NORTHEAST OHIO FOUR COUNTY REGIONAL PLANNING AND DEVELOPMENT ORGANIZATION (NEFCO)

Cuyahoga River
Canal Diversion Dam Removal Project

Final Report

January 31, 2023

This product was financed through a grant, GL00E02461-5, from the United States Environmental Protection Agency's Great Lakes Restoration Initiative; Great Lakes National Program Office; and from NEFCO's dues-paying members.

Canal Diversion Dam Removal Project – Overview

Purpose of the Project

The purpose of the Canal Diversion Dam Removal Project was to allow restoration of both the riverine habitat and ecological health of the Cuyahoga River, upstream from the dam's location at approximately River Mile 20.7. This is just upstream from the State Route 82 bridge that connects Sagamore Hills Township in northern Summit County to the City of Brecksville in Cuyahoga County. Completion of the project has removed a barrier on the river to Lake Erie fish migration and a safety hazard for paddlers. Qualitatively, this project also assisted in the removal of Beneficial Use Impairments (BUIs) within the Cuyahoga River Area of Concern that are associated with fish populations, benthos, and habitat. Due to delays caused by the pandemic, Ohio EPA has not yet performed a quantitative water quality assessment on this section of the Cuyahoga River to determine whether BUIs still exist. This project is listed as an implementation action in the US EPA-approved Lower Cuyahoga River Total Maximum Daily Load (for watersheds that do not meet the water quality goals of the Clean Water Act).

Who's Involved

The managing partners involved with this project were the Friends of the Crooked River (FOCR), an environmental nonprofit organization and the project lead, US EPA Region 5 Great Lakes National Program Office (GLNPO), Ohio EPA, Ohio Lake Erie Commission, National Park Service (NPS)/Cuyahoga Valley National Park (CVNP), the Northeast Ohio Regional Sewer District (NEORSD), the City of Akron, and the Northeast Ohio Four County Regional Planning and Development Organization (NEFCO). The permitting agencies included the Ohio EPA, Ohio Department of Natural Resources (ODNR), State Historic Preservation Office (SHPO), US Army Corps of Engineers (US ACOE), and NPS. The property owners include the NPS/CVNP, ODNR, Ohio Department of Transportation, and Cleveland Metroparks.

Funders

US EPA Region 5 GLNPO and the Ohio EPA funded the project. NEFCO received an $800,000 grant from US EPA in 2019 for the Canal Diversion Dam Removal Project through US EPA's Great Lakes Restoration Initiative (GLRI). FOCR is the subrecipient of the NEFCO's grant and is the implementor of the project. Other project moneys included Supplemental Environmental Project (SEP) funds from the City of Akron and NEORSD. In 2017, FOCR received access to $900,000 in SEP funds from Ohio EPA for the project. Those SEP funds are from the City of Akron's federal court consent decree regarding its combined sewer overflows abatement implementation. SEP funds provided by the NEORSD will be for the long-term operation and maintenance of the needed river water pump station.

NEFCO's Role

NEFCO managed the $800,000 US EPA grant. The funding from this GLNPO GLRI grant was essential for completing the project. NEFCO was responsible for tracking this funding and for providing this final report, and for providing past grant progress and financial reports to US EPA Region 5 GLNPO. Local funds from NEFCO's dues paying members were provided to cover NEFCO's administrative expenses when the US EPA grant funds had been exhausted.

Progress to Date

Demolition of the Canal Diversion Dam by FOCR's contractor began on May 21, 2020. The 1952 Canal Diversion Dam was constructed of concrete and steel reinforcement bar. The 1827 Pinery Dam was located a few yards upstream from the Canal Diversion Dam and was constructed of wooden timbers that were still intact when they were removed by the project's contractor. Both dams were removed by early summer 2020. By mid-August 2020, clean-up and riverbank stabilization had been completed. The final phase of the project was the installation of an Archimedes screw pump by FOCR's contractor. The screw pump is needed to provide river water once again to a historic section of the Ohio & Erie Canal in the Cuyahoga Valley National Park.

By early summer 2021, FOCR's contractor received the needed electric power to the screw pump installation site. After manufacturing and shipping delays caused by the COVID 19 pandemic, the screw pump was finally delivered and set in place by FOCR's contractor on January 25, 2022. On May 12, 2022, FOCR's contractor performed a successful start-up of the screw pump with key members of the project team present at the project site. On the evening of May 23, 2022, an unforeseen setback occurred when the screw pump's discharge pipe outlet became clogged with debris, causing a back-up and overflow of river water from the pump station's discharge box, which caused erosion and a cave-in of the soil that supported the pump's electrical panel, which then leaned and came to rest against the undamaged, stable screw pump.

By May 27, 2022, FOCR's contractor had righted the pump's electrical panel, and had stabilized the soil surrounding it and the screw pump. However, another unforeseen setback occurred on August 18, 2022 when the electrical panel's variable frequency drive (VFD) failed. The VFD allows the pump's discharge rate to be adjusted to less than the maximum discharge rate of 20 cubic feet per second. The VFD is being replaced under warranty but isn't expected to be delivered for installation any sooner than late March 2023. FOCR has SEP funds available to complete this work and its contractor is under contract to complete it.

By March 28, 2022, all federal funds from this grant had been expended and NEFCO began using local funds to administer it. Therefore, with 100% of the environmental aspect of the project completed and with less than 5% of the historical aspect of it remaining, and with the support of all the key project partners, on November 30, 2022, NEFCO submitted a budget amendment to US EPA's Region 5 GLNPO and requested that the agency close out the grant.

Final Report

The final report that follows cumulatively documents the project's progress and environmental progress under the project in six-month intervals over the entire project/budget period. It also incorporates photo documentation of the project and environmental progress under the project at appropriate phases. It is written in the same format, and contains much of the same information as the semi-annual progress reports that NEFCO submitted to US EPA Region 5 GLNPO over the course of the grant's project/budget period.

NEFCO Final Report
The reporting period for this final report is from **August 1, 2019 to October 31, 2022**. The final report is **cumulative** and must contain sufficient information, including photo documentation, for your Project Officer to ascertain that the work plan has been carried out as specified:

GRANT INFORMATION
1. Provide the following information in the final report:

Grant Number: GL00E02461-5
Project Title: Canal Diversion Dam Removal
Project Manager: Tom LaPlante
Reporting Period: 08/01/2019 – 10/31/2022
Project Period: 08/01/2019 – 10/31/2022

2. Has the project manager changed? If so, provide updated contact information (name, address, phone, fax, and email).
- No.

WORK PROGRESS – QUANTIFY WORK COMPLETED AS MEASURABLE PRODUCTS (I.E. NUMBERS, ACRES, CONTACTS, WATER QUALITY/HABITAT IMPROVEMENTS, ETC.) IT IS OFTEN HELPFUL TO INCLUDE THIS INFORMATION IN A TABLE.

3. List activities from the Work Plan, and any required Quality System Documentation, and report the **numerical and percent completed for this reporting period and for the entire project**. This section cumulatively documents the project's progress and environmental progress under the project in six-month intervals over the entire project period. It also incorporates photo documentation of the project and environmental progress under the project at appropriate phases.

Reporting Period: 10/01/2019 – 03/31/2020
FOCR had completed the request for qualifications, request for proposal, design team interviews, selected firm notification, and 30% design; and NEFCO submitted the first semi-annual progress report on October 31, 2019. We were approximately 85% complete with obtaining the notice to proceed, and 90% complete with the establishment of an approved QAPP.

Reporting Period: 04/01/2020 – 09/30/2020
We were approximately 45% complete with the project (100% complete with the removal of the dams and 60% complete with the river water pump station)
- Bat Study
- Removal of Trees
- Notching of Dams
- SHPO Documentation of Pinery Dam and Canal Diversion Dam
- Removal of Dams
- 60% Design submitted and reviewed
- 60% design workshop held

Reporting Period: 10/01/2020 – 03/31/2021
We were approximately 50% complete with the project (100% complete with the removal of the dams and 67% complete with the river water pump station).
- Electrical conduit installed to bring electric to the river water pump station site
- Kokosing Industrial, Inc. (KII) continued working on responses to 60% re-review comments
- Confirmation of final pump sizing/capacity
- Finalization of operation of pump once the pump station was up and operating
- Shop drawing submission of mechanical portion of screw pump to dms water solutions (FOCR)

- Review completed of above shop drawing by dms water solutions (FOCR), NEORSD, and CVNP and shop returned to KII team to address comments for return response
- Shop drawing submission of electrical portion of screw pump to dms water solutions (FOCR)
- Coordination with First Energy to bring electrical to the project site
- Further review and development of foundation for river water pump station based on geotechnical report
- Trimming of trees by First Energy for construction
- Additional geotechnical borings were taken
- Further review and development of foundation for river water pump station based on geotechnical report
- Review of electrical comments from 60% re-review with NEORSD as the responsible entity for O&M

Reporting Period: 04/01/2021 – 09/30/2021

We were approximately 60% complete with the project (100% complete with the removal of the dams and 72% complete with the river water pump station)

- KII addressed final comments from re-review of 60% for 100% DB document
- KII addressed comments from shop drawing for mechanical portion of pump station and received acceptance
- Review of completed on shop drawing for electrical portion of pump station by dms water solutions (FOCR), NEORSD, and CVNP and returned to KII team to address comments for return response
- Submission of additional shop drawings for piping and preliminary review completed and returned
- Completed bringing the electrical conduits to the site
- First Energy pulled their lines through the conduit. The site now has power.
- Submission and acceptance of reinforcement for revised outlet structure due to poor soil conditions
- Continued re-design of foundation for river water pump station based on additional geotechnical information obtained
- Continued working to obtain required permits for the construction of the River Water PS
- Provided documents for CVNP to obtain an easement from CMP for the electrical installation
- Re-review of the KII pipe shop drawing
- Submittal of pipe shop drawing to FOCR, CVNP and NEORSD for review and acceptance
- Review and provided comments back to KII on grout shop drawing
- Review of updated KII schedule
- Update of KII insurance certificates

Reporting Period: 10/01/2021 – 03/31/2022

We were approximately 95% complete with the project (100% complete with the removal of the dams and 90% complete with the river water pump station).

- Resubmittal and review of grout shop drawing and submittal to CVNP and NEORSD for their review
- Finalization of permits for access to site for construction
- Construction of infrastructure base and piping for pump station
- Initial on-line training for the pump station
- Inspection of pump and screen
- Installation of the screw pump and bar screen and appurtenances
- Installation of the electrical
- Phase I Training
- Secured updated permits

Reporting Period: 04/01/2022 – 09/30/2022

We are approximately 95% complete with the project (100% complete with the removal of the dams (environmental aspect of the project) and 90% complete with the river water pump station (historical aspect of the project)). This has not changed since our last reporting due to the unexpected cave-in at the site and electrical panel issues.

- Start-up of the screw pump and electrical controls
- Phase II of training on-site

- Re-established the structural integrity of the pump support system after the cave-in
- Encased the surrounding area of the pump and electrical panel with control density fill (CDF) and capped with concrete
- Geotechnical engineer reviewed the site for recommended further improvements to mitigate risk for future site concerns
-Virtual training was provided on the control panel operations
- Inspection of the screw pump
- Re-start-up of the screw pump and electrical controls
- Site improvements recommended by the geotechnical engineer at the outfall
- Site work (paving)
- Site restoration and seeding (a reseeding also occurred)
- Demonstration of failure mode was completed and accepted
- Turned pump on to do a 3-day performance operation and after the second day the pump failed.
- Troubleshooting took place; the variable frequency drive (VFD) was burned up and needs to be replaced
- After running the pump for 3 daily runs and 2 days continuously it was determined that the issues for failure was a result of the effluent bar screen on the discharge side of the pump; the screen will remain off and will be given to the O&M owner for use if needed when the pump is out of operation.
- Punch list items completed: installed rails on the north and south side of the pump and at the headwall, completed paving, fixed grating on discharge box, installed 2 chain links between the pump and the retaining wall, delivered spare parts to O&M owner, regraded site, and reseeded it

Reporting Period: 10/01/2022 – 10/31/2022 (equals Reporting Period 04/01/2022 – 09/30/2022 above)

Please see Appendix A for the updated table of project milestones, which reports the completion or approval dates for each project milestone.

Incorporate **photo documentation** of the project and environmental progress under the project at appropriate phases (please see Appendix B).

Include GLRI Action Plan II Measures of Progress indicated in the Terms and Conditions of your grant agreement. Consult your Project Officer on how to report this information.

- Number of miles of Great Lakes tributaries reopened by GLRI-funded project: 23 linear miles; 247 square miles of drainage area
- Number of miles of Great Lakes shoreline and riparian corridors protected, restored, and enhanced by GLRI funded project: 23 linear miles; 247 square miles of drainage area

4. Is the project work on schedule?

- No (NEFCO formally requested a fourth no-cost grant period extension from US EPA on 6/10/2022. The extension was approved during the fourth quarter of FFY 2022, extending the project period and budget period end date to 10/31/2022. The needed replacement VFD is covered under the manufacturer's warranty and has been ordered, but due to delays caused by the COVID-19 pandemic, a new VFD isn't expected to be delivered and installed until the third quarter of FFY2023, well after the project period and budget period end date, which is 10/31/2022.)

5. What work is projected after 10/31/2022, the project period and budget period end date?

- Completion of the record drawings, punch list items, and performance demonstration of the river water pump station by FOCR's contractor, funded by SEP funds
- Side note: As mentioned above, delivery and installation of the new VFD will not occur until the third quarter of FFY 2023. It will be installed by FOCR's contractor and funded by SEP funds.

6. If a problem was encountered, describe the problem and action(s) taken to correct it.

-During the third quarter of FFY 2022, the project team witnessed a successful start-up of the newly installed screw pump at the project site. However, shortly afterward, an unforeseen setback occurred when a back-up of river water at the discharge chamber created an overflow which quickly eroded the surrounding soil around the discharge box, pump, and electrical panel. This resulted in a cave-in of the soil supporting the pump's variable frequency drive (VFD)/electrical panel, which leaned and came to rest against the undamaged, stable screw pump. All equipment was still operational at the end of the third quarter of FFY 2022. The contractor stabilized the areas surrounding the discharge box, pump and electrical control panel using CDF, topped with concrete. As mentioned above, because of this unforeseen setback in the third quarter of FFY 2022, NEFCO formally requested and received a fourth no-cost time extension to move the project period end date from 6/30/2022 to 10/31/2022.

- During the running of the screw pump for 3 consecutive days in the fourth quarter of FFY 2022, the VFD failed, was burned, and requires replacement. The new VFD has been ordered. Unfortunately, the project is still being impacted by global challenges in shipping due to the COVID-19 pandemic, which means that the delivery of a new VFD is not expected to arrive any earlier than 120 working days or March 31, 2023, with no guarantee from the manufacturer that the project team will have it on that date. If the new VFD is received by March 31, 2023, this would put completion of the project into the 3rd quarter of FFY2023, well after the project period and budget period end date.

7. Will the project take longer than the approved project period?

- Yes. As mentioned above, there was an issue with the VFD and a new one has been ordered. However, the estimated delivery time of the new VFD is not less than 120 working days (March 31, 2023). The manufacturer has not guaranteed that the project team will receive it even on that date due to the continued resource challenges because of the pandemic.

8. If so, have you formally requested an amendment in writing?

- NEFCO discussed the next steps for the grant with the US EPA GLNPO project officer. The ecological goals of the project were qualitatively met when the dams were completely removed by the end of June 2020. Due to delays caused by the pandemic, Ohio EPA has not yet performed a quantitative water quality assessment on this stretch of the Cuyahoga River. What remains to be completed is a small amount (5 percent or less) of the historical goals of the project—returning the flow of river water by mechanical means to a historic section of the Ohio and Erie Canal in the Cuyahoga Valley National Park, as required by the National Park Service (NPS). The VFD allows the screw pump's discharge rate to be adjusted to less than the maximum discharge rate of 20 cubic feet per second. As mentioned above, it is being replaced under warranty but isn't expected to be delivered for installation any sooner than late March 2023. FOCR has SEP funds available to complete this work and its contractor is under contract to complete it. By March 28, 2022, all federal funds from this grant had been expended and NEFCO began using local funds to administer it. Therefore, with 100% of the environmental aspect of the project completed and with less than 5% of the historical aspect of it remaining, and with the support of all the key project partners, including the NPS, on November 30, 2022, NEFCO submitted a budget amendment to US EPA and requested a closeout of the grant.

BUDGET INFORMATION

9. Report the amount and percentage of the budgeted Federal and non-Federal funds expended.

- Federal funds: a total of $800,000 has been spent by NEFCO, or 100 percent of the total federal funds
- Non-federal funds: a total of $408,216 has been spent by FOCR, or 56.3 percent of the total non-federal funds
- As mentioned above, on 11/30/2022, NEFCO submitted a budget amendment to US EPA and requested a closeout of the grant. The US EPA GLNPO project officer indicated that a budget amendment is needed to close it out since the total amount of non-federal funds expended by the grant's subrecipient, FOCR, during the budget period is $408,216, which is 56.3% of the voluntary match of $725,000 as stated in the grant's budget. **US EPA GLNPO approved the budget amendment on 1/18/2023.**

10. Is the rate of spending proportional to the work progress?

- Yes.

11. What is the date and amount of your latest drawdown request? If funds have not yet been drawn down, please explain.

- 3/28/2022 and $4,100.00. (This was the final drawdown request.)

12. Were any significant changes (>10% of the total award amount) made to the personnel, fringe, travel, equipment, supplies, contractual, other, or indirect costs? If so, have you formally requested an amendment in writing?

- No, not greater than 10% of the total award amount.

Appendix A

GRANT INFORMATION

Grant Number: GL00E02461-5
Project Title: Canal Diversion Dam Removal
Project Manager: Tom LaPlante, NEFCO
Project Period: 08/01/2019 – 10/31/2022

PROJECT MILESTONES		
Action	**Anticipated Completion Date[1] or Approval Date**	**Percent Completed**
Request for Qualifications	Completed	100
Request for Proposal	Completed	100
Design team interviews	Completed	100
Selected firm notification	Completed	100
Notice to proceed	Completed	100
30% design completion	Completed	100
First semi-annual progress report	October 31, 2019	100
Establishment of an approved QAPP	April 15, 2020	100
Second semi-annual progress report	April 20, 2020	100
Construction begins	May 21, 2020	N/A[2]
Achieve substantial completion	June 29, 2020 (dams removed)	100 (removal of dams) 60 (screw pump)
Third semi-annual progress report	November 13, 2020	100
Requested 1st no-cost time extension	January 26, 2021	N/A
Fourth semi-annual progress report	April 30, 2021	100
Requested 2nd no-cost time extension	September 14, 2021	N/A
Fifth semi-annual progress report	October 29, 2021	100
Requested 3rd no-cost time extension	April 4, 2022	N/A
Sixth semi-annual progress report	April 21, 2022	100
Achieve substantial completion	May 12, 2022 (successful screw pump start-up)	100 (removal of dams) 90 (screw pump) 95 (entire project)
Requested 4th no-cost time extension	July 12, 2022	N/A
Seventh semi-annual progress report	October 26, 2022	100
Achieve substantial completion of project	October 31, 2022 (end of project/budget period)	100 (removal of dams) 90 (screw pump) 95 (entire project)
Requested a no-cost budget amendment	January 18, 2023	N/A
Final Report	January 31, 2023	100

(1) Anticipated completion dates as amended in part by Dianne Sumego email on October 22, 2022, when she reported that Friends of the Crooked River (FOCR), the grant's subrecipient, is still waiting on a piece of electrical equipment for the river water pump station (variable frequency drive (VFD)), for which a firm delivery date has yet to be established, due to manufacturing and shipping delays. The VFD is being replaced under warranty and FOCR's contractor is under contract to install it when it eventually arrives in the spring of 2023. FOCR is using SEP funds through Ohio EPA to complete this work.

(2) "N/A" means not applicable.

Appendix B

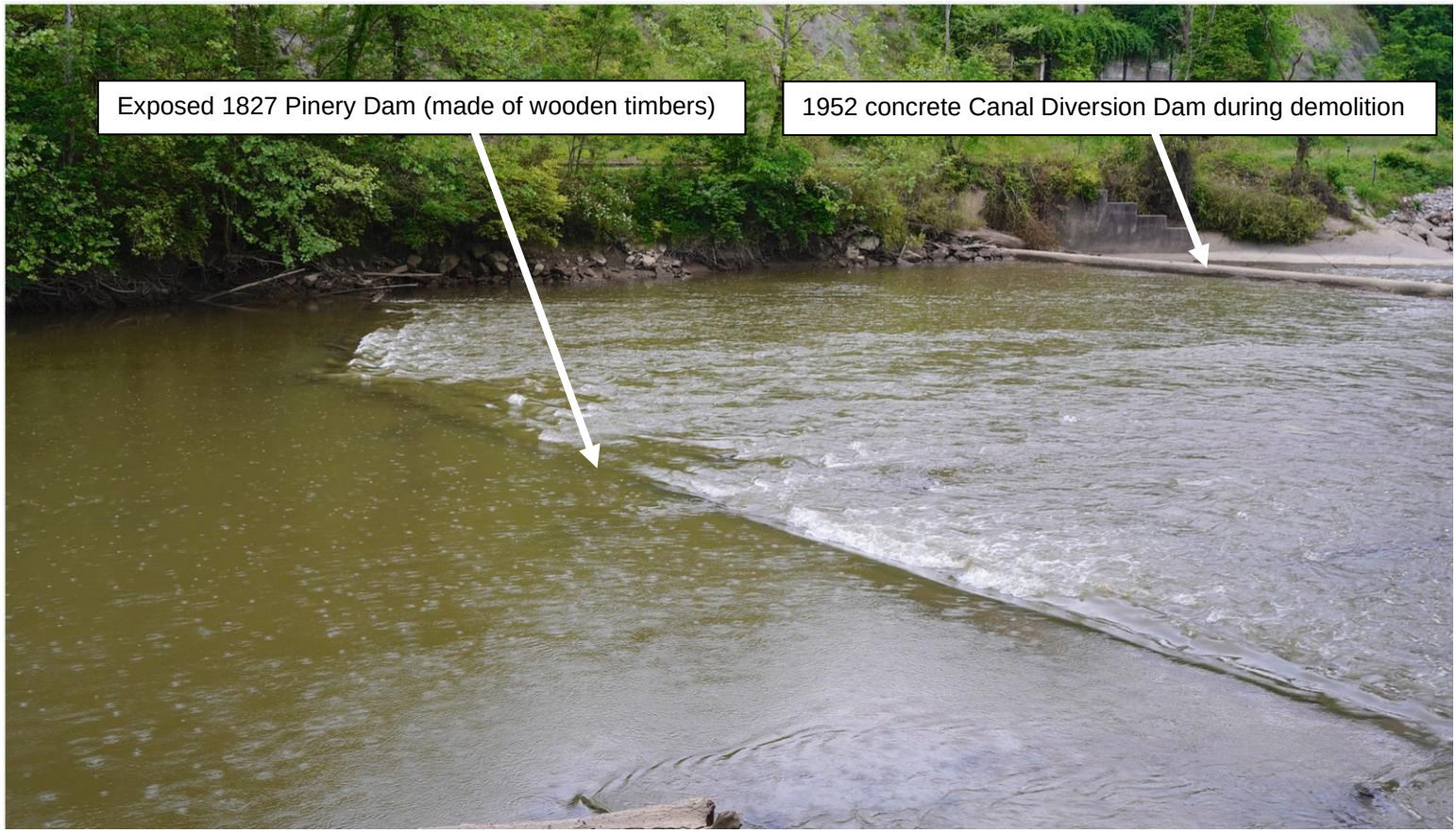
Canal Diversion Dam Removal Project
Final Report for USEPA Region 5 GLNPO's GLRI Grant GL00E02461-5
Photo Documentation of the Project and Environmental Progress at Appropriate Phases

5/21/2020 (Notching of the concrete Canal Diversion Dam commences. Photos courtesy of Friends of the Crooked River (FOCR), the grant's subrecipient and project lead, and dms water solutions, the project owner's representative.)

5/22-28/2020 (Canal Diversion Dam removal progress. Photos courtesy of FOCR/dms water solutions.)

5/22-28/2020 (Canal Diversion Dam removal progress. Photos courtesy of FOCR/dms water solutions.)

6/4/2020 (Top photos: Canal Diversion Dam removal in progress. Bottom photo: Exposed Pinery Dam during demolition of Canal Diversion Dam, as dam pool was drained. Photos courtesy of FOCR/dms water solutions.)



Appendix B

Canal Diversion Dam Removal Project
Final Report for USEPA Region 5 GLNPO's GLRI Grant GL00E02461-5
Photo Documentation of the Project and Environmental Progress at Appropriate Phases

6/6-9/2020 (Top left and right photos: Canal Diversion Dam demolition progress. Top center and bottom photos: exposed Pinery Dam. Photos courtesy of FOCR/dms water solutions.)

6/16/2020 (Exposed Pinery Dam before notching for removal. Photos courtesy of FOCR/dms water solutions.)

6/16/2020 (Top left photo: Canal Diversion Dam removal progress. Top right photo: First timber from Pinery Dam removed. Bottom photos: Additionally removed Pinery Dam timbers. Photos courtesy of FOCR/dms water solutions.)

7/7/2020 (Top photo: Canal Diversion Dam Removed. Pinery Dam Removed. Free-flowing Cuyahoga River! Bottom photo: Removed Pinery Dam timbers. NEFCO file photos.)

3/22/2022 (Cuyahoga River AOC Symposium included a tour of the project site. Top right and bottom photo: Former Canal Diversion Dam site in background; newly installed Archimedes screw pump in foreground. NEFCO file photos.)

3/22/2022 (Sign at the project site. NEFCO file photo)

5/12/2022 (Top photo: FOCR's contractor inspects the river water pump station intake during a successful screw pump start-up; former Canal Diversion Dam site in background. Bottom photo: Screw pump successfully discharging 20 cubic feet of river water per second (maximum discharge rate by design) to the Ohio and Erie Canal feeder ditch. NEFCO file photos.)

5/23-27/2022 (Top two photos: On the evening of 5/23/2022, an unforeseen setback occurred when the screw pump's discharge pipe outlet became clogged with debris, causing a back-up and overflow of river water from the pump station's discharge box, which caused erosion and a cave-in of the soil that supported the pump's electrical panel, which then leaned and came to rest against the undamaged, stable screw pump. Bottom photo: By 5/27/2022, FOCR's contractor had righted the pump's electrical panel, and had stabilized the soil surrounding it and the screw pump. However, another unforeseen setback subsequently occurred in the fall of 2022 when the electrical panel's variable frequency drive (VFD) failed. The VFD allows the screw pump's discharge rate to be adjusted to less than the maximum discharge rate of 20 cubic feet per second. It is being replaced under warranty but isn't expected to be delivered for installation any sooner than late March 2023. FOCR has SEP funds available to complete this work and its contractor is under contract to complete it. By 3/28/2022, all federal funds from this grant had been expended and NEFCO began using local funds to administer it. Therefore, with 100% of the environmental aspect of the project completed and with less than 5% of the historical aspect of it remaining, and with the support of all the key project partners, on 11/30/2022, NEFCO submitted a budget amendment to USEPA and requested to close out the grant. Photos courtesy of FOCR/dms water solutions.)

8/18/2022 (Discharge of returned river water to historic Ohio and Erie Canal feeder ditch at maximum 20 cubic feet per second from river water pump station with riprap in place. Photo courtesy of FOCR/dms water solutions.)

11/15/22 (River water pump station/screw pump; post-project/budget period. Photo courtesy of FOCR/dms water solutions.)