



§1 — Chapter 1: Executive Summary

Introduction

On May 19, 2020, and after days of steady rain, the Edenville Dam in Gladwin County, Michigan, failed. The resulting surge overwhelmed the Sanford Dam in Midland County, causing it to fail. The upstream Secord and Smallwood dams were also damaged by the flood and the Federal Energy Regulatory Commission (FERC) ordered the private dam owner, Boyce Hydro Power (Boyce), to fully lower both lakes for inspection and repair. Ten thousand people were evacuated, the area was declared a national disaster by the president of the United States and the community was left with extensive economic, environmental and property damage.

The recovery (i.e., interim stabilization) and restoration of the four dams (Secord, Smallwood, Edenville and Sanford), and the four lakes (Secord, Smallwood, Wixom and Sanford) (Four Lakes) along with their ecosystems is estimated to cost between \$250 and \$300 million.¹ The Four Lakes communities consist of more than 8,400 properties, with an average home value of approximately \$117,909.² If the lakes are not restored, the cost for dam removal and environmental mitigation alone could cost \$125 million.³ The impact on the economy of the four communities that have lost their lakes is incalculable. Amidst this tragedy, Boyce filed for bankruptcy protection and is insolvent.

The only path forward to protect the safety, welfare and environment of the lake communities was for Gladwin and Midland counties to take the properties through their eminent domain authority under Part 307, inland lakes of the Natural Resource and Environmental Protection Act 451 of 1994 (Part 307). Through this authority, Four Lakes Task Force (FLTF), as the counties' delegated authority, performed emergency repairs and continues to manage the recovery and restoration of the Four Lakes System and make plans to restore the lakes to their Part 307 legal levels as defined.

FLTF published its Recovery and Restoration Plan in September of 2020. In it, FLTF committed to having a feasible plan for the restoration of the lakes by May of 2021. In December 2020, the counties obtained the title of the dams, gaining control of the properties, and making it possible to begin work in earnest to restore the lakes.

Engineering and financing to fund the capital improvements to restore the four dams are underway. FLTF is committed to restoring Secord and Smallwood legal lake levels by 2024, Sanford by 2025 and Wixom by 2026. FLTF's plan to accomplish this is summarized below.

Public Sector Consultants Survey

FLTF hired Public Sector Consultants (PSC)⁴ to survey all property owners within the Four Lakes Special Assessment District (SAD). FLTF was interested in understanding property owners' willingness to pay an assessment to rebuild the dams to restore the lakes, as well as understand property owners' preferences and concerns as it relates to the dams. Several key takeaways are highlighted below and discussed in greater detail in the report findings.

¹ Estimated costs of recovery, engineering, design and construction.

² See Public Sector Consultants Demographic Report in Chapter 1 Appendix.

³ See Decommissioning Report for Secord, Smallwood, Edenville and Sanford Dams in Chapter 1 Appendix.

⁴ Results of the Public Sector Consultants community survey are shared in detail in Chapter 5.



- Survey respondents were overwhelmingly in favor of rebuilding and restoring the dams to restore their lake.
- Respondents who owned lakefront property were more in favor of rebuilding the dams.
- Property owners on Secord Lake were willing to pay at least \$500 annually to support the repair of the dam on Secord Lake. This was the highest level of support for paying something to repair and rebuild the lakes and may indicate the property owners on Secord Lake are the most comfortable with current assessment estimates.
- The lakes are incredibly important to property owners within the SAD.
- Most property owners have owned their property for 10 years or more, indicating a strong connection to the property. Given the length of ownership, it was interesting that 50% of respondents indicated they would consider selling their property if the lakes were not restored.
- Property owners across all four lakes agreed that people outside the SAD should be contributing to the cost of rebuilding and repairing the dams, in particular, the state and federal government should be contributing more.

Legal Structure for the Four Lakes

Failed System of Federally Regulated Hydroelectric Dams: Four privately-owned dams and lakes that existed for almost 100 years ended in an avoidable disaster in May 2020. This group of dams included perpetually deeded lake properties and access for adjacent properties. After years of non-compliance and neglect by the dam owner, a worst-case scenario occurred. Neither FERC nor the Michigan Department of Natural Resources (MDNR) was able to enforce Boyce to maintain its facilities, comply with emergency orders, or provide any recovery support. Boyce did not comply with FERC or State of Michigan orders and escaped its obligation through bankruptcy.

Incredibly, there is no emergency power for FERC to assume control of a failed dam, or funding recourse to restore the property or environmental damages if the owner of the dam is unable or refuses to do so. FERC revoked Boyce's Edenville Dam license in 2018 and will likely rule that an implied surrender occurred by Boyce for the remaining three FERC licensed dams, putting all four lakes and their dams under the jurisdiction of the Michigan Department of Environment, Great Lakes and Energy (EGLE).

Michigan Legal and Regulatory Governance of Lakes or Dams: There are 2,500⁵ dams in Michigan. If a private owner chooses or cannot operate a dam safely, or if a dam fails, EGLE has emergency authority to order the owner of a high hazard dam to make necessary safety improvements. Although, as demonstrated by the Edenville case, once it assumes jurisdiction of a dam it must seek funding to accomplish what it ordered the owner to do. The only recourse for a community to save the lakes and their associated ecosystems is to acquire the property, repair the dams and maintain the lakes under Part 307.

The Four Lakes Situation: After the FERC revocation of the Edenville license, the counties petitioned the Gladwin and Midland Circuit Courts, which subsequently issued orders, with EGLE and the MDNR's concurrence, to establish legal lake levels for the four lakes and the Four Lakes

⁵ https://www.michigan.gov/egle/0,9429,7-135-3313_3684_3723-9515--,00.html.



SAD. FLTF was contracted as the counties' delegated authority under Part 307, and an affordable \$35 million⁶ plan was developed to acquire all four lakes and maintain the legal lake levels into the future, with an estimated average assessment of \$350 for a waterfront owner. That plan, along with the opportunity to offset costs to operate the dams with hydropower revenues, was extinguished by the May 2020 failures.

Recovery: Without the Part 307 legal lake level order, or had the counties not exercised their authority of eminent domain under Part 307 after the dam failures, the property would have remained in dispute through bankruptcy for years. Conditions for public safety would have continued to deteriorate, and damage to the ecosystems would amass, with no regulatory or legal path to resolve the situation.

Using its authority under Part 307, and FLTF as its agent, the counties acquired the properties from bankruptcy and sponsored a coordinated recovery. With private support, funds from the State of Michigan and matching grants from the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), approximately \$40 million was raised to stabilize the damaged dams, abate shoreline erosion and remove tons of debris from the dry lake beds. It is costing approximately \$600,000 this year just to manage these lakes in their lowered state until the dams are rebuilt, and the legal lake levels are reestablished. Fifteen million dollars is being spent on studies and engineering to prepare for the restoration of the Four Lakes.

Public Policy: This disaster sounded an alarm throughout the United States on the issue of aging dams under private ownership. FERC asked for input on the need for financial considerations, and FLTF responded.⁷ Michigan's governor formed a Dam Safety Task Force, and FLTF provided input.⁸ FLTF's position on public policy simply stated is:

- Infrastructure that can impact the public and the environment cannot be allowed to “age” to failure. It must be managed safely on a lifecycle basis and improved in response to changing environmental conditions and evolving dam safety requirements.
- Federal and state governments need to establish reserve funds to take emergency action or restore damage to natural resources.
- Part 307 of the Michigan Natural Resources and Environmental Protection Act 451 of 1994 is the appropriate framework for the transition of lake ownership from private to public and restoration of the lakes.
- FLTF supports the general recommendations of the Michigan Dam Safety Task Force for reform.⁹ However, Four Lakes cannot simply be the poster child for what should be done for future dams and lakes. Going forward, this must be a private-public partnership to restore these lakes. FLTF is encouraged since the failure that the State of Michigan has funded \$17.5 million for initial recovery. EGLE and FLTF have been working together in partnership for recovery with a long-term plan for the region in mind.¹⁰

⁶ \$35 million was the “not to exceed estimate” for financing that was approved by the counties prior to the dam failures.

⁷ FLTF letter to FERC: https://www.four-lakes-taskforce-mi.com/uploads/1/2/3/1/123199575/fltf_to_ferc_re_taking_of_properties_and_comments_and_requests_related_to_fercs_dec_7_order_1.5.21.pdf.

⁸ FLTF Comments on Recommendations of Dam Safety Task Force, January 27, 2021: <https://www.four-lakes-taskforce-mi.com/updates/fltf-comments-on-dam-safety-task-force-recommendations>.

⁹ Michigan Dam Safety Task Force Report, February 12, 2021.

¹⁰ https://www.michigan.gov/documents/egle/egle-EdenvilleDamPreliminaryReport_700997_7.pdf.



FLTF will restore the system using current best practices for safety and ecosystem restoration. It will take the next two years to develop a financeable construction path forward for each dam. During that time, FLTF will advocate for regulatory and legislative intervention to lower the burden of the cost of restoration to the lake community and seek support for the failures of a regulatory system that not only failed to protect but left the financial burden of recovery on those that the regulations were intended to protect.

Four Lakes Task Force Conclusion: The Best Alternative Is to Move Forward

FLTF conducted this thorough feasibility report that includes the following three critical components:

- The experience and information we gained in the recovery phase to stabilize the dams and bottomlands
- Inspections, condition assessment, analyses and preliminary designs to rebuild the dams, performed by nationally recognized experts in dam engineering, design and safety
- Engagement with the community and consulting with government agencies

FLTF Conclusions:

The best alternative for Midland and Gladwin counties is to fulfill their legal obligations under Part 307 to return the four lakes, as soon as safely possible, to their legally defined lake levels. Survey respondents were overwhelmingly in favor of rebuilding and restoring the dams to restore the lakes.¹¹

The lake levels of the four lakes as legally defined under Part 307, best describes the end state of the restoration — “...that best protect public health, safety and welfare; that best preserve the natural resources of the state; and that best preserve and protect the value of property around the lake.”¹²

It is technically feasible to rebuild and repair the dams. FLTF assembled an experienced team that has the necessary expertise. FLTF’s most recent cost projections are lower than originally estimated for Edenville and Sanford dams, and have slightly increased for Secord and Smallwood.

FIGURE 1: Dam Restoration Costs

	Restored By	Total Cost ¹³
Secord Dam	2024	\$25.1 million
Smallwood Dam	2024	\$17.9 million
Edenville Dam	2026	\$120.9 million
Sanford Dam	2025	\$51.2 million

¹¹ See PSC Survey data in Chapter 5 Appendix.

¹² <http://legislature.mi.gov/doc.aspx?mcl-451-1994-iii-1-inland-waters-307>.

¹³ GEI Report, Chapter 7 Appendix.



Restoration of the four hydroelectric facilities is not financially feasible.¹⁴ The hydroelectric facilities were marginally economic before the May 2020 failures. The additional costs to repair the damage and restore the power-generating facilities make hydropower impractical under current conditions.

Historical flooding would still exist without the dams. Flooding that occurred downstream in May 2020 was already in progress because of heavy rains before the dam failures. Forty percent of the water that flows into the City of Midland is from the Tittabawassee River watershed. The remaining 60% is from the Pine, Chippewa and other smaller rivers. Midland is a known flood zone that has been problematic for over a century and FLTF is working with the Midland and Gladwin communities, National Weather Service, U.S. Geologic Service, and other agencies to better understand the historic causes of flooding and collaborate to find solutions throughout the watersheds.

FLTF must be committed to being a responsible operator of the dams and a good steward of the public trust. While the independent investigation team has not completed its report, it has become clear to FLTF that these dams should not have failed if they were managed on a lifecycle basis, kept compliant, maintained to respond to changing conditions and received necessary improvements to maintain a high degree of public safety.

Critical Actions Underway:

Hydraulic modeling is being performed with and without the dams to establish flood depths, flow rates and water surface elevations at critical locations upstream and downstream of FLTF dams. Inundation maps and flood profiles are being developed upstream and downstream of FLTF dams to establish the floodplain inundation limits at critical locations. The inundation mapping also identifies roads, highways, bridges and other critical infrastructure impacted by the floods including major roads expected to be overtopped. The flood inundation limits and discharges downstream of Sanford Dam for the dam removed and dam reconstructed scenarios will be compared to ascertain the incremental impacts of reconstructing the four dams.

Towards this end, FLTF is conducting new extreme precipitation, hydrology and flood studies to establish the design criteria and proposed dam configurations to safely pass the inflow design flood per EGLE requirements. The scope of the new studies includes the total watershed from the headwaters above the Secord Dam to just downstream of Sanford Dam. In other words, this will include the total rainfall and runoff in the Tittabawassee River system upstream of the Sanford Dam. The extreme precipitation study will provide calibrated rainfall totals observed during historic flood events (including May 2020) and an estimation of the probable maximum precipitation (PMP). The hydrology study will include new estimates of recurrence interval flood events such as the 100-, 200- and 500-year storm events up to the probable maximum flood (PMF).

The design storm criteria on all FLTF dams will be based on an Inflow Design Flood (IDF) per the Federal Emergency Management Agency (FEMA) Dam Safety Guidelines¹⁵ as recommended by the Michigan Dam Safety Task Force.¹⁶ The selected design storm will likely exceed the current EGLE dam safety requirements for each of the FLTF dams.

¹⁴ See Chapter 1 Appendix for Update to Hydropower Feasibility.

¹⁵ https://www.fema.gov/sites/default/files/2020-08/fema_dam-safety_inflow-designs_P-94.pdf.

¹⁶ https://www.michigan.gov/documents/egle/2021-02-25-MI-Dam-Safety-Task-Force-Report-to-Governor-Whitmer_717510_7.pdf.



FLTF has a primary focus on the management of the system for public safety, preserving the environment and ecosystem services and proactively working with the counties on strategic flood mitigation and improved flood management during historical storms. To help address the regional flood issue, FLTF expanded the scope of the PMP study to include the entire Tittabawassee watershed upstream of Midland. FLTF will share the precipitation study results with other stakeholders and proactively work with public officials on strategies for flood mitigation and improved flood management during storms. The above studies are expected to be completed this year.

Short-term funding is needed to develop a financeable plan for all four dams to avoid delaying the project:

- An assessment will be needed by the winter of 2022 if additional funds are not received.
 - Approximately \$10 million will be needed by early 2022 for the recovery phase, to complete the engineering and design to rebuild the dams and to avoid a year delay on Sanford and Wixom lakes' restoration. FLTF is working on this issue and believes it can be resolved. Twenty-five million dollars or more would significantly reduce the risk to project timing by addressing long lead time items.
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An environmental framework has been established and will be implemented. This includes the environmental permitting requirements to repair or reconstruct each dam. Wetlands and other environmental resources directly impacted by reconstruction activities of the four dams will be addressed and mitigated. Secord and Smallwood, while in need of major repair, are still in serviceable condition, and EGLE has agreed these two dams will be treated as “drawdown and repair.” Environmental restoration efforts at Wixom and Sanford lakes will focus on the ecosystems that will exist after the lakes are brought back up. FLTF and EGLE are cooperatively in dialogue to ensure all parties are aligned on an environmental restoration plan to restore all four lakes to their legal lake levels.

An assessment of property owners in the Four Lakes SAD needs to be in place by the end of 2022 to attract funding and assure there are financial means for long-term operations and maintenance. The Four Lakes system is complex based on its geographic reach, multiple communities and diversity of waterways. Benefit factors in connection with the apportionment of costs will be refined by the end of 2021.

If the cost to rebuild the dams cannot be significantly lowered, if additional public funds do not become available, or if there is not sufficient public support, property owners' ability to pay will be challenged. Property values and demographic data suggest most of the lake property owners can afford moving forward. Unfortunately, there would be many who could not. For those property owners, FLTF is working with the counties to identify options to support primary homeowners who risk being displaced because of the assessment if more state or federal funding does not become available.

Community advocacy is needed to support FLTF in its efforts. This disaster occurred under a private owner regulated by a federal agency that had no clear remedy for the affected communities. FLTF must find a way to lower the cost and impacts of this disaster. Approximately \$150 million in funding is needed to get close to the estimated assessment values to pre-failure and significant grants will be needed for much of the environmental restoration plans.



Status on Each Lake:

Secord has an estimated assessment that most of the property owners can financially manage and there are funds to finish the engineering and financing for the restoration of the lake level.

Smallwood has an estimated assessment roll that most lake owners would likely accept compared to not having a lake. There would be a moderate churn of ownership, most likely in vacation homes, without government support. There are funds to complete engineering and finance the restoration of the lake level.

Wixom has an estimated assessment that would have an economic impact on almost half of the lake homeowners and backlot owners, without state or federal funding. A total of \$4 million in funding is needed to complete engineering without delaying the 2026 timeline of the project.

Sanford, while its estimated assessment is high for waterfront property owners, the value of the homes on Sanford and the economic demographics suggest most can afford and will accept an assessment. Backlots are a different story, and more investigation of lake benefits and economic impact needs to be completed. Approximately \$4 million of funding is needed to complete engineering without delaying the 2025 timeline of the project.

Critical Success Factors

There are four key issues on which FLTF needs to make progress in 2021:

1. FLTF needs to acquire at least \$10 million from outside the SAD by early 2022. In the next three years, approximately \$150 million would bring the funding to the level of assessment estimated prior the dam failure and would be in the means of almost all property owners.

FIGURE 2: Funds Needed to Achieve Lower Assessment

Secord	Smallwood	Edenville	Sanford	Total
Funds Needed to Achieve Below \$500/Year Assessment				
\$317,000	\$10 million	\$90 million	\$37 million	\$137.3 million
Funds Needed to Achieve Below \$1,000/Year Assessment				
\$0	\$1.6 million	\$53 million	\$21 million	\$75.6 million

2. Environmental recovery on Wixom and Sanford lakes is significant, and FLTF is engaged with EGLE to get state acceptance of the restoration plan, and then identify funding sources.
3. A fair and consistent methodology for the assessment of property owners of the Four Lakes SAD needs to be put in place to attract funding and assure that there are financial means for long-term operations and maintenance.
4. Flood studies must be completed, and capacity designs must be acceptable to the state to move forward with the completion of engineering.

FLTF and the counties, under Part 307, have the authority and legal obligation to restore the lakes. With the implementation of this Four Lakes restoration plan, and through continued collaboration between the lake communities, the State of Michigan and the federal government, the lakes can all be returned by 2026.

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