



Clear Fork Reservoir Sedimentation Study



Study Purpose and Background

Clear Fork Reservoir

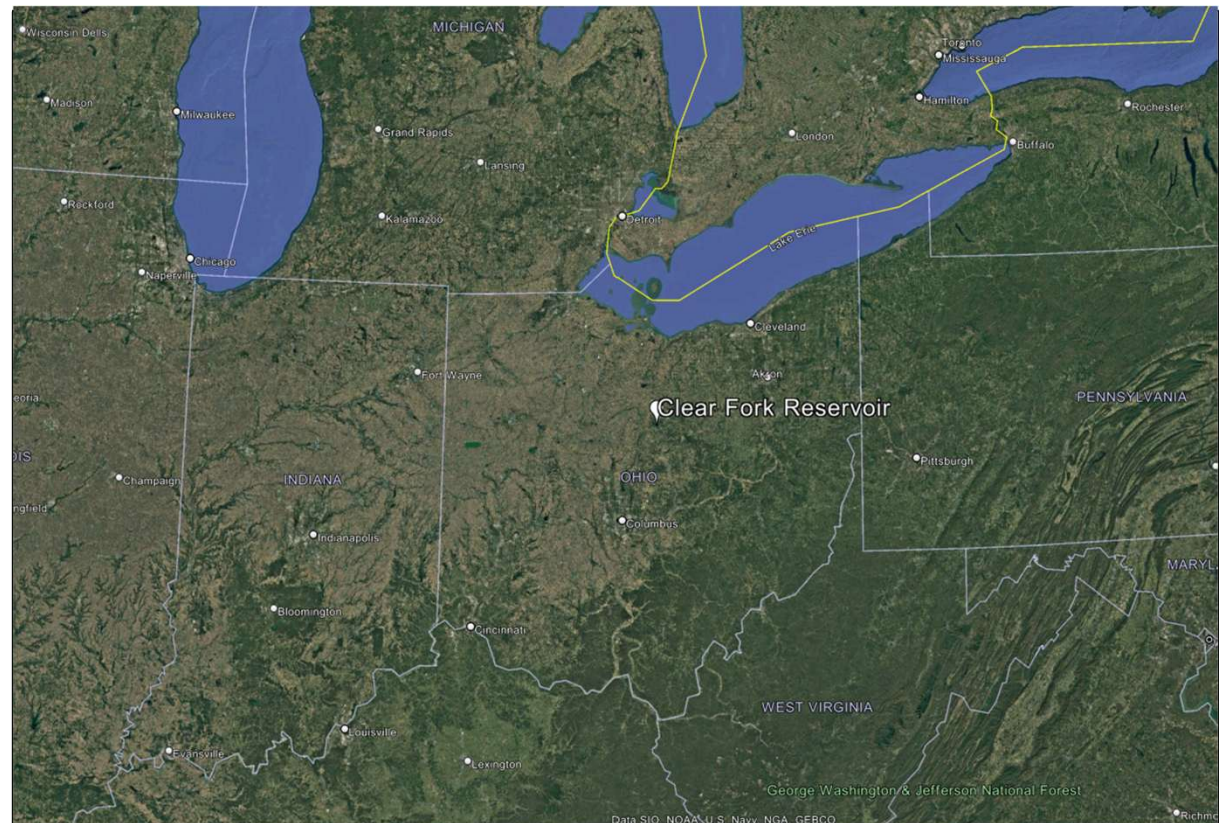
Constructed in 1949, the reservoir has provided drinking water for over 70 years.

Sediment Accumulation Impact

Sediment naturally collects over time, reducing storage capacity and potentially affecting water withdrawal.

Study Purpose

The study evaluated sediment levels and rates to support long-term water supply reliability planning.





Why the Study was Conducted

Sedimentation Impact

Unmanaged sedimentation reduces reservoir storage capacity and limits operational flexibility over time.

Need for Baseline Data

Updated measurements established a baseline to responsibly plan and compare future reservoir conditions.

Proactive Water Management

The study supports proactive planning to ensure water supply reliability for community demands.





How the Study was Conducted

Bathymetric Survey

Survey equipment was used in 2025 to measure reservoir depth and lake bottom.

Historical Data Comparison

Measurements from 2025 were compared with 1949 and 1999 surveys to track sediment accumulation over time.

Water Balance Modeling

A daily water balance model simulated reservoir inflows, outflows, and evaporation to estimate future conditions.

Sediment Management

Introduce potential sediment management options.



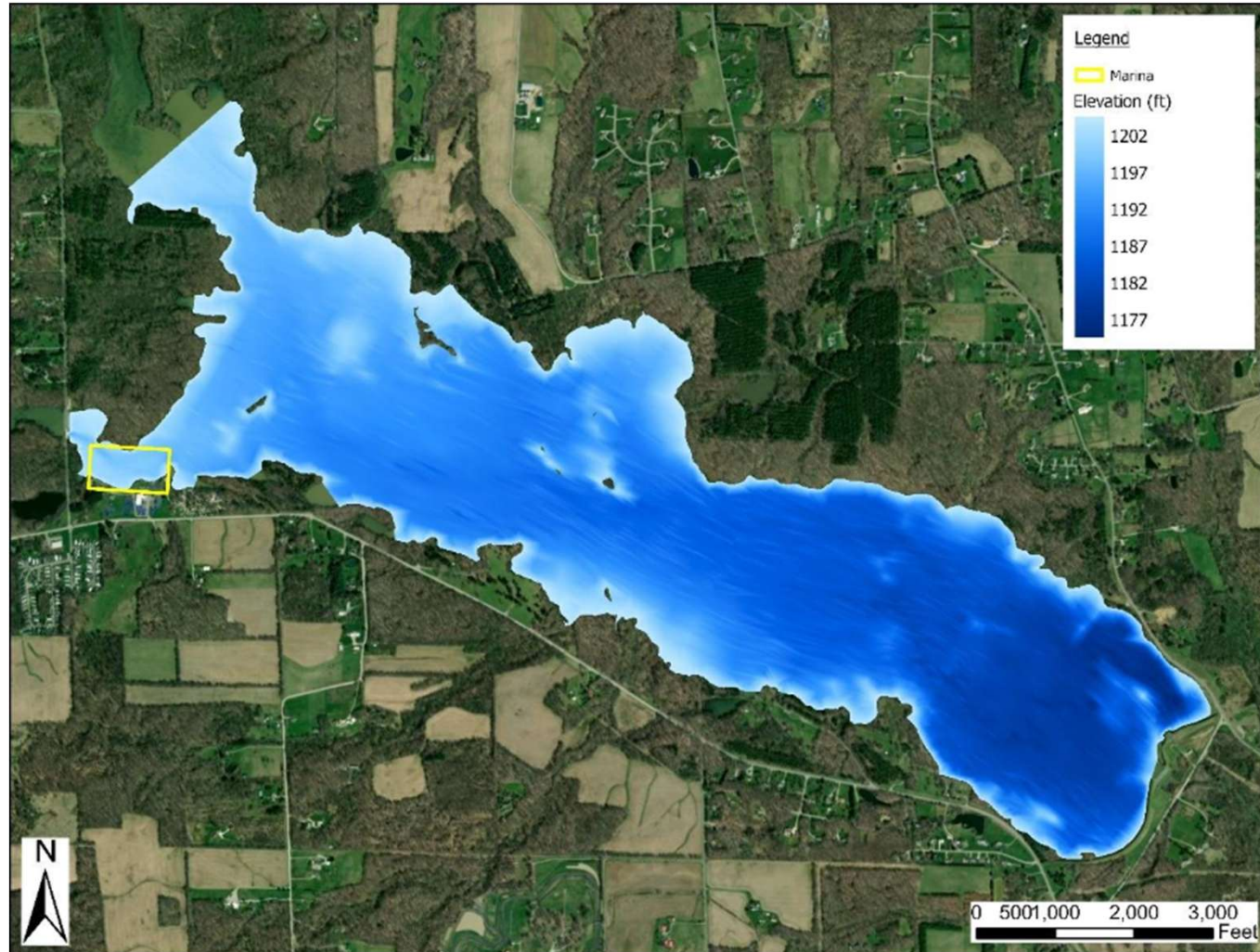
What Sedimentation Looks Like in the Reservoir

Sediment Distribution

Largest sedimentation depths within the original stream channel and at upstream end of reservoir.

Sediment Depth

Some locations have more than ten feet of sediment buildup, raising the reservoir bottom over time.





How Much Sediment has Accumulated

Sediment Volume Accumulation

Approximately 5.5 million cubic yards of sediment have accumulated in the reservoir since 1949, reducing storage capacity by 26%.

Reservoir Capacity

Study showed that reservoir still reliably meets today’s water demand.

Increasing Sedimentation Rates

Recent decades have shown increased sedimentation rates compared to earlier periods.

Data-Driven Future Planning

Quantifying sediment helps evaluate reservoir management options based on available data.

	Average Annual Sedimentation Volume (CY/year)	Total Sedimentation Volume (MG)	Total Sedimentation Volume (CY)	Decrease in Storage Capacity ⁽¹⁾
1949-1999	62,700	646	3,197,082	15%
1999-2025	88,250	463	2,294,155	13%
1949 - 2025 (Total Change)	72,253	1,109	5,491,238	26%

(1) Percentages are based on initial capacity at the year referenced (1949 or 1999); therefore, the sum of the listed percentages does not equal the total percentage from 1949 to 2025.



Current Water Supply Reliability

No Immediate Corrective Action Needed

At today's water demand, Clear Fork Reservoir remains a reliable water source.

Reliable Water Supply

Clear Fork Reservoir currently supplies about 4.5 million gallons per day. This is about 40% of Mansfield's water demand, with about 60% from wells.

Stable Reservoir Levels

Reservoir refills annually, maintaining stable water levels for intake operations.

Sedimentation Impact

Current sedimentation level does not impact operation using current intake.

Future Conditions at Current Reservoir Demand

Reservoir Performance Projection

Modeling through 2075 shows reservoir can maintain function with current water demand despite sediment buildup.

Intake Functionality

Current intake remains operational above sediment levels, supporting continued water withdrawals at current demand.

No Immediate Intervention Needed

Study recommends continued monitoring and planning, but no major sediment removal is urgently required under current demand.



Future Conditions at Higher Reservoir Demand

Daily withdrawals of 9.5 million gallons and above were checked to assess future water availability.

Current Intake Capacity Limits

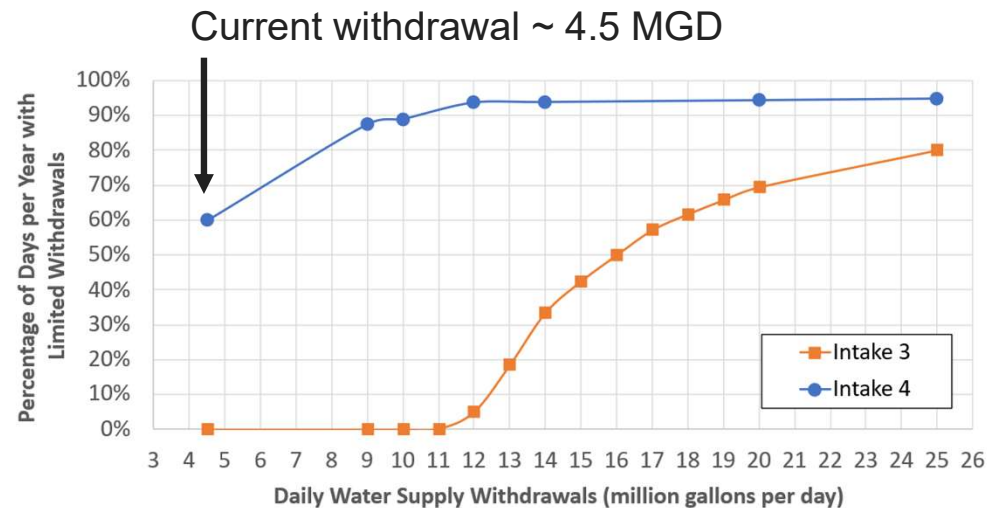
Current intake can reliably support withdrawals up to about 11 million gallons daily.

Risks of Higher Withdrawal

Higher withdrawal rates increase risk of low water or algae intake.

Planning and Decision-Making

Water demand has greater influence on supply than sedimentation, provided current intake remains functional.





Sediment Management and Dredging Options



Large-Scale Dredging

A one-time large dredging project can restore significant storage but involves high costs and complexity.



Routine Maintenance Dredging

Routine dredging every few years offers a flexible, adaptive approach to managing sediment accumulation.



Targeted Sediment Removal

Targeted dredging near intake tower can improve operational flexibility at a lower cost.

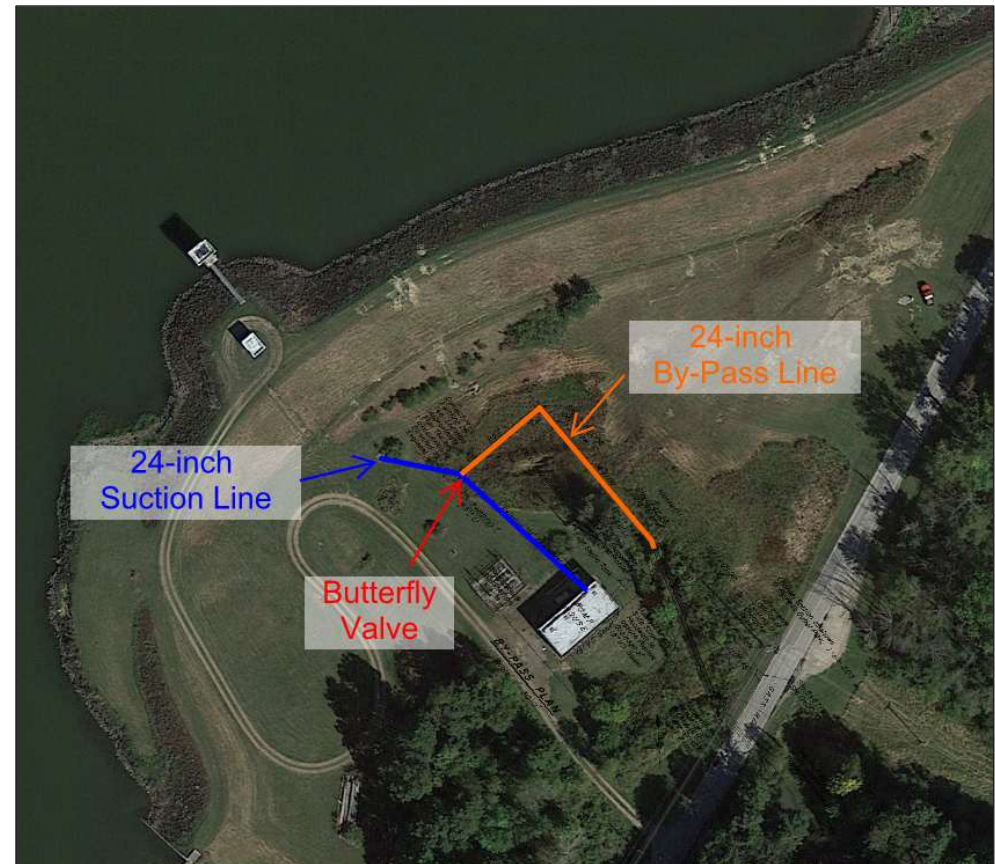
The planning horizon for major dredging is on the order of 5-10 years, or longer to secure funds



Sediment Management and Dredging Options

Non-Dredging Strategies

Sediment bypassing and upstream watershed improvements can reduce future sediment accumulation.





Cost and Permitting Considerations

High Costs of Large Projects

Large dredging projects can require tens of millions of dollars and 5-10 years of planning, design, and permitting.

Coordination with Regulatory Agencies

Sediment management projects require coordination with state and federal environmental authorities for appropriate permitting.

Importance of Early Planning

Early planning is important when considering large-scale projects. It allows for preparedness and thoughtful decision-making.

Water Quality Protection

Permitting processes protect drinking water quality which is critical during sediment management activities.



Key Takeaways and Recommended Next Steps



Reliable Water Supply

Clear Fork Reservoir remains a dependable water source expected to sustain supply for decades under current demand.

Sedimentation Considerations

Sedimentation is a long-term issue requiring ongoing monitoring and planning rather than immediate action.

Recommended Next Steps

- The City will continue to monitor water demand trends and reservoir performance over time.
- The City will maintain awareness of sediment conditions through periodic evaluation as needed.
- Future actions such as sediment bypassing and removal near the intake tower will be re-evaluated based on changes in demand and system performance.