



**US Army Corps  
of Engineers®**

Pittsburgh District

Planning and Environmental Branch  
William S. Moorhead Federal Building  
1000 Liberty Avenue  
Pittsburgh, Pennsylvania 15222

Public Notice Date: April 19, 2022  
Expiration Date: May 19, 2022

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## **NOTICE OF AVAILABILITY**

### **Draft Engineering Report and Environmental Assessment**

#### **Mahoning River Basin Water Control Manual Updates Berlin Lake**

#### **Michael J. Kirwan Dam and Reservoir Mosquito Creek Lake**

U.S. Army Corps of Engineers Pittsburgh District (USACE) is evaluating updates to the Water Control Manuals for Berlin Lake, Michael J. Kirwan Dam and Reservoir, and Mosquito Creek Lake within the Mahoning River Basin located in the State of Ohio.

USACE invites submission of comments on the draft Engineering Report, draft Environmental Assessment, and draft Finding of No Significant Impact for the revised Water Control Manuals. USACE will consider all submissions received before the expiration date of the public comment period. The nature or scope of the proposal may be changed upon consideration of the comments received.

The draft Engineering Report, draft Environmental Assessment, and draft Finding of No Significant Impact are available electronically at:

<https://www.lrp.usace.army.mil/Missions/Planning-Programs-Project-Management/>

**Comments can be submitted to the address posted at the top of this notice or to [lrp.plan.enviro@usace.army.mil](mailto:lrp.plan.enviro@usace.army.mil). Comments must be received by May 19, 2022 to ensure consideration.**

A public meeting is scheduled for:

**Tuesday, May 3, 2022 | 7 – 8:30 p.m.**  
**Stambaugh Auditorium | 1000 5<sup>th</sup> Avenue, Youngstown, OH 44504.**

The purpose of this meeting is to inform the public of the updates to the Water Control Manuals and answer questions about the project.

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## **DRAFT FINDING OF NO SIGNIFICANT IMPACT**

### **Mahoning River Basin Water Control Manual Update Berlin Lake, Michael J. Kirwan Dam & Reservoir, Mosquito Creek Lake Mahoning, Portage, Stark, and Trumbull Counties, Ohio**

The U.S. Army Corps of Engineers, Pittsburgh District (Corps) has conducted a **DRAFT** environmental analysis, prepared in accordance with the National Environmental Policy Act of 1969, as amended. The April 2022 **DRAFT** Environmental Assessment (EA) for the Mahoning River Basin Water Control Manual Updates at Berlin Lake, Michael J. Kirwan Dam & Reservoir and Mosquito Creek Lake located in Mahoning, Portage, Stark, and Trumbull Counties, Ohio, evaluated potential environmental impacts associated with the updates to the Water Control Manuals and subsequent revisions to the Water Control Plans for Berlin Lake and Michael J. Kirwan Dam & Reservoir. The Mosquito Creek Lake Water Control Manual is also proposed for updates; however, no changes to the Water Control Plan are proposed.

The **DRAFT** EA, incorporated herein by reference, evaluated various alternatives that would make operational changes through the revision of the Water Control Plans at Berlin Lake and Michael J. Kirwan Dam & Reservoir that will:

- maintain the level of flood risk reduction benefits the Mahoning Reservoirs currently provide to the Mahoning River Basin watershed;
- maintain contractually agreed to water supplies for withdrawals within and downstream of the Mahoning Reservoirs;
- increase recreation opportunities within and downstream of the Mahoning Reservoirs, provided that project authorizations for flood risk reduction, water supply, and water quality are met;
- maintain flow requirements at Leavittsburg and Youngtown; and,
- maintain and if possible enhance ecosystem function within and downstream of Berlin Lake and Michael J. Kirwan Dam & Reservoir.

The Preferred Alternative includes changing the Water Control Plans for Berlin Lake and Michael J. Kirwan Dam & Reservoir, to include extending the Berlin Lake guide curve to begin drawdown of summer pool on Labor Day, and to remove the fixed percentages of augmentation flow from Berlin Lake Reservoir and Michael J. Kirwan Dam & Reservoir.

In addition to a “no action” alternative and the Preferred Alternative, one other alternative was evaluated. This alternative included changing the Water Control Plans for Berlin Lake Reservoir and Michael J. Kirwan Dam & Reservoir to include utilizing an additional 25% of reservoir storage during drawdown from summer pool to winter pool at Berlin Lake Reservoir and removing the fixed augmentation flow percentages from Berlin Lake Reservoir and Michael J. Kirwan Dam & Reservoir.

For all alternatives, the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the Preferred Alternative are listed in Table 1.

**Table 1: Summary of Potential Effects of the Preferred Alternative**

<b>Environmental Resource</b>	<b>Minor effect</b>	<b>No effect</b>	<b>Resource unaffected by action</b>
Aesthetics	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Air quality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aquatic resources/wetlands	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive species	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Fish and wildlife habitat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Threatened/Endangered species	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Historic properties	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Other cultural resources	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Floodplains	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Hazardous, toxic & radioactive waste	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Hydrology	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Land use	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Navigation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Noise levels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Socio-economics	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Environmental justice	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Soils	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Water quality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Climate change	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Child health and safety	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the Preferred Alternative. Best management practices (BMPs) as detailed in the EA will be implemented, if appropriate, to minimize impacts.

No compensatory mitigation is required as part of the Preferred Alternative.

Public review of the draft EA and FONSI will be completed on 19 May 2022. All comments submitted during the public review period will be responded to in the Final EA and FONSI.

Pursuant to section 7 of the Endangered Species Act of 1973, as amended, the Corps determined that the Preferred Alternative would have no effect on federally listed threatened or endangered species or their designated critical habitat.

Pursuant to section 106 of the National Historic Preservation Act of 1966, as amended, the Corps determined that the Preferred Alternative has no potential to affect historic or cultural resources.

### **FINDING**

Technical, environmental, and economic criteria used in the formulation of alternative plans were those specified in the Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, regulations, and local government plans were considered when evaluating alternatives. Based on this report, input from Federal, State, and local agencies, Tribes, and the public, and the review by my staff, it is my determination the Preferred Alternative would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

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Date

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ADAM J. CZEKANSKI  
Colonel, Corps of Engineers  
District Commander

# ENVIRONMENTAL ASSESSMENT

Mahoning River Basin Water Control Manual Updates  
Berlin Lake, Michael J. Kirwan Dam & Reservoir, and  
Mosquito Creek Lake



Berlin Lake Dam

November 2021

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# 1 Introduction

An Environmental Assessment (EA) is prepared “for a proposed action that is not likely to have significant effects,” and that “provide[s] sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact” (40 CFR §§ 1501.5(a) and 1501.5(c)).

US Army Corps of Engineers (USACE) reservoir water management activities are governed by a project’s authorized purposes as defined in law. They must also be consistent with other legal requirements related to real estate, environmental principles, public use, and public safety. USACE Engineering Regulation (ER) 1110-2-240 requires that an integrated water control master manual be prepared for system water management of Corps-regulated projects in a drainage basin with interrelated purposes. The Pittsburgh District (Corps), manages and operates three reservoirs within the Mahoning River Basin watershed in northeastern Ohio: the reservoir at Berlin Lake (Berlin Lake Reservoir), the reservoir at Michael J. Kirwan Dam & Reservoir (Michael J. Kirwan Reservoir), and the reservoir at Mosquito Creek Lake (Mosquito Creek Lake Reservoir) (the Mahoning Reservoirs). A system-based approach to managing the Mahoning River basin was not originally done since the construction of these reservoirs was staggered. This EA is being prepared to support a system-based approach to accomplishing the projects’ authorized purposes.

This EA evaluates the environmental consequences of proposed operational changes at Berlin Lake Reservoir and Michael J. Kirwan Reservoir through updates to the Water Control Manuals (WCMs) and changes to their Water Control Plans (WCPs). The WCM for Mosquito Creek Lake Reservoir is also proposed for updates; however, no changes to the WCP or to the operation of this reservoir are proposed at this time.

The purpose of this EA is to assess the impact of proposed updates to the WCMs and WCPs, and to ensure compliance with the National Environmental Policy Act (NEPA) and other environmental laws. The EA will also provide an opportunity for public involvement in the decision-making process. This EA has been prepared in accordance with NEPA and the Council on Environmental Quality’s (CEQ) Regulations (40 CFR Part 1500-1508), and USACE ER 200-2-2, Procedures for Implementing NEPA.

The WCM is a broader document, with the WCP being a chapter within the WCM. Each reservoir has an individual WCM. The WCP defines the regulation (i.e., hold or release of water) of the individual reservoir to meet the authorized purpose(s) of that reservoir. Also, the WCP includes a discussion on how to regulate any interrelated reservoirs as a system. The WCM informs day-to-day water management under variable conditions that may affect a federal project (ER 1110-2-8156). The WCM provides a reference source on project issues, authorities, data, schedules, and other information necessary to regulate a project. As defined in ER 1110-2-240, the WCM is a document providing guidance and instruction for project personnel and a reference source for others who may be involved with, responsible for, or affected by project regulation. It includes all water control management activities as they relate to hydraulic and hydrologic aspects

of the project, such as descriptions of physical components, operating procedures, historical facts, and other pertinent data. The WCM also provides a format to document the effects and benefits of project purposes, which may be used to improve the WCP.

ER 1110-2-240 defines the WCP as a document that includes coordinated regulation schedules for project/system regulation and such additional provisions as may be required to collect, analyze, and disseminate basic data, prepare detailed operating instructions, assure project safety, and carry out regulation of projects in an appropriate manner. The WCP is a plan of regulation for a water resources project in the interest of flood risk management, navigation, and other authorized purposes. The purpose of the WCP is to prescribe operations for authorized project purposes to accomplish those purposes to the greatest extent possible while seeking to minimize the risk to public safety. The WCP is the guide for water release decisions for a project. Operations are directed by the Pittsburgh District Water Management Team.

A WCM is the guiding document that specifies how USACE operates each reservoir. Each reservoir has congressionally mandated purposes, and these manuals are what USACE uses to balance those purposes. The WCMs also provide details on the reservoir's history, authorizations, watershed characteristics, data collection networks, forecasting methods, and stakeholder coordination. The most critical section of the manual is the WCP, outlining the operational plan, such as when and how to release or hold water, to meet all of the reservoir's Congressionally authorized purposes.

USACE conducts periodic reviews to ensure the WCMs contain current information. The Berlin Lake Reservoir WCM containing the WCP was originally written in April 1977 with revisions in July 1978. An update in February 2010 changed the vertical datum from NGVD 29 to NAVD 88, as required, and an administrative update was completed in 2012. The Michael J. Kirwan Reservoir WCM containing the WCP was originally written in February 1977 with revisions in July 1978. An update in August 2010 changed the vertical datum from NGVD 29 to NAVD 88, as required, and an administrative update was completed in 2020. The Mosquito Creek Reservoir WCM containing the WCP was originally written in January 1977 with revisions in August 1978. An update in February 2010 changed the vertical datum from NGVD 29 to NAVD 88, as required, and an administrative update was completed in 2020. Comprehensive updates have not been completed for any of the WCMs. Since the development of the original WCMs, the Corps has gathered an extensive record of precipitation data, watershed land use data, revised basin characteristics, and water quality data for the Mahoning River Basin watershed.

The Corps proposes to make operational changes through the revision of the WCPs at Berlin Lake Reservoir and Michael J. Kirwan Reservoir that would:

- Maintain the level of flood risk reduction benefits the Mahoning Reservoirs currently provide to the Mahoning River Basin watershed.
- Maintain contractually agreed to water supplies for withdrawals within and downstream of the Mahoning Reservoirs.

- Increase recreation opportunities within and downstream of the Mahoning Reservoirs, provided that project authorizations for flood risk reduction, water supply, and water quality are met.
- Maintain flow requirements at Leavittsburg and Youngstown.
- Maintain and if possible enhance ecosystem function within and downstream of Berlin Lake Reservoir and Michael J. Kirwan Reservoir.

Reauthorization – the act of changing the authorized purposes of the reservoirs – requires an act of Congress. Reallocation – the act of changing the relative reservoir storage allowed for each authorized purpose – requires a viable partner for a cost sharing project. Reauthorization and reallocation were not considered viable options for this study and were not considered further. There would be no change to winter or summer pool elevations and no change to the amount of water allocated for project authorizations.

Lake Milton is located approximately two miles downstream of Berlin Lake Reservoir on the Mahoning River. It is located in Lake Milton State Park, operated by the Ohio Department of Natural Resources (ODNR). Lake Milton is mentioned in this EA as its operations and reservoir elevations are interrelated with Berlin Lake Reservoir operations.

### **1.1 Project Authorizations**

All three Mahoning Reservoirs are authorized for flood risk management, water quality control, fish and wildlife, recreation, and water supply, and have storage allocated for flood risk management and water quality control. Berlin Lake Reservoir and Mosquito Creek Lake Reservoir also have storage allocated for water supply.

The Berlin Lake Reservoir was authorized by the Flood Control Act of 1938 for the purposes of flood risk management, and to provide low flow augmentation for water quality (Flood Control Act of 1938 and Federal Water Pollution Control Act Amendments of 1972). Subsequent acts authorized supplemental purposes for water supply (Flood Control Act of 1938), fish and wildlife enhancement (Fish and Wildlife Coordination Act of 1958), and recreation (Flood Control Act of 1944). Of these three supplemental purposes, additional storage in Berlin Lake Reservoir was allocated only for water supply.

The Berlin Lake Project includes approximately 8,061 acres of fee lands managed by the Federal government, and flowage easements on privately owned lands, over which the Federal government acquired a perpetual right to flood in connection with reservoir operation. The Berlin Lake Project has been operated and maintained since 1943. The Berlin Lake Project also includes the reservoir, dam, Corps' facilities, such as a Resource Manager's Office, information center, maintenance compound, campground, two boat launches, playgrounds, picnic areas, a disc golf course, and reservable picnic shelters, as well as fee lands leased to the ODNR for management as a wildlife area.

The Michael J. Kirwan Dam & Reservoir Project was authorized by the Flood Control Act of 1958 with local cooperation requirements modified by the Flood Control Act of 1960 for the purposes of flood risk management, low flow augmentation for water quality, water supply, fish and wildlife enhancement (Fish and Wildlife Coordination Act of 1958), and recreation (Flood Control Act of 1944). Storage is allocated only for the purposes of flood risk management, low flow augmentation, and water supply. The Michael J. Kirwan Dam & Reservoir Project includes approximately 6332 acres of fee lands and flowage easements and includes the reservoir, dam, Corps facilities (information center, picnic shelter, nature trail), and other fee land managed through leases to the ODNR (West Branch State Park). The Michael J. Kirwan Dam & Reservoir Project has been operated and maintained since 1966.

The Mosquito Creek Lake Project was authorized by the Flood Control Act of 1938 for the purposes of flood risk management, low flow augmentation for water quality (Flood Control Act of 1938 and Federal Water Pollution Control Act Amendments of 1972), water supply (Flood Control Act of 1938), fish and wildlife enhancement (Fish and Wildlife Coordination Act of 1958), and recreation (Flood Control Act of 1944). Storage is allocated only for the purposes of flood risk management and water supply. The Mosquito Creek Lake Project includes approximately 11,486 acres of fee lands and flowage easements and includes the reservoir, dam, Corps facilities (offices, maintenance facilities, recreation areas), and other land including land managed by ODNR (Mosquito Lake State Park). The Mosquito Creek Lake Project has been operated and maintained since 1944.

Berlin Lake Reservoir and Michael J. Kirwan Reservoir are operated to meet downstream flow requirements (see Section 2.1) at Leavittsburg, Ohio. Mosquito Creek Lake Reservoir, in combination with the Mahoning River flow at Leavittsburg, is operated to meet downstream flow requirements at Youngstown, Ohio.

## **1.2 Project Background and Location**

The Mahoning River headwaters begin in Columbiana County, Ohio, about 12 miles southeast of Alliance, Ohio. The Mahoning River flows generally northward to a point near Warren, Ohio, where it turns southeast and flows through the communities of Leavittsburg, Warren, Niles, Youngstown, and Lowellville, Ohio, and then into Pennsylvania (Figure 1). There it joins the Shenango River to form the Beaver River, a tributary to the upper Ohio River. The West Branch Mahoning River joins the Mahoning River in Newton Falls, Ohio. Mosquito Creek joins the Mahoning River in Niles, Ohio. The total drainage area of the Mahoning River basin is approximately 1,140 square miles, with approximately 1,085 square miles (96%) located in the Ohio counties of Ashtabula, Geauga, Trumbull, Portage, Mahoning, Stark and Columbiana. The remaining 4% of the drainage area is located in Lawrence County, Pennsylvania.

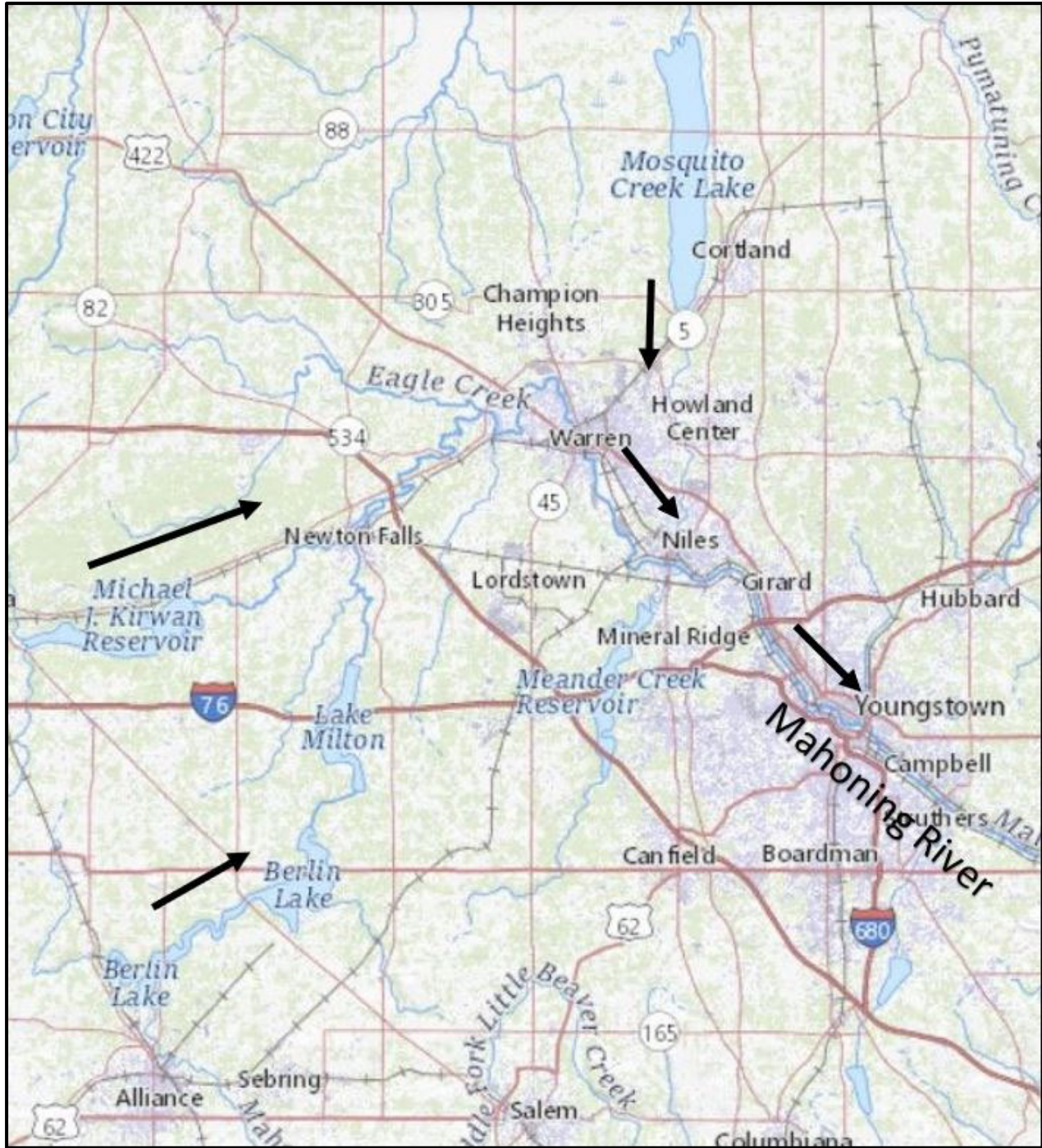


Figure 1. Location map of Mahoning Reservoirs (USGS, 2021). Arrows indicate direction of water flow.

Berlin Lake Reservoir is located to the west of Berlin Center, approximately 22 miles southwest of Youngstown, in Stark, Portage and Mahoning Counties, Ohio. The Berlin Lake Dam is located at Mahoning River mile 70.7 and controls the runoff from 249 square miles of the Mahoning River drainage area. River miles begin at the mouth of the river (River Mile 0) and increase as one moves upstream, so the Berlin Lake Dam is located approximately 70 miles upstream of its confluence with the Beaver River. The

regulation of Berlin Lake Reservoir is integrated with Lake Milton. The ODNR's Lake Milton dam is located approximately 11 miles downstream from Berlin Lake Dam at Pricetown, Ohio (Figure 2).

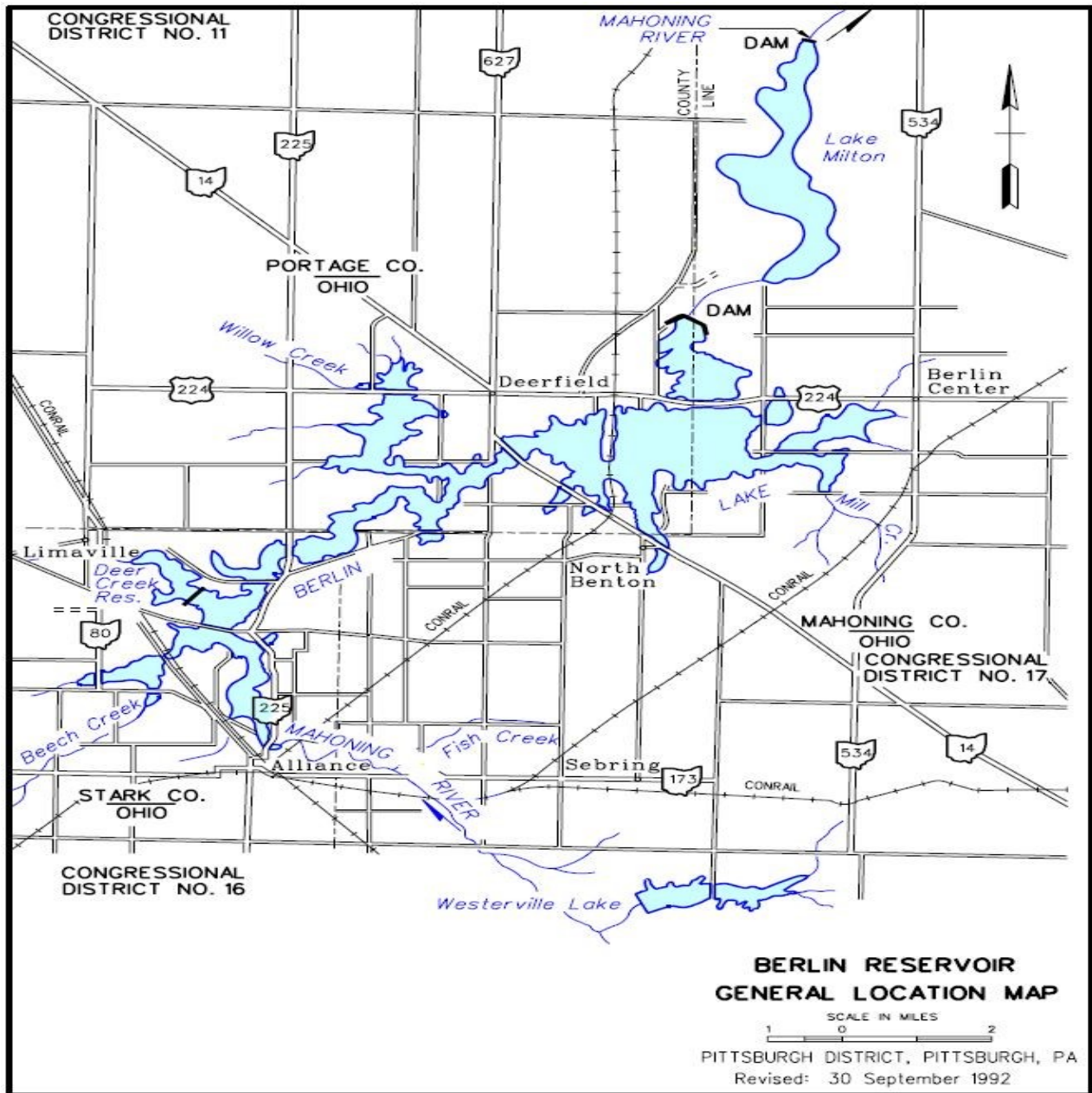


Figure 2. Berlin Lake Reservoir and Lake Milton location map.

Michael J. Kirwan Reservoir is located west of Newton Falls, approximately 27 miles west of Youngstown, in Portage County, Ohio. The dam is located at West Branch Mahoning River mile 11.8 and controls the runoff from approximately 81 square miles of the West Branch Mahoning River drainage area (Figure 3).

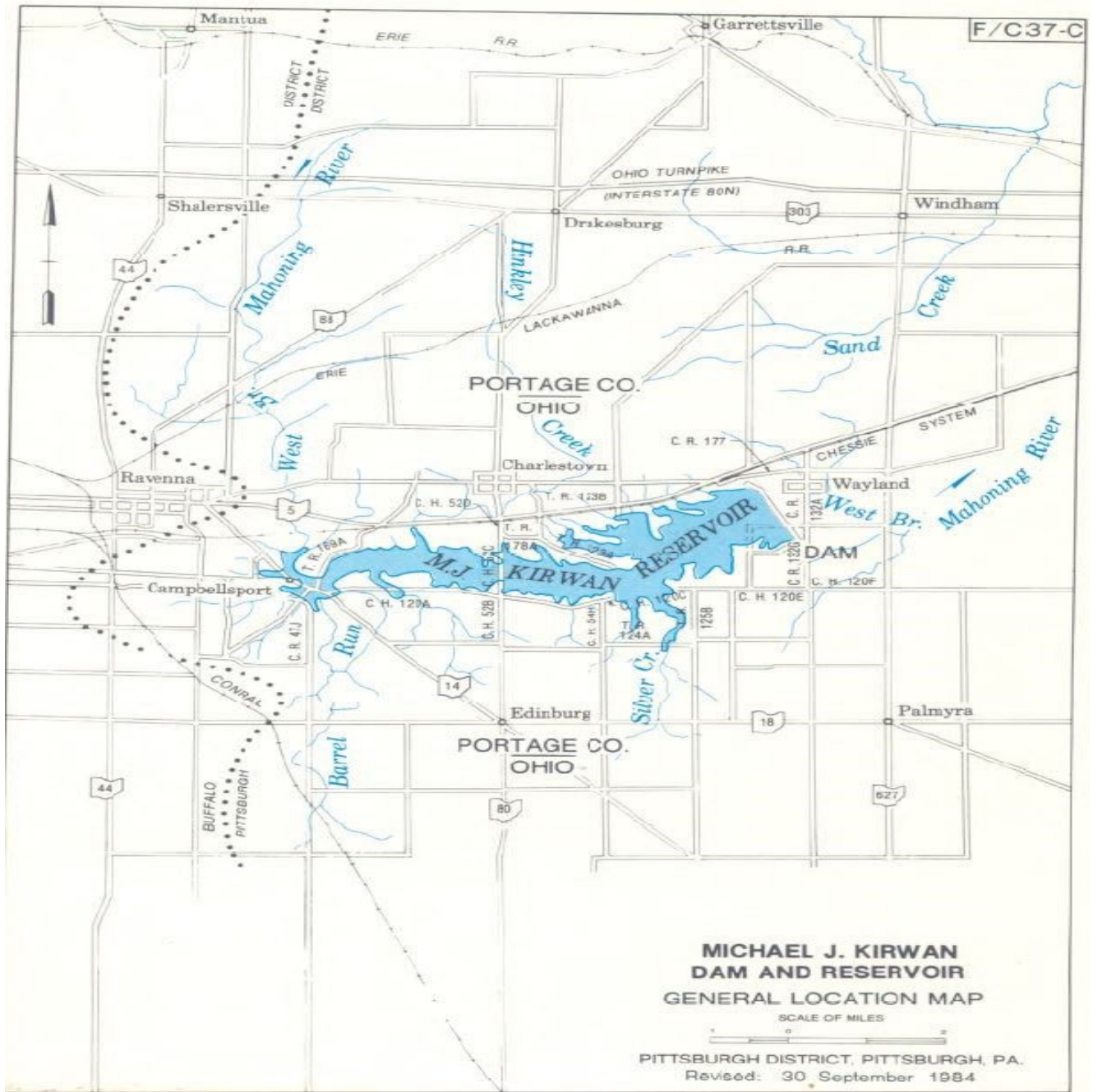


Figure 3. Michael J. Kirwan Dam & Reservoir location map.

Mosquito Creek Lake is located in Cortland, approximately 6 miles north of Warren, in Trumbull County, Ohio. The Mosquito Creek Lake Dam is located at Mosquito Creek river mile 12.5 and controls the runoff from an approximately 97 square mile drainage area (Figure 4).

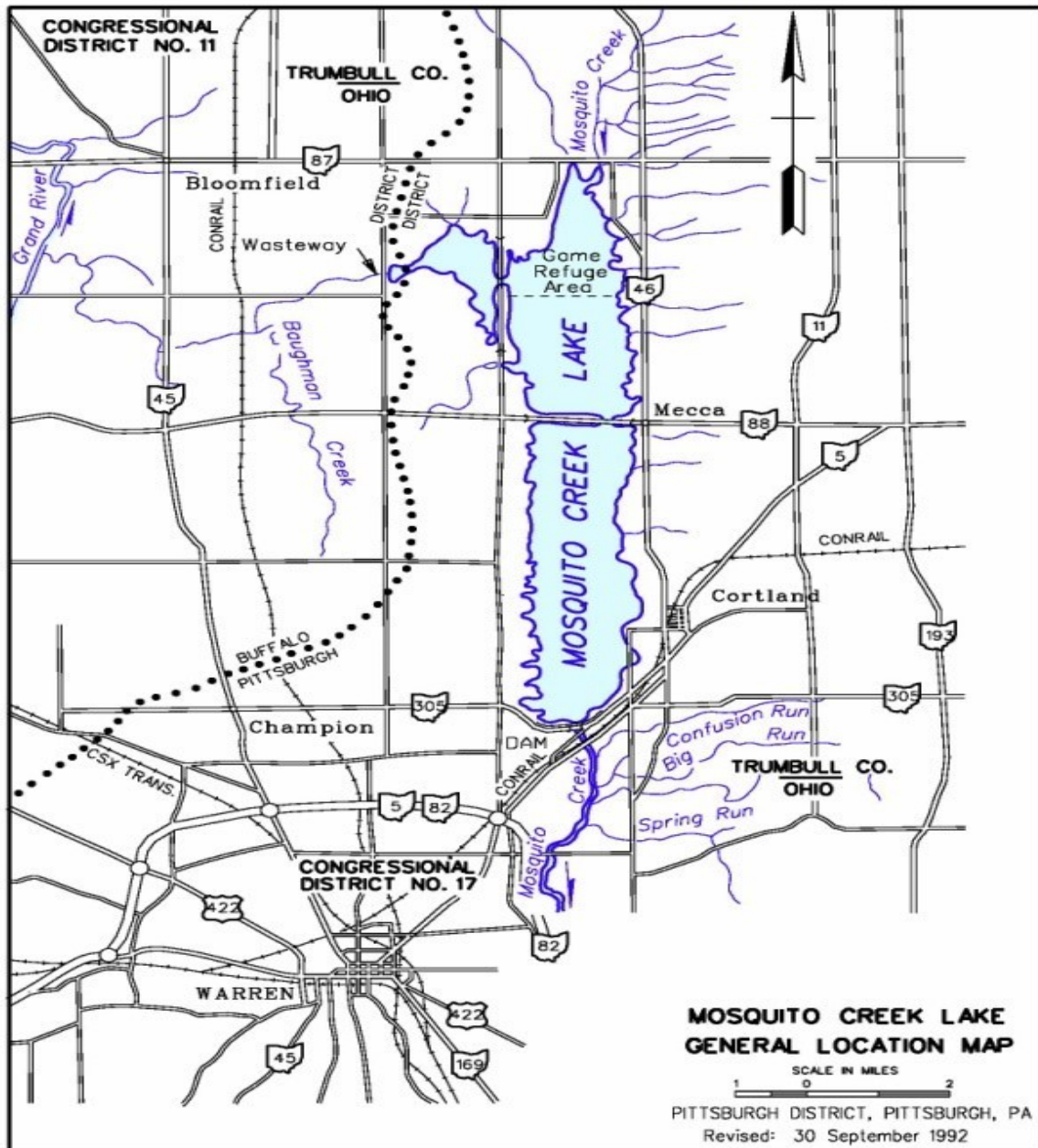


Figure 4. Mosquito Creek Lake location map.

### 1.3 National Environmental Policy Act Overview

USACE must assess the environmental effects of proposed federal actions and consider reasonable alternatives to those actions in accordance with processes established by NEPA, CEQ regulations, and USACE regulations. In general, NEPA requires federal agencies to make a series of evaluations and decisions that anticipate adverse effects on environmental resources. For those actions with the greatest potential to create significant environmental effects, the consideration of the proposed action and alternatives is presented in an Environmental Impact Statement (EIS).



Where the potential effects of the proposed action are not determined to be significant, an agency shall prepare an EA.

The CEQ's NEPA Regulations do not contain a detailed discussion regarding the format and content of an EA, but an EA must briefly discuss the need for the proposed action, an evaluation of the proposed action and alternatives, probable environmental effects of the proposed action and alternatives, and agencies and persons consulted.

#### **1.4 Purpose and Need**

The purpose of the Mahoning River Basin WCMs is to optimize reservoir management and codify operations in a WCP change, provided the planning objectives for flood risk reduction, water supply, and water quality are met. Historically, in an effort to provide economic and recreational benefits to the local region, the Pittsburgh District Water Management Team tried to balance the above planning objectives by managing the required drawdown of Berlin Lake outside the parameters of the WCP to allow for recreation through Labor Day, as much as practicable, while not negatively affecting other authorized project purposes.

As stated in ER 1110-2-8156, it is the policy of the USACE Chief of Engineers that WCMs and associated WCPs be continually reviewed, updated, and adjusted as needed to ensure the best use is made of available water resources. The Corps is updating the WCMs for Berlin Lake Reservoir, Michael J. Kirwan Reservoir, and Mosquito Creek Lake Reservoir incorporating precipitation data, watershed land use information, revised basin characteristics, and water quality data gathered in the Mahoning River watershed since the WCMs were first developed over 40 years ago. Hydrologic, hydraulic, and water quality analyses were conducted to determine if current and historical reservoir operations employed by the Corps continue to balance the needs of the watershed with authorized project purposes.

The Corps held a public meeting in July 2017 to gather information from Berlin Lake Reservoir users and interested parties. The presentation and agenda are located on the Corps' website (<https://www.lrp.usace.army.mil/Missions/Recreation/Lakes/Berlin-Lake/Berlin-Lake-Visioning-Meeting>). During the public meeting, participants noted a desire to extend the summer recreation season for boating. Local residents, business owners and organizations have requested the Corps maintain Berlin Lake Reservoir at higher pool level beyond Labor Day to facilitate recreational boating into the autumn, in order to economically benefit the community surrounding Berlin Lake. With the current drawdown schedule, the reservoir drawdown begins at the end of June to reach winter pool by late August. The Berlin Lake Reservoir users' request to modify the reservoir level indicated an opportunity to optimize the Corps' benefits to the region. This study affords the Corps the chance to optimize the way the water is controlled in the watershed, incorporating opportunities that address the various authorized purposes.

The Corps requested a planned deviation from the Berlin Lake Reservoir WCP in 2018 to hold the summer pool at Berlin Lake Reservoir in the range of 1021-1024 feet (NAVD 88) through Labor Day 2018, provided the downstream minimum flow target was met at

Leavittsburg, Ohio. The purpose of the deviation was to provide extended recreational benefits through later months of the year. The request was reviewed by water management staff at the Great Lakes and Ohio River Division Headquarters (LRD) and was disapproved (USACE, 2018). The memorandum concluded that “the more appropriate course of action is to do a comprehensive assessment that engages all Berlin Lake stakeholders, and if it leads to a recommendation for changed operations, propose a change to the approved water control plan in the Berlin Lake Water Control Manual.” The denial of the planned deviation in 2018 by LRD necessitated the need to conduct the study and if warranted, propose changes to the WCMs and WCPs for Berlin Lake, Michael J. Kirwan, and Mosquito Creek Lake Reservoirs, to ensure the best use of the available water resources within the scope of project authorizations. The deviation request, EA, and denial memorandum are located online at: <https://www.lrp.usace.army.mil/Missions/Recreation/Lakes/Berlin-Lake>.

## **2 Alternatives**

When preparing an EA, USACE will develop a range of alternatives that could reasonably achieve the need the proposed action is intended to address. The alternatives being considered in this EA are a no action alternative of continuing to operate the reservoirs under the current WCMs and WCPs and two alternatives that propose changes to the WCPs and WCMs. Historically, summer pool elevations at Berlin Lake have been held beyond the drawdown date as prescribed by the WCP guide curve to allow increased recreational use of the reservoir by boaters. In years with adequate precipitation, winter pool elevations were often not reached until approximately a month later than the WCP guide curve target date. One exception occurred during 2018, where reservoir drawdown was managed to follow the guide curve as closely as possible. The operations at Berlin Lake Reservoir, other than in the year 2018, are similar to Alternative 2 except that the percentages of augmentation flow followed the existing WCP for Berlin Lake.

### **2.1 No Action**

NEPA requires that federal agencies describe and analyze a no action alternative. The no action alternative considers what would happen if the Corps continued operating and managing the reservoirs under the current WCMs and WCPs. The no action alternative provides a baseline from which other alternatives can be compared and evaluated.

Comprehensive updates to the WCMs for each of the Mahoning Reservoirs have not been completed since the WCMs were first developed. The existing WCP for Berlin Lake Reservoir is illustrated in Figure 5. The guide curve (solid black line) depicts the targeted water elevations throughout the year. The actual reservoir elevations may be higher or lower depending upon the amount of precipitation received. Full or maximum pool is at 1031.3 feet (NAVD 88) in elevation, summer pool is 1024.0 feet (NAVD 88) in elevation and winter pool is 1015.9 feet (NAVD 88) in elevation. There is permanent minimum pool storage at 979.3 feet (NAVD 88) in elevation.

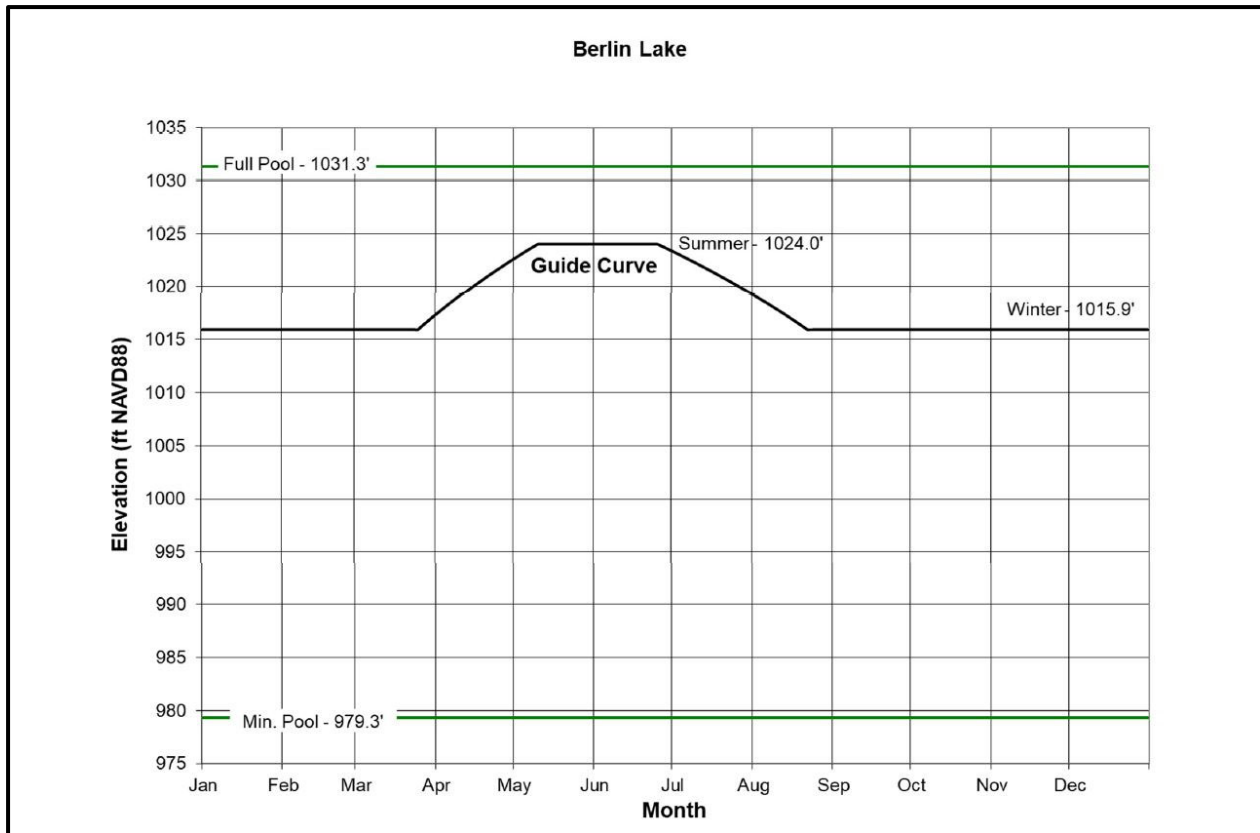


Figure 5. Existing guide curve in Berlin Lake Reservoir WCP.

Berlin Lake Reservoir is regulated to meet downstream flow requirements. As outlined in the existing Berlin WCM and WCP, the minimum scheduled flow at Leavittsburg, Ohio varies from 145 cubic feet per second (cfs) in the winter months (November through March) to 310 cfs in the summer months (June through August) (USACE, 1978). Berlin Lake Reservoir is regulated with Michael J. Kirwan Reservoir to meet the downstream flow requirements at Leavittsburg. Berlin Lake Reservoir and Michael J. Kirwan Reservoir are operated together to meet the flow schedule. Flow deficiencies at Leavittsburg are augmented 64% by Berlin Lake Reservoir and 36% by Michael J. Kirwan Reservoir. If the flow in the Mahoning River at Leavittsburg is below the daily flow schedule, then the Corps releases additional water into the rivers from Berlin Lake Reservoir and Michael J. Kirwan Reservoir to make up for the deficiency. Generally, the lowest water level elevations in Berlin Lake Reservoir occur during the months of September through mid-March. This is the period of time where the reservoir is at winter pool and the elevation is held near 1015.9 feet (NAVD 88). Beginning in mid-March, more water is held in the reservoir to gradually raise the pool to reach summer pool elevations (1024.0 feet (NAVD 88)) by early to mid-May. The summer pool is held in order to allow water releases that augment downstream water levels for improved water quality. If conditions allow, the summer pool is held until late June and then a gradual drawdown of the reservoir begins until winter pool is reached in late August for adequate flood storage.

The Michael J. Kirwan Reservoir WCP guide curve (solid black line) depicts the targeted water elevations throughout the year (Figure 6). The actual reservoir elevations may be higher or lower depending upon the amount of precipitation received. Full or maximum pool is at 992.6 feet (NAVD 88) in elevation, summer pool is 985.1 feet (NAVD 88) in elevation and winter pool is 980.6 feet (NAVD 88) in elevation. There is permanent minimum storage at pool elevation 950.5 feet (NAVD 88).

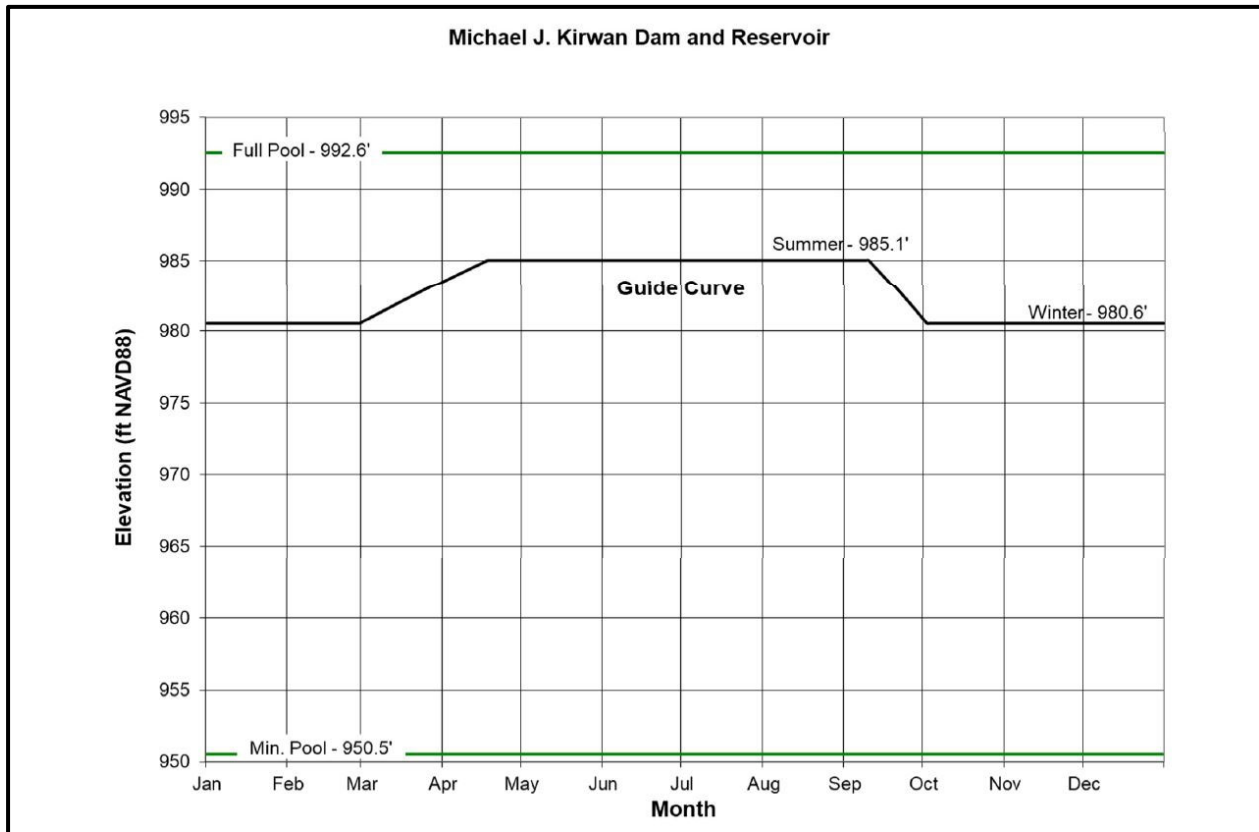


Figure 6. Existing guide curve in Michael J. Kirwan Reservoir WCP.

Michael J. Kirwan Reservoir is regulated to meet downstream flow requirements at Leavittsburg, Ohio. Generally, the lowest water level elevations in Michael J. Kirwan Reservoir occur during the months of October through February. This is the period of time when the reservoir is at winter pool and the elevation is held at 980.6 feet (NAVD 88). Beginning in late February/early March, more water is held in the reservoir to gradually raise the pool to reach summer pool elevations (985.1 feet (NAVD 88)) by mid-April. As with Berlin Lake Reservoir, summer pool is held in order to augment downstream water levels for water quality. If weather conditions allow, summer pool is held until mid-September and then a gradual drawdown of the reservoir begins until winter pool is reached in early October for adequate flood storage.

The Mosquito Creek Lake Reservoir WCP guide curve (solid black line) depicts the targeted water elevations throughout the year (Figure 7). The actual reservoir elevations may be higher or lower depending upon the amount of precipitation received. Full or maximum pool is at 903.3 feet (NAVD 88) in elevation, summer pool is 900.7 feet

(NAVD 88) in elevation and winter pool is 899.2 feet (NAVD 88) in elevation. There is permanent minimum storage of at pool elevation 880.3 feet (NAVD 88).

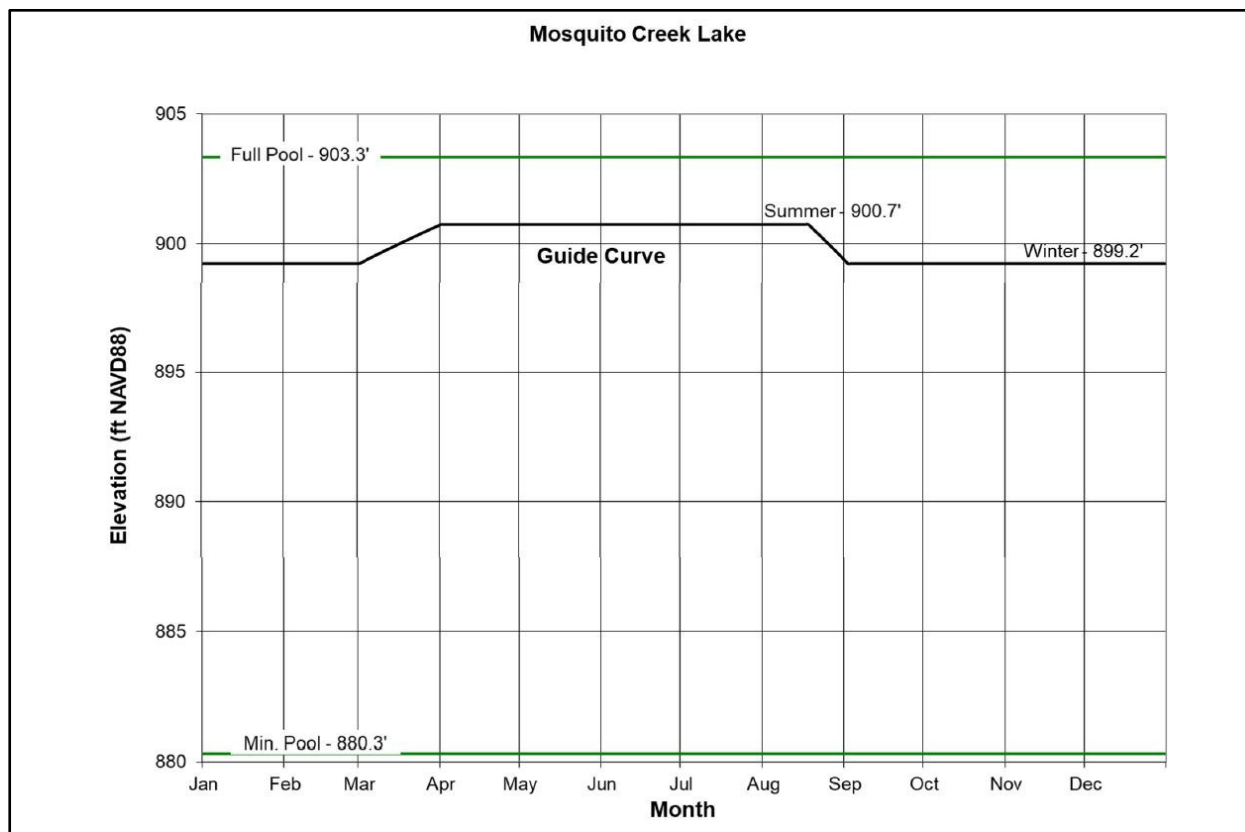


Figure 7. Existing guide curve in Mosquito Creek Lake Reservoir WCP.

Mosquito Creek Lake Reservoir, in combination with the flow at Leavittsburg, is regulated to meet downstream flow requirements at Youngstown, Ohio, where minimum flow requirements of 480 cfs in the summer and 230 cfs in the winter must be met. Generally, the lowest water level elevations in Mosquito Creek Lake Reservoir occur during the months of September through March. This is the period of time when the reservoir is at winter pool and the elevation is held around 899.2 feet (NAVD 88). In early March, more water is held in the reservoir to gradually raise the pool to reach summer pool elevation (900.7 feet (NAVD 88)) by early-April. Summer pool is also held at Mosquito Creek Lake Reservoir to augment downstream water levels for improved water quality. If weather conditions allow, summer pool is held until mid-August and then a gradual drawdown of the reservoir begins until winter pool is reached in early September for adequate flood storage.

Pool elevations at all reservoirs are maintained at levels to support the authorized purposes of the reservoirs. The Corps manages the reservoirs' water levels by opening and closing the gates at the dams to control the outflows in order to adhere to the WCPs. Reservoir elevations can change depending upon the amount of precipitation

received during the year. In drier years, reservoir elevations can begin to decrease earlier than WCP targets for the beginning of drawdown to reach winter pool elevations.

More water is drawn from Berlin Lake Reservoir than Michael J. Kirwan Reservoir with the amounts in fixed percentages. The fixed percentages of augmentation flow are 64% from Berlin Lake Reservoir, which is operated with Lake Milton, and 36% from Michael J. Kirwan Reservoir.

Under the no action alternative, all three reservoirs would continue to operate under the existing WCMs and WCPs. Berlin Lake Reservoir, Michael J. Kirwan Reservoir, and Mosquito Creek Lake Reservoir would continue to follow the guide curves described above. Fixed augmentation flow percentages would remain at 64% from Berlin Lake Reservoir and 36% from Michael J. Kirwan Reservoir.

## **2.2 Alternative 1: Extend Berlin Lake Reservoir guide curve to begin drawdown on Labor Day and remove fixed percentages of augmentation flow from Berlin Lake Reservoir and Michael J. Kirwan Reservoir**

Under this alternative, the Corps would update all three of the WCMs. Operational changes (and WCP changes) would occur at Berlin Lake Reservoir and Michael J. Kirwan Reservoir. No operational change would occur at Mosquito Creek Lake Reservoir.

The Corps would extend the guide curve at Berlin Lake Reservoir to begin drawdown from summer pool elevation of 1024 feet (NAVD 88) on Labor Day, thus reaching winter pool elevation in early November. The guide curve at Michael J. Kirwan Reservoir would not be changed. The fixed percentages of augmentation flow from Berlin Lake Reservoir and Michael J. Kirwan Reservoir would be removed.

Currently, the drawdown of summer pool begins in late June and winter pool is reached in late August. Under this alternative, the Corps' Water Management staff would make operational decisions regarding the percentages of augmentation flow contributed by each reservoir based on the need for water discharge necessary to meet downstream flow requirements and water needed to maintain summer pool elevations at Berlin Lake Reservoir. The timing changes between existing elevations and proposed elevations during the months of June through November are listed in Table 1. The proposed guide curve and transition zone are shown in Figure 8. The transition zone is approximately 0.50 feet higher than the guide curve elevation and is shown as Zone B, which is the area located between the orange and red lines (proposed) and black lines (existing). The orange line is the upper limit of the transition zone, and the red line is the lower limit of the transition zone. This zone is used to stabilize the pool level in a controlled manner during or following high precipitation events and to smooth the downstream effects of the transition from high releases to more normal outflows. The period of time during which the pool level drops from the upper limit to the lower limit of Zone B should be within 10 days.

Table 1. Existing and proposed elevations (in feet NAVD 88) for guide curve and transition zone for Berlin Lake Reservoir.

Guide Curve				Transition Zone			
Existing		Proposed		Existing		Proposed	
Date	Elevation	Date	Elevation	Date	Elevation	Date	Elevation
Jan 1	1015.91	Jan 1	1015.91	Jan 1	1016.41	Jan 1	1016.41
Mar 24	1015.91	Mar 24	1015.91	Mar 15	1016.41	Mar 15	1016.41
May 10	1024.01	May 10	1024.01	May 1	1024.51	May 1	1024.51
Jun 25	1024.01	Sep 7	1024.01	Jun 30	1024.51	Sep 12	1024.51
Aug 20	1015.91	Nov 2	1015.91	Aug 31	1016.41	Nov 13	1016.41
Dec 31	1015.91	Dec 31	1015.91	Dec 31	1016.41	Dec 31	1016.41

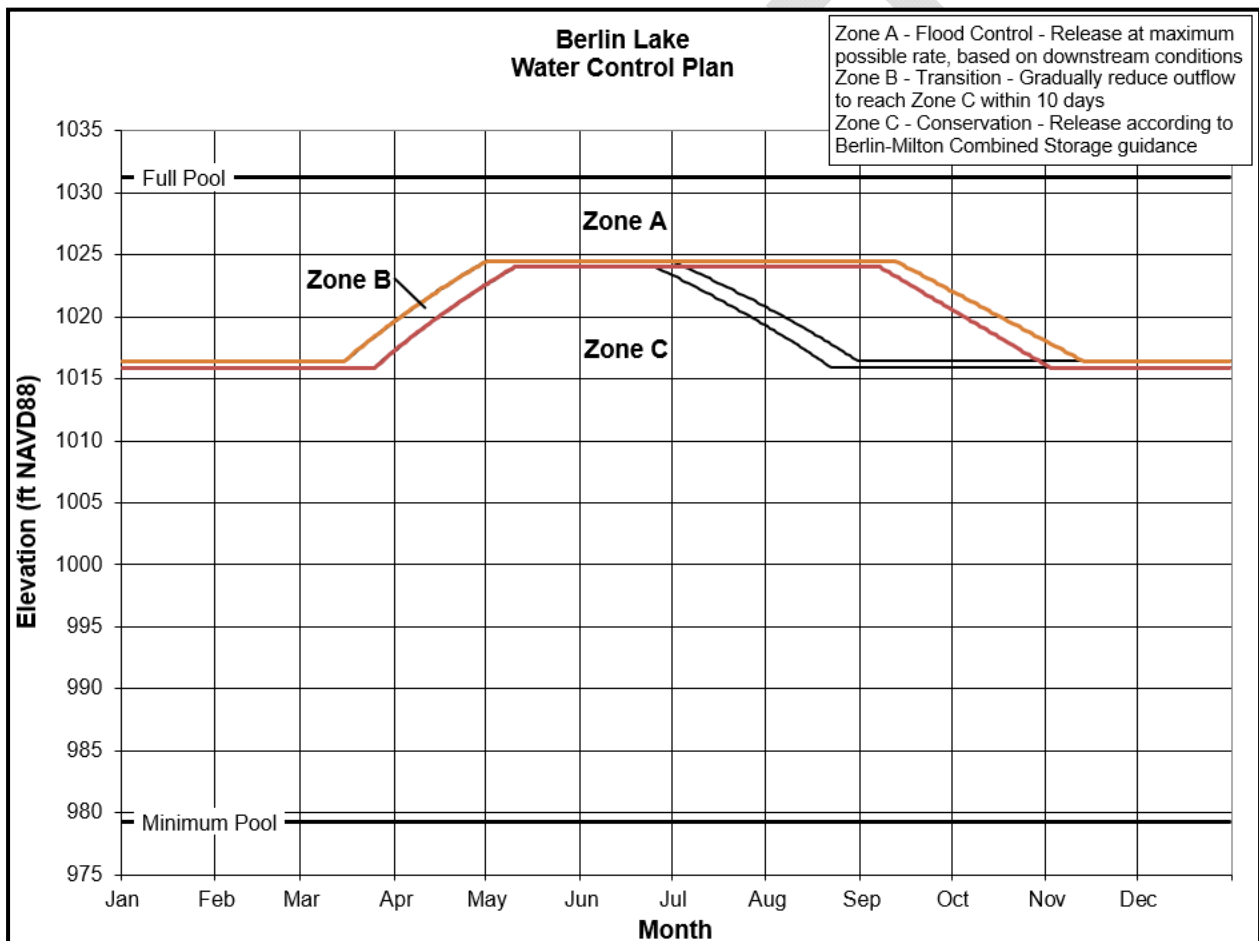


Figure 8. Proposed guide curve and transition zone shown as red and orange lines, existing guide curve and transition zone shown as black lines.

**2.3 Alternative 2: Utilize an additional 25% of reservoir storage at Berlin Lake Reservoir during drawdown from summer to winter pool, and remove fixed percentages of augmentation flow from Berlin Lake Reservoir and Michael J. Kirwan Reservoir**

Under this alternative, the Corps would update all three WCMs. Operational changes (and WCP changes) would occur at Berlin Lake Reservoir and Michael J. Kirwan Reservoir. No operational change would occur at Mosquito Creek Lake Reservoir.

Berlin Lake Reservoir’s WCP would be revised during the drawdown to reflect utilizing an additional 25% of reservoir storage compared to the existing guide curve, and removing the fixed augmentation flow percentages from Berlin Lake Reservoir and Lake Milton. The Michael J. Kirwan Reservoir fixed augmentation flow percentages would be removed. This alternative would extend summer pool at Berlin Lake Reservoir by several weeks (until mid-July) and would decrease the rate at which drawdown occurs. The guide curve at Michael J. Kirwan Reservoir would not be changed. As with Alternative 1, removing the fixed percentages of augmentation flow would result in the Corps’ Water Management staff making operational decisions regarding the percentages of augmentation flow contributed by each reservoir based on the need for water discharge necessary to meet downstream flow requirements and water needed to maintain summer pool elevations at Berlin Lake Reservoir. The timing changes between existing elevations and proposed elevations during the months of June through October are listed in Table 2. The proposed guide curve and transition zone are shown in Figure 9.

*Table 2. Existing and proposed elevations (in feet NAVD 88) for guide curve and transition zone for Berlin Lake Reservoir.*

Guide Curve				Transition Zone			
Existing		Proposed		Existing		Proposed	
Date	Elevation	Date	Elevation	Date	Elevation	Date	Elevation
Jan 1	1015.91	Jan 1	1015.91	Jan 1	1016.41	Jan 1	1016.41
Mar 24	1015.91	Mar 24	1015.91	Mar 15	1016.41	Mar 15	1016.41
May 10	1024.01	May 10	1024.01	May 1	1024.51	May 1	1024.51
Jun 25	1024.01	Jul 21	1024.01	Jun 30	1024.51	Jul 16	1024.51
Aug 20	1015.91	Oct 14	1015.91	Aug 31	1016.41	Oct 9	1016.41
Dec 31	1015.91	Dec 31	1015.91	Dec 31	1016.41	Dec 31	1016.41



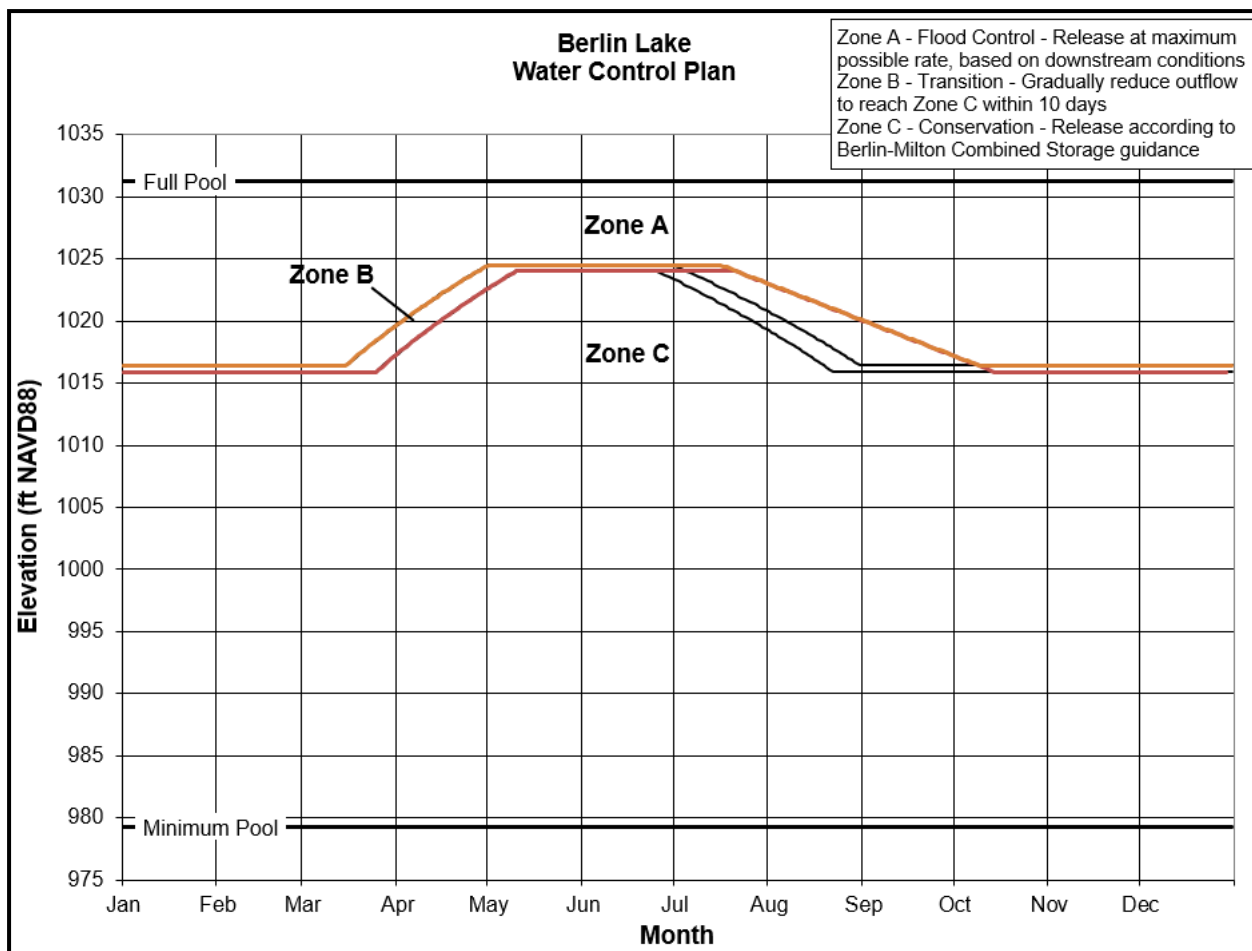


Figure 9. Proposed guide curve and transition zone shown as red lines, existing guide curve and transition zones shown as black lines.

## 2.4 Preferred Alternative

The Corps recommends Alternative 1 to Extend Berlin Lake Reservoir guide curve to begin drawdown on Labor Day and remove fixed percentages of augmentation flow from Berlin Lake Reservoir and Michael J. Kirwan Reservoir. This plan maximizes economic and recreational benefits to Berlin Lake Reservoir with limited impacts to natural resources.

## 2.5 Alternatives evaluated but not carried forward

Hydrologic and hydraulic modeling was completed for twenty-five scenarios from which four scenarios were chosen for further analysis. Scenario details are described in Table 7-2 of the *Berlin Lake, Michael J. Kirwan Dam and Reservoir, and Mosquito Creek Lake Engineering Report for Revisions to the Water Control Manuals*. For the purposes of comparing the alternatives described above, hydrologic and hydraulic modeling along with water quality modeling was completed for one of the four scenarios, which was an alternative that included extending Berlin Lake Reservoir summer pool to Labor Day, removing fixed augmentation flow percentages, and removing the downstream flow

requirements at Leavittsburg and Youngstown. The removal of downstream flow requirements has the potential to impact environmental resources, such as fish and wildlife habitat, hydrology, and water quality. In addition, this alternative could impact the calculated permit limits on National Pollutant Discharge Elimination System permits for discharges located on the Mahoning River. The removal of flow requirements cannot be implemented without significant coordination with numerous federal, state, and local agencies. Furthermore, the water quality CE-QUAL-W2 model (Wells, 2020), discussed in Section 3.7.2, was specifically run with this alternative. The model run showed worsening water quality conditions on the Mahoning River with the removal of the flow requirements at both downstream control points at Leavittsburg and Youngstown. This alternative would have significant impacts on water quality and therefore was not considered further. The information obtained from the modeling was used as a comparison to the modeling results obtained for the alternatives discussed above.

### **3 Affected Environment and Environmental Consequences**

This section describes the existing environmental conditions within the Mahoning Reservoirs (affected environment) providing a baseline for measuring expected changes that would result from each of the alternatives.

This section provides a discussion of any beneficial or adverse environmental effects of each of the alternatives and the No Action alternative. The terms “impact” and “effect” are used interchangeably in this section. Effects may occur at the same time and place or may occur at a later time or a distance away from an action but have a reasonably close causal relationship to a proposed action. The section also describes whether effects are temporary (short-term and occurring during the period of construction or implementation) or permanent (long-term and remaining for years into the future). The term “significant” means that an effect would result in a substantial change to the environment or resource. Minor effects do not substantially change the environment or resource.

The surrounding ecosystem is accustomed to the rising and falling reservoir levels since 1943, when the projects went into operation. Summer pool levels may be held longer at Berlin Lake Reservoir with the proposed alternatives and the Preferred Alternative. This would store more water in the reservoir and would increase reservoir retention time, which could lead to stronger reservoir stratification, higher biological productivity, and greater hypolimnetic anoxia, negatively impacting reservoir water quality and aquatic life. Since the proposed alternatives include no construction or structural changes, and do not substantially change the duration/rapidity of summer pool drawdown in the reservoirs, there are no expected impacts to the following resources:

- Aesthetics
- Floodplains
- Vegetation
- Soils
- Topography

- Geology
- Invasive species
- Child health and safety
- Navigable waters
- Land use
- The spread of invasive species
- Navigable waters
- Hazardous, toxic and radioactive waste sites or sources
- Cultural resources or historic properties
- Noise
- Climate change

These resources are not discussed further in this EA because no impacts to these resources were identified.

The Corps proposes to update the Mosquito Creek Lake Reservoir WCM only; no changes to the WCP are proposed at this time. Mosquito Creek Lake Reservoir is mentioned in this EA as it is part of the system, along with Berlin Lake Reservoir and Michael J. Kirwan Reservoir, functioning to reduce flood risk and maintain water quality in the Mahoning River Basin. It is not expected the proposed operational changes to Berlin Lake Reservoir and Michael J. Kirwan Reservoir analyzed in this EA would affect environmental resources within or downstream of Mosquito Creek Lake Reservoir.

### **3.1 Aquatic Resources and Wetlands**

#### **3.1.1 Existing Conditions**

Berlin Lake Reservoir, Michael J. Kirwan Reservoir and Mosquito Creek Lake Reservoir are all constructed impoundments. Berlin Lake Reservoir was created by damming the Mahoning River, Michael J. Kirwan Reservoir was created by damming the West Branch of the Mahoning River, and Mosquito Creek Lake Reservoir was created by damming Mosquito Creek. A number of tributaries flow into each of the reservoirs (Figures 1, 2, 3, and 4).

Wetlands are defined as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (USACE, 1987). A review of the United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Map shows that wetlands are prevalent in and around the Berlin Lake, Michael J. Kirwan, and Mosquito Creek Lake Projects, and throughout eastern Ohio (USFWS, 2021a). While the NWI map does not include all wetlands in the area, it does provide general information regarding the presence (or historical presence) of larger wetland systems in the area. To confirm the presence or absence of wetlands at a particular site, a site-specific wetland delineation would need to be conducted. NWI mapped wetlands are shown in Figure 10 (Berlin Lake Reservoir), Figure 11 (Michael J. Kirwan Reservoir), and Figure 12 (Mosquito Creek Lake Reservoir).

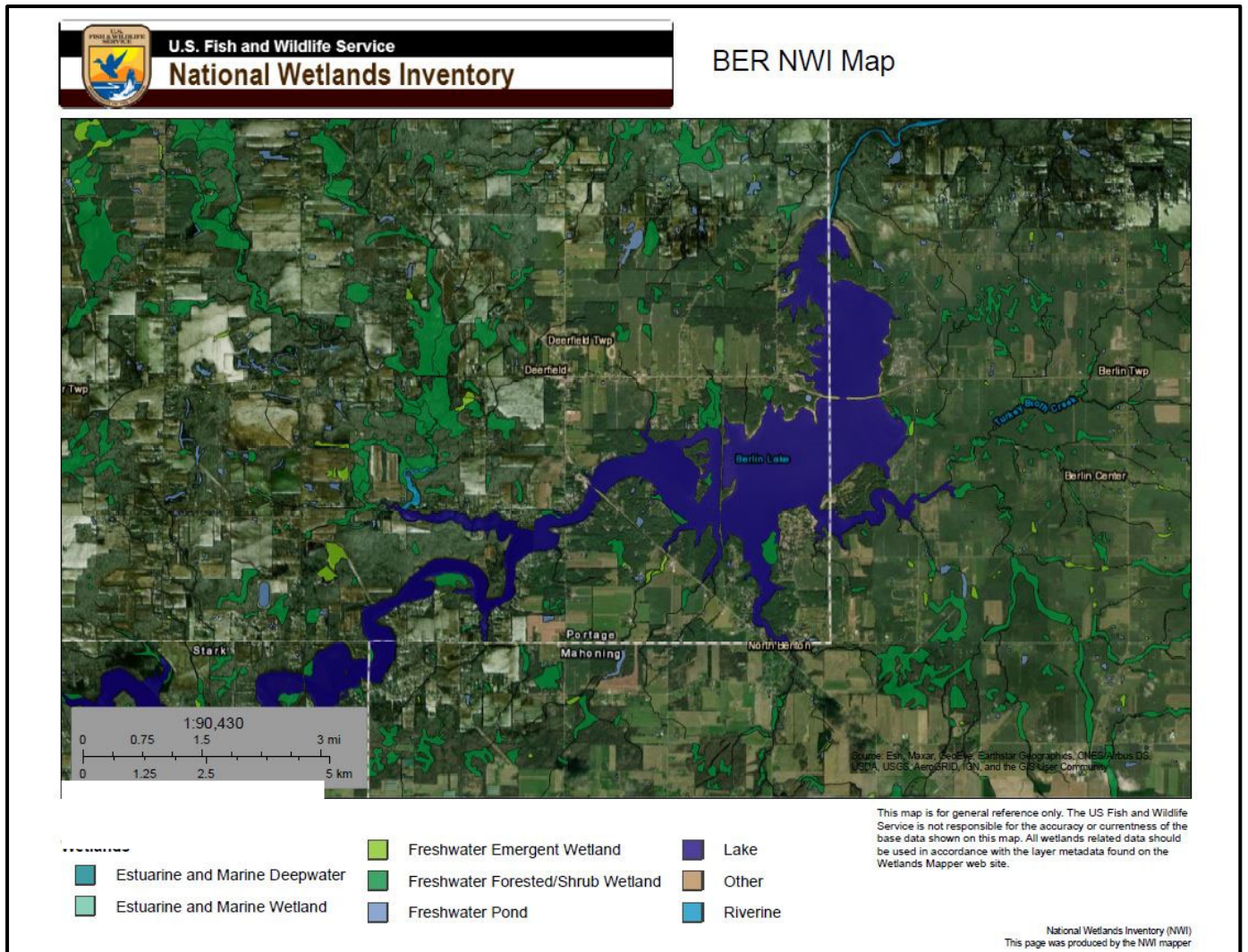


Figure 10. NWI Map showing Berlin Lake Reservoir and surrounding wetlands

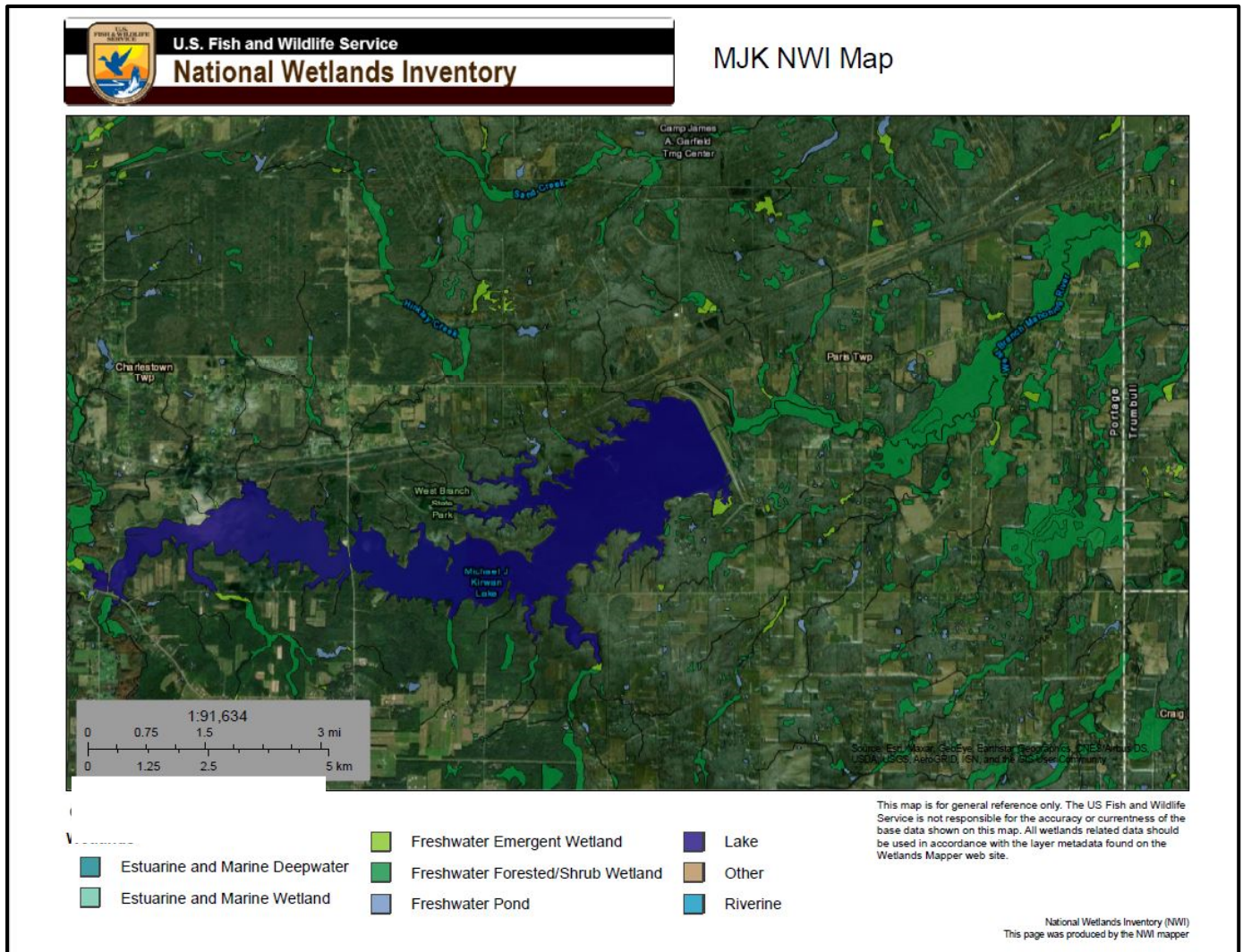


Figure 11. NWI map showing Michael J. Kirwan Reservoir and surrounding wetlands.

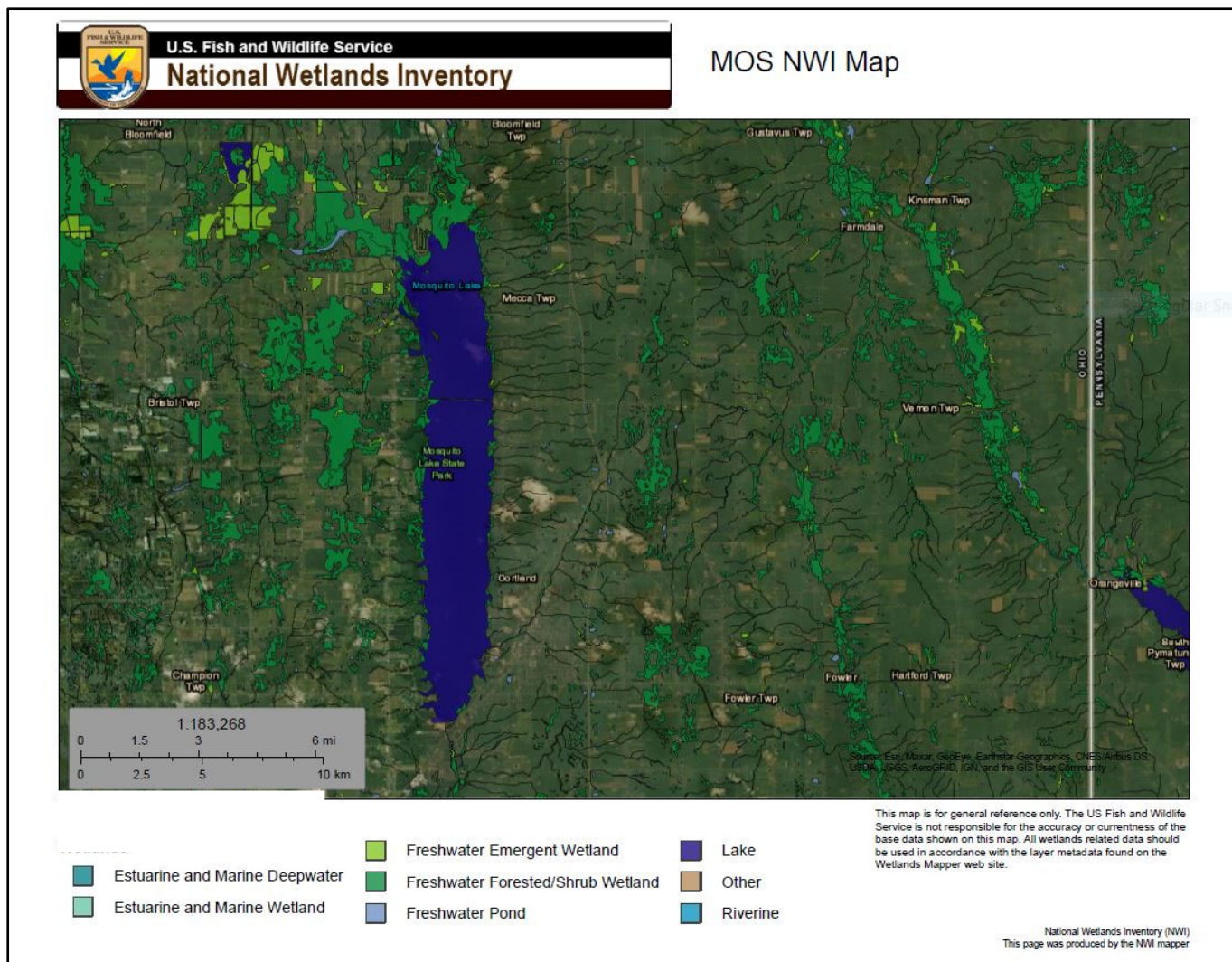


Figure 12. NWI map showing Mosquito Creek Lake Reservoir and surrounding wetlands.

During the drawdown of the reservoirs at Berlin Lake and Michael J. Kirwan, mudflats are exposed along the shorelines. Vegetation begins growing on these mudflats and remains through the winter months. When the reservoirs begin to fill in the spring, the vegetated mudflats become inundated.

### 3.1.2 Environmental Consequences

#### *No Action*

The reservoirs would continue to be managed per the existing WCP. No change to aquatic resources or wetlands would occur.

#### *Alternative 1*

It is not expected that there would be significant changes to aquatic resources. Holding summer pool at Berlin Lake Reservoir until Labor Day would not be expected to

significantly impact the Mahoning River or its tributaries, although it is likely that water levels downstream of Berlin Lake Reservoir in the Mahoning River would be lower during drier years. Downstream flow requirements will still be met with this alternative, so significant impacts to the Mahoning River and other tributaries are not expected. Holding summer pool until Labor Day may cause minor impacts to the hydrology of wetlands located downstream and adjacent to the Mahoning River during the months of July through September, and may cause minor impacts to wetlands located adjacent to and downstream of Michael J. Kirwan Reservoir, as it is expected that a minor loss of hydrology to these wetlands would occur. A complete loss of wetlands is not expected as July through September are typically drier months and any additional loss of hydrology during these months as a result of implementing this alternative would be offset during the spring when there are higher amounts of precipitation providing increased hydrology to wetlands. Overall, wetland functions are expected to be maintained. The range of reservoir elevations will not change from existing conditions at either Berlin Lake Reservoir or Michael J. Kirwan Reservoir. Overall, no change to wetland acreage is expected in and around Berlin Lake and Michael J. Kirwan Reservoirs.

### *Alternative 2*

It is not expected that there would be changes to aquatic resources or wetlands. The increase in reservoir storage during summer months and delayed drawdown of approximately several weeks at Berlin Lake Reservoir would not be expected to impact the Mahoning River or its existing tributaries as water levels fluctuate throughout the season due to precipitation events or lack of precipitation, and the expected change in reservoir levels is within the normal range seen at the reservoirs. Further, downstream flow requirements will still be met with this alternative. The minor changes in reservoir storage and delayed drawdown would also not be expected to impact existing wetlands at Berlin Lake Reservoir or at Michael J. Kirwan Reservoir, as they are subject to variations in hydrology throughout the year and the months during which this alternative would occur is typically a drier time of year with less precipitation and the change from existing conditions would only be for several weeks during the period of time that the drawdown of Berlin Lake Reservoir is delayed.

## **3.2 Fish and Wildlife Habitat**

### **3.2.1 Existing Conditions**

In the Mahoning River Basin watershed forested habitat, scrub-shrub uplands, wetlands, streams, rivers, and reservoirs support a variety of fish and wildlife species common to Ohio. The ODNR manages a wildlife area at the Berlin Lake Project and enacts a wildlife management plan to maintain and protect woodlands, establish crop rotations, make improvements to open fields for nesting, and establish food patches for general wildlife use (ODNR, 2021a). The wildlife area is open for public hunting and fishing. The ODNR manages West Branch State Park at the Michael J. Kirwan Dam & Reservoir Project. The park contains a stand of beech-maple forest and numerous boggy wetlands (ODNR, 2021b). Fishing and hunting are also available here. At the

Mosquito Creek Lake Project, the ODNR manages the Mosquito Lake State Park where beech-maple woodlands can be found along with a variety of wildlife habitat including woodlands, open fields, and wetlands (ODNR, 2021c).

All three reservoirs are designated as Important Bird Areas (IBA). The IBA program is a partnership between BirdLife International and the National Audubon Society and recognizes those areas which provide breeding, wintering, or migration habitat (Audubon, 2021a). IBA sites are categorized by their priority (state, global, or continental), and the three reservoirs are recognized as state priority areas in Ohio (Audubon, 2021b). Berlin Lake Reservoir is part of the larger Berlin Lakes System comprised of Berlin Lake Reservoir, Lake Milton, and Walborn Reservoir, providing shoreline and mudflat habitat for migratory shorebirds. A variety of species visit the shoreline and mudflats when Berlin Lake Reservoir levels drop beginning in mid-summer through the fall (Audubon, 2021c). Michael J. Kirwan Reservoir is part of the larger Ravenna Arsenal System, which is noted for its extensive scrub habitat and large populations of orchard orioles (*Icterus spurius*), blue-winged warblers (*Vermivora cyanoptera*), and northern shrikes (*Lanius borealis*) (Audubon, 2021d). Mosquito Creek Lake Reservoir is part of the Mosquito Creek Corridor IBA, noted for its extensive variety of habitats including grassland, woodland, marshland, and floodplains. Waterfowl overwinter in this IBA corridor, and migratory songbirds and shorebirds utilize its habitats. Notable species nesting within the Mosquito Creek Wildlife Area include the bald eagle (*Haliaeetus leucocephalus*), wood thrush (*Hylocichla mustelina*), scarlet tanager (*Piranga olivacea*), cerulean warbler (*Setophaga cerulea*), prothonotary warbler (*Protonotaria citrea*), blue-winged warbler (*Vermivora cyanoptera*), and ovenbird (*Seiurus aurocapilla*). A variety of hawks and owls also nest along the corridor, and it is an important staging area for immature eagles (Audubon, 2021e).

Mammal species of the region include white-tailed deer (*Odocoileus virginianus*), red fox (*Vulpes vulpes*), opossum, (*Didelphis virginiana*), raccoon (*Procyon lotor*), and gray squirrel (*Sciurus carolinensis*).

The region also provides habitat for a diverse assemblage of fish species. The reservoirs are natural spawning areas for fish and other aquatic organisms. a variety of fish species including smallmouth/largemouth bass (*Micropterus sp.*), walleye (*Sander vitreus*), yellow perch (*Perca flavescens*), black crappie (*Pomoxis nigromaculatus*), muskellunge (*Esox masquinongy*), catfish (i.e., *Ictalurus punctatus*, *Ameiurus catus*, etc.), common carp (*Cyprinus carpio*), white sucker (*Catostomus commersonii*), golden redhorse (*Moxostoma erythrurum*), green sunfish (*Lepomis cyanellus*), pumpkinseed (*Lepomis gibbosus*), bluegill (*Lepomis macrochirus*), bluntnose minnow (*Pimephales notatus*), and white crappie (*Pomoxis annularis*). Fish spawning for most species occurs in the spring when water temperatures begin to rise. Walleye spawn when water temperatures increase to 45 degrees Fahrenheit, which typically occurs in late March and early April (PAFBC, 2013). Largemouth and smallmouth bass spawn during mid-April to mid-June (PAFBC, 2020).

Numerous state listed threatened and endangered species are present in the region (ODNR, 2021d).



Bird species include:

- American bittern (*Botaurus lentiginosus*)
- Barn owl (*Tyto alba*)
- Black tern (*Chlidonias niger*)
- Black-crowned night-heron (*Nycticorax nycticorax*)
- Common tern (*Sterna hirundo*)
- Least bittern (*Ixobrychus exilis*)
- Northern harrier (*Circus hudsonius*)
- Sandhill crane (*Grus canadensis*)
- Trumpeter swan (*Cygnus buccinator*)
- Upland sandpiper (*Bartramia longicauda*)

Fish species include:

- American eel (*Anguilla rostrata*)
- Iowa darter (*Etheostoma exile*)
- Lake chubsucker (*Erimyzon sucetta*)
- Mountain brook lamprey (*Ichthyomyzon greeleyi*)
- North brook lamprey (*Ichthyomyzon fossor*)
- Western banded killifish (*Fundulus diaphanus menona*)

Mollusk species include:

- The black sandshell (*Ligumia recta*)
- Clubshell (*Pleurobema clava*)
- Eastern pondmussel (*Ligumia nasuta*)
- Longsolid (*Fusconaia subrotunda*)
- Pocketbook (*Lampsilis ovata*)
- Rabbitsfoot (*Theliderma cylindrica*)
- Sloan's crayfish (*Orconectes (Rhoadesius) sloanii*)

Mammal species include:

- Black bear (*Ursus americanus*)
- Northern long-eared bat (*Myotis septentrionalis*)

Reptile species include:

- Eastern massasauga rattlesnake (*Sistrurus catenatus*)
- Smooth greensnake (*Opheodrys vernalis*)
- Spotted turtle (*Clemmys guttata*)

As described in Section 3.1.1, mudflat habitat is exposed during the drawdown period for Berlin Lake Reservoir and Michael J. Kirwan Reservoir. Vegetation begins to grow on the exposed mudflats and continues throughout the growing season. When the

reservoirs begin to fill in the spring, the vegetated mudflats are inundated providing cover and habitat for juvenile fish species.

### 3.2.2 Environmental Consequences

#### *No Action*

Continuing to operate under the existing WCP would not result in any changes to fish or wildlife habitat. No effects to habitat are expected.

#### *Alternative 1*

It is not expected that Alternative 1 would impact fish spawning, as drawdown would occur after the spawning period for most fish species. The schedule for raising reservoir elevations at Berlin Lake and Michael J. Kirwan Reservoirs would not change with this alternative and conditions in late winter and early spring would not be impacted by the drawdown after Labor Day and thus would not be expected to impact fish spawning.

Holding summer pool until Labor Day at Berlin Lake Reservoir would delay the exposure of mudflats, which would decrease the amount of time available for vegetation to grow. The amount of vegetated mudflat habitat would decrease which may result in minor adverse effects to juvenile fish species that use the vegetation as cover from larger prey species during the spring.

As discussed in Section 3.1, minor impacts to wetland habitat downstream of Berlin Lake Reservoir and adjacent to the Mahoning River may occur with drier conditions during the months of July through September if summer pool is held until Labor Day, as there would be less water released from Berlin Lake Reservoir. Lower reservoir levels and hydrology in Michael J. Kirwan Reservoir and the West Branch Mahoning River would also be expected with this alternative, which may cause minor impacts to wetland habitat adjacent to and downstream of Michael J. Kirwan Reservoir and its tributaries. Downstream flow requirements will still continue to be met with this alternative and it is not expected that reservoir elevations would change beyond what typically occurs with existing conditions. Impacts to tributaries are not expected. With longer reservoir retention time at Berlin Lake Reservoir and the potential for shallower reservoir elevation levels at Michael J. Kirwan Reservoir, minor impacts to fish may occur (see Section 3.7.2.2). Significant adverse impacts to fish and wildlife habitat are not expected.

This alternative would delay the exposure of mudflat habitat by approximately two months at Berlin Lake Reservoir. This would impact migratory bird species that utilize this habitat as a stopover point during fall migration. Birds of conservation concern that would be impacted include the American golden-plover (*Pluvialis dominica*), buff-breasted sandpiper (*Calidris subruficollis*), lesser yellowlegs (*Tringa flavipes*), ruddy turnstone (*Arenaria interpres morinella*), semipalmated sandpiper (*Calidris pusilla*), and the short-billed dowitcher (*Limnodromus griseus*). This is further discussed in Section 3.3.

## Alternative 2

It is not expected that Alternative 2 would impact fish spawning, as drawdown would not begin until later in July. The shift in reservoir drawdown would also not significantly impact wildlife habitat with the exception of a slightly later shift in the formation of mudflats utilized by migratory birds at Berlin Lake Reservoir. See Section 3.3 for additional discussion on the impacts to migratory birds. Vegetation growth on mudflat habitat would be delayed slightly; however, it is not expected that it would affect the amount of cover habitat for juvenile fish species in the spring as much of the growing season would still remain. Fish habitat would not be impacted, nor would this alternative result in any significant changes to wetland habitat. Downstream flow requirements will be met, so it is not expected that there would be significant changes in hydrology that would impact fish and wildlife habitats.

### 3.3 Threatened and Endangered Species, Bald Eagles, and Migratory Birds

Under the Endangered Species Act (ESA) of 1973 (16 USC §§ 1531-1544), endangered species are defined as any species in danger of extinction throughout all or portions of its range. A threatened species is any species likely to become endangered in the foreseeable future. The ESA defines critical habitat of the above species as a geographic area that contains the physical or biological features that are essential to the conservation of a particular species and that may need special management or protection. This section also covers birds listed under the Migratory Bird Treaty Act (MBTA) of 1918 (16 USC §§ 703-712) as birds of conservation concern and birds listed under the Bald and Golden Eagle Protection Act (BGEPA) (16 USC §§ 668-668d).

#### 3.3.1 Existing Conditions

##### *Threatened and Endangered Species*

The USFWS Information for Planning and Consultation (IPAC) website provides site specific information regarding whether threatened or endangered species, and migratory birds may be present in a particular location (USFWS, 2021b). The species information is made available through a search of the IPAC database along with county species lists maintained by the USFWS Ohio Field Office (USFWS, 2021c). A review of this information on 29 November 2021 included six threatened and endangered species: the Indiana bat (*Myotis sodalis*), the northern long-eared bat (*Myotis septentrionalis*), northern wild monkshood (*Aconitum noveboracense*), Mitchell's satyr butterfly (*Neonympha mitchellii*), the clubshell mussel (*Pleurobema clava*) and the eastern massasauga rattlesnake (*Sistrurus catenatus*) and one candidate species, the monarch butterfly (*Danaus plexippus*). IPAC species lists and the USFWS Ohio Field Office county list are located in Appendix A.

Potentially occupied habitat exists for the endangered Indiana bat at the Mahoning Reservoirs. The Indiana bat roosts under the peeling bark of dead and dying trees during the summer months and hibernates during the winter months in caves or abandoned mines (USFWS, 2021d).

Potentially occupied habitat exists for the threatened northern long-eared bat at the Mahoning Reservoirs. During the summer months, the northern long-eared bat resides underneath bark, in cavities or crevices of both live trees and snags (dead trees) and hibernates during winter months in caves and mines (USFWS, 2021e).

Northern wild monkshood is a threatened plant species typically found on shaded to partially shaded cliffs, algal talus slopes, or on cool streamside sites (USFWS, 2021f).

Mitchell's satyr butterfly is endangered and inhabits fens, which are a rare type of wetland (USFWS, 2021g). Fens develop over a long period of time, up to 10,000 years, and receive nutrients from drainage of surrounding mineral soils and groundwater movement. They are capable of forming peat and have significantly declined due to mining and agricultural activities (USEPA, 2021d).

The eastern massasauga rattlesnake is threatened and inhabits wet areas including wetlands and low areas along rivers and lakes (USFWS, 2021h.) While eastern massasauga rattlesnakes are found throughout eastern Ohio, potentially suitable habitat is not present around Berlin Lake Reservoir and downstream of the dam on the Mahoning River (A. Boyer, USFWS, personal communication September 9, 2021). Potentially suitable habitat is also not present downstream of the Michael J. Kirwan Reservoir dam.

The clubshell mussel is endangered and inhabits clean, loose sand and gravel in medium to small rivers and streams (USFWS, 2021i.)

The monarch butterfly is a candidate species that lays eggs on milkweed plants during the breeding season. It has a widespread range throughout the United States and migrates south in the fall where it overwinters in warmer habitats (USFWS, 2021j.)

### *Bald Eagles*

Bald eagles (*Haliaeetus leucocephalus*) are known to nest within the Mahoning Reservoirs and are regularly sighted in the vicinity of the reservoir. These birds are protected under the MBTA and the BGEPA.

### *Migratory Birds*

As discussed in Section 3.2, all three reservoirs are designated as IBAs and serve as year-round habitat for a variety of bird species and as a stopover point for numerous migratory birds. The IPAC database details birds of conservation concern, which may be present in the reservoirs, and are protected under the MBTA. Birds of conservation concern are identified as "the migratory and non-migratory bird species (beyond those already designated as Federally threatened or endangered) that represent [the USFWS'] highest conservation priorities. The list is based on an assessment of several factors, including population abundance and trends, threats on breeding and nonbreeding grounds and size of breeding and nonbreeding ranges" (USFWS, 2021k). When summer pool levels at Berlin Lake Reservoir fall at or below 1020 feet in elevation, mudflats along the shoreline are exposed. Mudflat habitat, utilized by many

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migratory birds, including species that are birds of conservation concern, can be found upstream of Berlin Lake Reservoir in Deer Creek Reservoir beginning in August, which is the start of fall bird migration. Additional mudflats are exposed as reservoir levels drop extending downstream to the Berlin Lake Wildlife Area and continuing along the shoreline of the reservoir to the dam (OOS, 2021a). Mudflat habitat occurs at Michael J. Kirwan Reservoir notably at the upstream end of the reservoir in West Branch State Park (OOS, 2021b).

The IPAC database lists sixteen migratory bird species protected under the MBTA and the bald eagle protected under the BGEPA that occur in the Berlin Lake and Michael J. Kirwan Dam & Reservoir Projects. These species include American golden-plover (*Pluvialis dominica*), bald eagle (*Haliaeetus leucocephalus*), black-billed cuckoo (*Coccyzus erythrophthalmus*), bobolink (*Dolichonyx oryzivorus*), buff-breasted sandpiper (*Calidris subruficollis*), Canada warbler (*Cardellina canadensis*), cerulean warbler (*Dendroica cerulea*), dunlin (*Calidris alpina arctica*), golden-winged warbler (*Vermivora chrysoptera*), lesser yellowlegs (*Tringa flavipes*), long-eared owl (*Asio otus*), prairie warbler (*Dendroica discolor*), red-headed woodpecker (*Melanerpes erythrocephalus*), ruddy turnstone (*Arenaria interpres morinella*), semipalmated sandpiper (*Calidris pusilla*), short-billed dowitcher (*Limnodromus griseus*), and wood thrush (*Hylocichla mustelina*).

The IPAC database also includes a probability of presence summary, which provides information as to when birds of conservation concern are likely to be present in the area. The migratory bird species most likely to be present between mid-July and mid-September include the majority of the birds listed above with the exception of the warblers and the long-eared owl.

### 3.3.2 Environmental Consequences

#### *No Action*

No effect to any threatened or endangered species, candidate species, migratory birds, or bald eagles would occur by continuing to operate the Mahoning Reservoirs under the existing WCMs and WCPs.

#### *Alternative 1*

Threatened, endangered, and candidate species that may be found within the Mahoning Reservoirs are terrestrial species that would already be accustomed to pool level and downstream flow changes throughout the year. These species do not reside within the lakes, reservoirs, or the Mahoning River. The clubshell mussel may be present downstream of the Mosquito Lake Reservoir; however, no changes to the operation of the reservoir are proposed. There would be no effect to any threatened or endangered species with this alternative.

No construction activities or structural changes are proposed with any of the alternatives. Bald eagles present in the area would already be accustomed to the typical noise levels found at the Mahoning Reservoirs and although a minor increase in boating

noise levels may occur during the additional months that Berlin Lake Reservoir is held near summer pool, those noises would not be different than boating noise levels occurring during the early summer months. Additionally, in the later summer eagles are less sensitive to human activity (USFWS, 2020). No impacts to bald eagles are expected to occur.

With this alternative, mudflat habitat around Berlin Lake Reservoir would not begin to appear until late September. This would have a moderate impact to those shorebirds that use the area as a stopover point on their migration. Birds of conservation concern that would be impacted include the American golden-plover (*Pluvialis dominica*), buff-breasted sandpiper (*Calidris subruficollis*), lesser yellowlegs (*Tringa flavipes*), ruddy turnstone (*Arenaria interpres morinella*), semipalmated sandpiper (*Calidris pusilla*), and the short-billed dowitcher (*Limnodromus griseus*). These species utilize mudflat habitat during the months of July through September. This alternative would result in a loss of habitat during the months these birds would be present. Moderate adverse impacts may occur to migratory shorebirds with this alternative if mudflat habitat formation is delayed until late September. If reservoir elevations drop at Michael J. Kirwan Reservoir as a result of maintaining summer pool elevations at Berlin Lake Reservoir, mudflat habitat may begin to develop at Michael J. Kirwan Reservoir earlier in the year. Migratory shorebirds may utilize available mudflat habitat at Michael J. Kirwan if that habitat is not available at Berlin Lake Reservoir.

#### *Alternative 2*

For the same reasons explained in Alternative 1, there would be no effect to any threatened, endangered, or candidate species, or to bald eagles with this alternative.

Alternative 2 would delay the drawdown of summer pool by several weeks, which would cause a shift in the exposure of mudflat habitats. While there may be minor impacts to migratory birds that begin fall migration early in the season (August), it is not expected that this would significantly adversely impact those species. Three of the species listed as birds of conservation concern that may be present at the Berlin Lake Reservoir in late July to early August include the lesser yellowlegs (*Tringa flavipes*), semipalmated sandpiper (*Calidris pusilla*), and the short-billed dowitcher (*Limnodromus griseus*). These species are shorebirds and use the Mahoning Reservoirs as stopover points along their migration. All three species are likely to be present from July through September so this alternative may have a minor impact on the individual birds that pass through the area early on in the migration during the two-to-three-week period where mudflat habitat would typically be present but would not yet be exposed if this alternative were implemented due to the delay in drawdown of summer pool. It would be expected that the majority of the individual birds of these three species would still be able to utilize mudflat habitat when they pass through the area in August through September.

## 3.4 Hydrology

### 3.4.1 Existing Conditions

The WCP guide curve for Berlin Lake Reservoir graphically represents the operations of the reservoir throughout the year (Figure 5). The guide curve represents an operational goal, a reservoir elevation that the Pittsburgh District Water Management staff works to meet, provided that the authorized purposes of the reservoir are being met and weather conditions allow. The amount of precipitation received in a given year influences reservoir elevations. For example, in a dry year, reservoir elevations can begin to decrease earlier than the late June target described in the WCP. Descriptions of winter and summer pool elevations, and downstream flow requirements are discussed in Section 2.1. Berlin Lake Reservoir has a maximum surface area of 5,500 acres and its maximum pool is at elevation 1031.31 feet. The project has the capability to store the equivalent run-off of 4.1 inches of precipitation at winter pool and 2.4 inches of precipitation at summer pool from its 249 square mile watershed.

The WCP guide curve for Michael J. Kirwan Reservoir (Figure 6) and descriptions of winter and summer pool elevations, and downstream flow requirements are discussed in Section 2.1. Michael J. Kirwan Reservoir has a maximum surface area of 3,240 acres and its maximum pool is at elevation 992.6 feet. The project has the capability to store the equivalent run-off of 7.6 inches of precipitation at winter pool and 5.0 inches of precipitation at summer pool from its 81 square mile watershed.

The WCP guide curve for Mosquito Creek Lake Reservoir (Figure 7) and descriptions of winter and summer pool elevations, and downstream flow requirements are discussed in Section 2.1. Mosquito Creek Lake Reservoir has a maximum surface area of 8,900 acres and its maximum pool is at elevation 903.3 feet. The project has the capability to store the equivalent run-off of 6.2 inches of precipitation at winter pool and 4.1 inches of precipitation at summer pool inches from its 97 square mile watershed.

#### *Flood Seasonality Analysis*

A flood seasonality analysis was performed for the Mahoning reservoirs. Flood seasonality is defined as months when high inflows have historically occurred throughout the year. The analysis is used to determine the potential for flood events in any given month. To perform the flood seasonality analysis, daily inflows are input into a USACE program, Risk Management Center-Reservoir Frequency Analysis (RMC-RFA), and a threshold flow varied until the number of daily inflows above that threshold flow is equal to approximately the number of years of inflow data availability. The threshold flow is used as a baseline flow. Flows higher than the threshold flow increase the chance of flood events. The RMC-RFA program simulates flood events and then calculates how many of those events occurred during each month. Separate seasonality analyses were performed for Berlin Lake Reservoir, Michael. J. Kirwan Reservoir, and Mosquito Creek Lake Reservoir within the RMC-RFA program.

For Berlin Lake Reservoir, daily inflow data from 1 January 1944 through 31 December 2020 was used along with a threshold flow of 2,800 cfs. The results of the flood seasonality analysis for Berlin Lake Reservoir which summarized which months daily inflows above the threshold flow is shown below (Figure 13). Higher relative frequency means a higher potential for flood events. For Berlin Lake Reservoir, the flood seasonality analysis shows the highest potential for flood events in January, February, and March.

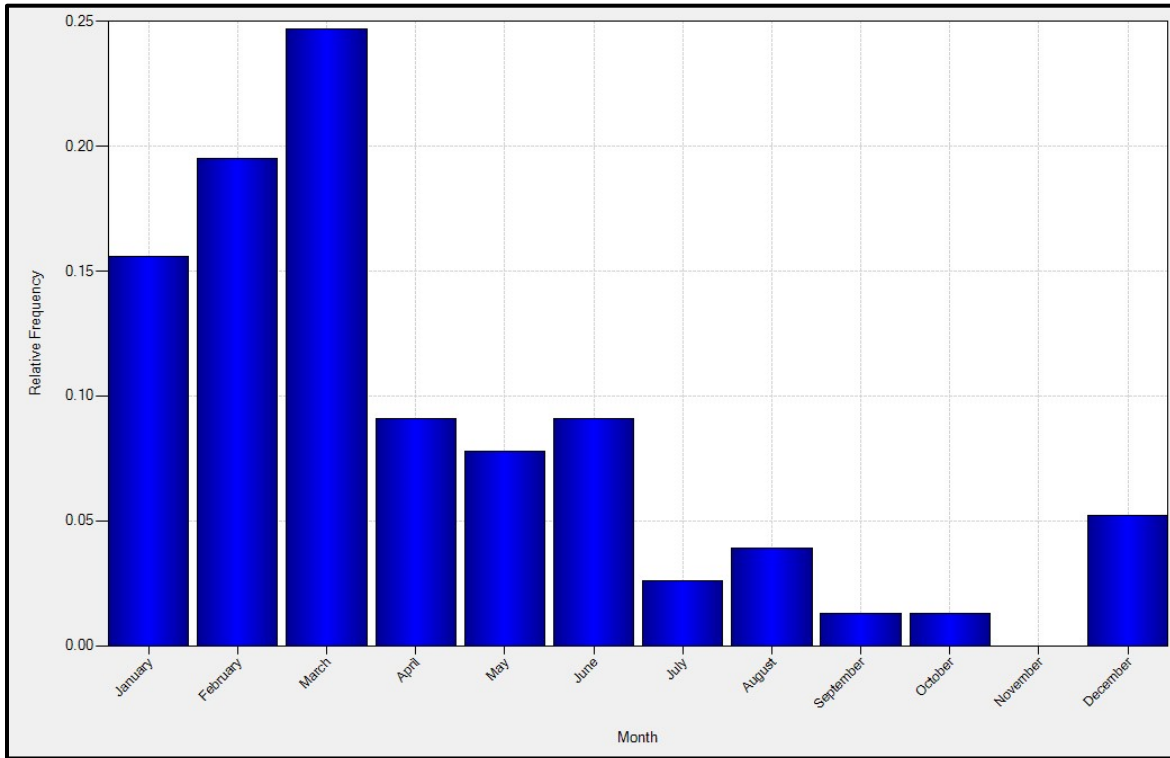


Figure 13. Relative frequency of flood events by month at Berlin Lake Reservoir.

For Michael J. Kirwan Reservoir, daily inflow data from 1 January 1968 through 31 December 2020 and a threshold flow of 908 cfs was used (Figure 14). For Michael J. Kirwan Reservoir, the flood seasonality analysis shows the highest potential for flood events during the months of December through May.



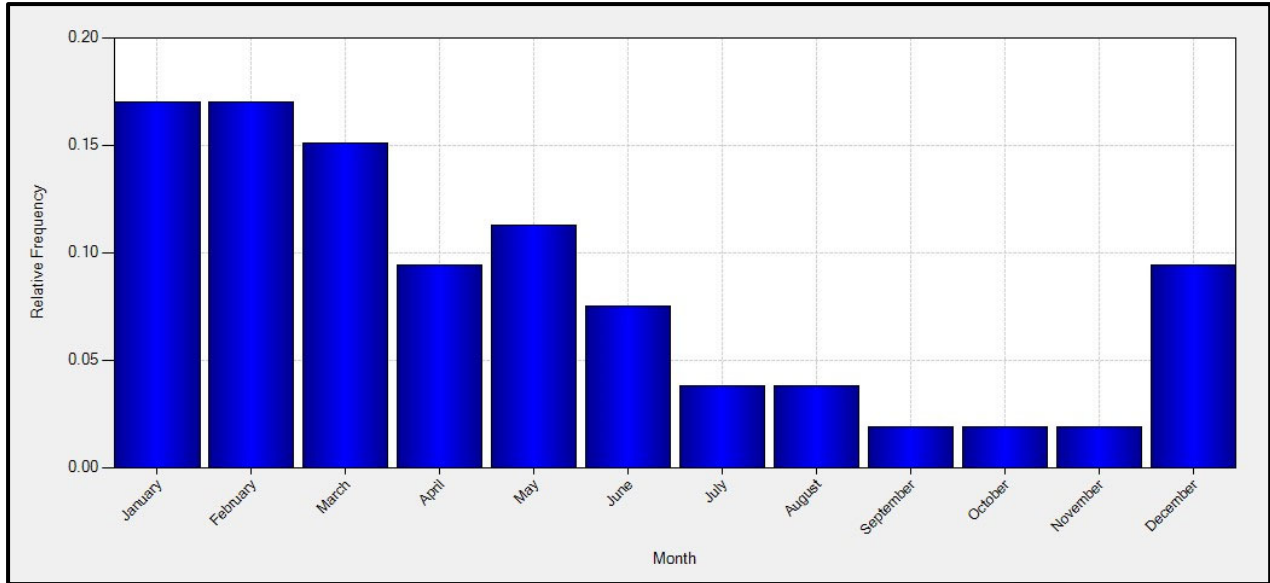


Figure 14. Relative frequency of flood events by month for Michael J. Kirwan Reservoir.

For Mosquito Creek Lake Reservoir, daily inflow data from 1 January 1944 through 31 December 2020 was used. A threshold flow of 930 cfs was used. The results of the flood seasonality analysis for Mosquito Creek Lake Reservoir which summarized which months daily inflows above the threshold flow is shown below (Figure 15). For Mosquito Creek Lake Reservoir, the flood seasonality analysis shows the highest potential for flood events during the months of December through April.

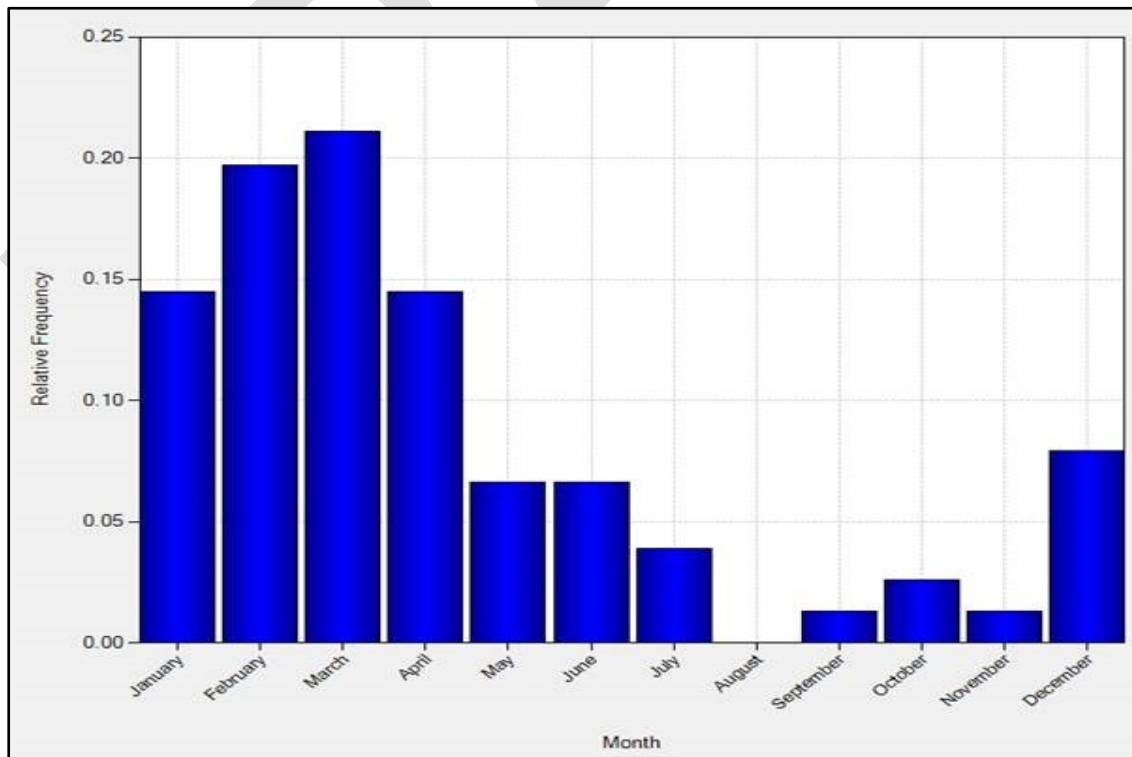


Figure 15. Relative frequency of flood events by month for Mosquito Creek Lake Reservoir.

The reservoirs are operated for the purpose of reducing the flood risk downstream so that flood water is stored during a storm event to be released after the storm event is over. The Corps does not drawdown the reservoirs in advance of a storm event as this leads to additional (higher) water in the downstream system as the storm event hits which could lead to increased flooding.

### *Dam Safety*

In 2005, the USACE started screening every one of the approximately 694 dams in the USACE inventory, to expeditiously identify and classify high risk dams requiring urgent and compelling action (USACE, 2021). USACE uses a Dam Safety Action Classification System (DSAC) to provide consistent and systematic guidelines for appropriate actions to address dam safety issues and deficiencies. DSAC ratings range from immediate recognition of an urgent situation where a very high chance of dam failure is confirmed through normal, adequately safe dams that meet all agency guidelines and have a very low chance of failure.

The current DSAC rating at Berlin Dam indicates a very low chance of dam failure. The current DSAC ratings at Michael J. Kirwan Dam and at Mosquito Creek Lake Dam are rated at a moderate risk.

### *Historical Reservoir Elevations and Precipitation*

The Corps plots the elevations of each managed reservoir on a daily basis and provides graphical information depicting the guide curve elevation along with the actual reservoir elevation (Appendix B). A review of reservoir plots from 2015 through 2020, shows that generally during the months of July through September when Berlin Lake Reservoir elevations are held at or above the guide curve elevations, the reservoir elevations at Michael J. Kirwan Reservoir fall below the guide curve, even in years with average or above average precipitation. In years with below average precipitation, it would be expected that holding Berlin Lake Reservoir elevations at or above the guide curve would result in a greater drop in reservoir elevation at Michael J. Kirwan Reservoir.

The state of Ohio had near average precipitation rates during the months of July through September during 2015, 2016, 2017, 2019, and 2020 and had above average precipitation rates during the same months in 2018 (NOAA, 2021). In all years examined, the reservoir levels at Michael J. Kirwan dropped below the guide curve at some point during the months of July through late August. The most notable elevation drop at Michael J. Kirwan Reservoir occurred in 2016 where reservoir elevations began to drop in early June, falling below winter pool elevation in early August and continuing to drop remaining below winter pool elevation through the end of 2016. In 2020, reservoir levels at Michael J. Kirwan dropped below the guide curve beginning in mid-June and continued to decline to winter pool elevation at the end of August.

### *Climate Change Effects to Hydrology*

The USACE Climate Assessment Tool detects trends in observed annual peak instantaneous streamflow and provides the equation for the trendline, providing a

reasonable estimate of the expected increase or decrease in flowrate for a watershed, based on historical data. This trendline occurs for the entire Hydrologic Unit Code (HUC) for the Upper Ohio (HUC-4), which includes all of the Beaver River and the Ohio River below the confluence of the Allegheny and Monongahela River Basins to the confluence with the Kanawha River Basin, excluding the Muskingum River Basin. Additionally, the Climate Assessment Tool can be run for a specific United States Geological Survey (USGS) Gage. For this analysis, the USGS Gage at Eagle Creek at Phalanx Station was chosen, as Eagle Creek is an unregulated stream that flows into the Mahoning River upstream of Leavittsburg, Ohio. Trends detected for Eagle Creek are reasonably expected to occur throughout the Mahoning River watershed. These trends represent two different ways to view the potential increase of runoff due to climate change. Eagle Creek is a small portion of the Mahoning River watershed. The Upper Ohio HUC (HUC 0503), includes but is not limited to the Mahoning River. Neither trend completely includes the potential increases to flow for the Mahoning River. The potential in runoff would likely fall somewhere in between the two trends.

The trendline for HUC 0503, which includes the entire Beaver River watershed, is shown below (Figure 16). The predicted annual mean flows for HUC 0503 show an increase of approximately 0.05% per year based on the combination of 93 climate-changed hydrology models. Note that the p-value is approximately 0.004, which is associated with an 0.4% chance of a false positive (i.e., the chance of no statistically significant increase in flows). This assumes that the climate-changed hydrology models are representative of future conditions.

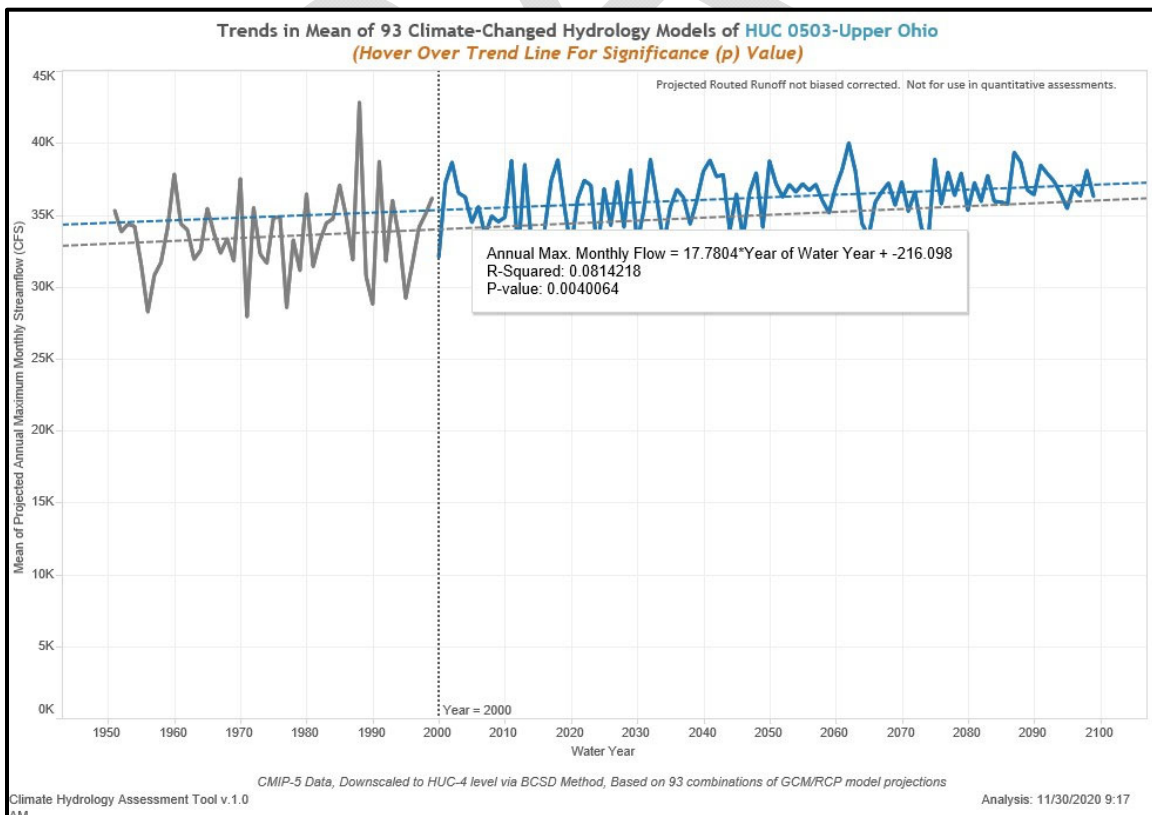


Figure 16: Climate Hydrology Assessment Tool Trend for HUC 0503-Upper Ohio.

The trendline for annual maximum flow collected at the USGS Gage at Eagle Creek at Phalanx Station, OH is shown below (Figure 17). Based on this figure, flows are expected to increase approximately 0.3% per year based on the historic record at the gage. Note that the p-value is approximately 0.08, which is associated with an 8% chance of a false positive (i.e., the chance of no statistically significant increase in flows).

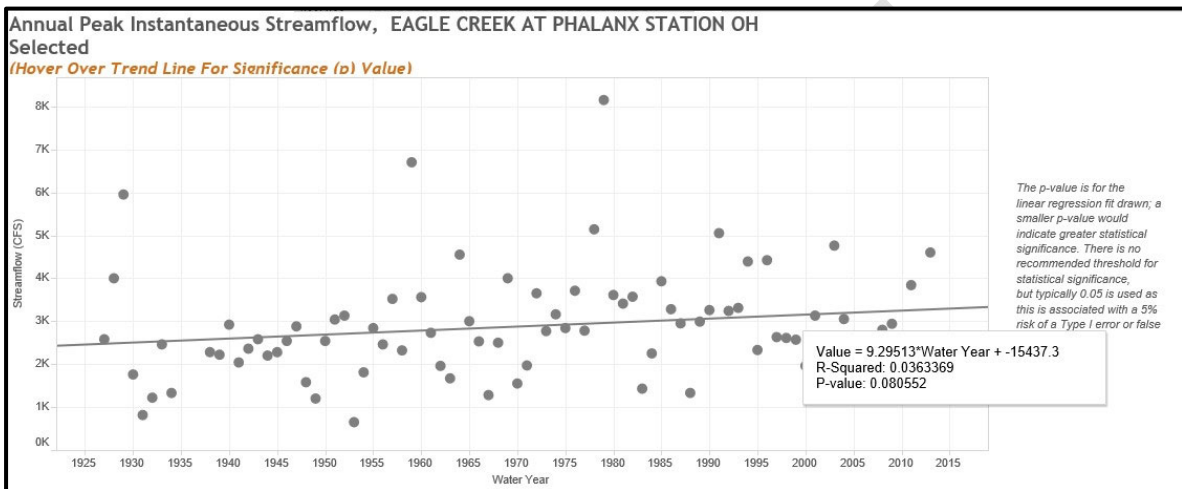


Figure 17: Climate Hydrology Assessment Tool Trend for USGS Gage 0309300 - Eagle Creek at Phalanx Station OH.

### 3.4.2 Environmental Consequences

#### No Action

The reservoirs would continue to be managed per the existing WCPs. No change to hydrology or flooding would occur.

#### Alternatives

##### 3.4.2.1.1 Alternative 1

Under this alternative, the Corps would extend the guide curve at Berlin Lake Reservoir to begin drawdown from summer pool elevation of 1024 feet (NAVD 88) on Labor Day. The fixed percentages of augmentation flow, which regulate releases from Berlin Lake and Michael J. Kirwan Reservoirs to maintain flow requirements at Leavittsburg, would be removed, allowing the Corps' Water Management staff more flexibility in operational decisions.

With this alternative, it is expected that reservoir levels at Michael J. Kirwan would drop below the guide curve elevations during the months of July through September. In years with average precipitation, reservoir elevations at Michael J. Kirwan drop below the guide curve when Berlin Lake Reservoir elevations are held at or above the guide

curve. If Berlin Lake Reservoir summer pool elevations are held until Labor Day, it is expected that reservoir elevations at Michael J. Kirwan would likely be lower yet – and in a year with below average precipitation reservoir levels may drop further at Michael J. Kirwan.

Delaying drawdown of summer pool at Berlin Lake Reservoir until Labor Day means that there is less reservoir storage between the months of July through November when compared to the current WCP operations. The flood seasonality analysis indicates that the risk for significant flooding is lower during the months of July through November; however, there is a chance that a hurricane or other significant storm event could occur. If such a hurricane or storm event occurred while the pool was being held at the summer pool level, there would be an increased risk of downstream flooding due to less storage availability for flood waters in Berlin Lake Reservoir compared to current WCP operations. However, the Pittsburgh District Water Management Team will continue to manage the reservoirs to reduce flood risk.

The Corps would not drawdown the reservoir in advance of a storm event. There could be impacts downstream of Berlin Lake Reservoir to residents, businesses, golf courses and Lake Milton should a flood event occur. At summer pool, Berlin Lake Reservoir has the capacity to hold 2.35 inches of runoff before reaching the spillway flow. Once spillway flow is reached, flow is no longer controlled, such that all of the runoff that enters the reservoir flows uncontrolled over the spillway and into the downstream river.

An analysis was performed to determine the probability of Berlin Lake Reservoir elevations reaching the crest of the uncontrolled spillway. The RMC-RFA program was used to estimate the probability of the reservoir reaching certain elevations, such as the top of the uncontrolled spillway, or the top of dam. Based on the RMC-RFA analysis, the probability of the reservoir reaching the top of the uncontrolled spillway during any particular year (since the analysis looks at the entire year) under current operating conditions is 0.037 (1 in 27). Alternative 1 was also analyzed using this model, and the model indicates that the probability of the reservoir reaching the top of the uncontrolled spillway increases slightly to 0.042 (1 in 24). This represents a slightly higher risk for flooding compared to the current WCP operations. The model results also do not account for the ability of the Pittsburgh District Water Management team to manage reservoir operations to reduce flood risk. The Pittsburgh District Water Management Team will continue to operate Berlin Lake Reservoir (in tandem with Lake Milton) to reduce the flooding risk downstream on the Mahoning River. Operational efforts employed currently when Berlin Lake Reservoir is at or near summer pool include incorporating the National Weather Service's (NWS) 48-hour operational precipitation forecast at established forecast locations (Leavittsburg, Warren, Youngstown, and Lowellville) downstream of Berlin Lake Reservoir and monitoring the potential of tropical storm and/or hurricane remnants passing through the District in the Mahoning River Basin. Reservoir operations are managed to reduce flooding at the NWS forecast locations, which reduce flood risk to those communities downstream of Berlin Lake Reservoir. These operational efforts have been employed successfully during May through mid-July and will continue with this alternative through the incorporation of the updated WCP at Berlin Lake Reservoir.

The proposed operational changes are not expected to impact the dam's DSAC rating and do not increase the probability of failure. Alternative 1 maintains the pool level in the range of 1021-1024 feet (NAVD 88). Uncontrolled flow over the spillway would occur when the reservoir elevation reaches 1031.73 feet (NAVD 88). The elevation of the dam is approximately 13 feet higher than the spillway. While there is an increased risk in overtopping the spillway, it is not expected that there is any increase in the risk of overtopping the dam with this alternative.

Mosquito Creek Lake Reservoir flows into Mosquito Creek which joins the Mahoning River downstream of Leavittsburg in Niles, Ohio. Flow requirements would continue to be met at Leavittsburg and no impacts are expected at Mosquito Creek Lake Reservoir.

#### 3.4.2.1.2 Alternative 2

Under this alternative, the WCP at Berlin Lake Reservoir would be changed to hold an additional 25% of the flood storage capacity compared to the existing WCP during the drawdown from summer pool to winter pool and the fixed augmentation flow percentages from Berlin Lake Reservoir and Michael J. Kirwan Reservoir would be removed. This alternative extends summer pool at Berlin Lake Reservoir by several weeks and lowers the rate at which drawdown occurs. Part of this alternative (holding summer pool for a longer length of time and holding reservoir elevations higher than the existing WCP guide curve) was implemented prior to 2018 and in 2019, 2020 and 2021.

As noted above in Section 3.4.1.3, reservoir levels at Michael J. Kirwan dropped below the guide curve beginning in mid-June and continued to decline to winter pool elevation at the end of August. Precipitation levels in Ohio during 2020 were near average amounts (NOAA, 2021). It would be expected that in years with below average precipitation, that the reservoir elevations at Michael J. Kirwan would be much lower than the guide curve elevations.

Delaying the drawdown of summer pool at Berlin Lake Reservoir for several weeks means that there is less reservoir storage during the few weeks where Berlin Lake Reservoir is held at a higher elevation when compared to the current WCP operations. The flood seasonality analysis indicates that the risk for significant flooding is lower during the month of July through November; however, there is a chance that a hurricane or other significant storm event could occur. If such a hurricane or storm event occurred while the pool was being held at the summer pool level, there would be an increased risk of downstream flooding due to less storage availability for flood waters in Berlin Lake Reservoir compared to current WCP operations. As with Alternative 1, the Pittsburgh District Water Management Team will continue to manage reservoir operations to reduce flood risk and will incorporate current operational efforts into the updated WCP.

As discussed in Section 3.4.1, and in Section 3.4.2.2.1, a storm event producing more than 2.35 inches of runoff would produce uncontrolled spillway flow and could result in an increased risk of flooding downstream. However, this risk would be of a much shorter duration than Alternative 1 because drawdown to winter pool would begin in mid-July.

The flood seasonality analysis suggests that flooding is less likely in July, so it would be expected that flood risk would be less with this alternative, as compared to Alternative 1. As with Alternative 1, the Pittsburgh District Water Management Team will manage reservoir operations to reduce flood risk.

Berlin Lake Reservoir has been operated in a manner similar to this alternative since approximately 2005, and as a result, the RMC-RFA model could not be used to estimate additional risk. During this time period, there was one instance of uncontrolled spillway flow in 2011. This occurred during the month of March, when reservoir operations are managed to follow the guide curve. It is expected that flood risk would not significantly increase with this alternative.

As with Alternative 1, maintaining the pool level in the range of 1021-1024 feet (NAVD 88) is not expected to have adverse effects related to the dam at Berlin Lake Reservoir.

Mosquito Creek Lake Reservoir flows into Mosquito Creek which joins the Mahoning River downstream of Leavittsburg in Niles, Ohio. Flow requirements will continue to be met at Leavittsburg and no impacts are expected at Mosquito Creek Lake Reservoir.

### **3.5 Public Infrastructure**

There would be no change to public infrastructure with either the no action alternative or any of the proposed alternatives. Water supply intakes at Berlin Lake Reservoir, Michael J. Kirwan Reservoir, and Mosquito Creek Lake Reservoir would not be impacted by either the no action alternative or by any of the proposed alternatives because water elevations would not drop below the minimum elevations necessary for operation of the water supply intakes. No impacts to water supply would occur.

### **3.6 Environmental Justice and Socioeconomics**

Executive Order (EO) 12898, dated February 11, 1994, directs each federal agency to “make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.”

The CEQ has oversight of the federal government’s compliance with EO 12898 and NEPA. CEQ, in consultation with the USEPA and other affected agencies, developed NEPA guidance for addressing requirements of the EO (CEQ, 1997). This guidance was developed to further assist federal agencies with their NEPA procedures so environmental justice (EJ) concerns are effectively identified and addressed.

The CEQ identified six general principles for consideration in identifying and addressing EJ in the NEPA process which include: (1) area composition (demographics); (2) data (concerning cumulative exposure to human health or environmental hazards); (3) interrelated factors (recognize the interrelated cultural, social, occupational, or economic factors); (4) public participation; (5) community representation; and (6) tribal representation.

The CEQ uses the following definitions:

- Low-income population: Low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty.
- Minority population: Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

### 3.6.1 Existing Conditions

The Berlin Lake Project is located in Mahoning, Portage, and Stark Counties, Ohio and the Michael J. Kirwan Dam & Reservoir Project is located in Portage County, Ohio. The Mosquito Creek Lake Project is located in Trumbull County, Ohio.

An analysis of the five-year average (2014-2018) American Community Survey (ACS) data profiles for Mahoning, Portage, Stark, and Trumbull Counties, and the state of Ohio was completed to identify minority populations (USCB, 2021). Low-income populations were identified using the USEPA Environmental Justice Screening and Mapping Tool (EJSCREEN) (USEPA, 2020). Total population data and the percentage of the population considered low-income is listed in Table 3. The percentage of minority populations is listed in Table 4.

*Table 3. Total population (individuals) and percentage of low-income population.*

	Mahoning County	Portage County	Stark County	Trumbull County	Ohio
Total Population	231,064	162,644	373,475	201,794	11,641,879
Percentage of population considered low-income	37%	29%	32%	37%	32%

*Table 4. Percentage of minority populations.*

	Mahoning County	Portage County	Stark County	Trumbull County	Ohio
White Alone	80.0%	90.8%	88.0%	88.6%	81.5%
Black or African American Alone	15.1%	4.1%	7.4%	8.3%	12.4%



American Indian and Alaska Native Alone	0.3%	0.2%	0.1%	0.2%	0.2%
Asian Alone	0.9%	1.9%	0.9%	0.5%	2.1%
Some Other Race Alone	0.7%	0.6%	0.6%	0.1%	0.9%
Two or More Races	3.0%	2.4%	3.1%	2.3%	2.8%

The percentages of the population in Mahoning, Portage, Stark, and Trumbull Counties, and in Ohio that are employed by industry type, utilizing data from the five-year average ACS profile is included in Table 5. Per capita income for the same populations is included in Table 6.

*Table 5. Percentages of employed population by industry type.*

Industry	Mahoning County	Portage County	Stark County	Trumbull County	Ohio
Agriculture, forestry, fishing and hunting, and mining	0.7%	1.1%	1.0%	0.8%	1.0%
Construction	6.0%	5.6%	6.0%	6.2%	5.3%
Manufacturing	13.6%	18.1%	17.2%	20.1%	15.3%
Wholesale trade	2.9%	3.0%	2.9%	2.0%	2.7%
Retail trade	13.6%	12.5%	11.8%	12.1%	11.5%
Transportation and warehousing, and utilities	4.6%	4.2%	5.3%	5.6%	5.0%
Information	1.4%	1.6%	1.6%	1.3%	1.6%
Finance and insurance, and real estate and rental and leasing	4.4%	4.4%	5.0%	4.1%	6.4%
Professional, scientific, and management, and administrative and waste management services	8.5%	8.5%	8.3%	6.9%	9.6%
Educational services, and health care and	26.3%	22.6%	23.9%	23.1%	24.1%

Industry	Mahoning County	Portage County	Stark County	Trumbull County	Ohio
social assistance					
Arts, entertainment, and recreation, and accommodation and food services	9.6%	10.6%	9.4%	9.2%	9.1%
Other services, except public administration	5.1%	4.7%	4.8%	4.6%	4.4%
Public administration	3.3%	3.0%	2.7%	4.1%	3.8%

Table 6. Per capita income.

	Mahoning County	Portage County	Stark County	Trumbull County	Ohio
Per capita income	\$27,429	\$29,439	\$28,434	\$26,116	\$30,304

### 3.6.2 Environmental Consequences

#### *No Action*

The no action alternative would not cause disproportionate adverse effects to either minority or low-income communities. No change to socioeconomics is expected.

#### *Alternatives 1 and 2*

#### *Environmental Justice*

Neither of the proposed alternatives would cause disproportionate adverse effects to minority or low-income communities.

As discussed in Section 3.4.2.2.1, while the modeling shows that there is a slightly increased risk of overtopping the spillway at Berlin Lake Reservoir, the model cannot account for how the reservoir operations will be managed in real-time to reduce flood risk. The Pittsburgh District Water Management Team will continue to employ operational efforts to reduce flood risk downstream. Communities, including those with minority and low-income populations, upstream of Berlin Lake Reservoir would not be impacted by holding summer pool longer because they are located at an elevation higher than the spillway at Berlin Lake Reservoir.

## *Socioeconomics*

Minor localized benefits to socioeconomics may occur at Berlin Lake Reservoir with increased recreational boating (see Section 3.8) and the associated economic benefit to local businesses with boaters patronizing restaurants, marinas, and other local businesses. Minor localized impacts to socioeconomics may occur at Michael J. Kirwan Reservoir if recreational boating decreases as a result of lower pool elevations. These benefits and impacts would be expected with an increase or decrease in recreational usage by users with larger boats as discussed in 3.8.1.

Recreational usage with users that have smaller boats would not be expected to change as they would be able to continue recreational boating no matter what the reservoir elevation would be. They would be expected to patronize local businesses the same as they do with the existing condition or no action alternative.

For both alternatives, the benefits of recreational boating would be associated with those users of larger boats at Berlin Lake Reservoir who may be able to use their larger boats for a longer period of time during the summer as a result of holding summer pool elevations longer. The impacts of recreational boating would be associated with larger boat users at Michael J. Kirwan who would choose to remove their boats earlier if reservoir elevations drop as a result of holding summer pool elevations longer at Berlin Lake Reservoir.

As discussed in Section 3.8, bird watchers may choose to visit Michael J. Kirwan Reservoir if decreased bird watching opportunities occur at Berlin Lake Reservoir due to reduced numbers of migratory birds. If so, minor economic benefits may occur at Michael J. Kirwan Reservoir resulting from the increased recreational use and minor economic impacts may occur at Berlin Lake Reservoir resulting from decreased recreational use.

### **3.7 Water Quality**

Water quality standards are the provisions that describe the desired condition of a water body and the means by which that condition will be achieved (USEPA, 2021e). Water quality standards for waters in Ohio are developed by the Ohio Environmental Protection Agency (OEPA) and approved by the USEPA. The water quality standards form the legal basis for controlling pollutants entering waters of the United States (WOUS). Water quality standards consist of three core elements: designated uses (human health, recreation, water supply, aquatic life), criteria (numeric concentrations of chemical constituents and/or a narrative describing a condition), and antidegradation requirements (maintenance and protection of existing uses and high-quality waters) (USEPA, 2021e).

States assess waters based on water quality standards to determine if waters are meeting designated uses, meeting water quality standard criteria and degradation requirements. Streams, lakes, and impoundments that do not meet these standards are considered impaired.

Water quality conditions in Ohio are summarized in the *Ohio Integrated Water Quality Monitoring and Assessment Report*, which is updated every two years. The most recent report, dated 2020, summarized the water quality conditions in Ohio for four specific water uses: human health impacts related to fish tissue contamination, human health impacts related to drinking water, recreation, and aquatic life (OEPA, 2020).

The Mahoning Reservoirs are operated to meet temperature and downstream flow requirements. Temperature criteria was established for a seasonally based maximum water temperature schedule. The maximum limiting water temperatures are 67° Fahrenheit in the winter and 98° Fahrenheit in the summer at Youngstown. Historically, manufacturing and energy plant discharges increased the temperatures in the Mahoning and Beaver Rivers. Some of the plants are no longer in operation and point source discharges are more regulated now under NPDES permit requirements. As a result, thermal pollution loading to the Mahoning and Beaver Rivers has decreased. OEPA noted in a study report of the Lower Mahoning River watershed that temperature exceedances documented in 1994 were related to cooling water discharges from an existing plant. When surveys were conducted in 2013, after the plant was no longer operating, water temperatures returned to more typical temperatures that did not exceed temperature water quality criteria (OEPA, 2018a).

### 3.7.1 Existing Conditions

The upper Mahoning River watershed, which includes the reach of the Mahoning River upstream of Berlin Lake Reservoir, Berlin Lake Reservoir, Lake Milton, and the reach of the Mahoning River between Milton Dam and Leavittsburg, OH, was assessed by the OEPA in 2006 and was found to have impairments to aquatic life and recreational uses (OEPA, 2008). OEPA developed a Total Maximum Daily Load (TMDL) report, the “Upper Mahoning River Watershed TMDL Report,” for the upper watershed, which was approved by the US Environmental Protection Agency on September 28, 2011, to identify and address these impairments (OEPA, 2011). This TMDL report addresses impairments for total phosphorus, habitat, siltation, and *Escherichia coli* (*E. coli*) bacteria. There are a number of point source discharges within the watershed regulated with National Pollutant Discharge Elimination System (NPDES) discharge permits. According to this TMDL report, the reach of the Mahoning River from Berlin Dam downstream to Leavittsburg, OH, which includes Lake Milton, is also impaired. Primary causes of impairment include siltation, flow alteration, nutrients, upstream dam releases, upstream impoundment, low dissolved oxygen, and poor habitat. Pollutants from waste-water treatment systems contribute to the impairment of the watershed.

In 2013 the OEPA also assessed the lower Mahoning River watershed, which includes the 35-mile-long reach of the Mahoning River from Leavittsburg, OH to the PA/OH state line, and documented impairments to the OEPA’s aquatic life and recreation designated uses (OEPA, 2018b). The USEPA prepared a TMDL for pathogens for the lower reach of the Mahoning River in 2004, “Mahoning River Total Maximum Daily Load for Fecal Coliform Bacteria.” The TMDL also identified metals, sediments, nutrients, and related low dissolved oxygen levels as issues of concern (USEPA, 2004). In 2013, the OEPA conducted comprehensive chemical, physical, and biological monitoring in the lower

Mahoning River watershed to identify the pollutants impairing beneficial uses and to support the development of TMDLs for those pollutants. Results were included in the OEPA's 2016 Integrated Water Quality Monitoring and Assessment Report (OEPA, 2016). This report indicated significant recovery of biological communities since the previous assessment that was conducted in 1994. However, this reach of the Mahoning River was still impaired, that is, it did not attain the OEPA's beneficial use designations of aquatic life, human health, and recreation. Sources of impairment identified included combined sewer overflows, municipal point source discharges, upstream sources, and sedimentation/siltation.

Numerous watershed impairments are documented in the OEPA 2020 Integrated Water Quality Report (OEPA, 2020). The USEPA's "*How's My Waterway*" website integrates the impairments into a searchable map categorized by the watershed's Hydrologic Unit Code (HUC) (USEPA, 2021f). The Island Creek – Mahoning River watershed, which includes Berlin Lake Reservoir, identifies impairments to aquatic life, fish and shellfish consumption, and recreational uses and include sources of impairments as *E. coli*, nutrients (nitrogen and/or phosphorus), Polychlorinated Biphenyls (PCBs), and sediment/siltation (USEPA, 2021g). Impairments in the Fish Creek – Mahoning River watershed, include aquatic life impairments (habitat alterations, flow regime modification, nutrients, sedimentation/siltation), human health fish consumption (PCBs), and recreation (*E. coli*) (USEPA, 2021h.) The headwaters of the West Branch Mahoning River, which drain into Michael J. Kirwan Reservoir, are impaired for aquatic life (nutrients, organic enrichment, sedimentation/siltation), human health fish consumption (cause unknown), and recreation (*E. coli*) (USEPA, 2021i). The Kirwan Reservoir – West Branch Mahoning River watershed is impaired for aquatic life (sedimentation/siltation), human health fish consumption (PCBs), and recreation (*E. coli*) (USEPA, 2021j.) The Town of Newton Falls – West Branch Mahoning River, which is downstream of Michael J. Kirwan Reservoir, is impaired for aquatic life (flow regime modification, habitat alterations, sedimentation/siltation), and recreation (*E. coli*) (USEPA, 2021k.) The Chocolate Run – Mahoning River watershed, which includes Leavittsburg, is impaired for aquatic habitat (flow regime modification, habitat alterations, sedimentation/siltation), and recreation (*E. coli*) (USEPA, 2021l.) The Mahoning River Mainstem (Eagle Creek to Pennsylvania Border) is impaired for aquatic life (cause unknown, flow regime modification, habitat alterations, organic enrichment, pollutants in urban stormwater, sedimentation/siltation), human health fish consumption (PCBs), and recreation (*E. coli*) (USEPA, 2021m).

Water quality monitoring at the Berlin Lake Reservoir has been performed by the Corps regularly since 1969. Project staff collect samples from the dam outflow twice per month that are analyzed for pH, alkalinity, acidity, hardness, color solids, specific conductance, and turbidity. Corps water quality staff conduct yearly limnology surveys of the reservoir. Also, every ten years, monthly intensive limnology surveys are conducted from March through November to document long-term changes within the reservoir. Samples collected by the water quality staff throughout the reservoir and watershed are analyzed for chemical, physical, and biological parameters. The Corps also operates real-time continuous water quality monitors in Berlin Lake, and on the Mahoning River upstream and downstream of Berlin Lake and Lake Milton.

Berlin Lake Reservoir is a nutrient enriched and hyper-eutrophic impoundment that experiences moderate to severe thermal and chemical stratification during the summer season. Concentrations of iron, manganese, aluminum, phosphorus, ammonia nitrogen, apparent color and acidity all increase with depth during the summer season and conversely, water temperature, dissolved oxygen, phytoplankton, chlorophyll, nitrate-nitrite, nitrogen, and pH values decrease with depth in the reservoir. Anoxic, or low dissolved oxygen conditions defined as concentrations of 4.0 mg/l or less, first develop in the deeper hypolimnetic waters of the reservoir in May and persist there until late September or early October. Anoxic water conditions during the summer stratification period normally persist at depths approximately 15 feet beneath the reservoir surface. Abundant algal growth in the reservoir occurs annually and is likely due to increased nutrient inputs from wastewater treatment plants, aging sewer infrastructure leaks, and agricultural fertilizers. Factors that contribute to reservoir productivity and algae growth include nutrient over-enrichment, high water temperatures, sunlight, impoundment, and related summer thermal stratification (NRDC, 2021). A rapid increase in algae growth is called an algal bloom, and a bloom of a species of algae or cyanobacteria (bluegreen algae) that can naturally produce biotoxins is called a harmful algal bloom (HAB). HABs can create biochemical conditions that may harm the health of the environment, plants, or animals. Algae and bluegreen algal blooms commonly occur every summer at Berlin Lake Reservoir, driven by increasing nutrient inputs and increasing water temperature. HABs were documented by the Corps during 2020 and 2021. Prior to 2020, it is likely that HABs were occurring; however, the Corps did not begin water sampling and analysis until recently. Once HABs form in the reservoir, they generally persist through the summer months until temperatures start to decrease in the fall.

Water quality samples have been collected from the West Branch Mahoning River below the Michael J. Kirwan dam site since 1960. Project staff collect water samples from the reservoir outflow twice per month that are analyzed for pH, alkalinity, acidity, hardness, color, solids, specific conductance, and turbidity. The Corps water quality staff conduct yearly limnology surveys of the reservoir. Also, every ten years, monthly intensive limnology surveys are conducted from March through November or December to document long-term changes within the reservoir. Samples collected by the water quality staff throughout the reservoir and watershed are analyzed for chemical, physical, and biological parameters. The Corps also operates real-time continuous water quality monitors in Michael J. Kirwan Reservoir, on the West Branch of the Mahoning River upstream and downstream of the Dam, and on the Mahoning River.

Michael J. Kirwan Reservoir can be characterized as a warm, shallow, and moderately to highly productive reservoir which undergoes thermal and chemical stratification during the summer months. The reservoir can become anaerobic, with less than or equal to 4.0 milligram per liter of dissolved oxygen in the reservoir during summer stratification at depths below the elevation of the upper gates, which are utilized during the summer and fall (below 30 feet deep at summer pool elevation). Heavy metals and nutrients tend to accumulate in the hypolimnion, but do not have an adverse impact on the overall reservoir quality. High manganese and nutrient concentrations do not generally impact the quality of the dam discharge because the upper elevation gates are used but can occasionally be passed downstream during the autumnal turnover of

the reservoir. Biological productivity can be very high in the upper reservoir, but it decreases in the lower reaches.

### 3.7.2 Environmental Consequences

To evaluate the impacts of proposed operational changes on water quality, the Corps contracted the U.S. Geological Survey (USGS) to conduct water quality modeling, which examined four scenarios and the impacts of each scenario on water quality parameters. Flow and water quality models of the Mahoning Reservoirs and the Mahoning River were constructed using the CE-QUAL-W2 version 4.2 model (Wells, 2020) and were run to analyze the effects of changing reservoir water surface elevations and reservoir outflows on water quality within the reservoirs, the reservoir outflows, and the Mahoning River. The scenarios included a base scenario using current reservoir elevations, a scenario that included the changes proposed in Alternative 1, a scenario that included the changes proposed in Alternative 2, and a fourth scenario that modeled current reservoir elevations without minimum flow requirements at Leavittsburg and Youngstown. The base scenario, or existing condition, was the scenario that the other three scenarios were compared to. The fourth scenario was run to look at potential impacts to water quality if there were no minimum flow requirements and to assess water quality benefits of the downstream flow schedule.

The water quality parameters analyzed in the model included water temperature, total dissolved solids, sulfate, chloride, inorganic suspended sediment, nitrate, ammonia, total Kjeldahl nitrogen, orthophosphorus, total phosphorus, dissolved and particulate organic matter, algae, and dissolved oxygen. Iron was included for the reservoir models, but not the river (USGS, 2022). Section 7 of the *Berlin Lake, Michael J. Kirwan Dam and Reservoir, and Mosquito Creek Lake Engineering Report for Revisions to the Water Control Manuals* provides a more detailed description of the model and analyses.

#### *No Action*

Under the No Action Alternative, the reservoirs would continue to be managed per the existing WCMs and WCPs. No impacts to water quality differing from those already documented by the OEPA would occur in Berlin Lake Reservoir, Michael J. Kirwan Reservoir, Mosquito Creek Lake Reservoir, the Mahoning River, and the West Branch Mahoning River.

#### *Alternative 1*

According to the water quality modeling results performed by USGS, no significant impacts to water quality would occur as a result of implementing this alternative. Compared to the base scenario model, minor changes include increases in water temperature, iron, and nutrient concentrations, and decreases in dissolved oxygen were predicted in the model for the Berlin Lake Reservoir and its outflow. Minor decreases in dissolved oxygen were also predicted in the model for Michael J. Kirwan Reservoir. These changes resulted in minor changes to water quality in the Mahoning River at Leavittsburg, which were not significant impacts.

The most notable change occurred in the model run for the fourth scenario described in Section 2.5 (removal of the minimum flow requirements at Leavittsburg and Youngstown). In this scenario, higher concentrations of total dissolved solids and nutrients were predicted in the Mahoning River between April and mid-September (the period of time Berlin Lake Reservoir would be held at summer pool elevations). Lower concentrations of total dissolved solids and nutrients were predicted between mid-September through November (the period of time Berlin Lake Reservoir would be drawn down to winter pool). As noted in Section 2.5, this scenario was not considered a feasible alternative but was considered and run in the model as a scenario to which the proposed alternatives could be compared. This suggests that keeping the minimum flow requirements at Leavittsburg and Youngstown reduces the impacts of this alternative on water quality as only minor impacts to water quality were predicted in the model for Alternative 1.

Of the minor changes predicted when comparing this alternative to the base scenario, temperature changes varied by a few degrees and did not come close to approaching the maximum limiting water temperatures described in Section 3.7. According to the water quality model, dissolved oxygen levels were slightly lower in Berlin Lake Reservoir between April and mid-September and nutrient concentrations were slightly higher during the same time period in the epilimnion layer, which is the surface layer of the reservoir.

This alternative would increase reservoir retention time in Berlin Lake Reservoir, which may lead to a stronger and more persistent reservoir stratification, higher biological productivity and associated algae production resulting from increases in nutrient concentrations and temperature increases.

A deeper reservoir with a longer retention time, along with predicted increases in nutrient inputs and temperature increases, would increase the potential for HABs to form earlier and to persist for a longer duration into the fall compared to current conditions, and would increase the potential for fish kills (which can occur when water temperatures rise and/or dissolved oxygen levels drop). Once HABs occur in a system, not only can that individual occurrence be harmful, but it may perpetuate future HABs as they can persist in aquatic systems and the biotoxins produced by the algae can survive in reservoir sediments year-round (Corbel et al. 2014, Johnson et al. 2013).

The predicted minor changes in water quality parameters may result in increased reservoir stratification, algae production, and the increased potential for a longer duration of HABs and increased potential for fish kills, but do not differ substantially from existing conditions. It is not expected that this alternative would significantly impact water quality.

### *Alternative 2*

According to the water quality modeling results performed by USGS, no significant impacts to water quality would occur as a result of implementing this alternative. Compared to the base scenario model, minor changes include increases in water



temperature, iron, and nutrient concentrations, and decreases in dissolved oxygen were predicted in the model for the Berlin Lake Reservoir and its outflow. No changes were predicted for Michael J. Kirwan Reservoir. The changes in Berlin Lake Reservoir resulted in minor changes to water quality in the Mahoning River at Leavittsburg, which were not significant impacts. Water quality impacts would be of a shorter duration than Alternative 1. This alternative would increase reservoir retention time in Berlin Lake Reservoir; however, it would also be of a shorter duration than Alternative 1. This could lead to reservoir stratification, and higher biological productivity and associated algae production but these would be less likely with this alternative as the change from current reservoir operations differs by only a few weeks. As noted in Section 3.4.2.2.2, the District has been operating Berlin Lake Reservoir similarly to this alternative for a number of years and no significant impacts to water quality have occurred. HABs of varying severity and extent have been documented in the reservoir for the past six years, and this alternative may also increase the duration of HABs in the reservoir compared to existing conditions, although it may be of a shorter duration than Alternative 1. This alternative is not expected to have significant impacts to water quality and would be expected to have less impacts than Alternative 1 due to the shorter duration of the operational change.

### **3.8 Recreation**

Congress authorized Federal participation in recreation development as discussed in Section 1.2. This authority allows USACE, sometimes in partnership with other agencies, to construct and maintain recreation facilities such as campgrounds, playgrounds, trails, and boat ramps on USACE properties for public benefit. Depending upon the type of project and the authorized use of USACE projects, they are either fully funded by a non-federal sponsor or cost shared with USACE.

#### **3.8.1 Existing Conditions**

At the Berlin Lake Project, the Corps and the ODNR partner to manage several recreation facilities, including a picnic area, a camping area, boat ramps, hiking trails, a swimming pool, a playground, and a marina. At the Michael J. Kirwan Dam & Reservoir Project, the ODNR manages West Branch State Park which includes a campground, beach, boat ramps, and picnic areas. Michael J. Kirwan Reservoir also has a marina. Similarly, at the Mosquito Creek Lake Project, ODNR manages the Mosquito Lake State Park, which includes a campground, picnic areas, and a swimming beach.

As discussed in Section 1.4, local residents, businesses, and organizations at Berlin Lake Reservoir requested the Corps maintain a higher reservoir level for a longer period during the summer months for recreational boating.

Dutch Harbor Marina and Les's Bait Shop, Berlin Lake Reservoir's two largest commercial marinas, report that once the reservoir reaches an elevation of 1021 feet (NAVD 88), their businesses experience negative financial impacts. Regardless of whether it is a dry or a wet year, boaters generally start storing their vessels once the water lowers to this level. Although Berlin Lake Reservoir could still be utilized by most

vessels at this elevation, many boat owners perceive elevation 1021 feet (NAVD 88) to be the reservoir level at which their boats are subject to an unacceptable level of risk of sustaining damage, and therefore they remove their boats from the water and put them into storage.

Table 7 displays the number of estimated boats that utilize Berlin Lake Reservoir throughout the recreational season.

*Table 7. Estimated number of docks and boats at Berlin Lake Reservoir.*

<b>Boats on Berlin Lake Reservoir</b>		
<b>Location</b>	<b>Number of Docks</b>	<b>Number of Estimated Boats</b>
Private Docks	273	546
Community Docks	31	541
Dutch Harbor Marina	1	200
Les's Bait Shop	1	125
Mill Creek Recreation Area	1	83
State Boat Launches	2	200
<b>Estimated Total Boats:</b>		<b>1,695</b>

The lowest preferred recreation water surface elevation for, M.J. Kirwan Reservoir and Mosquito Creek Lake Reservoir, are 981 feet (NAVD 88), and 899 feet (NAVD 88), respectively. Below these elevations, negative impacts are perceived by recreational boat users. The number of docks and boat launches at West Branch State Park and estimated number of boats is shown in Table 8.

*Table 8. Estimated number of docks and boats at Michael J. Kirwan Reservoir.*

<b>Boats on Michael J. Kirwan Reservoir</b>		
<b>Location</b>	<b>Number of Docks</b>	<b>Number of Estimated Boats</b>
West Branch Marina	284	568
Boat Launches	5	500
<b>Estimated Total Boats:</b>		<b>1,068</b>

The ideal recreational flow on the Mahoning River measured at the Leavittsburg Gage corresponds to a flow of 299.03 – 1168.2 cfs. This reach of the Mahoning River includes recreational uses such as kayaking.

As discussed in Sections 3.2 and 3.3, the Mahoning Reservoirs contain habitat for many species of local and migratory birds. Bird watching is a popular recreational activity, and the reservoirs attract bird watchers throughout the year. Bird watchers visit the Berlin Lake Project to observe migratory shorebirds, which are found in the greatest numbers from mid-August to mid-September (OOS, 2021c). Migratory shorebirds can also be observed at Michael J. Kirwan Reservoir and Mosquito Creek Lake Reservoir during the fall migration as described in Sections 3.2 and 3.3.

### 3.8.2 Environmental Consequences

#### *No Action*

The reservoirs would continue to be managed per the WCMs and WCPs. No change to the existing recreational opportunities would occur.

#### *Alternative 1*

Maintaining summer pool through Labor Day at Berlin Lake Reservoir would increase the potential for a longer boating season at that reservoir and provide benefits to recreational boating. The potential increase in recreation is dependent on the weather conditions throughout the boating season. It is possible the pool elevation would drop below summer pool prior to Labor Day if there is insufficient precipitation, as downstream flow requirements will still be required to be met. In drier years, holding summer pool through Labor Day may have adverse effects on recreational boating in Michael J. Kirwan Reservoir if more water is drawn down at Michael J. Kirwan Reservoir to meet flow requirements. Water levels at Michael J. Kirwan would still be sufficient to support smaller draft boats and non-motorized craft throughout the recreation season.

With this alternative, provided the area receives sufficient precipitation, additional recreation days are possible for boaters.

As discussed in Sections 3.2 and 3.3, holding summer pool at Berlin Lake Reservoir until Labor Day delays the exposure of mudflat habitat. Bird watchers visit the Berlin Lake Project to observe a variety of migratory birds, including shorebirds utilizing mudflat habitat in the fall. It is expected fewer birds would utilize habitat at Berlin Lake Reservoir during fall migration, adversely affect bird watching recreational opportunities. Bird watchers may choose to visit other areas to observe birds, resulting in a decrease in recreational bird watching at Berlin Lake Reservoir. Conversely, mudflat habitat may increase or form earlier at Michael J. Kirwan Reservoir if pool elevations drop as a result of maintaining higher pool levels at Berlin Lake Reservoir. This may increase recreational bird watching opportunities at Michael J. Kirwan Reservoir, resulting in little to no net regional change in bird watching.

Removing the fixed percentages of augmentation flow from Berlin Lake Reservoir and Michael J. Kirwan Reservoir would continue to allow flow requirements to be met at Leavittsburg, both during the wet and dry season, though it may be at the expense of maintaining preferred reservoir elevations for boaters at Michael J. Kirwan Reservoir. Revising the percentage of augmentation flow would result in lower summer pool elevations in, and higher discharges from, Michael J. Kirwan Reservoir than with existing conditions.

#### *Alternative 2*

This alternative may provide benefits to recreational boaters at Berlin Lake Reservoir but is more heavily dependent on the weather. Drawdown to winter pool would be delayed by several weeks compared to the current WCP guide curve. This may provide

a longer boating season at Berlin Lake Reservoir provided there is enough precipitation to hold summer pool and still meet downstream flow requirements.

In a wetter year, provided that the downstream flow requirement is met, summer pool would be held at Berlin Lake Reservoir until late July with a gradual drawdown to reach winter pool by late October. In a drier year, draw down may be necessary earlier than late July to meet the flow requirement.

In drier years, holding summer pool and delaying drawdown at Berlin Lake Reservoir may result in lower reservoir levels at Michael J. Kirwan Reservoir if more water is required to be discharged from Michael J. Kirwan Reservoir to meet downstream flow requirements. This could negatively impact recreational boating at Michael J. Kirwan Reservoir, although the impact would be expected to be less than with Alternative 1.

Revising the fixed percentages of augmentation flow may result in lower pool elevations and higher discharges at Michael J. Kirwan Reservoir than with existing conditions if there is less precipitation during the year, as more water may need to be discharged to meet downstream flow requirements.

Minor impacts to recreational bird watching may occur with this alternative, particularly with bird watchers that visit the Berlin Lake Project early in the fall migration season. However, the formation of mudflat habitat would only be delayed by several weeks so it is anticipated that the impacts to recreational birdwatching would be less than with Alternative 1.

### **3.9 Land Use**

No change to land use is expected with any alternative. No change or impacts to any local land use management plans are expected with any alternative.

Local land use plans include Corps reservoir master plans, which are management plans that serve as strategic land-use management documents that guide the comprehensive management and development of all recreational, natural, and cultural resources throughout the life of the Corps' Civil Works Projects. Master plans do not address water level management for flood risk or water quality. The Berlin Lake Reservoir Master Plan, last approved in 1984, is currently being updated. The Michael J. Kirwan Reservoir Master Plan was recently updated in 2018. The Mosquito Creek Reservoir Master Plan, last approved in 1994, is also currently being updated. Shoreline management plans for Berlin Lake Reservoir (2008), and Mosquito Creek Lake Reservoir (2014), provide policies and guidelines for the effective long-term management of the shoreline resources of Berlin Lake Reservoir.

The ODNR, through lease agreements with the Corps, manages lands for recreation and wildlife at Berlin Lake Reservoir, for wildlife, recreation, and water use at Michael J. Kirwan Dam & Reservoir, and for fish and wildlife management and recreation at Mosquito Creek Lake Reservoir. The ODNR does not have land use planning documents at the reservoirs. Proposed work by ODNR on leased lands is reviewed and approved by the Pittsburgh District.

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### 3.10 Air Quality

The Clean Air Act requires the United States Environmental Protection Agency (USEPA) to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants, known as criteria air pollutants. These pollutants include lead, sulfur dioxide, particulate matter (PM-2.5 and PM-10), ozone, carbon monoxide, and nitrogen dioxide (USEPA, 2021n). The NAAQS are the concentrations of these principal pollutants, above which, adverse effects on human health may occur. Areas that persistently exceed the standards are designated as nonattainment areas. Federal actions must not cause or contribute to new violations, worsen existing violations, or delay attainment of NAAQS.

#### 3.10.1 Existing Conditions

Berlin Lake Reservoir and Michael J. Kirwan Reservoir are located in the Greater Metropolitan Cleveland Intrastate Air Quality Control Region (40 CFR 81.22) and Berlin Lake Reservoir and Mosquito Creek Lake Reservoir are located in the Northwest Pennsylvania-Youngstown Interstate Air Quality Control Region (40 CFR 81.74). Only Portage County is not in attainment for the 8-hour ozone (2015) standard. Berlin, Michael J. Kirwan, and Mosquito reservoirs are in attainment for all other NAAQS in Mahoning, Portage, Stark, and Trumbull Counties (USEPA, 2021o). Berlin Lake, Michael J. Kirwan, and Mosquito Creek Lake reservoirs are located within a rural area and *de minimis* emissions likely occur from gasoline vapors, motor vehicle exhaust, and lawn care equipment exhaust on a regular basis, and construction equipment exhaust during construction work.

The USEPA index for reporting air quality is the U.S. Air Quality Index (AQI). Values range from 0 to 500. As AQI values increase, air pollution levels increase. An AQI value range between 0-50 is considered “good” with little to no risk of air pollution causing health problems. AQI values ranging from 51-100 are considered “moderate” where air quality is acceptable, but populations sensitive to air pollution may have an increased risk of health problems. AQI values greater than 100 are considered unhealthy (Airnow, 2021). Daily AQI values for Mahoning County, Portage County, Stark County, and Trumbull County are shown in Figures 18, 19, 20 and 21.

Stark County, and Trumbull County are shown in Figures 18, 19, 20 and 21.

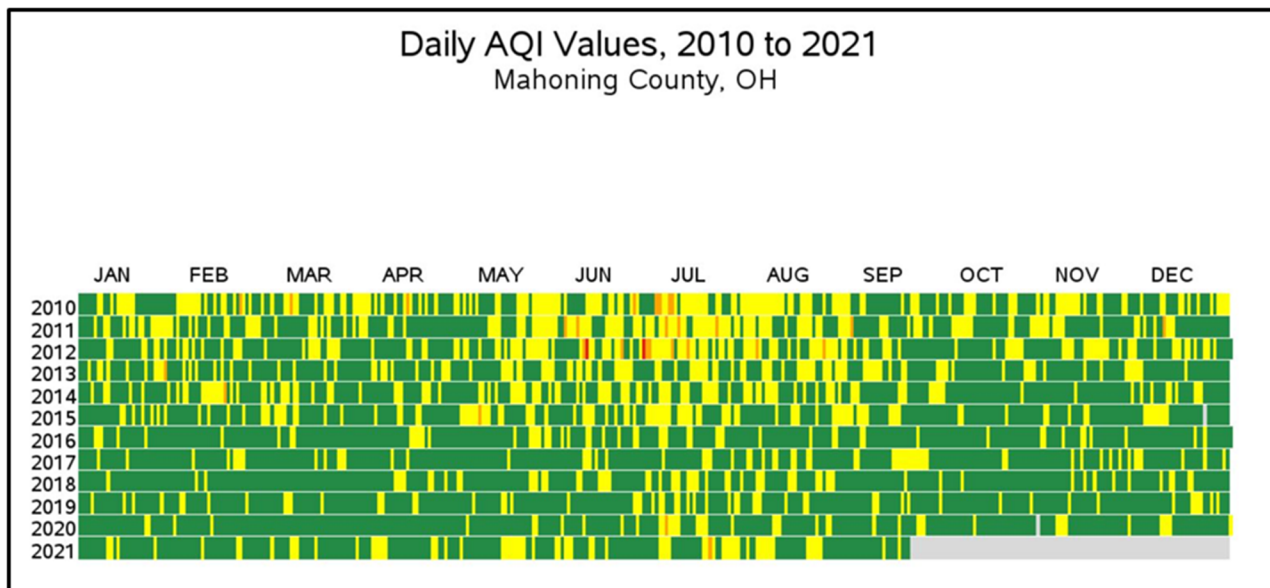


Figure 10 – Daily AQI values from January 2010 to September 2021 for Mahoning County (USEPA, 2021p).

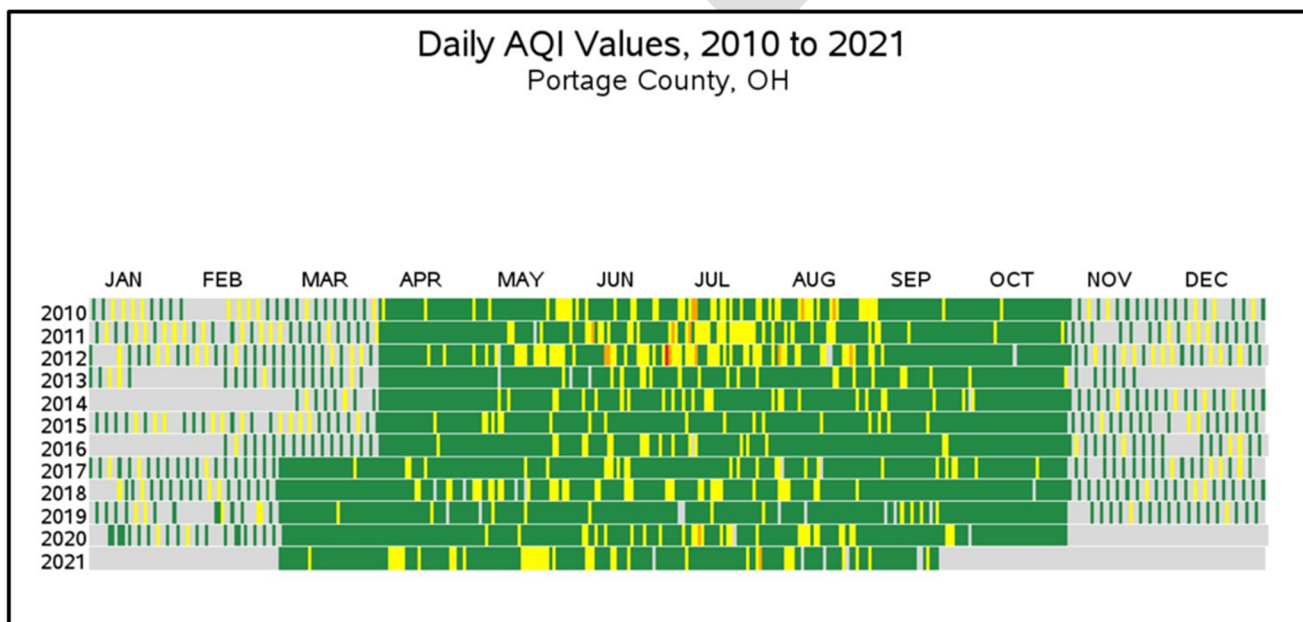


Figure 11 – Daily AQI values from January 2010 to September 2021 for Portage County (USEPA, 2021p).

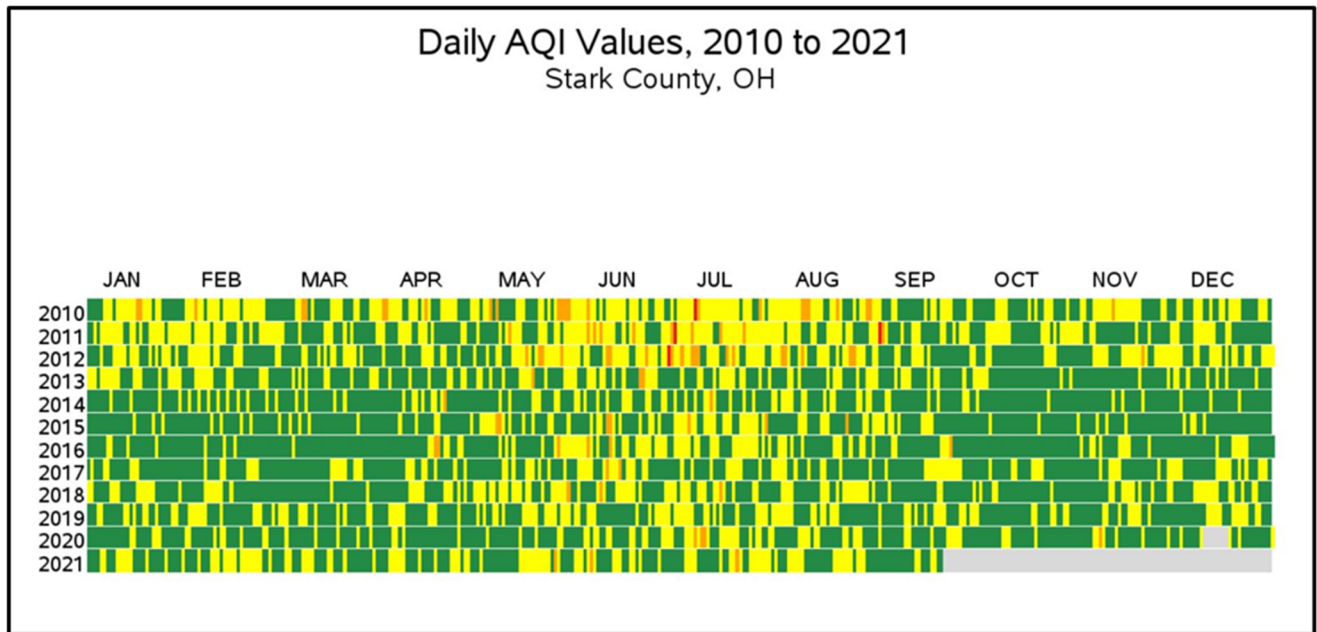


Figure 12 – Daily AQI values from January 2010 to September 2021 for Stark County (USEPA, 2021p).

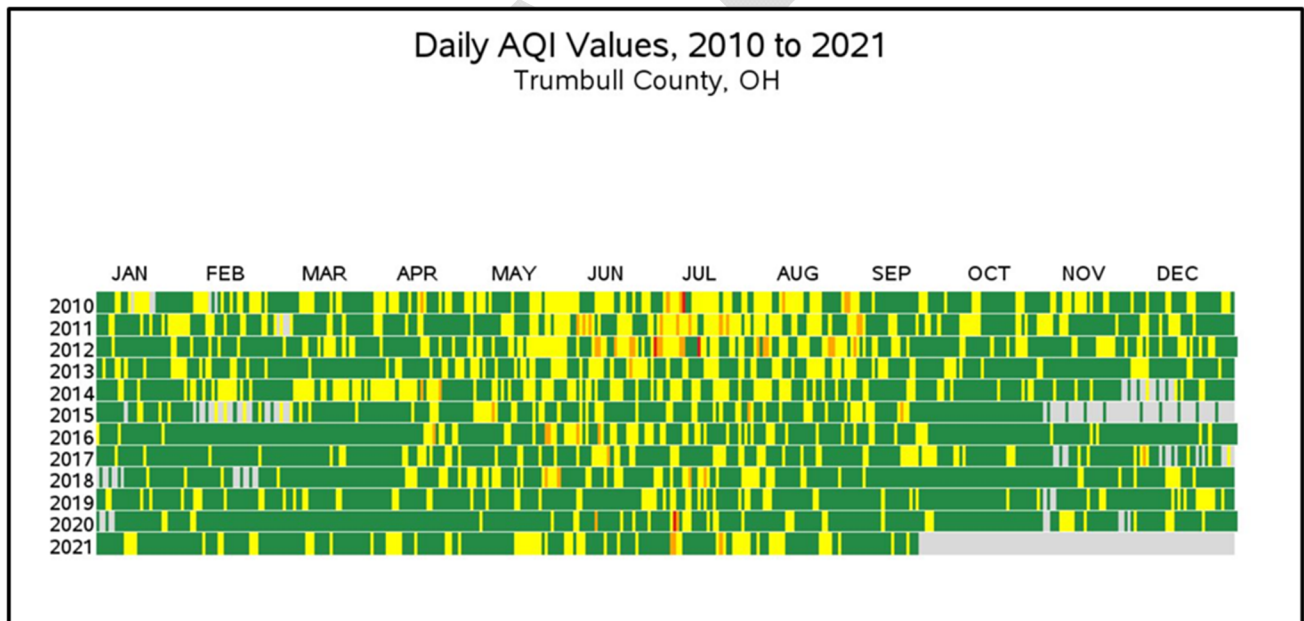


Figure 13 – Daily AQI values from January 2010 to September 2021 for Trumbull County (USEPA, 2021p).

### 3.10.2 Environmental Consequences

#### 3.10.2.1 No Action

The reservoirs would continue to be managed per the existing WCPs. No change to air quality would occur.

### 3.10.2.2 Alternatives 1 and 2

Minor impacts to air quality may occur with extending the summer pool at Berlin Lake Reservoir. The extended summer pool at Berlin Lake Reservoir would likely result in an increase in recreational motorboat use of the reservoir, which would cause a minor increase in emissions for the duration of time that Berlin Lake Reservoir remains at summer pool. It is expected that this increase would be *de minimis* and would not cause a significant adverse impact to air quality. Extending summer pool at Berlin Lake Reservoir may result in lower summer pool elevations at Michael J. Kirwan Reservoir, which may lead to a reduction in recreational motorboat use of the reservoir. Minor decreases in emissions may occur at Michael J. Kirwan Reservoir, if recreational motorboat use decreases.

## 4 Summary of Environmental Effects

The WCM for Mosquito Creek Lake Reservoir would be updated; however, operations would follow the existing WCP. Therefore, no effects to Mosquito Creek Lake Reservoir are expected as a result of the WCM update.

As discussed in Section 3, the Preferred Alternative (Alternative 1) would not significantly impact any environmental resources.

Minor impacts to wetland hydrology may occur during drier years with the Preferred Alternative, although a complete loss of wetland habitat is not expected.

Minor to moderate impacts to wildlife habitat (mudflats) would occur around Berlin Lake Reservoir with the Preferred Alternative. Mudflat habitat would not begin to appear until late September impacting migratory birds including shorebirds and birds of conservation concern that use the Berlin Lake Project as a stopover point on their fall migration. Mudflat habitat may appear earlier at Michael J. Kirwan Reservoir and migratory shorebirds may utilize this habitat instead. A decrease (or loss) of vegetated mudflat habitat would result in minor adverse impacts to juvenile fish species that use vegetated mudflat habitat as cover from larger prey species, as they would be more vulnerable to predation.

Minor impacts to recreational bird watching would occur with the Preferred Alternative at Berlin Lake Reservoir, as mudflat habitat would not be exposed until after Labor Day. Mudflat habitat may occur earlier at Michael J. Kirwan Reservoir if water discharges increase to maintain summer pool elevations at Berlin Lake Reservoir, resulting in minor beneficial impacts to recreational bird watching and minor benefits to migratory birds that use the Michael J. Kirwan Dam & Reservoir Project as a stopover point on their fall migration.

There is a slightly higher risk of flooding downstream of Berlin Lake Reservoir during the months of July through September when compared to the existing WCP, as there would be less storage available in Berlin Lake Reservoir.



The Preferred Alternative may produce minor economic benefits at Berlin Lake Reservoir by extending the time period for recreational boating. Conversely, minor impacts to economics at Michael J. Kirwan may occur if recreational boat usage decreases for users with larger boats as a result of lower summer pool elevations at Michael J. Kirwan Reservoir. Minor economic benefits resulting from increased bird watching may occur at Michael J. Kirwan Reservoir and minor economic impacts resulting from decreased bird watching may occur at Berlin Lake Reservoir corresponding with the presence or absence of mudflat habitat.

Minor impacts to water quality would occur with the Preferred Alternative.

Minor benefits to recreational boating are expected at Berlin Lake Reservoir with the Preferred Alternative. During drier years, minor adverse impacts to recreational boating may occur at Michael J. Kirwan Reservoir if water releases are increased to allow Berlin Lake Reservoir to maintain summer pool elevation.

It is expected that minor increases in air quality emissions will occur with the increased use of recreational motorboats during the months of July through September with the Preferred Alternative. It is possible that decreases in air quality emissions will occur during the same time at Michael J. Kirwan Reservoir if reservoir elevations drop to a level prohibiting the use of recreational motorboats.

The Corps did not identify any reasonably foreseeable impacts outside of those impacts discussed in Section 3 and summarized in this section.

The Preferred Alternative will not affect any land use plans.

The Preferred Alternative does not require compensatory mitigation.

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the Preferred Alternative. There are no probable adverse effects that cannot be avoided.

## **5 Compliance with Environmental Laws**

This section documents the compliance status of the major Federal laws, policies, and Executive Orders that were applicable or considered for the project. Upon completion of the NEPA process, the proposed WCP revision will comply with all requirements.

### **Bald and Golden Eagle Protection Act, 16 USC Sec. 668-668d.**

*In compliance.*

The Bald and Golden Eagle Protection Act prohibits the taking, possession or commerce of bald and golden eagles, except under certain circumstances. Amendments in 1972 added penalties for violations of the Act or related regulations. Implementing the Preferred Alternative would not adversely affect bald or golden eagles, or their habitat.

Clean Air Act, as amended, 42 USC 1857h-7, et seq.

*In compliance.*

The purpose of this Act is to protect public health and welfare by controlling air pollution at its source, and by setting forth primary and secondary National Ambient Air Quality Standards to establish criteria for States to attain or maintain. Minor and temporary releases may occur from the increased use of recreational boats during the additional months that summer pool is held at Berlin Lake Reservoir; however, these emissions would be short-term, small-scale, and therefore *de minimis*. No significant impacts to air quality are expected with the implementation of the Preferred Alternative.

Clean Water Act, as amended, (Federal Water Pollution Control Act) 33 USC 1251, et seq.

*In compliance.*

The Clean Water Act (CWA) is the primary legislative vehicle for federal water pollution control programs and the basic structure for regulating discharges of pollutants into WOUS, which includes navigable waters, rivers, streams, and wetlands. The CWA was established to “restore and maintain the chemical, physical, and biological integrity of the nation’s waters.” The CWA sets goals to eliminate discharges of pollutants into navigable waters, protect fish and wildlife, and prohibit the discharge of toxic pollutants in quantities that could adversely affect the environment. USACE regulates discharges of dredge or fill material into WOUS pursuant to Section 404 of the CWA. Section 404 authorization is required to place dredge or fill material into WOUS. If authorization under Section 404 is required, then Section 401 water quality certification is required from the state of Ohio. A NPDES permit would be required under Section 402 of the CWA, if proposed construction activities would disturb greater than one acre of land. No discharges of dredged or fill material in WOUS is proposed with the Preferred Alternative and no construction activities are proposed.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980.

*Not applicable.*

CERCLA was passed in response to numerous abandoned, leaking hazardous waste sites, discovered in the late 1970’s, which posed serious threats to human health and the environment. CERCLA was designed to impose cleanup and reporting requirements on the private sector, as well as federal facilities, by identifying those sites where releases of hazardous substances had occurred or might occur, and pose a serious threat to human health, welfare, or the environment; taking appropriate action to remedy those releases; and seeking that the parties responsible for the releases pay for the cleanup activities. CERCLA authorizes cleanup responses when there is a release or threat of a release of a hazardous substance into the environment and sets a framework for accomplishing those actions. To the extent such knowledge is available, 40 CFR

Part 373 requires notification of CERCLA hazardous substances in a land transfer. The implementation of the Preferred Alternative would not involve real estate transactions.

Endangered Species Act, as amended. 16 USC 1531, et seq.

*In compliance.*

The Endangered Species Act (ESA) establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants and the habitat upon which they depend. Section 7(a) of the ESA requires that federal agencies consult with the USFWS to ensure that proposed actions are not likely to jeopardize the continued existence of endangered or threatened species or to adversely modify or destroy designated critical habitats. No effects to any federally listed threatened or endangered species would occur with the implementation of the Preferred Alternative.

Environmental Justice (EO 12898).

*In compliance.*

EO 12898 mandates that “each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” The Preferred Alternative would not disproportionately affect minority or low-income populations.

Federal Water Project Recreation Act, 16 USC 460(l)(12), et. seq.

*In compliance.*

In the planning of any federal navigation, flood risk management, reclamation, or water resources project, the Federal Water Project Recreation Act, as amended, requires that full consideration be given to opportunities that the Project affords for outdoor recreation and fish and wildlife enhancement. The Act requires planning with respect to development of recreation potential. Projects must be constructed, maintained, and operated in such a manner if recreational opportunities are consistent with the purpose of the Project. The Preferred Alternative would provide increased recreational opportunities for boating on Berlin Lake Reservoir but would decrease recreational bird watching opportunities. The Preferred Alternative may decrease recreational opportunities for boating at Michael J. Kirwan Reservoir but may increase recreational bird watching opportunities if reservoir elevations drop resulting in earlier formation of mudflat habitat for migratory birds.

Fish and Wildlife Coordination Act, as amended, 16 USC 661, et seq.

*In compliance.*

The Fish and Wildlife Coordination Act requires governmental agencies, including USACE, to coordinate activities so that adverse effects on fish and wildlife would be minimized when water bodies are proposed for modification. No modifications are proposed in association with the Preferred Alternative.

### Migratory Bird Treaty Act

#### *In compliance.*

The Migratory Bird Treaty Act of 1918 (MBTA) is the domestic law that affirms, or implements, the United States' commitment to four international conventions with Canada, Japan, Mexico, and Russia for the protection of shared migratory bird resources. The MBTA governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests. The take of any migratory bird is governed by the MBTA's regulation of taking migratory birds for educational, scientific, and recreational purposes and requiring harvest to be limited to levels that prevent overutilization. Executive Order 13186 (2001) directs agencies to take certain actions to implement the act. The implementation of the Preferred Alternative would not result in a take of migratory bird species. Minor to moderate impacts to migratory birds may occur at Berlin Lake Reservoir during the fall migration season, as the formation of mudflat habitat may be delayed until September if summer pool elevations are held until Labor Day at Berlin Lake Reservoir. Conversely, mudflat habitat may begin to develop at Michael J. Kirwan Reservoir earlier in the year, with an overall limited impact to the available habitat in the region.

### National Historic Preservation Act, as amended, 16 USC 470a, et seq.

#### *In compliance.*

Section 106 of the National Historic Preservation Act of 1966 and its implementing regulations (36 CFR 800) require federal agencies to identify and resolve adverse effects to historic properties within the Area of Potential Effects (APE) of projects, activities, or programs funded in whole or in part under direct or indirect jurisdiction of a federal agency. Historic properties include buildings, structures, objects, sites, and historic districts worthy of preservation due to historic significance. This process is carried out in consultation with Advisory Council on Historic Preservation, State Historic Preservation Offices (SHPO), Certified Local Governments, Indian Tribes, and the interested public.

The Corps made the determination the Preferred Alternative does not have the potential to adversely impact cultural resources or historic properties. The Preferred Alternative does not include construction or structural changes, and there would be no change to the duration of reservoir drawdown nor the overall pool elevations, only a shift in timing. It is not expected that there would be a significant increase in erosion that could impact cultural resources or historic properties.

National Environmental Policy Act (NEPA), as amended, 42 USC 4321, et seq.

*In compliance.*

This EA and Finding of No Significant Impact (FONSI) have been prepared in accordance with the CEQ's NEPA Implementing Regulations (40 CFR 1500-1508). If the Corps determines there are significant impacts after public review, it will prepare an EIS.

Noise Control Act of 1972, 42 USC Sec. 4901 to 4918.

*In compliance.*

This Act establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. Federal agencies are required to limit noise emissions to within compliance levels. Noise emission levels at the Project site would increase above current levels if there were an increase in recreational boat use; however, these impacts are expected to be *de minimis*.

Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403)

*In compliance.*

This law prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This section provides that the construction of any structure in or over any navigable water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity of such waters is unlawful unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army. The Preferred Alternative does not involve the construction of structures within the reservoir.

Floodplain Management (EO 11988).

*In compliance.*

Executive Order 11988 requires federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy of the floodplain, and to avoid direct and indirect support of floodplain development where there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by flood plains." The Preferred Alternative does not constitute a major rehabilitation project, require extensive engineering and design, or significantly change the project footprint. The Preferred Alternative does not involve floodplain development and therefore is not required to be evaluated for its impact on the floodplain.

## Invasive Species (EO 13312).

### *In compliance.*

Federal agencies shall not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions. The Preferred Alternative would not introduce, change the presence of, or cause a significant increase in, the spread of invasive species.

## Protection of Wetlands (EO 11990).

### *In compliance.*

Executive Order 11990 encourages federal agencies to take actions to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands when undertaking federal activities and programs. Each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands, which may result from such use. The Preferred Alternative would not involve construction in wetlands.

## **6 Relationship Between Short-Term Use and Long-Term Productivity**

The Preferred Alternative will not impact short-term use and will not impact or change long-term productivity.

## **7 Irreversible and Irretrievable Commitment of Resources**

The Preferred Alternative would not result in significant irretrievable or irreversible commitments of resources.

## **8 Public Involvement**

As described in Section 1.4, participants of the July 2017 meeting with the Corps noted a desire to extend the summer recreation season for boating. The Corps requested a planned deviation from the Berlin Lake Reservoir WCP in 2018 to delay the drawdown schedule to hold the summer pool at Berlin Lake Reservoir through Labor Day 2018. The deviation request was not granted.

The Corps initiated this study to examine whether revisions to reservoir operations could maximize all of the reservoirs' authorized purposes. In June and July 2019, the Corps held meetings with resource agencies, stakeholders, and the public to present information on the WCM updates and to request comments. In May 2020, the Corps held another public meeting as an update on the approach to modeling the operation of the three reservoirs and to accept comments and feedback on which performance measures could be used to determine how well the reservoir operations met their authorized purposes. Information obtained from the meetings and public comments was used to refine the inputs to the hydraulic and hydrologic modeling. A more detailed description of the public involvement process can be found in Section 6 of the *Berlin Lake, Michael J. Kirwan Dam and Reservoir, and Mosquito Creek Lake Engineering Report for Revisions to the Water Control Manuals*.

In compliance with 40 CFR 1501.4(e)(2), this EA is being circulated for a 30-day review to concerned agencies, organizations, and the interested public (Appendix C). All comments received during this review period will be evaluated and appropriate changes to the EA will be implemented and addressed in the FONSI. The EA and FONSI will be retained in the Corps' administrative files for future reference and as a record of NEPA compliance.

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## APPENDIX A - USFWS Species Lists

DRAFT



## United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Ohio Ecological Services Field Office  
4625 Morse Road, Suite 104  
Columbus, OH 43230-8355  
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In Reply Refer To:  
Consultation Code: 03E15000-2022-SLI-0326  
Event Code: 03E15000-2022-E-00512  
Project Name: Berlin Lake

November 29, 2021

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

### To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

**Migratory Birds:** In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see <http://www.fws.gov/migratorybirds/RegulationsandPolicies.html>.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/BirdHazards.html>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <http://www.fws.gov/migratorybirds/AboutUS.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

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Attachment(s):

- Official Species List

## Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Ohio Ecological Services Field Office**

4625 Morse Road, Suite 104

Columbus, OH 43230-8355

(614) 416-8993

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## Project Summary

Consultation Code: 03E15000-2022-SLI-0326

Event Code: Some(03E15000-2022-E-00512)

Project Name: Berlin Lake

Project Type: \*\* OTHER \*\*

Project Description: Proposed updates to Berlin Lake water control manual and water control plan.

Project Location:

Approximate location of the project can be viewed in Google Maps: [https://](https://www.google.com/maps/@41.00309695,-81.03156487199522,14z)

[www.google.com/maps/@41.00309695,-81.03156487199522,14z](https://www.google.com/maps/@41.00309695,-81.03156487199522,14z)



Counties: Mahoning, Portage, and Stark counties, Ohio

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## Endangered Species Act Species

There is a total of 6 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 1 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

- 
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

### Mammals

NAME	STATUS
Indiana Bat <i>Myotis sodalis</i> There is <b>final</b> critical habitat for this species. The location of the critical habitat is not available. Species profile: <a href="https://ecos.fws.gov/ecp/species/5949">https://ecos.fws.gov/ecp/species/5949</a>	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> <li>▪ Incidental take of the northern long-eared bat is not prohibited at this location. Federal action agencies may conclude consultation using the streamlined process described at <a href="https://www.fws.gov/midwest/endangered/mammals/nleb/s7.html">https://www.fws.gov/midwest/endangered/mammals/nleb/s7.html</a></li> </ul> Species profile: <a href="https://ecos.fws.gov/ecp/species/9045">https://ecos.fws.gov/ecp/species/9045</a>	Threatened

### Reptiles

NAME	STATUS
Eastern Massasauga (=rattlesnake) <i>Sistrurus catenatus</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/2202">https://ecos.fws.gov/ecp/species/2202</a>	Threatened

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## Insects

NAME	STATUS
Mitchell's Satyr Butterfly <i>Neonympha mitchellii mitchellii</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/8062">https://ecos.fws.gov/ecp/species/8062</a>	Endangered
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/9743">https://ecos.fws.gov/ecp/species/9743</a>	Candidate

## Flowering Plants

NAME	STATUS
Northern Wild Monkshood <i>Aconitum noveboracense</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1450">https://ecos.fws.gov/ecp/species/1450</a>	Threatened

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.



## United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Ohio Ecological Services Field Office  
4625 Morse Road, Suite 104  
Columbus, OH 43230-8355  
Phone: (614) 416-8993 Fax: (614) 416-8994

In Reply Refer To:  
Consultation Code: 03E15000-2022-SLI-0324  
Event Code: 03E15000-2022-E-00507  
Project Name: Lake Milton

November 29, 2021

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

### To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

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(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

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**Migratory Birds:** In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see <http://www.fws.gov/migratorybirds/RegulationsandPolicies.html>.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/BirdHazards.html>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <http://www.fws.gov/migratorybirds/AboutUS.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

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Attachment(s):

- Official Species List



## Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Ohio Ecological Services Field Office**

4625 Morse Road, Suite 104

Columbus, OH 43230-8355

(614) 416-8993

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## Project Summary

Consultation Code: 03E15000-2022-SLI-0324

Event Code: Some(03E15000-2022-E-00507)

Project Name: Lake Milton

Project Type: \*\* OTHER \*\*

Project Description: Proposed updates to Berlin Lake water control manual and water control plan.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@41.1302403,-80.97420659496586,14z>



Counties: Mahoning, Portage, and Trumbull counties, Ohio

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## Endangered Species Act Species

There is a total of 6 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 1 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

- 
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

### Mammals

NAME	STATUS
Indiana Bat <i>Myotis sodalis</i> There is <b>final</b> critical habitat for this species. The location of the critical habitat is not available. Species profile: <a href="https://ecos.fws.gov/ecp/species/5949">https://ecos.fws.gov/ecp/species/5949</a>	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> <li>Incidental take of the northern long-eared bat is not prohibited at this location. Federal action agencies may conclude consultation using the streamlined process described at <a href="https://www.fws.gov/midwest/endangered/mammals/nleb/s7.html">https://www.fws.gov/midwest/endangered/mammals/nleb/s7.html</a></li> </ul> Species profile: <a href="https://ecos.fws.gov/ecp/species/9045">https://ecos.fws.gov/ecp/species/9045</a>	Threatened

### Reptiles

NAME	STATUS
Eastern Massasauga (=rattlesnake) <i>Sistrurus catenatus</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/2202">https://ecos.fws.gov/ecp/species/2202</a>	Threatened

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## Insects

NAME	STATUS
Mitchell's Satyr Butterfly <i>Neonympha mitchellii mitchellii</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/8062">https://ecos.fws.gov/ecp/species/8062</a>	Endangered
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/9743">https://ecos.fws.gov/ecp/species/9743</a>	Candidate

## Flowering Plants

NAME	STATUS
Northern Wild Monkshood <i>Aconitum noveboracense</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1450">https://ecos.fws.gov/ecp/species/1450</a>	Threatened

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.



## United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Ohio Ecological Services Field Office  
4625 Morse Road, Suite 104  
Columbus, OH 43230-8355  
Phone: (614) 416-8993 Fax: (614) 416-8994

In Reply Refer To:  
Consultation Code: 03E15000-2022-SLI-0325  
Event Code: 03E15000-2022-E-00510  
Project Name: Michael J Kirwan

November 29, 2021

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

### To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

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**Migratory Birds:** In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see <http://www.fws.gov/migratorybirds/RegulationsandPolicies.html>.

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We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

---

Attachment(s):

- Official Species List

## Official Species List

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This species list is provided by:

**Ohio Ecological Services Field Office**

4625 Morse Road, Suite 104

Columbus, OH 43230-8355

(614) 416-8993

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## Project Summary

Consultation Code: 03E15000-2022-SLI-0325

Event Code: Some(03E15000-2022-E-00510)

Project Name: Michael J Kirwan

Project Type: \*\* OTHER \*\*

Project Description: Proposed updates to Michael J. Kirwan water control manual and water control plan.

Project Location:

Approximate location of the project can be viewed in Google Maps: [https://](https://www.google.com/maps/@41.1642916,-81.05174094083631,14z)

[www.google.com/maps/@41.1642916,-81.05174094083631,14z](https://www.google.com/maps/@41.1642916,-81.05174094083631,14z)



Counties: Portage and Trumbull counties, Ohio

## Endangered Species Act Species

There is a total of 6 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 1 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

- 
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

## Mammals

NAME	STATUS
Indiana Bat <i>Myotis sodalis</i> There is <b>final</b> critical habitat for this species. The location of the critical habitat is not available. Species profile: <a href="https://ecos.fws.gov/ecp/species/5949">https://ecos.fws.gov/ecp/species/5949</a>	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> <li>Incidental take of the northern long-eared bat is not prohibited at this location. Federal action agencies may conclude consultation using the streamlined process described at <a href="https://www.fws.gov/midwest/endangered/mammals/nleb/s7.html">https://www.fws.gov/midwest/endangered/mammals/nleb/s7.html</a></li> </ul> Species profile: <a href="https://ecos.fws.gov/ecp/species/9045">https://ecos.fws.gov/ecp/species/9045</a>	Threatened

## Reptiles

NAME	STATUS
Eastern Massasauga (=rattlesnake) <i>Sistrurus catenatus</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/2202">https://ecos.fws.gov/ecp/species/2202</a>	Threatened

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## Insects

NAME	STATUS
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## Flowering Plants

NAME	STATUS
Northern Wild Monkshood <i>Aconitum noveboracense</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1450">https://ecos.fws.gov/ecp/species/1450</a>	Threatened

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.



## United States Department of the Interior



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Ohio Ecological Services Field Office  
4625 Morse Road, Suite 104  
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Phone: (614) 416-8993 Fax: (614) 416-8994

In Reply Refer To:  
Consultation Code: 03E15000-2022-SLI-0323  
Event Code: 03E15000-2022-E-00501  
Project Name: Mosquito Creek Lake

November 29, 2021

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

### To Whom It May Concern:

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The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

**Migratory Birds:** In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see <http://www.fws.gov/migratorybirds/RegulationsandPolicies.html>.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/BirdHazards.html>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <http://www.fws.gov/migratorybirds/AboutUS.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

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Attachment(s):

- Official Species List

## Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Ohio Ecological Services Field Office**

4625 Morse Road, Suite 104

Columbus, OH 43230-8355

(614) 416-8993

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## Project Summary

Consultation Code: 03E15000-2022-SLI-0323

Event Code: Some(03E15000-2022-E-00501)

Project Name: Mosquito Creek Lake

Project Type: \*\* OTHER \*\*

Project Description: Proposed updates to Mosquito Creek Lake Water Control Manual. No changes to water control plan operations are proposed.

Project Location:

Approximate location of the project can be viewed in Google Maps: [https://](https://www.google.com/maps/@41.3157571,-80.75770246780748,14z)

[www.google.com/maps/@41.3157571,-80.75770246780748,14z](https://www.google.com/maps/@41.3157571,-80.75770246780748,14z)



Counties: Trumbull County, Ohio



## Endangered Species Act Species

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 1 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

- 
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

### Mammals

NAME	STATUS
Indiana Bat <i>Myotis sodalis</i> There is <b>final</b> critical habitat for this species. The location of the critical habitat is not available. Species profile: <a href="https://ecos.fws.gov/ecp/species/5949">https://ecos.fws.gov/ecp/species/5949</a>	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> <li>▪ Incidental take of the northern long-eared bat is not prohibited at this location. Federal action agencies may conclude consultation using the streamlined process described at <a href="https://www.fws.gov/midwest/endangered/mammals/nleb/s7.html">https://www.fws.gov/midwest/endangered/mammals/nleb/s7.html</a></li> </ul> Species profile: <a href="https://ecos.fws.gov/ecp/species/9045">https://ecos.fws.gov/ecp/species/9045</a>	Threatened

### Reptiles

NAME	STATUS
Eastern Massasauga (=rattlesnake) <i>Sistrurus catenatus</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/2202">https://ecos.fws.gov/ecp/species/2202</a>	Threatened

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## Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/9743">https://ecos.fws.gov/ecp/species/9743</a>	Candidate

## Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Ecological Services  
 4625 Morse Road, Suite 104  
 Columbus, Ohio 43230  
 (614) 416-8993 / FAX (614) 416-8994

### Federally Endangered, Threatened, Candidate Species, and Species of Concern in Ohio by County April 2018

COUNTY	SPECIES
ADAMS	Indiana bat (E), northern long-eared bat (T), running buffalo clover (E), fanshell (E), rayed bean (E), pink mucket pearly mussel (E), sheepsnose (E), snuffbox (E), timber rattlesnake (SC), bald eagle (SC)
ALLEN	Indiana bat (E), northern long-eared bat (T), bald eagle (SC)
ASHLAND	Indiana bat (E), northern long-eared bat (T), eastern hellbender (SC), bald eagle (SC)
ASHTABULA	Indiana bat (E), northern long-eared bat (T), Kirtland's warbler (E), piping plover (E), clubshell (E), snuffbox (E), rufa red knot (T), eastern massasauga (T), bald eagle (SC)
ATHENS	Indiana bat (E), northern long-eared bat (T), American burying beetle (E), fanshell (E), sheepsnose (E), pink mucket pearly mussel (E), snuffbox (E), running buffalo clover (E), timber rattlesnake (SC), bald eagle (SC)
AUGLAIZE	Indiana bat (E), northern long-eared bat (T), bald eagle (SC)
BELMONT	Indiana bat (E), northern long-eared bat (T), running buffalo clover (E), eastern hellbender (SC), bald eagle (SC)
BROWN	Indiana bat (E), northern long-eared bat (T), running buffalo clover (E), fanshell (E), pink mucket pearly mussel (E), rayed bean (E), sheepsnose (E), snuffbox (E), bald eagle (SC)
BUTLER	Indiana bat (E), northern long-eared bat (T), rayed bean (E), running buffalo clover (E), eastern massasauga (T), bald eagle (SC)
CARROLL	Indiana bat (E), northern long-eared bat (T), bald eagle (SC)
CHAMPAIGN	Indiana bat (E), northern long-eared bat (T), eastern massasauga (T), bald eagle (SC)
CLARK	Indiana bat (E), northern long-eared bat (T), rayed bean (E), eastern prairie fringed orchid (T), eastern massasauga (T), bald eagle (SC)
CLERMONT	Indiana bat (E), northern long-eared bat (T), running buffalo clover (E), fanshell (E), pink mucket pearly mussel (E), rayed bean (E), sheepsnose (E), snuffbox (E), bald eagle (SC)
CLINTON	Indiana bat (E), northern long-eared bat (T), eastern massasauga (T), bald eagle (SC)
COLUMBIANA	Indiana bat (E), northern long-eared bat (T), eastern massasauga (T), eastern hellbender (SC), bald eagle (SC)
COSHOCTON	Indiana bat (E), northern long-eared bat (T), clubshell (E), fanshell (E), rayed bean (E),

	purple cat's paw pearly mussel (E), sheepsnose (E), snuffbox (E), rabbitsfoot (T/CH), eastern hellbender (SC), bald eagle (SC)
CRAWFORD	Indiana bat (E), northern long-eared bat (T), eastern massasauga (T), bald eagle (SC)
CUYAHOGA	Indiana bat (E), northern long-eared bat (T), Kirtland's warbler (E), piping plover (E), rufa red knot (T), bald eagle (SC)
DARKE	Indiana bat (E), northern long-eared bat (T), rayed bean (E), bald eagle (SC)
DEFIANCE	Indiana bat (E), northern long-eared bat (T), clubshell (E), northern riffleshell (E), white cat's paw pearly mussel (E), rayed bean (E), copperbelly water snake (T), bald eagle (SC)
DELAWARE	Indiana bat (E), northern long-eared bat (T), rayed bean (E), snuffbox (E), rabbitsfoot (T), running buffalo clover (E), bald eagle (SC)
ERIE	Indiana bat (E), northern long-eared bat (T), Kirtland's warbler (E), piping plover (E/CH), Lakeside daisy (T), rufa red knot (T), eastern massasauga (T), Lake Erie watersnake (SC), bald eagle (SC)
FAIRFIELD	Indiana bat (E), northern long-eared bat (T), running buffalo clover (E), eastern massasauga (T), bald eagle (SC)
FAYETTE	Indiana bat (E), northern long-eared bat (T), eastern massasauga (T), bald eagle (SC)
FRANKLIN	Indiana bat (E), northern long-eared bat (T), running buffalo clover (E), Scioto madtom (E), clubshell (E), northern riffleshell (E), rayed bean (E), snuffbox (E), rabbitsfoot (T), eastern hellbender (SC), bald eagle (SC)
FULTON	Indiana bat (E), northern long-eared bat (T), rayed bean (E), bald eagle (SC)
GALLIA	Indiana bat (E), northern long-eared bat (T), fanshell (E), pink mucket pearly mussel (E), sheepsnose (E), snuffbox (E), running buffalo clover (E), timber rattlesnake (SC), bald eagle (SC)
GEAUGA	Indiana bat (E), northern long-eared bat (T), bald eagle (SC)
GREENE	Indiana bat (E), northern long-eared bat (T), clubshell (E), rayed bean (E), snuffbox (E), eastern massasauga (T), bald eagle (SC)
GUERNSEY	Indiana bat (E), northern long-eared bat (T), bald eagle (SC)
HAMILTON	Indiana bat (E), northern long-eared bat (T), running buffalo clover (E), fanshell (E), pink mucket pearly mussel (E), rayed bean (E), sheepsnose (E), snuffbox (E), bald eagle (SC)
HANCOCK	Indiana bat (E), northern long-eared bat (T), clubshell (E), rayed bean (E), bald eagle (SC)
HARDIN	Indiana bat (E), northern long-eared bat (T), clubshell (E), rayed bean (E), copperbelly water snake (T), eastern massasauga (T), bald eagle (SC)
HARRISON	Indiana bat (E), northern long-eared bat (T), bald eagle (SC)
HENRY	Indiana bat (E), northern long-eared bat (T), bald eagle (SC)
HIGHLAND	Indiana bat (E), northern long-eared bat (T), running buffalo clover (E), timber rattlesnake (SC), bald eagle (SC)
HOCKING	Indiana bat (E), northern long-eared bat (T), American burying beetle (E), running buffalo clover (E),

	northern monkshood (T), small whorled pogonia (T), timber rattlesnake (SC), bald eagle (SC)
HOLMES	Indiana bat (E), northern long-eared bat (T), eastern prairie fringed orchid (T), eastern massasauga (T), eastern hellbender (SC), bald eagle (SC)
HURON	Indiana bat (E), northern long-eared bat (T), eastern massasauga (T), bald eagle (SC)
JACKSON	Indiana bat (E), northern long-eared bat (T), running buffalo clover (E), timber rattlesnake (SC), bald eagle (SC)
JEFFERSON	Indiana bat (E), northern long-eared bat (T), eastern hellbender (SC), bald eagle (SC)
KNOX	Indiana bat (E), northern long-eared bat (T), eastern hellbender (SC), bald eagle (SC)
LAKE	Indiana bat (E), northern long-eared bat (T), Kirtland's warbler (E), piping plover (E/CH), snuffbox (E), rufa red knot (T), eastern massasauga (T), bald eagle (SC)
LAWRENCE	Indiana bat (E), northern long-eared bat (T), running buffalo clover (E), fanshell (E), pink mucket pearly mussel (E), sheepsnose (E), snuffbox (E), timber rattlesnake (SC), bald eagle (SC)
LICKING	Indiana bat (E), northern long-eared bat (T), eastern massasauga (T), bald eagle (SC)
LOGAN	Indiana bat (E), northern long-eared bat (T), rayed bean (E), eastern massasauga (T), bald eagle (SC)
LORAIN	Indiana bat (E), northern long-eared bat (T), Kirtland's warbler (E), piping plover (E), rufa red knot (T), bald eagle (SC)
LUCAS	Indiana bat (E), northern long-eared bat (T), Karner blue butterfly (E), Kirtland's warbler (E), piping plover (E), rayed bean (E), eastern prairie fringed orchid (T), rufa red knot (T), eastern massasauga (T), bald eagle (SC)
MADISON	Indiana bat (E), northern long-eared bat (T), Scioto madtom (E), clubshell (E), northern riffleshell (E), rayed bean (E), snuffbox (E), rabbitsfoot (T/CH), bald eagle (SC)
MAHONING	Indiana bat (E), northern long-eared bat (T), eastern massasauga (T), bald eagle (SC)
MARION	Indiana bat (E), northern long-eared bat (T), rayed bean (E), eastern massasauga (T), bald eagle (SC)
MEDINA	Indiana bat (E), northern long-eared bat (T), bald eagle (SC)
MEIGS	Indiana bat (E), northern long-eared bat (T), fanshell (E), pink mucket pearly mussel (E), sheepsnose (E), snuffbox (E), running buffalo clover (E), bald eagle (SC)
MERCER	Indiana bat (E), northern long-eared bat (T), bald eagle (SC)
MIAMI	Indiana bat (E), northern long-eared bat (T), rayed bean (E), snuffbox (E), bald eagle (SC)
MONROE	Indiana bat (E), northern long-eared bat (T), eastern hellbender (SC), bald eagle (SC)
MONTGOMERY	Indiana bat (E), northern long-eared bat (T), rayed bean (E), snuffbox (E), eastern massasauga (T), bald eagle (SC)
MORGAN	Indiana bat (E), northern long-eared bat (T), American burying beetle (E), fanshell (E), pink mucket pearly mussel (E), sheepsnose (E), snuffbox (E), bald eagle (SC)
MORROW	Indiana bat (E), northern long-eared bat (T), bald eagle (SC)

MUSKINGUM	Indiana bat (E), northern long-eared bat (T), fanshell (E), sheepnose (E), snuffbox (E), rabbitsfoot (T), eastern hellbender (SC), bald eagle (SC)
NOBLE	Indiana bat (E), northern long-eared bat (T), bald eagle (SC)
OTTAWA	Indiana bat (E), northern long-eared bat (T), Kirtland's warbler (E), piping plover (E), eastern prairie fringed orchid (T), Lakeside daisy (T), rufa red knot (T), eastern massasauga (T), Lake Erie watersnake (SC), bald eagle (SC)
PAULDING	Indiana bat (E), northern long-eared bat (T), bald eagle (SC)
PERRY	Indiana bat (E), northern long-eared bat (T), American burying beetle (E), eastern massasauga (T), bald eagle (SC)
PICKAWAY	Indiana bat (E), northern long-eared bat (T), running buffalo clover (E), Scioto madtom (E), clubshell (E), northern riffleshell (E), rayed bean (E), snuffbox (E), rabbitsfoot (T), bald eagle (SC)
PIKE	Indiana bat (E), northern long-eared bat (T), clubshell (E), northern riffleshell (E), rayed bean (E), running buffalo clover (E), timber rattlesnake (SC), bald eagle (SC)
PORTAGE	Indiana bat (E), northern long-eared bat (T), Mitchell's satyr (E), northern monkshood (T), eastern massasauga (T), bald eagle (SC)
PREBLE	Indiana bat (E), northern long-eared bat (T), eastern massasauga (T), bald eagle (SC)
PUTNAM	Indiana bat (E), northern long-eared bat (T), bald eagle (SC)
RICHLAND	Indiana bat (E), northern long-eared bat (T), eastern massasauga (T), eastern hellbender (SC), bald eagle (SC)
ROSS	Indiana bat (E), northern long-eared bat (T), running buffalo clover (E), clubshell (E), northern riffleshell (E), rayed bean (E), snuffbox (E), eastern hellbender (SC), timber rattlesnake (SC), bald eagle (SC)
SANDUSKY	Indiana bat (E), northern long-eared bat (T), Kirtland's warbler (E), piping plover (E), eastern prairie fringed orchid (T), rufa red knot (T), eastern massasauga (T), bald eagle (SC)
SCIOTO	Indiana bat (E), northern long-eared bat (T), running buffalo clover (E), clubshell (E), fanshell (E), northern riffleshell (E), pink mucket pearly mussel (E), rayed bean (E), sheepnose (E), snuffbox (E), small whorled pogonia (T), Virginia spiraea (T), eastern hellbender (SC), timber rattlesnake (SC), bald eagle (SC)
SENECA	Indiana bat (E), northern long-eared bat (T), bald eagle (SC)
SHELBY	Indiana bat (E), northern long-eared bat (T), rayed bean (E), bald eagle (SC)
STARK	Indiana bat (E), northern long-eared bat (T), eastern massasauga (T), bald eagle (SC)
SUMMIT	Indiana bat (E), northern long-eared bat (T), northern monkshood (T), eastern massasauga (T), bald eagle (SC)
TRUMBULL	Indiana bat (E), northern long-eared bat (T), clubshell (E), eastern massasauga (T), bald eagle (SC), eastern hellbender (SC)
TUSCARAWAS	Indiana bat (E), northern long-eared bat (T), eastern hellbender (SC), bald eagle (SC)

UNION	Indiana bat (E), northern long-eared bat (T), Scioto madtom (E), clubshell (E), northern riffleshell (E), rayed bean (E), snuffbox (E), rabbitsfoot (T/CH), bald eagle (SC)
VAN WERT	Indiana bat (E), northern long-eared bat (T), bald eagle (SC)
VINTON	Indiana bat (E), northern long-eared bat (T), running buffalo clover (E), American burying beetle (E), eastern hellbender (SC), timber rattlesnake (SC), bald eagle (SC)
WARREN	Indiana bat (E), northern long-eared bat (T), running buffalo clover (E), rayed bean (E), eastern massasauga (T), bald eagle (SC)
WASHINGTON	Indiana bat (E), northern long-eared bat (T), fanshell (E), pink mucket pearly mussel (E), sheepsnose (E), snuffbox (E), eastern hellbender (SC), timber rattlesnake (SC), bald eagle (SC)
WAYNE	Indiana bat (E), northern long-eared bat (T), eastern prairie fringed orchid (T), eastern massasauga (T), bald eagle (SC)
WILLIAMS	Indiana bat (E), northern long-eared bat (T), clubshell (E), northern riffleshell (E), rayed bean (E), white cat's paw pearly mussel (E), rabbitsfoot (T/CH), copperbelly water snake (T), bald eagle (SC)
WOOD	Indiana bat (E), northern long-eared bat (T), bald eagle (SC)
WYANDOT	Indiana bat (E), northern long-eared bat (T), rayed bean (E), eastern massasauga (T), bald eagle (SC)

**IMPORTANT NOTE:** This list reflects data available as of April 2018, and will change as new data become available. For this reason, searches for listed species should not necessarily be limited to the counties noted above. Any decisions in that regard should be made only after calling the USFWS (614/416-8993) for guidance.

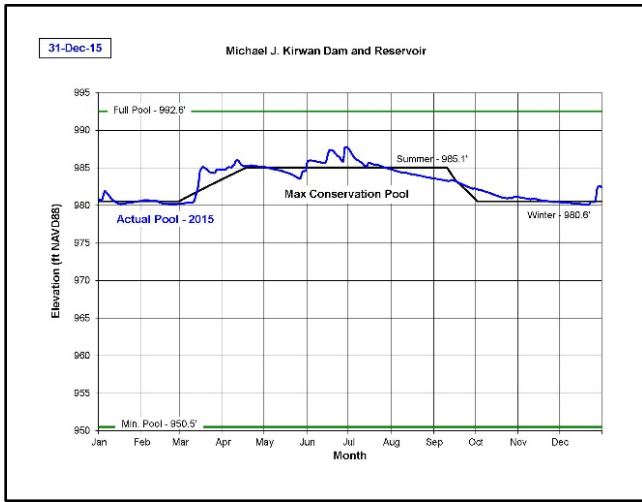
E = Endangered            SC = Species of Concern  
T = Threatened            CH = Critical Habitat  
C = Candidate             P = Proposed (T/E/CH)

## APPENDIX B - Reservoir Plots

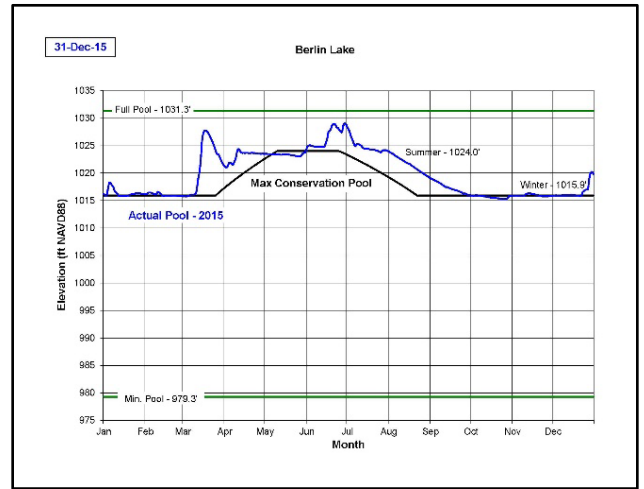
DRAFT



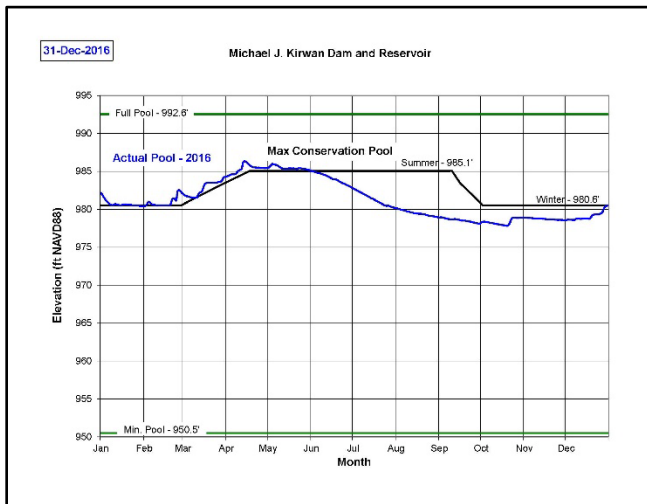
Michael J. Kirwan 2015 Reservoir Plot



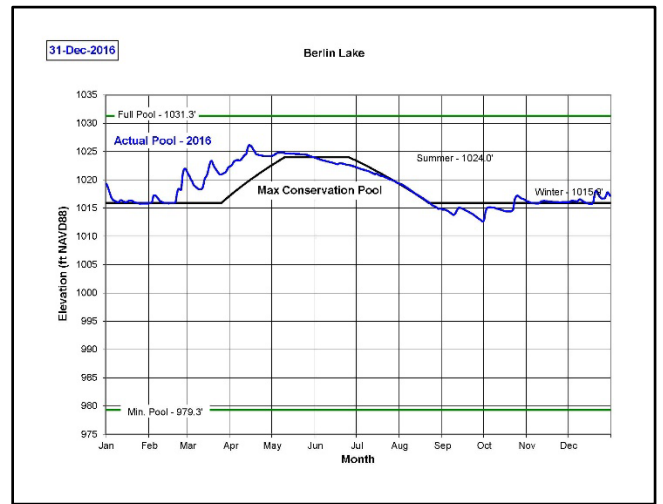
Berlin Lake 2015 Reservoir Plot



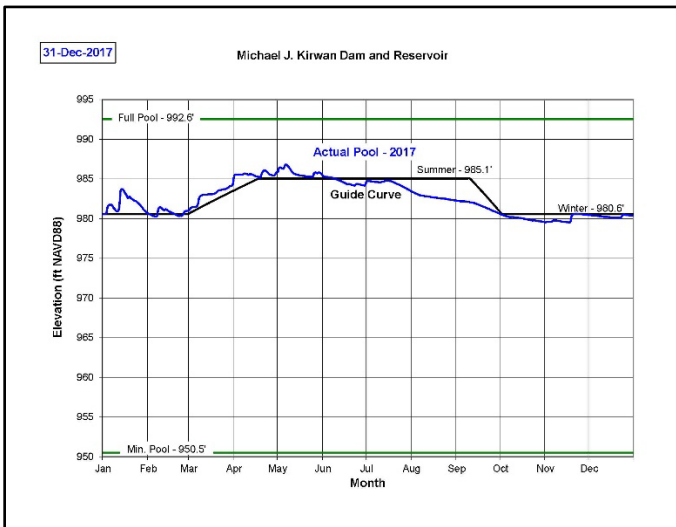
Michael J. Kirwan 2016 Reservoir Plot



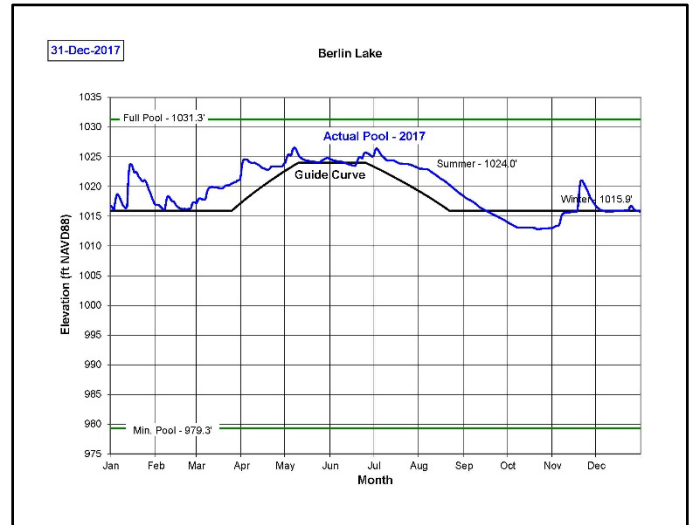
Berlin Lake 2016 Reservoir Plot



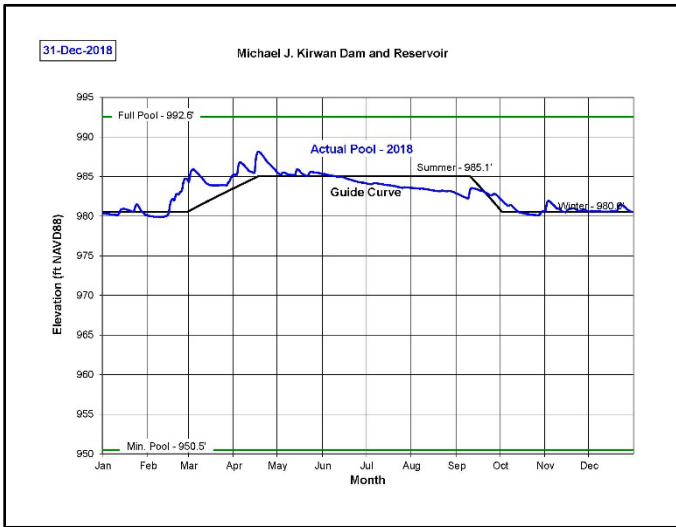
Michael J. Kirwan 2017 Reservoir Plot



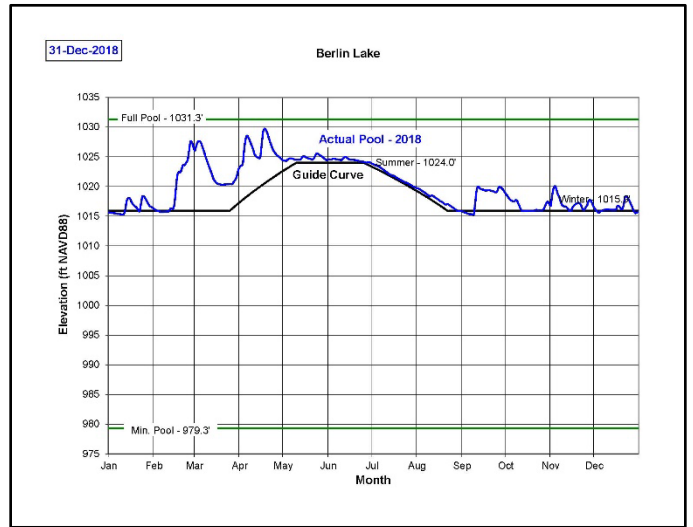
Berlin Lake 2017 Reservoir Plot



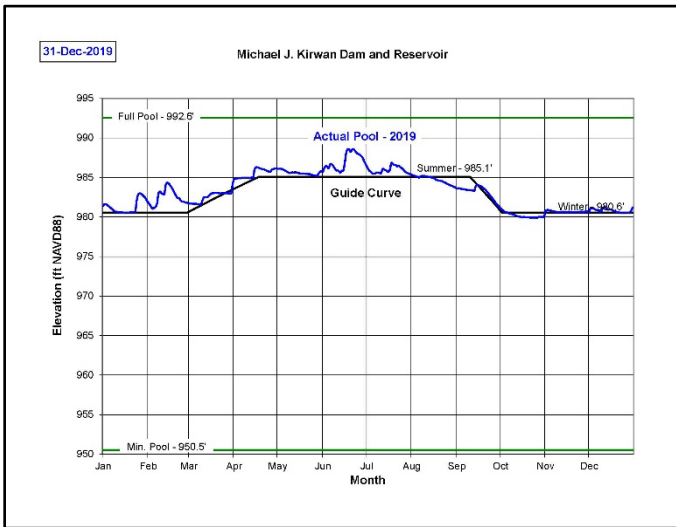
### Michael J. Kirwan 2018 Reservoir Plot



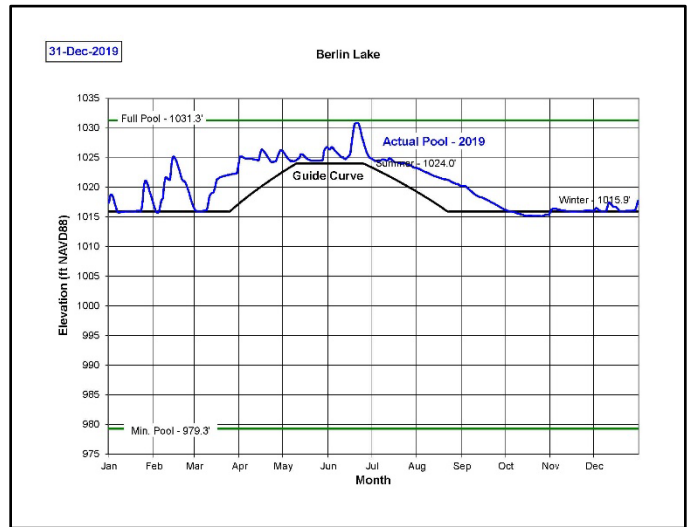
### Berlin Lake 2018 Reservoir Plot



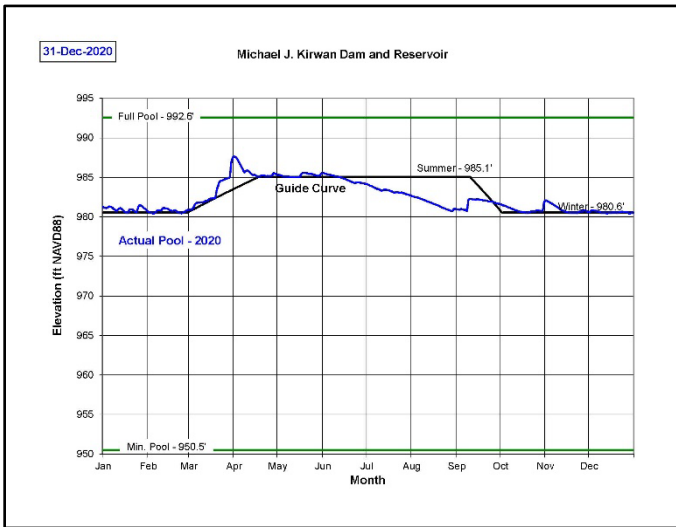
### Michael J. Kirwan 2019 Reservoir Plot



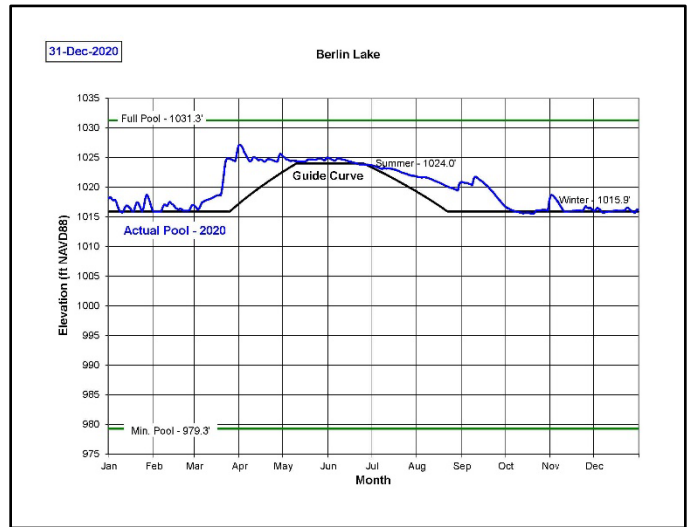
### Berlin Lake 2019 Reservoir Plot



### Michael J. Kirwan 2020 Reservoir Plot



### Berlin Lake 2020 Reservoir Plot



## APPENDIX C - Distribution List

DRAFT

The Pittsburgh District will send emails to elected officials, local, state, and Federal agencies, tribes, and interested citizens and parties announcing the project report's availability.

The Pittsburgh District will also send emails to all those who commented on the 2018 Berlin Lake Deviation request. A list of commenters can be found in Appendix A of final EA located at:

<https://www.lrp.usace.army.mil/Portals/72/docs/Recreation/Final%20EA%20and%20FO%20NSI%20Berlin%20Lake%20Deviation%20Request.pdf>

Those citizens or groups not having an email address will be sent a Notice of Availability letter that includes comment instructions and a link to the report's website.

### **Local agencies**

Trumbull County Soil and Water Conservation District

Trumbull County Planning Commission

Trumbull County MetroParks

Portage County Soil and Water Conservation District

Stark County Soil and Water Conservation District

Mahoning County Soil and Water Conservation District

Municipal Officials (Bazetta Township, Howland Township, City of Cortland, City of Warren, City of Youngstown, City of Newton Falls)

Trumbull County Commissioners

Mahoning Valley Sanitary District

City of Warren Water Operations

Stark County Commissioners

Trumbull County Engineers

Stark County Park District

Mahoning County District Board of Health

Ohio Development Services Agency

### **State agencies**

Ohio Environmental Protection Agency

US Army Corps of Engineers

Pittsburgh District

Mahoning River Basin Water Control Manual Updates Environmental Assessment

Ohio Department of Natural Resources

Ohio State Historic Preservation Office

Pennsylvania Department of Environmental Protection

**Federal agencies**

US Geological Survey

US Fish and Wildlife Service

US Department of Agriculture, Natural Resources Conservation Service

US Environmental Protection Agency

National Weather Service (National Oceanic and Atmospheric Administration)

**Tribes**

Absentee-Shawnee Tribe of Indians of Oklahoma

Delaware Nation of Oklahoma

Delaware Tribe of Indians

Forest County Potawatomi Community of Michigan

Hannahville Indian Community of Michigan

Little Traverse Bay Bands of Odawa Indians of Michigan

Miami Tribe of Oklahoma

Osage Nation

Ottawa Tribe of Oklahoma

Seneca Nation of Indians

Seneca-Cayuga Nation

Shawnee Tribe

Wyandotte Nation

Quapaw Nation

US Army Corps of Engineers

Pittsburgh District

Mahoning River Basin Water Control Manual Updates Environmental Assessment

## **Interested Parties**

Lake Milton Association

Friends of the Mahoning River

Berlin Lake Association

Berlin Yacht Club

Eastgate Regional Council of Governments

Dutch Harbor Marina

Les's Bait Shop

Spillway Marine

Youngstown State University

Riverview Golf Course

Mahoning River Adventures

Ravenna Boat Club

Mahoning County Pump Station

Cortland Conservation Club

## **Media**

The District will send a press release to regional and state-wide media outlets and will post information about the public review on the Berlin Lake, Michael J. Kirwan Reservoir, and Mosquito Creek Lake Facebook pages. Additionally, information about the public review will be posted on the District's homepage at: <https://www.lrp.usace.army.mil/>