

Improving Urban Ecosystem for Recreational Use:

Carpenter Lake Restoration



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Carpenter Lake Restoration Location

- Southfield is located just north of the City of Detroit in Oakland County Michigan
- 26 square miles with a population of approximately 76,000, and a work day population of 175,000
- Only 4% of land undeveloped



Carpenter Lake Restoration

Urban Community

Issue: Urban Community

- Lack of public access to water
- Lack of public access to natural open spaces

Solution:

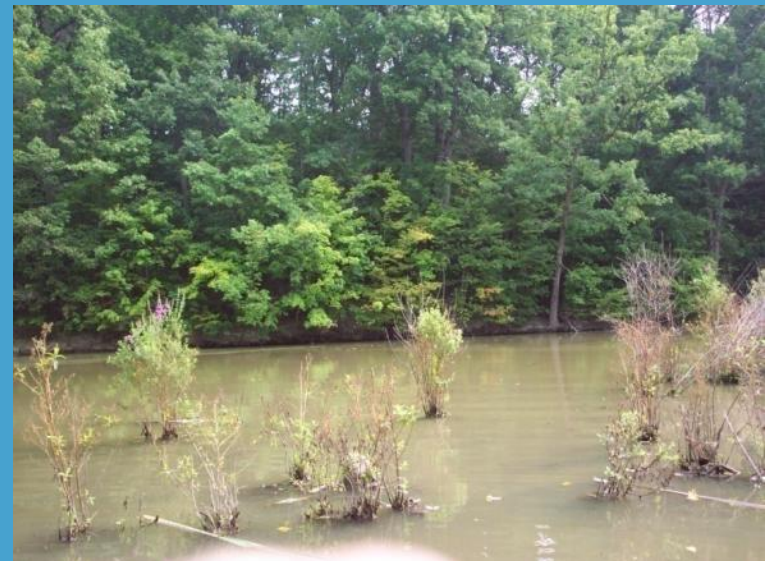
- City acquired 42 – acre property in 2003 that includes the only “Lake” in the City of Southfield



Carpenter Lake Restoration

Issues to Address

- Sedimentation reduced 8 acres to 3 acres
- Average depth 2 feet
- Maximum depth approximately 4.5 feet
- Invasive plants
- Carp dominated
- Lacks habitat
- Lack of public access



Carpenter Lake Restoration

Issues to Address

12 Foot Dam

- By-pass inoperable
- Earthen dam embankment missing
- Undersized
- Overtopping
- Structural integrity / public safety issues



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Design Considerations

- Storm Water Control
- Interpretive Opportunities
- Existing Woodlands Preservation
- Neighborhood Concerns & Easements
- ADA
- Site Constraints/Access
- Aquatic Habitat Integration
- Native plant selection
- Aesthetics
- Sustainability



Carpenter Lake Restoration

Lake Restoration Construction



Carpenter Lake Restoration

Dam Restoration Construction



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Habitat Restoration Construction



Carpenter Lake Restoration

Fishery Management

- 2 lakes and 2 miles of river
- Drawdown consolidation
- Electro shock seines and probes
- Seine and net collection



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Fishery Management

- 87% by bio mass common carp (1250 lbs)
- 8% Bullhead and Sucker
- 5% others (including large mouth bass and sunfish)
- Game fish were released back into the waters
- Rough fish landfilled



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Fishery Management

FISH STOCKING

- Large Mouth Bass
- Channel Catfish
- Hybrid Sunfish
- Bluegill Sunfish
- Fathead Minnows (food)



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Nature Preserve



Carpenter Lake Restoration Nature Preserve

NATIVE MEADOW

Spills from the dredged Carpenter Lake replaced an open area on the edge of forest and has been repaired with native meadow and prairie species.

LAKE PLAIN FOREST

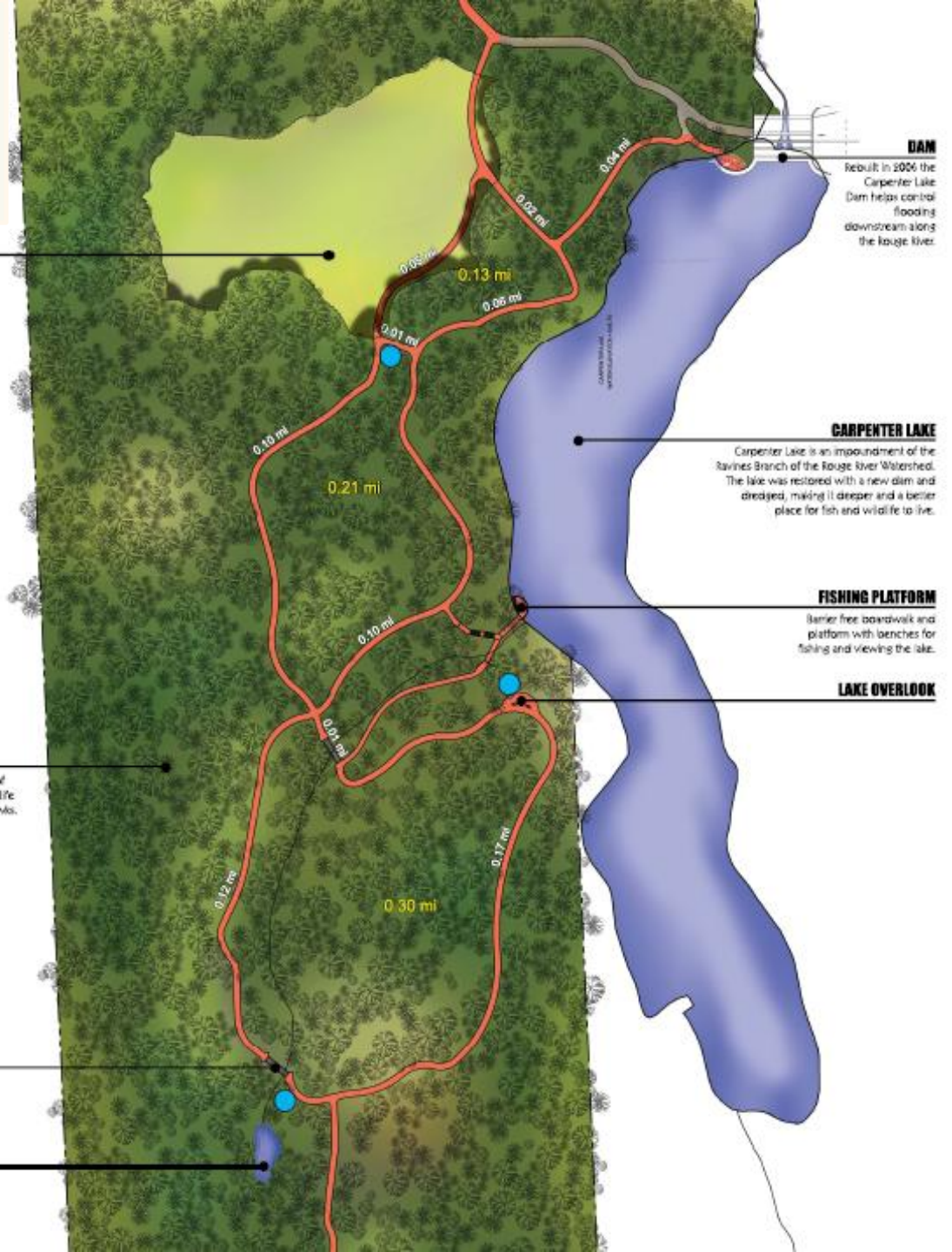
Heavy clay soils support a variety of deciduous trees which attract wildlife. White Tailed Deer & Red Tailed Hawks.

BOARDWALK BRIDGE

Boardwalk bridges pass over sensitive wet areas to preserve species and water movement.

VERNAL POND

Vernal ponds typically hold water only part of the year which gives rise to a unique combination of plants and animals.



DAM

Rebuilt in 2026 the Carpenter Lake Dam helps control flooding downstream along the Rouge River.

CARPENTER LAKE

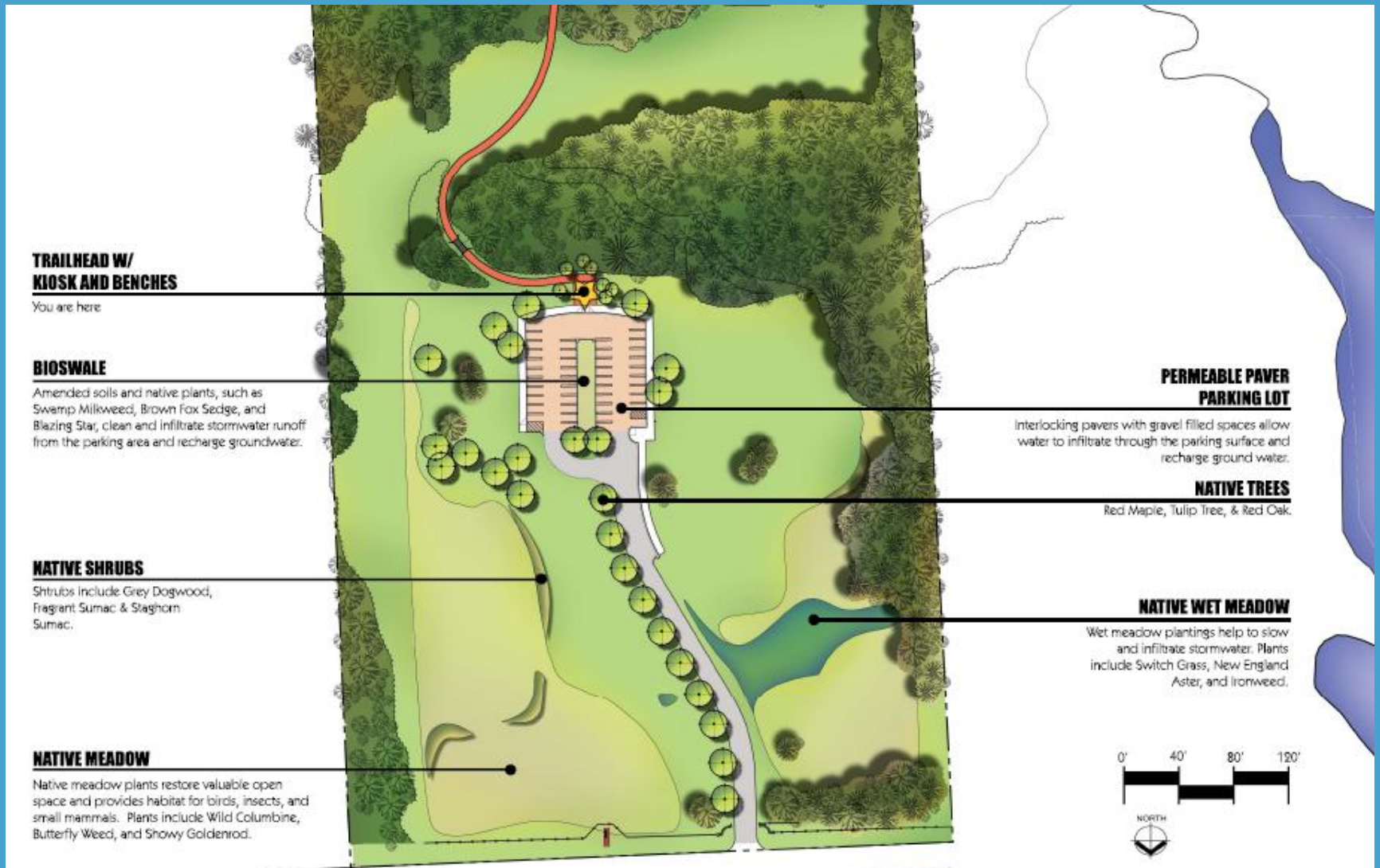
Carpenter Lake is an impoundment of the Ravines Branch of the Rouge River Watershed. The lake was restored with a new dam and dredged, making it deeper and a better place for fish and wildlife to live.

FISHING PLATFORM

Barrier free boardwalk and platform with benches for fishing and viewing the lake.

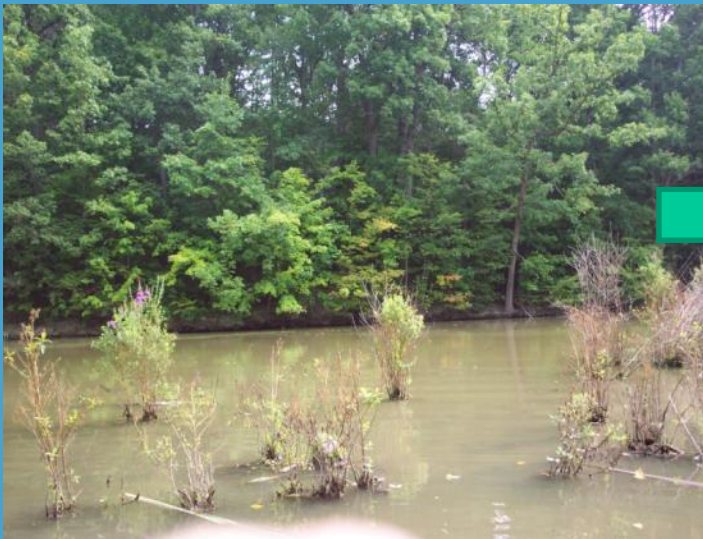
LAKE OVERLOOK

Carpenter Lake Restoration Nature Preserve



Carpenter Lake Restoration

Post Restoration



Carpenter Lake Restoration

Storm Water Management

- Storm flow control
- Pervious pavement
- Bio swales
- Native planting
- Wetland preservation

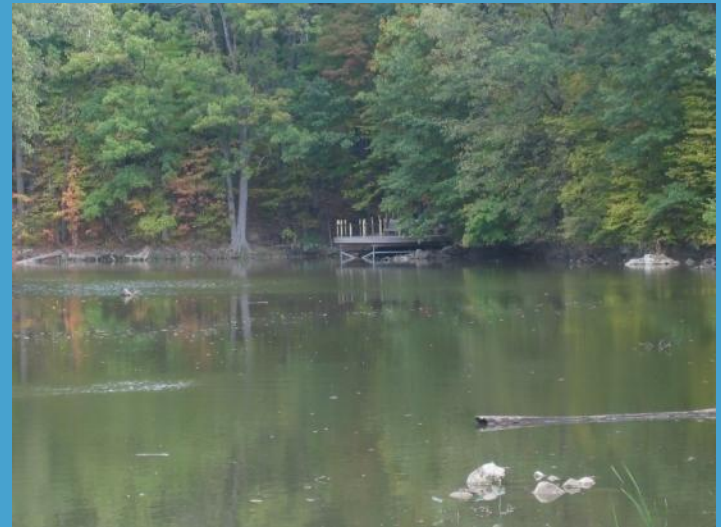


Carpenter Lake Restoration Cost

- Total Cost: \$3,300,000
 - Sediment – \$600,000
 - Dam Reconstruction – \$1,000,000
 - Habitat Development – \$300,000
 - Fish Removal / Restocking - \$125,000
 - Nature Preserve Development - \$700,000
- Funding: Local, State, and Federal Dollars
 - City of Southfield – Public Works and Parks & Recreation Departments
 - Michigan Natural Resources Trust Fund (Michigan Department of Natural Resources)
 - Rouge National Weather National Demonstration Project (EPA through Wayne County, Michigan)

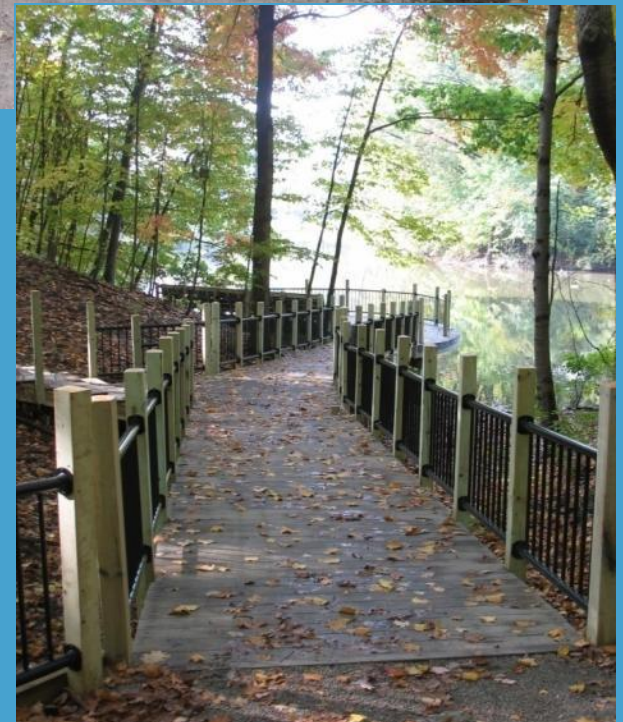
Carpenter Lake Restoration Success

- Removal of over 30,000 cubic yards of sediment
- Wetland fringe habitat established
- Flood storage for the Rouge River watershed increased
- Fish habitat developed
- Non-native and nuisance fish removed
- Public warm water fishery established



Carpenter Lake Restoration Success

- Diverse wildlife sightings
- Nature Preserve: Visitor amenity to City
- Protection of sensitive natural areas
- Nature education and interpretation
- Public access to water
- Public access to natural open spaces



Carpenter Lake Restoration Project

Concept

to

Reality

