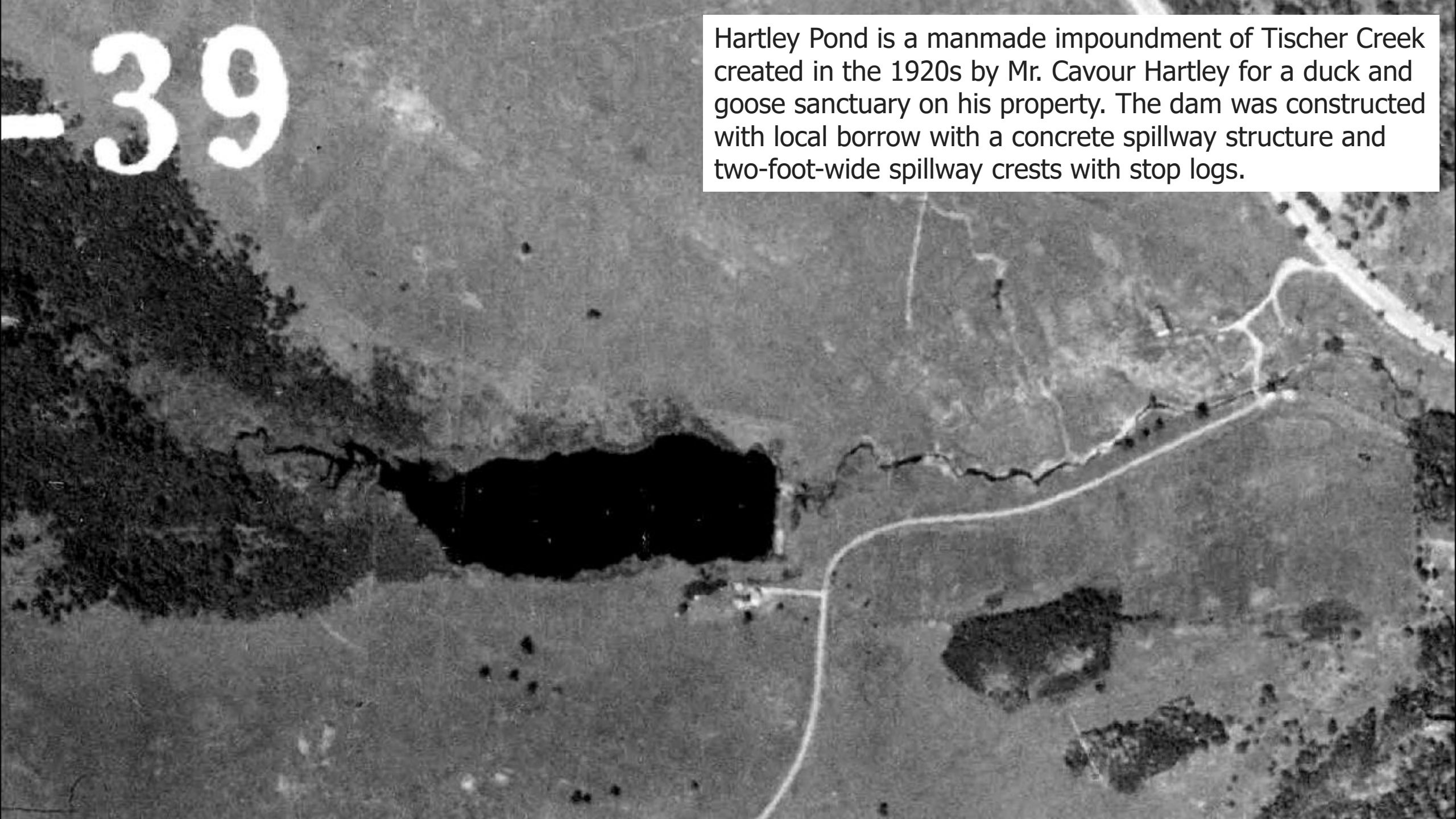
DEPARTMENT OF NATURAL RESOURCES

Man Made Barriers- Critical Issues

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

Hartley Pond and Dam History



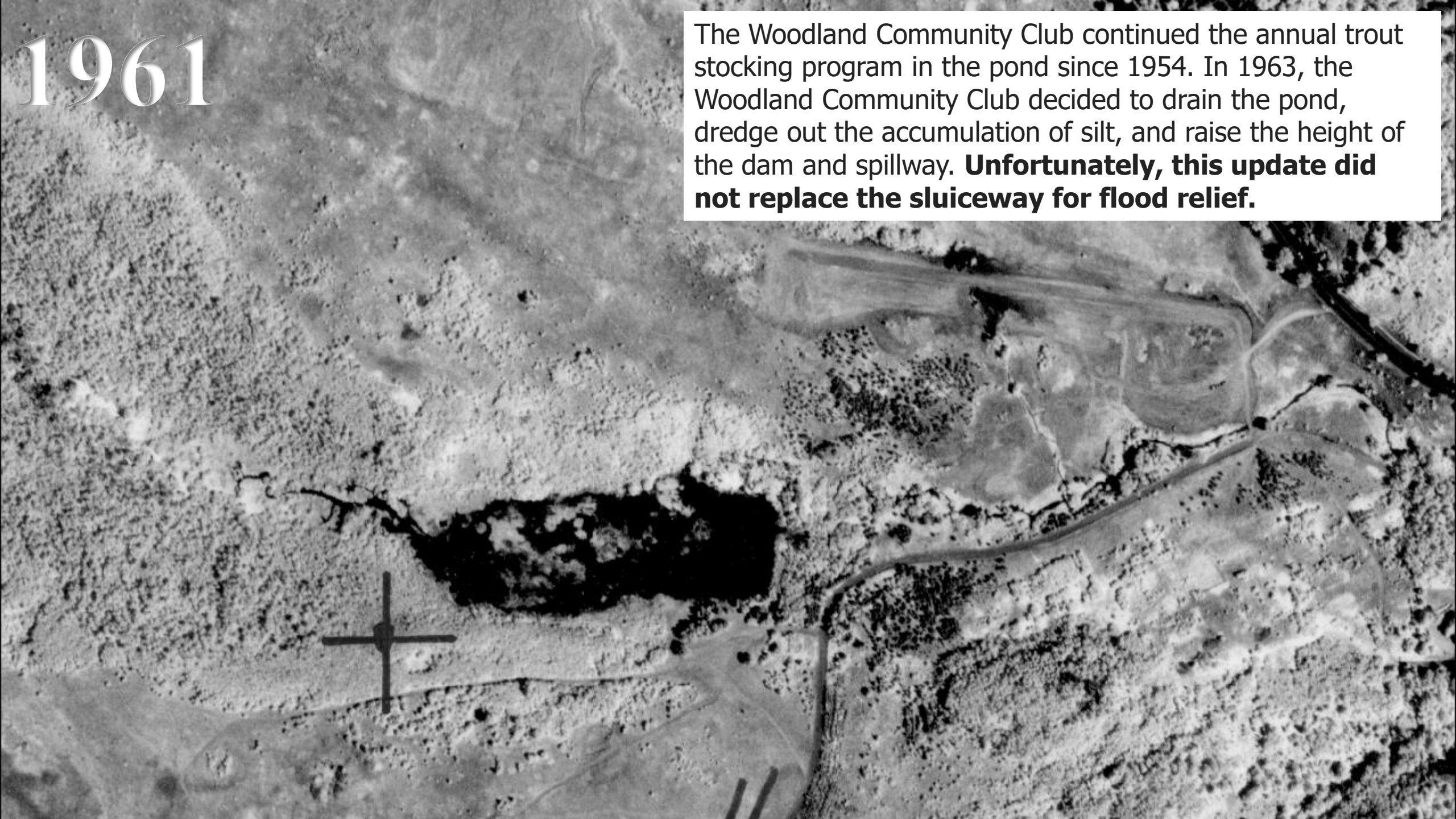


Hartley Pond is a manmade impoundment of Tischer Creek created in the 1920s by Mr. Cavour Hartley for a duck and goose sanctuary on his property. The dam was constructed with local borrow with a concrete spillway structure and two-foot-wide spillway crests with stop logs.

1948

In the 1930's Hartley allowed the property to go tax delinquent and was turned into Hartley Park. Various civic groups improved the area with tree planting.

1961



The Woodland Community Club continued the annual trout stocking program in the pond since 1954. In 1963, the Woodland Community Club decided to drain the pond, dredge out the accumulation of silt, and raise the height of the dam and spillway. **Unfortunately, this update did not replace the sluiceway for flood relief.**

1972

As a result, during the August and September 1972 flooding, thirty or forty feet of the earthen dam was completely washed out. In 1974, the dam was rebuilt due to mounting pressure from the Woodland Community Club and downstream property owners.

1981

In 1980 there was a dam safety inspection that noted several areas of cracking of the wing walls. This led to repair work in 1985.

#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

Pond Data

- Hartley Pond Max Depth: 7 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)

Dam Impacts on Tischer Creek

- Conversion of a stream to a pond resulted in loss of Brook Trout habitat
- Increase temperatures downstream of pond, impacts brook trout populations
- The dam blocks the passage of fish and other aquatic organisms
- Interrupts natural sediment transport, which results in downstream erosion
- May mitigate peak flows during large storm events
- Excessive accumulation of sediment in the pond has reduced both recreational and water quality
- Although it is satisfactory condition, Hartley Dam considered a Class I Hazard Dam (high risk) due to probable loss of human life and impacts on economic, environmental, and emergency response actions if it were to fail

Value of Hartley Pond

- Frequented by waterfowl such as ducks, geese and swans
- Used by anglers, although the quality of the fishery is low
- Used by the public for canoeing, kayaking, swimming and skating
- It is aesthetically pleasing to the public that recreates within the Park
- Used by Hartley Nature Center and other local educational entities for environmental studies

Feasibility Study

- What is a Feasibility Study?
  - A study to assess the proposed project alternatives' viability, practicality, and potential success while considering economic, technical, legal, and social factors.
  - Evaluate specific alternatives with regards to mitigating the negative impacts of warm water, sediment, and migration barrier that results the Hartley Pond Dam
  - Higher level analysis than detailed design but will inform design and process moving forward

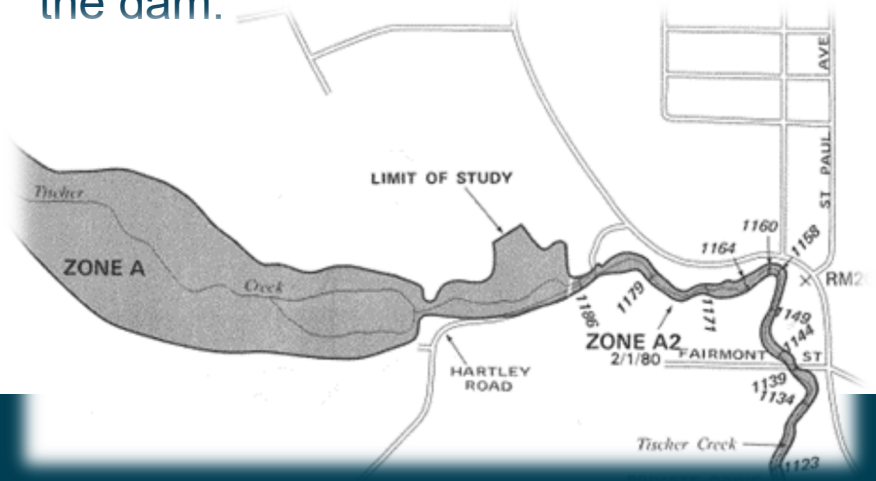
- Who are the partners?
  - City of Duluth
  - Minnesota Department of Natural Resources

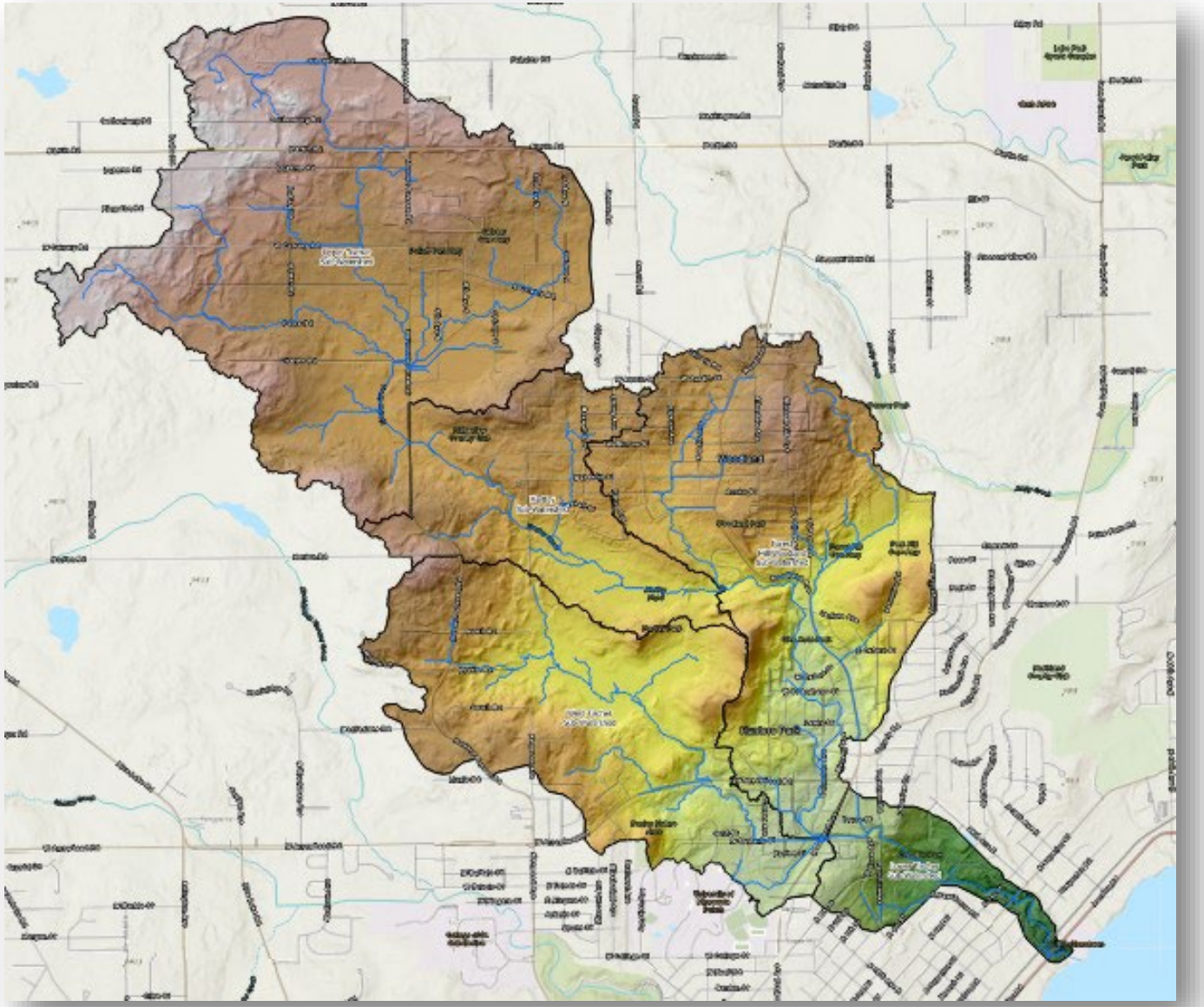
Feasibility Study Process

- Site visit and assessment of data
  - Historical and existing conditions
- Identify alternatives and conduct the following analysis/assessments for each alternative using the five components of watershed health and social factors
  - Hydrology – base flow and flood mitigation effects
  - Connectivity-ability for fish and other species to navigate the stream system
  - Biology – brook trout, other species
  - Geomorphology – stream processes and sediment transport
  - Water Quality – for example, dissolved oxygen and temperature
- Feasibility determination for each alternative
- Final report and recommendation, including technical, environmental, social, and regulatory factors

Modeling

- Hydraulic and Hydrologic study is being conducted to determine the following:
  - Impact of dam on downstream flooding potential
  - Model constructed to run various scenarios that are being considered for the dam.

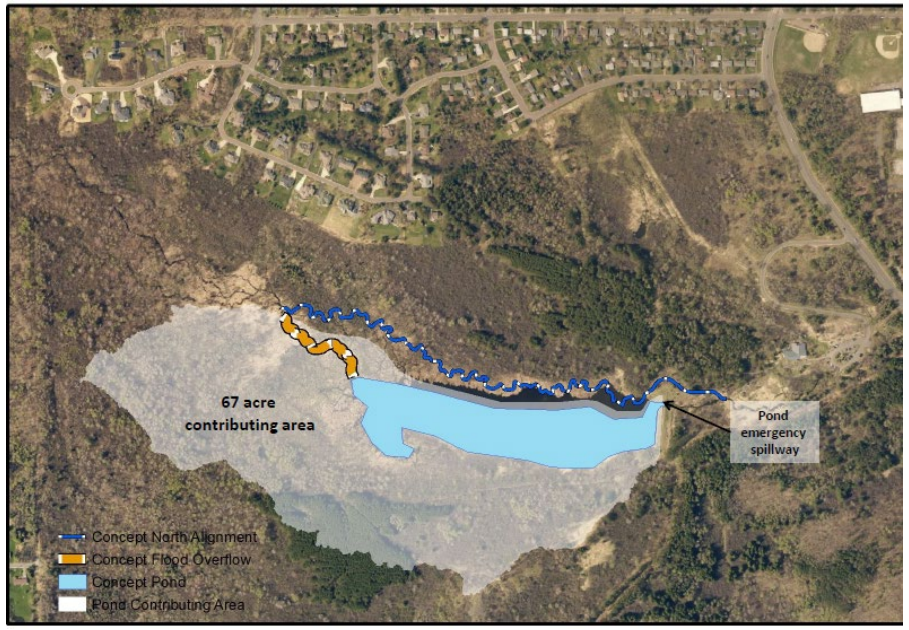




Proposed Alternatives

Alternative #1 - Leave dam in place and route a channel around the dam

- Sub alternative, dredge pond



Alternative #2 - Construct rock arch rapids at outfall of dam

Alternative #3 - Remove or modify existing dam and construct a stream channel in the original stream valley

- Sub Alternative would consider excavation of a pond

Alternative #4 - Do nothing

Next Steps

- Finalize the alternatives for evaluation in the feasibility study process
- Evaluate each alternative against issues such as stream temperature, habitat, fish passage, etc., using the five watershed components
- Analyze impacts on flood storage capacity for each alternative
- Analyze potential downstream flood and water quality impacts for each alternative
- Strive to develop an alternative that satisfies as many public interests as possible
- Secure support for the preferred alternative from the Parks Commission, Natural Resource Commission, and City Council

Thank You!
Questions?

Hartley Pond Feasibility Study

February 23, 2023