



**US Army Corps
of Engineers**
Huntington District

EXECUTIVE SUMMARY

The Fifth Avenue Dam is located on the Olentangy River about two miles upstream of the mouth and just north of downtown Columbus, Ohio. The dam is immediately downstream of The Ohio State University campus and the pool created by the lowhead dam is considered an integral part of campus life for those who use it for crew purposes since it causes a lake-like effect for nearly two miles of the river upstream. The dam originally functioned as a source of cooling water for The Ohio State University power plant but has ceased to provide that function. In 1999, Ohio Environmental Protection Agency (OEPA) monitored upstream and downstream of the dam and found that biological and water quality standards were not being met. OEPA documented the Non-Attainment of the use designations along this portion of the Lower Olentangy River and cited factors that include a lack of good instream and riparian habitat and impacts of lowhead dams disrupting the free-flow of the river.

The proposed Detailed Project Report (DPR) will evaluate a number of alternatives to restore the ecosystem in the above identified area, ranging from complete removal of the dam to some level of modification of the structure along with possible bank stabilization, in-stream work and or other habitat restoration. The cost to prepare the DPR is estimated to be \$359 K and is expected to be complete in six months. The City of Columbus has provided a Letter of Intent and asked for the Corps of Engineers to partner with them in the removal and/or modification of the Fifth Avenue Lowhead dam and restoration of this portion of the Olentangy River. They have made this request under the Section 206 authority, therefore a Preliminary Restoration Plan (PRP) has been developed for the purpose of initiating the Section 206 process.



**US Army Corps
of Engineers**
Huntington District

SECTION 206
Preliminary Restoration Plan (PRP)
For The
**Fifth Avenue Dam Removal / Modification
Ecosystem Restoration Project
Columbus, OH**



January 2006

U.S. Army Corps of Engineers
Huntington District
Huntington, West Virginia

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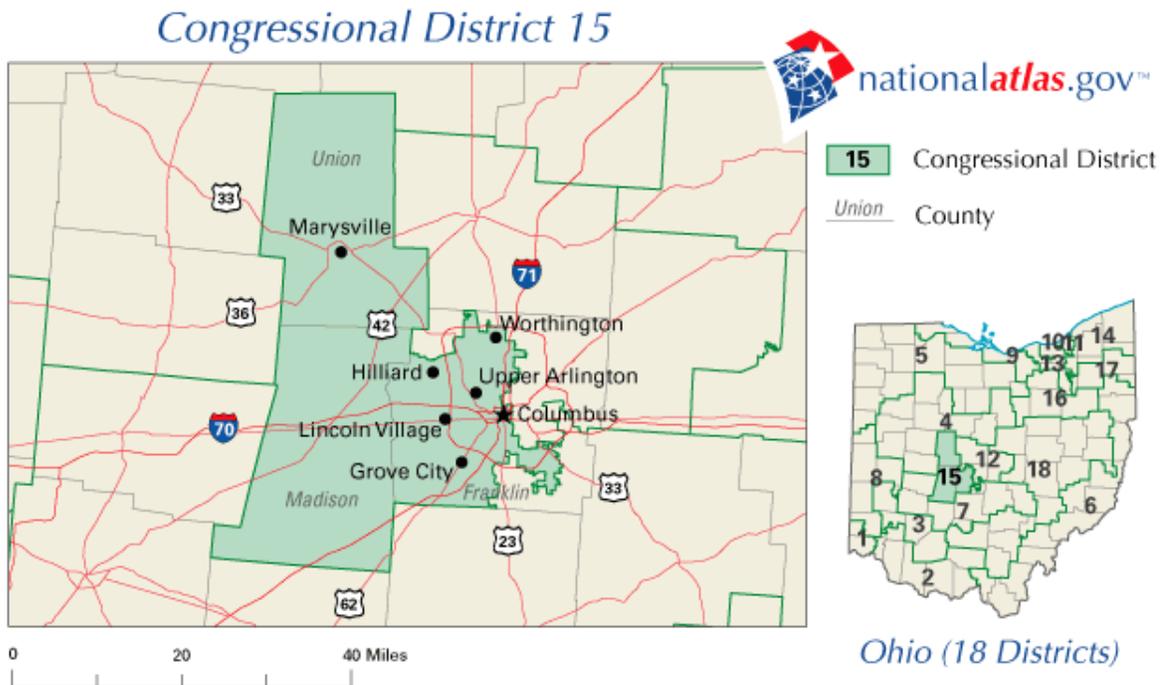
Date: January 27, 2006
Division: Great Lakes and Ohio River
District: Huntington

SECTION 206
PRELIMINARY RESTORATION PLAN (PRP)
FOR THE
**FIFTH AVE DAM REMOVAL / MODIFICATION
ECOSYSTEM RESTORATION PROJECT
COLUMBUS, OH**

1. PROJECT DATA

Name: Fifth Avenue Dam Removal / Modification, Columbus, OH.

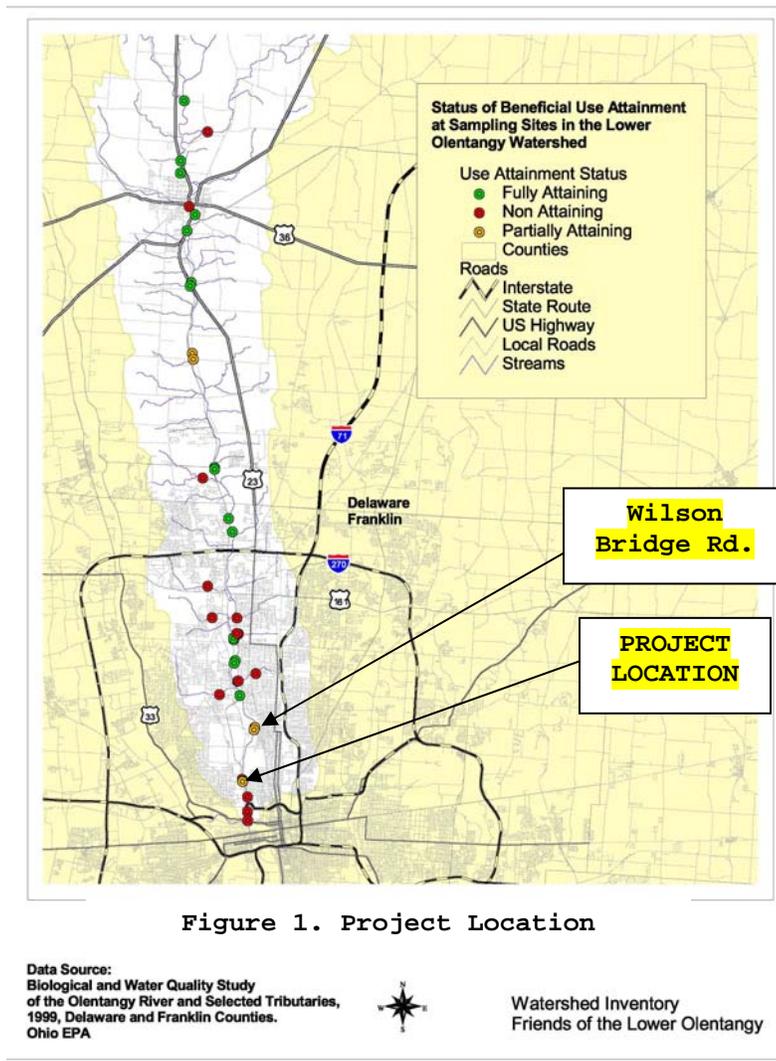
Congressional Delegation: Senators Dewine and Voinovich , Representative Pryce (Ohio 15th).



Authority: Section 206 (Aquatic Ecosystem Restoration) of the Water Resources Development Act (WRDA) of 1986, as amended, in support of fishery restoration and improving environmental quality.

2. LOCATION

The Fifth Avenue Dam is located on the Olentangy River just north of downtown Columbus, Ohio and immediately downstream of The Ohio State University campus. It is the largest of the twelve lowhead dams on the river and affects nearly two miles of the river upstream. The Fifth Avenue dam is located just two miles upstream of the confluence with the Scioto River. The entire Olentangy River watershed spans 6 counties and provides for a diverse habitat that includes mollusks, aquatic macroinvertebrates, migratory birds, beaver, otter, and raccoons. The Lower Olentangy River begins at the ACOE Delaware Dam in Delaware County and flows into the Scioto River in downtown Columbus. Twenty-two of the 32 miles of the Lower Olentangy River has been designated a State Scenic River by the Ohio Department of Natural Resources. The State designation ends at Wilson Bridge Road above the proposed project area. *See Figure 1.*



3. PROBLEM DESCRIPTION

The lowhead dam along Fifth Avenue was built in 1935 and originally functioned as a source of cooling water for The Ohio State University (OSU) Power Plant. The dam is no longer necessary for water supply to the power plant, due to increased efficiency of the plant and changes to environmental laws involving plants. Since the slack water created behind the dam has been in existence for over 70 years, this lake-like setting has become integral with the OSU Campus and is widely used by college and alumni crew teams for practice and recreation. The dam was modified in the 60's and currently is 470 feet wide and 8 feet high. Appendix A of this report contains excerpts from the Dam Safety Inspection Report performed by the Ohio Division of Water on 21 December 1999. The dam was visually inspected at that time and under the category of potential downstream hazard, the Fifth Ave Lowhead Dam was rated as *Class V. No Hazard To Structure Noted*. Although there were areas of concrete deterioration noted, the final dam safety classification remained unchanged and the structural integrity of the dam was not considered a threat to the downstream population (those at risk during a dam failure).

The effects of the lowhead dam are evident within the Olentangy River just upstream of where the dam is located. In 1999, Ohio EPA monitored upstream and downstream of the dam and found that biological and water quality standards were not being met. The reach of the river immediately upstream of the dam and adjacent to the OSU campus received the lowest habitat score (Index of Biological Integrity - IBI) at any point along the river. Ohio EPA documented the Non-Attainment of the use designations along this portion of the Lower Olentangy River and cited factors that include a lack of good instream and riparian habitat and impacts of lowhead dams disrupting the free-flow of the river. Over time, this stretch of river has been straightened, broadened, and deepened. During periods of low rainfall, this section of the Lower Olentangy River takes on the appearance of a stagnant, mud-bottom pond or lake rather than a free-flowing river.

The Fifth Avenue lowhead dam prevents the Lower Olentangy River from developing the natural riffle and pool sequence needed for high-quality fish and macroinvertebrate habitat found in natural, unimpaired river systems. Slow-moving water impounded behind this dam inhibits aerobic digestion of organic wastes from combined sewer outfalls and urban runoff.

4. DESCRIPTION OF PROPOSED PROJECT ALTERNATIVES

The purpose of this study is to identify potential dam modifications and/or removal scenarios as well alternatives that include habitat restoration (such as pool riffle sequences, the addition of vane dykes or boulder clusters, or other types of habitat areas found in a natural stream). The study will further evaluate both the positive and negative social, economic, and environmental (SEE) impacts associated with these alternatives.

For the purposes of preliminary cost estimation and scheduling funds and resources, the proposed project will consist of removal of the existing Fifth Avenue lowhead dam and restoration of this section of the Lower Olentangy River to a more free-flowing channel. Removing the dam should increase the diversity of fish and aquatic life, as well as eliminate dangerous undercurrents, that are a threat to canoeists and fishing enthusiasts. Dam removal would not only have a positive effect on water quality parameters such as dissolved oxygen and temperature regimes but could provide for the return of indigenous species. An additional benefit to the safety issue would be the cost savings on inspection, maintenance, rehabilitation and restoration required by keeping the dam in place. The project will provide ecological benefits to the Lower Olentangy River ecosystem by restoring the river to a more natural state. Important factors to be considered in removal of the dam include the type and amount of sediments trapped behind the dam, the effects on the floodplain and existing levees, and community support.

Other alternatives to be equally considered in the feasibility study along with the complete removal of the dam include cutting a notch(es) in the dam to allow more flow and aquatic life to pass safely through, building a by-pass channel, or possibly creating a rock ramp for fish passage. The formulation of the alternatives will include a thorough evaluation and characterization of the quantity and content of the sediments behind the dam and the nature of contaminants that may be found. This information is a critical first step in the process and may dictate the selected alternative. Also important in the formulation process is consideration of the recreational uses of the river. The men's and women's squads of The Ohio State Crew Club as well as the novice squad of The Ohio State Women's Crew currently practice in the flat water created by the lowhead dam. Removal of the dam is expected to eliminate the use of this section of the Olentangy River for rowing, which would displace an organization that has provided recreational access to the river for thousands of people for over twenty-five years. Public input will be an integral aspect of the study.

(a) Without Project Condition: The without project condition is represented by the currently degraded condition of the Olentangy river in the project area. This section of river is listed as one of the most biologically impaired sections of the Lower Olentangy. The future condition of the project area is not anticipated to change, and the dam would continue to negatively impact fish movement, water quality, and aquatic habitat. The Olentangy River in this section is currently not in attainment and is listed by the State of Ohio as an impaired water as per Section 303 (d) of the Clean Water Act. It has been cited as the poorest water quality in the entire lower river and can be expected to further degrade. Other factors contributing to the poor stream quality, aside from the impacts from impounding the stream, could be the presence of sewer outfalls, non-point run-off, pesticides, and/or herbicides. In effect, the pool and the entrapped sediments act as a sink for water-borne contaminants that are then reintroduced into the aquatic ecosystem food chain. A Total Maximum Daily Load (TMDL) study is currently underway to determine the water quality for the river and should be complete by early

2006. Once the TMDL is complete, a Federal mandate will go into place to ensure continuing degradation does not occur to the water quality of the river. Despite this anticipated regulatory change, the continued introduction of non-point materials and urban runoff will further degrade the aquatic habitat and the lack of upstream movement (due to the dam's continuing existence) of species will continue to limit diversity in the future condition.

(b) Major Project Features: The project would restore, enhance, and create habitat for indigenous aquatic species including fishes and other organisms by removing or altering the existing lowhead dam structure from the Olentangy River. The project could include complete removal of the dam and restoration of the banks and bed of the stream to facilitate a natural stream design. Restoration to a more natural stream will be designed in collaboration with faculty, staff, and students at The Ohio State University, the Ohio Department of Natural Resources, the Ohio EPA, and other relevant state and local agencies. Environmental enhancing features in the immediate area of the dam will be built and necessary bank and bed stabilization will be developed to augment the natural stream processes to complete the project. Additional studies and coordination with the local partners and regulatory agencies will be required to determine the extent and nature of the restoration components and to identify the need for bank stabilization both up and down stream of the dam to be removed. Additional restoration steps to be evaluated would include the removal of subsurface construction and manmade debris from the river channel affected by the dam modification or removal.

(c) Expected Ecosystem Changes: Removal of the existing dam structure will result in improved habitat, fisheries potential, and increased biotic integrity of the Lower Olentangy River ecosystem. Restoring the unimpounded flow regime and returning the river to a riffle and pool complex with more-natural sediment transport would result in increased biotic diversity through the creation of spawning grounds and other habitats niches.

Removing or notching the dam will also improve fish and mussel habitat, reduce stream temperature, restore the old river channel upstream to a more natural state, and improve fish and other aquatic species' access for approximately two miles to the upstream portions of the Lower Olentangy River watershed. Removal will also have localized benefits for resident species through recycling of structural stones into fish habitat at the site. Rock islands and/or subsurface rock piles will be considered to create habitat for adult and juvenile resident fish species and high quality substrate for aquatic macroinvertebrates. Rocky substrate is ideal for native species and some recreational fisheries.

Biotic diversity is expected to increase due to the increase in habitat diversity and modification of the river from impounded lacustrine habitat to a natural riffle run habitat. There would be an expected ecosystem shift from large mouth bass towards small mouth

bass. Improvement of the substrate to allow diversity and robustness of macroinvertebrates that would provide a food source for the small mouth bass population. Improvements to the aquatic habitat would be expected from modification or alteration of the dam to allow for movement of fish and other aquatic species through that reach of stream. Those benefits will be investigated during the feasibility study.

A major social benefit of this project will be the creation of a living laboratory for faculty and students at The Ohio State University as the restoration process proceeds. There is potential for many levels of involvement by university students during the development, construction, and long-term monitoring of the restoration features. There are over 1,700 dams in Ohio, the majority of which are lowhead dams. Many of these will need to be modified or removed for safety and environmental reasons, and the streams restored to a more natural condition. Public education and awareness of this highly visible project could have benefits to communities throughout Ohio and the surrounding region that may be facing modification or removal of lowhead dams and/or stream restoration projects. Incidental project benefits include increased fishing opportunities for the public, canoeing or boating along the roughly four-mile stretch of the Lower Olentangy River as it feeds into the Scioto River, and an improvement in the overall health of the riparian corridor due to a more natural flow regime mimicking high and low flows. The loss of current recreational rowing above the dam should be balanced against the assumed increases in recreational use under the dam removal/modification scenario. The impact on recreational uses will be assessed during the feasibility study and considered in the final decision.

(d) Outputs and Measurements: The river environment immediately located at the dam site and channel extending two miles upstream from the lowhead dam would receive the most direct physical impact from the proposed modifications. The upstream reach and the river channel will be converted from slow-moving, deeper pool habitat to free-flowing stream habitat. The most important regional effects would be indirect effects of the barrier removal, such as fish passage, restoration of the natural flow regime, and sediment transport. More than two miles of the Lower Olentangy River upstream of the dam would be opened to all fish and other aquatic species and a significant increase in biodiversity would be expected. Biological criteria utilized for the measurement of existing conditions and with and without future project conditions will incorporate the Aquatic Life Use Designation biological criterion of the Index of Biological Integrity (IBI) and Invertebrate Community Index (ICI).

(e) Significance of Outputs: The Lower Olentangy aquatic ecosystem has historically been impacted by habitat modification including damming of rivers, pollutant discharges, invasive species, and development. Each type of impact affects the diversity and health of the aquatic species that inhabit the ecosystem. By removing the Fifth Avenue lowhead dam, one of the many types of impacts will be eliminated, thereby increasing the free-flowing nature of the river. Direct environmental effects on the

riverine system will include improvement of physical water quality component regimes in addition to recreational uses and elimination of safety hazards.

(f) LERRD Issues: The proposed plan, consisting of removal of the existing lowhead dam and restoration of the Lower Olentangy River original channel and flow characteristics, requires the non-Federal sponsor to provide lands, easements, and rights-of-way, relocations and disposal areas (LERRDs). The dam removals will require only temporary work area and access road easements. It is contemplated that only temporary work area easements would be needed to conduct the work. At this stage of the study it is assumed that the restoration of flow to the existing river channel will not require construction of permanent structures or permanent changes to the channel except to increase aquatic habitat diversity. The exact real estate requirements for any structures or channel changes will be determined during the DPR. At this time no disposal area needs have been defined. If changes to the dam expose unexpected construction debris or other manmade features, these will be addressed through the channel restoration.

During the DPR, detailed information on the Project's real estate requirements (applicable estates), determination of the non-Federal-sponsor's legal and financial capabilities, preparation of a real estate cost estimate based on a gross appraisal, and creation of a Real Estate Plan for the decision document will be accomplished.

(g) Relationship of the Proposed Project to Other Activities: The West Columbus Floodwall project is essentially complete. This flood wall provides flood protection to the Franklinton area of downtown Columbus and is about seven miles in length. A detailed hydraulic analysis will be performed to quantify the impacts to the modified floodplain both up and downstream of the dam.

(h) Alternatives Considered: The purpose of this study is to identify potential dam modifications and/or removal scenarios as well as stream restoration components and evaluate the positive and negative social, economic, and environmental (SEE) impacts associated with these alternatives. The feasibility study will evaluate the cost-benefit for all alternatives and combination of alternatives. The alternatives considered in the project consist of the following:

(1) No Action. The No Action alternative would not modify the existing lowhead dam. This alternative assumes that no safety improvements or upgrades will be implemented, unless dictated by dam safety inspections. Under this condition, it can be expected that the quality of the aquatic habitat in this area will continue to degrade over time.

(2) Removal of Dam. This alternative would include the complete removal of the lowhead dam from the Olentangy River. This structure

currently provides only recreational usage of the flat water behind the dam and no longer serves the purpose for which it was built.

(3) Modification of Dam. This alternative would include a modification to the existing lowhead dam. This modification could be:

- a notch or several notches in the dam,
- addition of fish ladders,
- addition of a by-pass channel for fish and possibly portage, and/or
- other modifications that would result in an improvement to the aquatic habitat.

(4) Rock Ramp. This alternative would consider the placement of appropriately graded rocks on the downstream face of the dam to allow for fish passage.

(5) Instream Features. These features would include adding small structures to the stream, such as root wads, vane dykes, boulder clusters, and riffle pool sequences. These restoration components would be used in combination with other alternatives for modification/removal of the dam as listed above.

(6) Enhancement of Riparian Habitat. Planting bottomland hardwoods and other appropriate measures would be considered with bank stabilization and combined with other alternatives as listed above.

(i) Basis for Schedule and Cost of the Proposed Project: Based on the existing information, the proposed project for the purpose of programming for schedule and costs will be based on the removal of the dam. The dam removal scenario represents the maximum cost and construction period of the alternatives considered and therefore defines an upper limit to the cost and schedule period for budgeting purposes. This information has been developed to allow for proper planning of the funds and resources but does not mean the final outcome of the feasibility has been pre-determined. All reasonable solutions to improving the ecosystem in this reach of the Lower Olentangy River will be considered and treated equally in the feasibility study. This concept is supported by the Sponsor and the advisory group. While the dam removal alternative most likely will provide the greatest benefits to the river ecosystem and would restore the river to a more natural state, it would likely be the most costly of the aforementioned alternatives. A more detailed analysis of all the alternatives and any other reasonable alternatives will be completed during the feasibility phase.

5. VIEWS OF THE SPONSOR

The City of Columbus, Director of Public Utilities, initially requested assistance in a letter dated August 5, 2001, under Section 206 of the Water Resources Development Act (WRDA) of 1986, as amended, from the U.S. Army Corps of Engineers (USACE) for improving environmental quality and fisheries restoration in the Olentangy River. The City indicated a willingness to act as the non-Federal sponsor of an ecosystem restoration project within the river. The letter indicated that the City would be willing to cost share the project and provide all lands, easements, rights-of-way, and relocations necessary for construction, operation, and maintenance of the project. In addition, the sponsor formed a steering committee to discuss the aspects of such a project and held a public meeting on the topic in 2003. After review of the draft PRP, the local sponsor reconfirmed their interest in a January 12, 2006 letter which is included in Appendix B.

6. VIEWS OF FEDERAL, STATE, AND REGIONAL AGENCIES

The Ohio Department of Natural Resources (ODNR) has identified the Olentangy River from the headwaters to Wilson Bridge Road as a State Scenic River. ODNR has also expressed an interest in removing all the dams (six) along the Lower Olentangy River in Delaware County in order to restore the degraded river to its original condition. One of the six original dams (formerly the Dennison dam) was removed by the ODNR in late 2002. The USFWS has expressed interest in dam removal projects in other locations, especially the restoration of the waterway to its original channel and the removal of the dams to allow for fish passage and to improve aquatic habitat.

Due to the significance of the Olentangy and its tributaries, the Ohio EPA has prioritized the TMDL sampling and analysis to occur in 2005-2006. Ohio EPA also cites hydromodification as the leading source of impairment to Ohio's river and streams. Hydromodification is a threat because it causes siltation and sedimentation. The soil that is supposed to be on the land is washed into the water, clouding it with suspended particles, and reducing the amount of dissolved oxygen in the water available for fish and insects.

A local organization called the Friends of the Lower Olentangy Watershed (FLOW) is actively pursuing improvements in the watershed. The main goal of this group is to create a watershed action plan and a community-based movement, involving all affected parties, to implement strategies that will protect or improve water quality and increase the recreational value of the Lower Olentangy River. The group completed a draft plan in 2003. The specific recommendation for lowhead dams is removal where feasible and desirable or if infeasible, modification of the structures to provide for fish ladders and boat chutes. The goal for the Fifth Avenue lowhead dam as cited from *The Lower Olentangy Watershed Action Plan in 2003* is to "improve the habitat and water

quality of the impounded area above the Fifth Avenue Dam in order to meet use designation criteria.”

7. ENVIRONMENTAL COMPLIANCE REQUIREMENTS

National Environmental Policy Act (NEPA) documentation has not been initiated. An Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) or other appropriate NEPA documentation will be completed during the feasibility phase. Since the proposed project involves a structure modification or removal in a regulated water body, a permit pursuant to the Ohio 401 Water Quality Certification will be obtained.

A review of the *Lower Olentangy River Watershed Inventory, April 2002*, identified numerous species of plants, animals, insects and amphibians that are listed as State Endangered or Federally listed Threatened and Endangered Species. The list was refined to show only those species with similar habitat requirements to those found immediately upstream of the project area (Table 1). Due to the limited extent of the project area, the developed nature of the site, and the scarcity of the habitat requirements of the species, it is unlikely that the following rare species will be found within the project area.

Impacts to these protected species are not expected to result from implementation of the Recommended Plan. Additional coordination and analysis to identify potential impacts to protected plant and animal species will be conducted in the feasibility phase.

Table 1. List of State Endangered or Federally Listed Threatened and Endangered Species Having the Potential to be Found in the Project Area.

Northern Brook Lamprey	<i>Ichthyomyzon fossor</i>	Endangered
Snuffbox	<i>Epioblasma triquetra</i>	Endangered
Bluebreast Darter	<i>Etheostoma camurum</i>	Threatened
Rayed Bean	<i>Villosa fabalis</i>	Endangered
Spotted Darter	<i>Etheostoma maculatum</i>	Endangered
Mollusk Bed (Wavy- Rayed Lampmussel)	<i>Lampsilis faciola</i>	Special Interest

8. COSTS AND BENEFITS

The primary benefit resulting from dam removal / alteration is increase of habitat diversity as well as the restoration of natural fish and other aquatic species movement throughout the river. This would allow fishes to migrate to upstream spawning habitat as well as allow for instream movement of fishes for foraging.

Table 2 provides an estimated summary of the potential benefits using the biological criteria established with known ICI scores. The size of each habitat type listed is estimated in acres assuming an average river width of 225 feet and approximately four river miles (two miles below the dam and two miles above the dam) to be made accessible to fish from the lower river. Quality was estimated on a scale of 0 to 36 with 0 being of no habitat value and 36 representing the threshold of Warm Water Designation by Ohio EPA. The importance of each habitat was estimated based on a scale of 1 to 5, with common habitat being of low importance and rare or habitat at risk being of high importance. Ecosystem value units are the product of acreage, quality, and importance. Other project alternatives such as modification of the dam would also produce positive benefits but on a lesser scale. These benefits will be determined for each of the alternatives studied during the feasibility.

Table 2. Estimated Benefits of Dam Removal (Furry Method)

Habitat Type	Stream Bottom Habitat Acres	Quality - ICI (0-36)	Importance (1 to 5)	Standard Output Unit
Without Project Retained Stream	54.5	12	2	1,308
With Project Free Stream	109	28	3	9,156
Potential Net Benefits				7,848 units

The benefits described in Table 2 have a high probability of being achieved if the project is implemented. Movement past the dam is possible under some conditions by some fish but most fish and mussels are believed to be restricted by the dams. Other benefits would also occur in the vicinity of the dam removal as habitat is restored above and below the structure and along the riparian corridor. These benefits are not recorded in Table 2 as they would be highly dependant upon site-specific project details not yet formulated.

The total estimated cost to implement the removal of the dam is \$2,399,380 including \$1,452,000 for the demolition and removal of approximately 2,500 cubic yards of concrete, removal of any sheet pile exposed by removal of the dam, and the dredging of sediment and its removal; an estimated \$400,000 for bank stabilization and aquatic restoration components including habitat augmentation. Real estate costs (LERRD) are

\$20,000, including \$15,000 for administrative activities. The cost share for the project is 65% Federal and 35% non-Federal. See Table 3 for a breakdown of the total project cost. Project costs for the other alternatives and combinations of alternatives will be developed during the feasibility phase.

The feasibility study will determine the recommended plan which will be the alternative that produces the greatest net outputs, is socially and environmentally acceptable, and fulfills the intent of the Section 206 requirements.

9. FUTURE OPERATIONS AND MAINTENANCE

Future operations and maintenance of the project are expected to be minimal and would require inspection of bank stabilization, instream features, and annual biological monitoring. Restoration components typically have low to no maintenance requirements. The estimated inspections (annual) and biological monitoring (four times per year) costs are anticipated to be \$7,000 per year for the first five years. Inspection and monitoring be performed annually thereafter for the life of the project at \$2,000 per year. All O&M costs will be borne by the non-Federal sponsor.

10. SCHEDULE AND COST

The following schedule assumes that the feasibility phase will begin in January 2006. (See attached schedule at end of report for all activities). Tables 3, 4, and 5 demonstrate the major milestones for the project and a breakdown of the Federal and Non-Federal costs, respectively.

Table 3. Project Schedule / Major Milestones

Description	Duration	Completion Date
Complete PRP	3 Months	January 2006
LRD Review/Approval/Funding	1 Month	March 2006
Detailed Project Report (DPR)	6 Months	September 2006
Project Cooperation Agreement (PCA)	2 Months	October 2006
Real Estate Acquisition & Certification	6 Months	April 2007
Construction	4 Months	August 2007
TOTAL	22 Months	August 2007

Table 4. Project Costs for Programming Future Funds

All costs shown in \$1000s.				Fed Funding Needs	
	Totals	Non-Fed	Fed	FY 06	FY 07
Report	\$359		\$359	\$359	
P&S			\$150		\$150
Implementation		\$830	\$991		\$991
TOTALS	\$359	\$830	\$1,500	\$359	\$1,141

Note: Report and Plans and Specifications are initially federally financed, and costs distributed as part of the non-Federal share of project costs during implementation.

Table 5. Non-Federal Requirements

	Cost in \$1000s.
LERRD	\$20*
CASH	\$810
WORK IN KIND	NONE
OMRR&R	\$7

** LERRD includes \$15,000 in non-federal administrative costs. Federal real estate costs are included in the implementation costs and are estimated at \$5,000.*

11. SUPPLEMENTAL INFORMATION

Detailed Hazardous, Toxic, and Radiological Waste (HTRW) studies are incorporated in the initial phase of the feasibility study. Should HTRW exist in the sediments adjacent to the dam site, cleanup of the site would be the responsibility of the local sponsor. Due to the expense of this type of clean-up, the project could become cost-prohibitive.

Care would be required during dam removal / modification to assure that sediments trapped behind the dam would not adversely affect the area downstream. This may mean that the removal of the dam may need to occur in a way such that the sediments, if allowed to transport downstream naturally, are not released all at once. Once the quantity and character of the sediments are determined, the timing of the release of these sediments or the removal of a portion of the sediments can be incorporated into the removal/modification alternatives. The Olentangy is a tributary of the Scioto River and intersects approximately two miles downstream of the Fifth Avenue dam location.

12. REFERENCES

American Rivers. 2002. The Ecology of Dam Removal, A Summary of Benefits and Impacts. Washington, DC.

Bednarek, A. 2001. Undamming Rivers: A Review of the Ecological Impacts of Dam Removal. University of Pennsylvania, Philadelphia, Pennsylvania.
Environmental Management 27(6):803-814

Dam Removal: Science and Decision Making. 2002. The H. John Heinz Center for Science, Economics, and the Environment. Washington, DC.

Ohio EPA. 2001. Biological and Water Quality Study of the Olentangy River and Selected Tributaries, 1999, Delaware and Franklin Counties, Ohio.

The Lower Olentangy Watershed Action Plan in 2003 Draft: Strategies for Protecting & Improving Water Quality and Recreational Use of the Olentangy River and Tributary Streams in Delaware and Franklin Counties. Columbus, OH.

Trout Unlimited. 2001. Small Dam Removal, A Review of Potential Economic Benefits. Arlington, VA.

APPENDIX A – DAM SAFETY REPORT



DAM SAFETY INSPECTION REPORT



Fifth Avenue Low Head Dam
Class III
Franklin County, City of Columbus
File Number: 9730-033
Inspection Date: 12-21-99

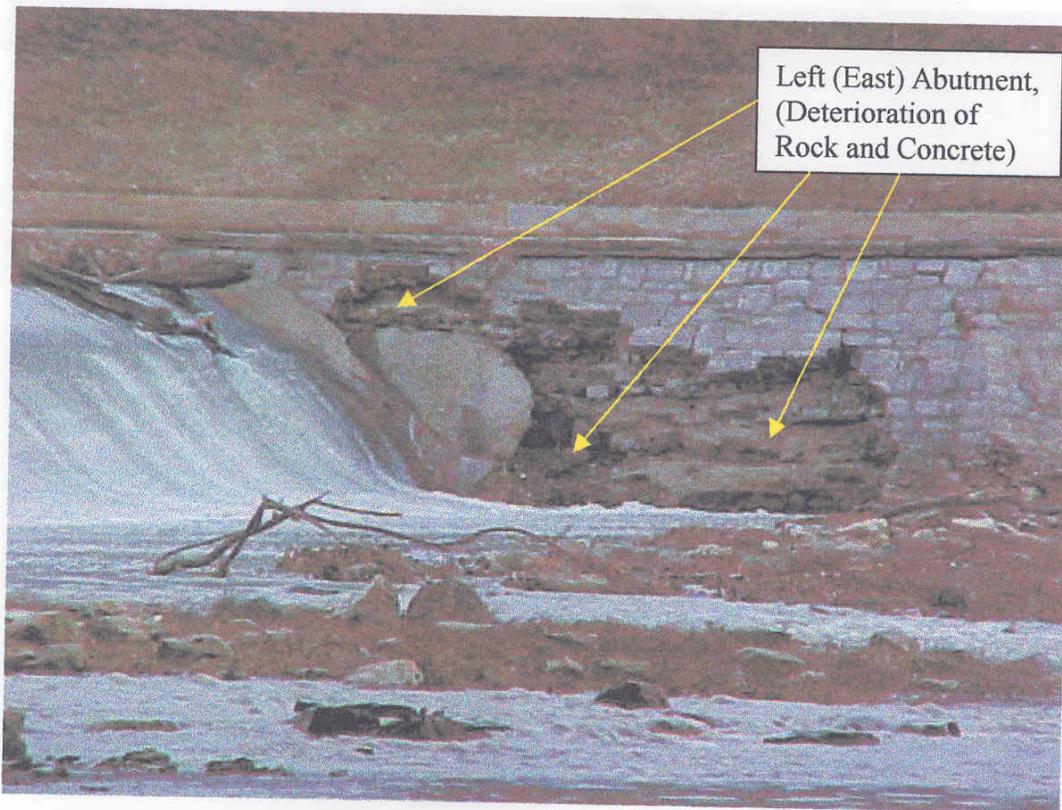


In accordance with Ohio Revised Code Section 1521.062, the owners of dams must monitor, maintain and operate their dams safely. Negligence of owners in fulfilling these responsibilities can lead to the development of extremely hazardous conditions to downstream residents and properties. In the event of a dam failure, owners can be subject to liability claims.

The Division of Water, Dam Safety Engineering Program, has the responsibility to ensure that human life, health and property are protected from the catastrophic failure of dams. Conducting periodic safety inspections and working with dam owners to maintain and improve the overall condition of Ohio dams are vital aspects of achieving this purpose.

This inspection was conducted to evaluate the condition of the dam and its appurtenances under authority of Section 1521.062 of the Ohio Revised Code. In accordance with Ohio Administrative Code Rule 1501:21-21-03, the owners of dams must implement all remedial measures listed in the enclosed report.

Photographs



Division of Water

James R. Morris • Chief

**DIVISION OF WATER
SITE VISIT MEMORANDUM
FIFTH AVENUE LOW HEAD DAM
FILE NUMBER: 9730-033**

LOCATION: Franklin County, City of Columbus

DATE: Tuesday, December 21, 1999

TIME: 11:00 a.m.

INSPECTORS: Peter George, P.E., Senior Project Engineer
Matthew Buttrum, Civilian Conservation Corps. Member

OTHERS PRESENT: Robert L. Ellinger, Sewer Maintenance Manager

SITE CONDITIONS: It was overcast and about 25 degrees Fahrenheit. The ground surface was dry.

PHOTOGRAPHS: Digital photographs were taken and are on file at this office.

INSPECTION PURPOSE AND AUTHORITY:

This inspection was conducted under the provisions of Section 1521.062 of the Ohio Revised Code to evaluate the condition of the dam and its appurtenances.

DESCRIPTION:

According to design drawings and information from Mr. Ellinger, the Fifth Avenue Low Head Dam was designed by Franklin County Relief Administration, Office of Works Division, and constructed in 1935. The low-head dam is located on the Olentangy River approximately 350 feet north of East Fifth Avenue in Columbus, Ohio. The original arch-shaped ogee weir was 6.5 feet in height and approximately 470.0 feet in length. The low head was constructed of concrete with a sheet-piling cutoff at the downstream apron. Then in 1964, Rackoff Assoc., Engineers designed an additional raising of the dam with concrete that was 1.5 feet in height. It was added to the upstream portion of the ogee weir and retained the original shape. The present height of the dam is 8.0 feet with an overall length of approximately 458.0 feet. The low-head dam extends the width of the Olentangy River and has no means of a draw-down system. The right (west) and the left (east) abutment walls were constructed of concrete and stone.

Mission: To ensure a balance between wise use and protection of our natural resources for the benefit of all.

Required Remedial Measures

The requirements listed below are based on observations made during this inspection, calculations performed following the inspection, and requirements of the Ohio Administrative Code (OAC). A site visit memorandum noting all observations made during the inspection has been enclosed in Section 3. References to right and left in this report are oriented as if you were standing on the dam crest and looking downstream.

Investigations and Repairs: The owner must retain the services of a professional engineer to address the following items. Plans, specifications, investigative reports, and other supporting documentation, as necessary, must be submitted to the Division of Water for review and approval prior to construction. The owner must complete these items and implement all engineered plans for improvement within 5 years unless otherwise stated. A record of all repairs should be included in the operation, maintenance and inspection manual.

1. Investigate and prepare plans and specifications for the repair of the left (east) abutment wall. The abutment wall must be monitored until repairs can be made. See the "Embankment Instabilities" fact sheet included in this section for guidance in monitoring this condition and for additional information.

Maintenance & Operation: The owner must address the following items. Maintenance already performed should be continued and other items attended to as noted. All current maintenance and operation procedures and those listed below should be included in the operation, maintenance and inspection manual.

1. Keep the dam clear of obstructions by removing dead trees and other debris that become lodged on or near the dam.

Monitoring: The owner/operator must monitor the following items and record all observations. A rapidly changing condition may be an indication of a potentially dangerous problem, and the Dam Safety Engineering Program should be contacted immediately at 614/265-6731 during business hours or at 614/799-9538 after business hours.

1. Monitor the deterioration of the right (west) abutment wall for further deterioration and/or undermining. Please note that repairs may be needed if this problem worsens.


Peter George, P.E. *March 27, 2000*
Senior Project Engineer Date
Dam Safety Engineering Program
Division of Water

APPENDIX B – LETTER OF INTENT



City of Columbus
Mayor Michael B. Coleman

Department of Public Utilities

Cheryl Roberto, Director

January 12, 2006

Colonel William E. Bulen
U.S. Army Corps of Engineers
Huntington District
502 8th Street
Huntington, WV 25701-2070

Dear Colonel Bulen:

In accordance with the provisions of Section 206 of the Water Resources Development Act of 1996, which authorizes the Federal government to carry out aquatic ecosystem restoration and protection projects to improve the quality of the environment; the City of Columbus, Department of Public Utilities, makes formal application for a study/evaluation of the modification and/or removal of the Fifth Avenue low head dam on the Olentangy River and restoration of the adjacent riparian area.

The low head dam located near the Fifth Avenue Bridge has converted nearly a two-mile reach of the Olentangy River into a lake system and reduced available in-stream habitat. The structure prevents fish and other organisms from migrating up and down river as well as decreases the ability of the river to assimilate organic wastes from combined sewer overflows, urban runoff and wastewater treatment plant effluent. There are also similar effects directly downstream of the dam which have been documented by the Ohio Environmental Protection Agency (OEPA).

The Department of Public Utilities has been working with the Friends of the Lower Olentangy Watershed (FLOW) and The Ohio State University to shape this project. This study/project is not being undertaken as a result of any Federal mandates. Throughout the course of the project the Department will continue to solicit input from the community, the Ohio Environmental Protection Agency and other stakeholders in the planning and design of this project.

As the non-Federal sponsor, the Department of Public Utilities understands that the investigation will result in the preparation of an Ecosystem Restoration Report, the cost of which will be shared between the Department and the Corps of Engineers. The City of Columbus, Department of Public Utilities, further understands that it must provide 35 percent of the entire project cost including the cost for the study and that the non-Federal sponsor may provide its entire share as in-kind services.

Utilities Complex	910 Dublin Road	Columbus, Ohio 43215	
Director's Office	614/645-6141	FAX: 614/645-8019	TDD: 614/645-6454
Sewerage and Drainage Division	614/645-7175	FAX: 614/645-3801	TDD: 614/645-6338
Water Division	614/645-7020	FAX: 614/645-8177	TDD: 614/645-7188
Electricity Division	3500 Indianola Avenue	Columbus, Ohio 43214	
	614/645-8371	FAX: 614/645-7830	TDD: 614/645-6454

The City of Columbus is an Equal Opportunity Employer

Letter to Colonel Bulen
January 12, 2006
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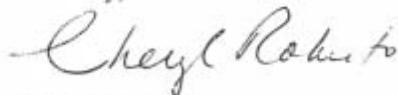
The City of Columbus can provide the following local cooperation and participation should the project move forward:

1. Provide without cost to the United States all lands, easements, rights-of-way, relocations, and disposal (LERRD), as determined by the Federal government to be necessary for the construction of the project. The value of LERRD will be included in the total project costs and credited towards the sponsor's share of projects costs, as defined in the project cooperation agreement.
2. Subject to City Council approval and further appropriation, assume responsibility for all costs in excess of the Federal cost limitation of \$5 million.
3. Ensure maintenance and repair of the project during the useful life of the works as required to serve the project's intended purpose, with no additional cost to the Federal government.
4. If the value of the sponsor's contribution above does not exceed 35 percent of the project cost, provide a cash contribution to make the sponsor's total contributions equal to 35 percent.

The Department is aware that this letter constitutes an expression of intent and not a contractual obligation. Any contractual obligation by the Department of Public Utilities is subject to the review and approval of the City of Columbus City Council.

Please address any questions concerning this project to Frances Beasley, Assistant Director, at 614-645-7117.

Sincerely,



Cheryl Roberto
Director

CR:sls

cc: Frances Beasley, Assistant Director, Dept. of Public Utilities