

Appendix D - Part 301 Supplementary Information Summary for Lake Refill

After the failures of the Edenville and Sanford dams, the Boyce Trust escaped its obligations, through bankruptcy, to address the subsequent environmental damage. The Michigan Department of Environment, Great Lakes, and Energy (EGLE) took control of the Edenville Dam to lower the Tobacco side of Wixom Lake to stabilize the dam site. Gladwin and Midland counties took the Boyce entities hydro project properties, with Four Lakes Task Force (FLTF) acting as their agent for recovery from the failure, as well as their Part 307 delegated authority for restoration of the normal lake levels.

The counties and communities should not pay for projects outside the lake level or cannot afford to address all the environmental damage and ongoing impacts from the actions of Boyce under FERC's oversight. The \$200 million Michigan state grant was to FLTF for the Four Lakes SAD, which are for lake level restoration.

It is understood that the restoration of the legal lake level will impact the Tittabawassee River and the tributary streams surrounding the lake. FLTF, with the engagement of 1,000s of volunteers reconfirmed the commitment to restoring the legal normal lake levels, completed a feasibility study, alternative analysis, and a restoration plan, that was acknowledged and supported by EGLE, recognizing EGLE has an oversight role to permit the lake restoration projects. In addition, it has performed a significant amount of mitigation, and features included in its construction plans that will have long term positive impacts on the environment.

EWP Projects

FLTF supported the counties in taking the Boyce Properties to start the recovery effort and volunteered to take oversight of the recovery effort and be the sponsor of the Natural Resource Conservation Service (NRCS) Emergency Watershed Program (EWP). Approximately \$5 million of community donations and \$17.5 million of state grants for restoration were obtained. These funds were used, with EWP Grants, for many restoration and stabilization projects within the watershed. To date, 24 projects have been completed including culvert stabilizations and replacements, shoreline stabilization, debris removal, and the interim stabilization efforts at both Edenville and Sanford dams. A summary of each project including scope of work, cost, impacts, photos, and location maps are included following this document.

Community Involvement/ Volunteer Efforts

Four Lakes Task Force's Board of Directors is staffed with seven volunteers appointed by their respective Lake Associations and a volunteer from each County Board of Commissioners.

NRCS EWP program

The Natural Resources Conservation Service (NRCS) is a branch of the US Department of Agriculture. NRCS has a program called Emergency Watershed Protection (EWP), which provides post-flood-disaster financial and technical help with:

1. Shoreline stabilization- stabilizing eroded shorelines and culverts that threaten structures in the event of future floods.
2. Dam stabilization- stabilizing flood-damaged dams to minimize sediment transfer and further dam failures until the dam can either be repaired or removed.

3. Flood debris removal- removing flood debris, including sediment, that impairs the capacity of the waterway or that could be mobilized in a future flood causing damage downstream. The EWP program assists in assessing post-disaster conditions in the affected area, determining where flood damage qualifies for EWP financial assistance and monitoring flood recovery project work. The EWP program requires a local "Sponsor", a role FLTF has assumed for the four dams, four lakes and the Sanford Village area immediately downstream of Sanford Dam. EWP reimburses up to 75% of eligible construction costs and up to 100% of eligible engineering costs.

Volunteer Work

Volunteers from the community were involved in many aspects of the flood recovery work. This section summarizes the volunteer efforts to date.

Shoreline Stabilization:

A group of volunteers is working with FLTF and contacting property owners in EWP-eligible project areas along stretches of flood-damaged shoreline, where structures (usually houses) were threatened with damage in a future flood event. 22 EWP-eligible shoreline stabilization and culvert projects have been completed around the lakes, with more pending. These volunteers' roles include:

1. Meeting with the affected shoreline property owners one-on-one and in project-level groups.
2. Explaining, in collaboration with Spicer Group and NRCS personnel, the shoreline stabilization project work, cooperation needed from the affected property owners and the property owners' share of the overall project cost.
 - a. Due to limited funds, FLTF needed the affected property owners to participate in project costs. Individual property owners were expected to pay the 25% matching funds for construction cost estimates, or \$5,000, whichever was less.
 - b. Securing cost sharing agreements with the affected property owners.
 - c. The requirement for property owners to share costs greatly complicated reaching agreements on shoreline stabilization projects.
 - d. Some property owners wanted additional work done at their own expense and the volunteers brokered agreements between the owners and contractors.
3. Securing access to the lake's bottom land for construction crews and equipment. This was a joint effort between Spicer Group and the volunteers.

Additional volunteer efforts on shoreline stabilization included the following:

1. FLTF published a recommendation that shoreline erosion could be reduced if shoreline property owners would connect their seawall drains to 4" or 6" drain tubing and run the tubing down to the river or at least far away from their seawalls. A number of property owners did just that.
2. NRCS put on a workshop on DIY shoreline repairs for small projects and taught a group of volunteers how to do these small projects. The workshop included performing a small project in front of a private home on Wixom Lake.
3. On Sanford Lake, Sanford Lake Improvement Board and Edenville Township volunteered their unspent aquatic weed control money to assist affected property owners in sharing the cost of shoreline stabilization projects.
 - a. As a result, agreements with property owners were easier to reach and all Sanford Lake shoreline stabilization projects have been completed. Seven Wixom Lake projects are still pending, due in part to the difficulty in reaching agreements on cost sharing.
4. On the Tobacco River side of Wixom Lake, there was a small shoreline stabilization project to protect a single shoreline property. A Spicer engineer and an NRCS engineer volunteered their time and performed this small repair with hand tools. This project is not included in the total of 22 completed shoreline stabilization projects mentioned above.

Flood Debris Removal:

There have been several ad hoc and organized community efforts to remove flood debris from the Village of Sanford, the Sanford Dam and the bottomlands of Sanford and Wixom lakes.

1. Immediately after the flood and continuing for close to twelve months, several work parties volunteered in the Sanford Village areas, including some pro bono work by local contractors, to organize the massive amount of flood debris in the Village. Some of this debris was hauled away, the rest organized in large piles on County property. This effort occurred before Cooperative Agreements were signed between FLTF and NRCS. Midland County partnered with FLTF to remove the large piles of debris with EWP funding.
2. Sanford Dam accumulated a massive amount of flood debris on the upstream side of the spillways. This was the first NRCS-funded flood debris removal project performed by FLTF via a local contractor (Fisher Construction Company). Volunteers organized the handling of private property recovered by this effort, interfacing with local law enforcement to identify owners of some property and contacting those owners to return the lost property. When useable materials were recovered from the debris, but ownership could not be established, volunteers worked with local non-profit organizations to donate the materials (e.g., dock sections) to Chippewa Nature Center and Little Forks Conservancy.
3. Wixom Lake Association organized half a dozen or more volunteer lake bottom cleanup crews to organize flood debris on the Tobacco River side of Wixom Lake and along Pontoon Alley on the Tittabawassee River side.
4. Private citizens working ad hoc piled up flood debris on the south side of the Tittabawassee River on Wixom Lake bottom land in the area from the dam to roughly three-fourths of a mile upstream.
5. Volunteers on Sanford Lake removed approximately 200 stranded pontoon boats from Sanford Lake bottom land and returned them to the owners.
6. Two Sanford Lake residents volunteered to work with the contractors removing flood debris from Sanford and Wixom lakes.
 - a. The volunteers provided periodic status reports on debris removal.
 - b. The volunteers are working with the law enforcement to connect lost property with identifiable owners.

Vegetation Control:

Two months after the May 2020 flood and dam breaches, millions of cottonwood and willow trees sprouted on the bottom lands of Wixom and Sanford lakes. The growth rate of these trees threatens to seriously impede future use of the lakes after refiling. The following efforts have occurred to date:

1. Volunteers began mowing portions of the lake bottoms in late 2020 and continue to the present day.
 - a. The volunteers include both private citizens and a local business working pro bono.
 - i. Volunteers are mowing anywhere from two acres to 100 acres.
 - b. Some volunteers are helping their neighbors by clearing vegetation within 50 feet of private seawalls in anticipation of herbicide spraying.
2. Tobacco Township chose to control the vegetation on Wixom Lake, west of M-30 with mowing and has used Township funds to engage local contractors to do the work.
3. Wixom Lake Improvement Board (WLIB) has engaged Progressive and PLM to plan and execute test plot applications of herbicide on Wixom Lake bottom lands east of M-30. WLIB is using unspent aquatic weed control funds. FLTF is consulting with WLIB on this effort. The first herbicide application was performed September 15, 2022, including 60 acres of Wixom Lake bottom land. Edenville Township has engaged local contractors for mowing and is

- participating in the herbicide application program on 150 acres of Sanford Lake bottom. Sanford Lake Improvement Board is reinstating their aquatic weed control assessment to pay for future tree control on the Jerome Township bottom lands of Sanford Lake.
4. Wixom Lake Association (WLA) bought brush cutters, brush mowers and an equipment trailer in 2022 for use in clearing vegetation in canals during the winter. This purchase followed a demonstration canal clearing project funded by WLA in the winter of 2021.
 5. On Sanford Lake, Edenville Township invested in mowing in 2021 and herbicide application in 2022. Edenville Township is reinstating their weed control assessment.
 6. Sanford Lake Improvement Board (SLIB) is reinstating their weed control assessment in order to fund bottomland vegetation control.
 7. CM-CISMA volunteered to release a specific beetle on the Sanford Lake bottom lands to control invasive purple loosestrife. The beetle release was performed in August 2022. A September review of results shows the beetles are flourishing and eating purple loosestrife.

Dam Stabilization Projects

In addition to the EWP project completed along the shoreline along the Four Lakes system, EWP stabilization projects have also been completed at three of the four dams. Below, please find a summary of the issues which resulted from the May 2020 event and the design and construction completed to stabilize the sites from further degradation.

Smallwood Dam

During the May 2020 event, significant erosion occurred downstream of the Smallwood Dam. Portions of this erosion was caused due to the high velocity and increased tailwater elevation downstream of the dam. In addition, water was bypassing through the powerhouse and exiting through a vent caused significant erosion on the right side (when looking downstream) of the powerhouse.

To mitigate this issue and stabilize the embankment, riprap was installed along approximately 600 feet on the downstream face. The top of riprap elevation was placed to provide protection to for the 200-year storm event. Geotextile fabric, bedding stone and MDOT heavy riprap were used, with approximately 2,000 cubic yards of riprap being placed. The project began in February 2021 and was completed in May 2021. This work was permitted under an emergency permit (WRP026941) and completed as NRCS EWP eligible work.

Edenville Dam – Tobacco Spillway

The Edenville Dam is located at the confluence of the Tobacco and Tittabawassee River. For this reason, two primary spillways exist, one on each river. The left embankment of the Edenville Dam (Tittabawassee River) failed during the May 2020 event resulting in catastrophic erosion, damage, and ultimately the failure of the Sanford Dam. Prior to the failure of the Tittabawassee left embankment, significant erosion was occurring in the tailrace area of the Tobacco Dam. As a preventive measure, EGLE, through an emergency order, implemented a project to modify the spillway structure to lower the impoundment surface water elevation to alleviate pressure on the remaining embankment.

In November 2020, work began on the Tobacco Spillway. The project was permitted through an emergency permit (WRP026173) acquired by EGLE dam safety. The work included construction of a new mass concrete weir within the existing hollow spillway. Partial demolition of the downstream rollway spillway was required to facilitate construction. At conclusion of the weir construction, the upstream

face of the spillway was demolished in a controlled manner to lower the water level of the Tobacco River impoundment by approximately 14 feet. The drawdown was completed in March 2022.

Following the EGLE project, the emergency permit was transferred to FLTF who completed the required stabilization efforts of the Tobacco Dam. These efforts included complete removal of the existing concrete rollway, installation of steel struts spanning the three spillway bays and construction of a sister wall on both the right and left training walls. This work began in June 2021 and was completed in February of 2022. Currently all stabilization efforts have been completed on the Tobacco River Spillway of the Edenville Dam and the approximate cost of construction is \$4.5 million.

Edenville Dam – Tittabawassee Spillway

As previously mentioned, major damage was sustained to the Tittabawassee River side of the Edenville Dam. Early on the stabilization efforts were identified and were included as conceptual designs with the emergency permit acquired by EGLE at the start of the project. The items identified consisted of stabilization of the right embankment, construction of an I-wall through the breachway, restoration of breachway area, sediment removal from the river channel, complete demolition of the spillway and ultimately returning flow through the original Tittabawassee River channel downstream of the spillway.

This work was completed in various stages as summarized below:

1. Stage 1 – Installation of cofferdam upstream and downstream of spillway.
2. Stage 2 – Complete demolition of the spillway down to the base slab, which was the approximate original grade of the Tittabawassee River.
3. Stage 3 – Construction of upstream grade control structure. Upon dewatering the area upstream of the dam, significant sediment accumulations were identified. An estimated 12 feet in depth of sediment was measured in the field. Based on this discovery, a grade control structure was constructed with steel sheet pile (SSP) and left in place. Downstream of the structure MDOT heavy and 3-to-5-ton boulders were placed to dissipate energy.
4. Stage 4 – Remove sediment which had accumulated in the river channel downstream of the spillway and at the confluence of the newly formed breach way and original channel. An estimated 50,000 cubic yards of material was removed and placed within the breachway to restore that area.
5. Stage 5 – Relocate the river back to the original river channel.
6. Stage 6 – Construct a SSP I-Wall to span the breachway and provide project to the 200-year storm event.
7. Stage 7 – Reconstruct the right embankment to prevent further erosion. Approximately 65,000 cubic yards of glacial till was borrowed from the lake bottom to complete this work.

Following transference of the EGLE permit to FLTF and permit modification approvals, work began on the Tittabawassee River side in July 2021 and the work was complete in March of 2022. The approximate cost of construction of \$5 million.

Sanford Dam

During the May 2020 event Sanford Dam was completely overtopped resulting in complete failure of the earthen embankment and auxiliary fuse plug spillway. Sanford Dam was the last of the three dams to become stabilized under the EWP program. The stabilization measures implemented at Sanford were similar to those used at the Edenville Dam.

The project was split up into three stages, with those stages outlined below:

1. Stage 1 – Creating site access and preparing the site for work to be completed. This included installation of a temporary bridge over the breachway, removal of all debris from the existing auxiliary spillway, and construction of access roads.
2. Stage 2 – Construction of mass concrete weir within the existing hollow spillway. This weir was constructed at an elevation similar to where the river was being maintained at, so no significant change in water elevation was observed. This phase also included demolition of the existing rollway.
3. Stage 3 – Construction of SSP I-wall through breachway, restoration/protection of tailrace area and relocating the river back to the original cross through the spillway.

Following issuance of the emergency permit (WRP026173), work began at the site in January 2022 and was completed in October 2022. The only work which remains at the site is some site restoration, mainly seeding. The approximate cost of construction of \$6.5 million.

Lake Management Plan

FLTF has also committed to operate the dams using run of river operations which has been shown to have positive environmental impacts and is committed in aiding in the development and implementation of a Lake Management Plan for both Sanford and Wixom lakes. These Lake Management Plans will include a review and recommendation of habitat and aquatic species, invasive species control recommendations, discussion of recreational opportunities, wetland monitoring, as detailed in the Part 303 attachments, and shoreline best management guidelines.

Invasive Species Control

A sea lamprey barrier is requested to be incorporated into the Sanford Dam Restoration Design. Typical sea lamprey passage is barred with three alternate systems: high velocity flow, extended lip and waterfall, and electrical barrier. Base flow and flows up to the 200-year storm will pass through the Low Level Outlet (LLO) and primary spillway. The LLO sill elevation is El. 603. Velocities through the LLO will generally be between 16 and 20 feet per second (ft/s), or faster, depending on tailwater conditions. The primary spillway gates hinge at the base and the top tilts downstream to spill flow. This type of gate generates a lip and waterfall in partial lowered conditions. In the full or near full open condition, flow through the gate would be more than 16 ft/s. The auxiliary spillway activates above the 200-year storm and the 200-year storm is an infrequent event and sea lamprey barriers are not considered.

During construction, flow will be routed first through the breachway (Phase 1B) and then the primary spillway (Phase 2). A four-foot tall sheet pile weir extended horizontal lip will be constructed in the breachway to form a sea lamprey barrier during Phase 1B. The measures in place for the final constructed condition will be in place during Phase 2.

Summary of Work

As stated above, FLTF has completed over 20 projects through the EWP program to address problem areas around Sanford and Wixom and is committed to assisting with the development and implementation of lake management plans for both lakes moving forward. A summary of the projects and costs can be found in the table below.

Table 1. Summary of project costs to date

Project	Cost
Secord Dam Stabilization	\$1,000,000
Smallwood Dam Stabilization	\$1,000,000
Wixom Shoreline Stabilization	\$2,870,000
Wixom Culvert Stabilization	\$292,228
Wixom Dam Debris Removal	\$3,052,542
Edenville Dam Stabilization	\$9,500,000
Sanford Shoreline Stabilization	\$3,323,000
Sanford Culvert Stabilization	\$48,822
Sanford Dam Debris Removal (all projects)	\$1,795,00
Sanford Dam Stabilization	\$6,500,000
Total	\$27,586,592

The monies received through the EWP program also has strict requirements for use for emergency restoration. FLTF advocated for funds to EGLE for impacts resulting from the dam failure, EGLE received \$9 million. FLTF would be open to work with EGLE to use some of their granted funds or other available grants for EWP programs, to pursue other projects.

Part 301 Compiled Project List

Site Name: Site #1 & 5 – Anderson Drive

EGLE Permit Number: WRP026837

Location: Wixom Lake

Summary of Work: Installation of 603 linear feet of riprap, 20 linear feet grade control structure, 108 linear feet riprap spillway, 1227 linear feet of seepage underdrain systems, 2049 linear feet of native fill for bank stabilization and erosion protection.

Benefits from Project: Reduction in soil erosion and sediment transport. Riprap addition below OHWM to add substrate variation for future habitat after lake refill.

Project Cost: \$684,000

Before Picture(s):



Part 301 Compiled Project List



After Picture(s):



Part 301 Compiled Project List

Site Name: Site #2 – E Lakeshore Drive Culvert

EGLE Permit Number: WRP026234

Location: Wixom Lake

Summary of Work: Install 66 linear feet of 60-inch HDPE culvert in-kind of existing culvert, 200 linear feet of 4-inch perforated tile, 123 linear feet and 169 cubic yards of riprap, 620 cubic yards of clean embankment fill, 7 cubic yards of angular rock for grade control structure, and grading 130 square feet and 10 cubic yards for the plunge pool.

Benefits from Project: Reduction in soil erosion and sediment transport. Riprap addition below OHWM to add substrate variation for future habitat after lake refill.

Project Cost: \$268,000

Before Picture(s):



Part 301 Compiled Project List

After Picture(s):



Part 301 Compiled Project List

Site Name: Site #3 – Grace Court

EGLE Permit Number: WRP026643

Location: Wixom Lake

Summary of Work: Install 238 linear feet, 309 cubic yards of riprap, two grade control structures totaling 20 linear feet and 15 cubic yards of angular rock and stabilize the shoreline using native fill, permanent turf reinforcement mats and biodegradable mulch blankets.

Benefits from Project: Reduction in soil erosion and sediment transport. Riprap addition below OHWM to add substrate variation for future habitat after lake refill.

Project Cost: \$218,000

Before Picture(s):



Part 301 Compiled Project List

After Picture(s):



Site Name: Site #4 – Donald Drive

EGLE Permit Number: WRP026955

Location: Sanford Lake

Summary of Work: Install 734 linear feet (1,041 cubic yards) of riprap along shoreline, 70 linear feet (26 cubic yards) of riprap for spillway and dredge 99 cubic yards of native fill to reshape stream bank to pre-flooding conditions.

Benefits from Project: Reduction in soil erosion and sediment transport. Riprap addition below OHWM to add substrate variation for future habitat after lake refill.

Project Cost: \$493,000

Part 301 Compiled Project List

Before Picture(s):



Part 301 Compiled Project List

After Picture(s):



Part 301 Compiled Project List

Site Name: Site #6 – Island Drive

EGLE Permit Number: WRP027060

Location: Wixom Lake

Summary of Work: Installation of 203 linear feet of riprap, three grade control structures (39 feet, 63 feet, and 85 feet in length respectively).

Benefits from Project: Reduction in soil erosion and sediment transport. Riprap addition below OHWM to add substrate variation for future habitat after lake refill.

Project Cost: \$85,000

Before Picture(s):



Part 301 Compiled Project List

After Picture(s):



Site Name: Site #7 – Weeping Willow

EGLE Permit Number: WRP026377

Location: Sanford Lake

Summary of Work: Install 1,125 linear feet, 1,125 cubic yards of riprap shoreline protection and 9 linear feet, 3 cubic yards of riprap for spillway, and dredge up to 300 cubic yards of deposited material.

Benefits from Project: Reduction in soil erosion and sediment transport. Riprap addition below OHWM to add substrate variation for future habitat after lake refill.

Project Cost: \$397,000

Part 301 Compiled Project List

Before Picture(s):



After Picture(s):



Part 301 Compiled Project List

Site Name: Site #8 – Dundas Road

EGLE Permit Number: WRP030333

Location: Wixom Lake

Summary of Work: Install 660 ft (1430 cubic yards) of riprap for shoreline protection with 611 cubic yards of native fill for stabilization, 19 cubic yards of riprap for a spillway, and dredging of 151 cubic yards of material for a temporary access road.

Benefits from Project: Reduction in soil erosion and sediment transport. Riprap addition below OHWM to add substrate variation for future habitat after lake refill.

Project Cost: \$1,100,000

Before Picture(s):



Part 301 Compiled Project List



After Picture(s):



Part 301 Compiled Project List

Site Name: Dundas Road North (Location E from permit drawings)

EGLE Permit Number: WRP026173

Location: Wixom Lake

Summary of Work: Install bank stabilization measures within the former Tobacco Impoundment, as needed, to prevent further sloughing once the impoundment is lowered. Site was included in the application as an area of concern. Shoreline protection and bank stabilization was required for 320 feet of shoreline.

Benefits from Project: Reduction in soil erosion and sediment transport. Riprap addition below OHWM to add substrate variation for future habitat after lake refill.

Project Cost: \$276,000

Before Picture(s):



After Picture(s):



Part 301 Compiled Project List

Site Name: Site #13 – Curtis Road

EGLE Permit Number: WRP03005

Location: Sanford Lake

Summary of Work: Shoreline work will be done to restore to "pre-flood" conditions. Use up to 695 cubic yards of native fill below the Ordinary High Water Mark. Install 268 linear feet, 338 cubic yards of rock riprap and 268 linear feet, 465 cubic yards, for shoreline protection. Install 40 linear feet, 89 cubic yards, of rock riprap for a spillway. Install seepage French Drains. Use up to 1,042 cubic yards of native fill and cut up to 1,700 cubic yards of native material above the Ordinary High Water Mark.

Benefits from Project: Reduction in soil erosion and sediment transport. Riprap addition below OHWM to add substrate variation for future habitat after lake refill.

Project Cost: \$250,000

Before Picture(s):



Part 301 Compiled Project List

After Picture(s):



Site Name: Site #14– Wilson Drive

EGLE Permit Number: WRP029031

Location: Sanford Lake

Summary of Work: Install 1,150 feet of riprap along shoreline, 265 feet of riprap for the inlet of the Francis Drain and an unnamed tributary, and grading of 400 feet of shoreline, which will return the shoreline to “pre-flood” conditions.

Benefits from Project: Reduction in soil erosion and sediment transport. Riprap addition below OHWM to add substrate variation for future habitat after lake refill.

Project Cost: \$1,200,000

Part 301 Compiled Project List

Before Picture(s):



After Picture(s):



Part 301 Compiled Project List

Site Name: Site #15 – Turtle Cove/ Easy Street

EGLE Permit Number: WRP026560

Location: Sanford Lake

Summary of Work: Install 394 linear feet, 482 cubic yards of riprap and 46 linear feet, 34 cubic yards of riprap for a spillway and shaping existing bank to achieve a 2-foot horizontal to 1-foot vertical slope to restore the riverbanks to a stable condition while not exceeding what was in place prior to the May 2020 flood event.

Benefits from Project: Reduction in soil erosion and sediment transport. Riprap addition below OHWM to add substrate variation for future habitat after lake refill.

Project Cost: \$168,000

Before Picture(s):



Part 301 Compiled Project List

After Picture(s):



Part 301 Compiled Project List

Site Name: Site #16 – Sunset Way

EGLE Permit Number: WRP029334

Location: Sanford Lake

Summary of Work: To prevent further loss of property or damage to critical infrastructure, install up to 468 linear feet, 338 cubic yards, of riprap slope protection to return the shoreline to "pre flood" conditions. Use up to 98 cubic yards of native material displaced along the shoreline as native fill to return the bank to "pre flood" conditions.

Benefits from Project: Reduction in soil erosion and sediment transport. Riprap addition below OHWM to add substrate variation for future habitat after lake refill.

Project Cost: \$250,000

Before Picture(s):



Part 301 Compiled Project List

After Picture(s):



Site Name: Site #17 – Arapahoe Trail

EGLE Permit Number: WRP027805

Location: Wixom Lake

Summary of Work: Installation of 320 linear feet of riprap with two 10-foot riprap spillways on the east and west side.

Benefits from Project: Reduction in soil erosion and sediment transport. Riprap addition below OHWM to add substrate variation for future habitat after lake refill.

Project Cost: \$339,000

Part 301 Compiled Project List

Before Picture(s):



After Picture(s):



Part 301 Compiled Project List

Site Name: Site #20A – E Lakeshore Drive Tributary

EGLE Permit Number: WRP031680

Location: Wixom Lake

Summary of Work: Cut 39 CYDs of material; Install riprap, native fill, grade control structure, and a riprap spillway resulting in 167 CYDs of fill to stabilize slopes of unnamed tributary to Wixom Lake.

Benefits from Project: Reduction in soil erosion and sediment transport. Riprap addition below OHWM to add substrate variation for future habitat after lake refill.

Project Cost: \$168,000

Before Picture(s):



Part 301 Compiled Project List

After Picture(s):



Site Name: Site #26 – N Lakeview Drive

EGLE Permit Number: WRP032014

Location: Sanford Lake

Summary of Work: Bring shoreline back to grade at 2:1 slope, install French drains where needed, and install 855 ft of riprap for shoreline protection.

Benefits from Project: Reduction in soil erosion and sediment transport. Riprap addition below OHWM to add substrate variation for future habitat after lake refill.

Project Cost: \$565,000

Part 301 Compiled Project List

Before Picture(s):



After Picture(s):



Part 301 Compiled Project List

Site Name: Sanford Culvert Stabilization

EGLE Permit Number: WRP031947

Location: Sanford Lake

Summary of Work: Grade up to 46 cubic yards of clean onsite fill to construct 60 linear feet of 24-inch HDPE pipe for a culvert extension in the 100-year floodplain of the Tittabawassee River at Site O. Grade up to 42 cubic yards of onsite fill to construct 60 linear feet of 12-inch HDPE pipe for a culvert extension in the 100-year floodplain of the Tittabawassee River at Site P. Grade up to 60 cubic yards of onsite fill to construct 75 linear feet of 12-inch HDPE pipe for a culvert extension on Sanford Lake at Site D. Grade up to 58 cubic yards of onsite fill to construct 85 linear feet of 12-inch HDPE pipe for a culvert extension on Sanford Lake at Site E.

Benefits from Project: Reduction in soil erosion and sediment transport.

Project Cost: \$48,822

Before Picture(s):



Part 301 Compiled Project List



After Picture(s):



Part 301 Compiled Project List



Site Name: Wixom Culvert Stabilization

EGLE Permit Number: WRP031943

Location: Wixom Lake

Summary of Work: Grade up to 31 cubic yards of clean onsite fill to construct 40 linear feet of 12-inch HDPE pipe for a culvert extension in the 100-year floodplain of the Tittabawassee River at Site C (Hook's Culvert). Repair the eroded areas underneath the existing concrete box culvert at Site B by placing 10.5 total cubic yards of concrete fill and 11.5 total cubic yards of existing concrete rock from on-site or MDOT plain limestone riprap if on-site materials are not available.

Benefits from Project: Reduction in soil erosion and sediment transport.

Project Cost: \$15,409

Part 301 Compiled Project List

Before Picture(s):



After Picture(s):



Part 301 Compiled Project List

Site Name: Sanford Lake Debris Removal

EGLE Permit Number: No Permit Required

Location: Sanford Lake

Summary of Work: The project includes the removal of wooden debris and any man-made debris not naturally found in the environment. Man-made debris being anything other than downed trees and limbs, for example coolers, boat docks, sheds, etc. The project started in May 2022 and will be substantially complete by December 31, 2022. To date 1,044 pieces of debris have been identified and removed from the lake bottom.

Benefits from Project: The project to clean up the debris will remove and properly dispose of pollutants, prevent material from impacting downstream areas and restore the area to existing conditions prior to the dam breaches.

Project Cost: \$1,269,000

Before Picture(s):



Part 301 Compiled Project List



Part 301 Compiled Project List



After Picture(s):



Part 301 Compiled Project List



Part 301 Compiled Project List



Site Name: Sanford Dam Debris Removal

EGLE Permit Number: No Permit Required

Location: Sanford Lake

Summary of Work: The project includes the removal of wooden debris and any man-made debris not naturally found in the environment that has accumulated at the dam site. Man-made debris being anything other than downed trees and limbs, for example coolers, boat docks, sheds, etc. This project removed a total of 57,000 cubic yards of material.

Benefits from Project: The project to clean up the debris will remove and properly dispose of pollutants, prevent material from impacting downstream areas and restore the area to existing conditions prior to the dam breaches. Additionally, it will allow for reconstruction work at Sanford Dam to be completed.

Project Cost: \$245,000

Part 301 Compiled Project List

Before Picture(s):



After Picture(s):



Part 301 Compiled Project List

Site Name: Sanford Lake County Park Debris Removal

EGLE Permit Number: No Permit Required

Location: Sanford Lake

Summary of Work: The project includes the removal of wooden debris and any man-made debris not naturally found in the environment. Man-made debris being anything other than downed trees and limbs, for example coolers, boat docks, sheds, etc.

Benefits from Project: The project to clean up the debris will remove and properly dispose of pollutants, prevent material from impacting downstream areas and restore the area to existing conditions prior to the dam breaches.

Project Cost: \$56,000

Before Picture(s):



Part 301 Compiled Project List

After Picture(s):



Part 301 Compiled Project List

Site Name: River Trails Heritage Park Debris Removal

EGLE Permit Number: No Permit Required

Location: Sanford Lake

Summary of Work: The project includes the removal of wooden debris and any man-made debris not naturally found in the environment. Man-made debris being anything other than downed trees and limbs, for example coolers, boat docks, sheds, etc.

Benefits from Project: The project to clean up the debris will remove and properly dispose of pollutants, prevent material from impacting downstream areas and restore the area to existing conditions prior to the dam breaches.

Project Cost: \$225,000

Before Picture(s):



Part 301 Compiled Project List



Unclassified
For Review

Part 301 Compiled Project List

After Picture(s):



Part 301 Compiled Project List



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Review

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Site Name: Wixom Lake Debris Removal

EGLE Permit Number: No Permit Required

Location: Wixom Lake

Summary of Work: The project includes the removal of wooden debris and any man-made debris not naturally found in the environment. Man-made debris being anything other than downed trees and limbs, for example coolers, boat docks, sheds, etc. The project started in May 2022 and will be substantially complete by December 31, 2022. To date 1,307 pieces of debris have been identified and removed from the lake bottom.

Benefits from Project: The project to clean up the debris will remove and properly dispose of pollutants, prevent material from impacting downstream areas and restore the area to existing conditions prior to the dam breaches.

Project Cost: \$3,052,000

Before Picture(s):



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Part 301 Compiled Project List



Part 301 Compiled Project List



After Picture(s):



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Site Name: Edenville Dam Interim Stabilization

EGLE Permit Number: WRP026173

Location: Wixom Lake

Summary of Work: The applicant proposes to drawdown the Wixom Lake impoundment by a maximum of 15.0 vertical feet, from elevation 662.0 feet NAVD88 to 647.0 feet NAVD88; lower the crest of the Tobacco Spillway of the Edenville Dam, Dam ID No. 549, by approximately 20.8 feet, from elevation 667.8 feet NAVD88 to 647.0 feet NAVD88; regrade and stabilize the earthen embankment and newly formed Tobacco River channel east of the M-30 Causeway to the Tittabawassee Spillway; lower the crest of the Tittabawassee Spillway by approximately 47.8 feet, from elevation 667.8 feet NAVD88 to approximately 630 feet NAVD88; construct a new riprap and steel sheet pile wall through the existing breach area, east of the Tittabawassee Spillway; restore the Tittabawassee River downstream of the spillway and breach locations; remove sediment deposited by the dam failure from within the former Tittabawassee River channel approximately 3,000 feet downstream from the Tittabawassee Spillway; stabilize the Tittabawassee River channel as needed; stabilize the existing breach channel once river flows have been redirected back through the Tittabawassee Spillway former channel; restore the Tobacco River channel downstream of the spillway; remove material previously placed in the river channel; install bank stabilization as needed; and install bank stabilization measures within the former

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Tobacco Impoundment, as needed, to prevent further sloughing once the impoundment is lowered. Grade approximately 88,773 cubic yards of material below the Ordinary High-Water Mark (OHWM) and within the 100-year floodplain of the Tobacco and Tittabawassee Rivers, including dredging of approximately 15,536 cubic yards of sediment and placement of approximately 1,837 cubic yards of riprap fill. No filling of wetland areas is proposed.

Benefits from Project: Reduction of sediment transport, safety modifications to the current site and site preparation for dam restoration.

Project Cost: ~ \$9,500,000

Before Picture(s):



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After Picture(s):



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Site Name: Sanford Dam Interim Stabilization

EGLE Permit Number: WRP031613

Location: Sanford Lake

Summary of Work: Create access to the site by installing a temporary lift bridge across the breachway, demolish the existing fuse plug, place 1,260 cubic yards of riprap within the temporary diversion channel, construct an I-wall embankment with a crest elevation of 629.0 FT (NAVD 88) by driving steel sheet piling across the breachway and along the embankment, remove the existing tainter gates, place mass concrete under the remaining barrel arches, remove the rollway structures, place a supplemental reinforced base slab downstream of the spillway, install a reinforced sister wall along the right spillway training wall, lower the barrel arches by 8.3 vertical feet through demolition from El. 621.7 to 613.0 (NAVD 88), place 295 cubic yards of riprap for shoreline stabilization, place 4,030 cubic yards of temporary fill to construct a berm for rerouting of the river back through the constructed spillway, and remove 8,225 cubic yards of sediment below the ordinary high water mark (OHWM) from the river channel immediately downstream of the spillway.

Benefits from Project: Reduction of sediment transport, safety modifications to the current site and site preparation for dam restoration.

Project Cost: ~ \$6,500,000

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Before Picture(s):



After Picture(s):



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