

hardlines design company

4608 indianola avenue columbus, ohio 43214 tel. 614.784.8733 fax. 614.784.9336 web. www.hardlinesdesign.com

architecture * cultural resources management * planning

INVENTORY AND EVALUATION OF NINE LOW-HEAD DAMS

MAHONING RIVER, MAHONING AND TRUMBULL
COUNTIES, OHIO

March 16, 2004

**Inventory and Evaluation of Nine Low-Head Dams
Mahoning River, Mahoning and Trumbull Counties, Ohio**

Submitted By:

Hardlines Design Company
4608 Indianola Avenue
Columbus, Ohio 43214
(614) 784-8733

Contributors:

Historian and Project Manager: Roy A. Hampton III
Editor: Susan Maughlin

Submitted To:

U. S. Army Corps of Engineers
Pittsburgh District
Moorhead Federal Building
1000 Liberty Avenue
Pittsburgh, Pennsylvania 15222-4186
(412) 395-7205

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INTRODUCTION

This report has been prepared by Hardlines Design Company (HDC) of Columbus, Ohio, as part of an inventory and National Register of Historic Places evaluation of nine low-head dams on the Mahoning River in the Youngstown and Warren, Ohio, vicinities. The project team consisted of Roy A. Hampton III (Historian and Project Manager), and Susan Maughlin, Editor. The survey and concluding report will assist the Pittsburgh District Army Corps of Engineers in complying with the National Historic Preservation Act, as amended, and the Archeological Resources Protection Act, as amended. The firm conducted the work under the terms of U.S. Army Corps of Engineers contract number DACW59-02-D-0001, and under the guidance of Executive Order 11593 and Section 106 and 110(a) of the National Historic Preservation Act, as amended. This report, developed through field surveys, documentary research, and literature review, was conducted from February through March 2004. It assesses the architectural/engineering, and any federal, state, or local historical significance of nine low-head dams on the Mahoning River in the vicinity of Youngstown and Warren, Ohio. The dams are privately owned but may be affected by projects to restore portions of the river through dam removal and environmental dredging. These efforts involve federal funds and permits.

It has been established that eight of the nine dams are over fifty years old, making it possible that the eight structures could be eligible for the National Register under the regular criteria A, B, C, and D. The current evaluation was necessitated by the possibility that some of the dams could be altered or removed as a result of the environmental dredging project. If a structure is eligible for the National Register, action must be taken to avoid adverse effects to the structure, or to mitigate any adverse effect that the proposed expenditure of federal funds would have on the historic character of the property.

This report provides a brief economic and political history of the area and describes how the development of water resources in Youngstown contributed to the growth of the area as a center of industry.

Based on the information gathered in the survey, HDC recommends that three of the dams are eligible for the National Register.

SUMMARY OF RESULTS

None of the nine dams were listed on the National Register or had been officially determined eligible in past studies. Three of the nine dams inventoried were recommended as eligible for the National Register as part of this study. All of the other dams were recommended as non-eligible because they lacked historic and architectural/engineering significance, and in many cases had a low level of material integrity and integrity of setting. The majority of the dams were conventional concrete weirs built in a straight line or with a V-shaped profile. Three of the dams were piles of rocks, concrete fragments, gravel, slag, and earth that were strewn across the river

to form crude weirs. One of the dams was a timber crib arch dam, and one was a concrete weir attached to the piers of a now-defunct coke trestle. Two dams were associated with nineteenth-century grist mills and sawmills, five were associated with the early twentieth-century steel industry, one was associated with late-nineteenth and early-twentieth century water utilities and hydroelectric power, and one was associated with late twentieth-century industrial infrastructure.

Overall, it was reasoned that four out of the five dams associated with the steel industry were not eligible for the National Register. All of these dams were either common concrete weirs or crude weirs composed of rocks and concrete fragments. Most were once located in or adjacent to large steel plants that have now been wholly or partially demolished. The oldest and most intact of these dams is the Ohio Iron & Steel Company Dam at Lowellville (ca. 1908-1915), which was recommended as eligible as the most intact example of an early twentieth-century steel-mill dam on the Mahoning River in the Warren-Youngstown area. Although the other four dams related to steel mills are remnants of Youngstown's twentieth-century steel industry, these small dams played a modest role in the operation of the steel plants, and the physical context that gave the dams meaning, the steel plants themselves, have in many cases disappeared. Many of these dams are also in obscure locations and some appear to have been altered. At least one of these dams appeared to be a ruin of an earlier structure.

Of the two dams associated with nineteenth-century water-powered mills, the Baldwin Mills Dam appeared to be a pile of rocks and concrete fragments that dates to the twentieth century. The material appeared to be located on the site of the original nineteenth-century mill dam, but it did not resemble early descriptions and maps of this dam. The second mill dam was located in Girard, Trumbull County, and appeared to be a fairly intact timber-crib arch dam with a poured-concrete cap, a cut-sandstone abutment, and a nineteenth-century cut-stone embankment that corresponds with the location of an old navigation lock wall on a real-estate parcel map. This highly significant site was recommended as eligible for the National Register because of the wealth of remaining nineteenth-century cut-stone fabric and the dam's associations with nineteenth-century mills and river navigation in Girard and Trumbull County.

The Warren Water Works Dam at Mahoning and Summit Avenues in the City of Warren was also recommended as eligible for the National Register since it contained a late nineteenth- early twentieth-century concrete dam and a mostly intact hydroelectric spillway dating to ca. 1902. The dam is an interesting example of an early concrete dam with hydroelectric power capacity and is associated with the early history of electric and water utilities in the City of Warren.

The Ohio Steel and Iron Company Dam at Lowellville was built between 1908 and 1915. A 1915 real-estate atlas that reproduces a plan of the dam indicates that the structure retains its original form today. The dam has a series of concrete piers and sections of concrete weir. It is associated with the now defunct Ohio Steel and Iron/Sharon Steel Hoop Co. Plant, a site that originated in the 1840s as one of the area's early iron furnaces and that continued to serve as an important iron-and-steel-industry plant until the decline of the local steel industry that began in the late 1970s. This well-preserved dam was recommended as eligible for the National Register because of its associations with this site, and as the oldest, most well-preserved example of a concrete water-supply dam for the steel and iron industry on the Mahoning River from Warren to Lowellville. Other dams of this type were small, minor linear weirs, many of which were built later. Several of these dams also appeared to have undergone alterations.

Table 1. Table of Resources Surveyed and National Register Eligibility Recommendations

Resource/OHI No.	Location/River Mile	Date	Associations	NR Eligibility
Ohio Iron & Steel Co. Dam OHI MAH-1722-10	Lowellville, R.M. 13.05	c. 1908-1915	Ohio Iron & Steel Co.	Rec. Eligible Crit. A
YS & T Dam OHI MAH-1723-5	Struthers, R.M. 16.78	c. 1908-1915	Youngstown Sheet & Tube	Rec. Non-Elig. Low signif/integ.
Republic Dam/Trestle OHI MAH-1724-4	Youngstown, R.M. 18.2	c. 1908-1915	Republic Campbell Wks.	Rec. Non-Elig. Low signif/integ.
Baldwin Mills Dam OHI MAH-1725-4	Youngstown, R.M. 22.11	c. 1915	Baldwin Grist Mill	Rec. Non-Elig. Low integrity
Carnegie Ohio Wks. Dam OHI MAH-1726-5	Youngstown, R.M. 23.14	c. 1915-1937	Carnegie Steel Ohio Works	Rec. Non-Elig. Low signif/integ.
Girard Mills Lock & Dam OHI TRU-2744-24	Girard, R.M. 26.97	c. 1840	Girard Mills, P&O Canal	Rec. Eligible Crit. A&C
Republic Warren Wks. Dam OHI TRU-2741-17	Warren Twp. R.M. 36.79	c. 1915-1937	Republic Steel Warren Wks.	Rec. Non-Elig. Low signif/integ.
Warren Water Works Dam OHI TRU-2742-17	Warren City, R.M. 40.03	c. 1884-1900	Water & Electric Utilities	Rec. Elig. Crit. A&C
Warren N. River Rd. Dam OHI TRU-2743-17	Warren Twp., R.M. 42.99	c. 1960	Industrial Infrastructure	Rec. Non-Elig. Under 50 years

SURVEY METHODOLOGY

Prior to performance of work, the principals of HDC conducted a telephone conference with Pittsburgh District environmental personnel for a post-award conference. After this conference, HDC reviewed background information concerning the historic property, discussed the project's objectives, examined available natural resource data, determined field plans, and coordinated access to the site.

The research for this survey assisted in the establishment of an overall context that was used to evaluate the engineering and historic significance, as well as integrity of these nine structures. Literature research was conducted at the Ohio State University Libraries, the Youngstown Public Library, Youngstown State University Main Library, and the Ohio Historical Society. The County Engineer offices for Mahoning and Trumbull Counties were contacted, but these offices did not have any information on the dams. The city governments of Girard, Youngstown, and Warren were also contacted, but they also were not able to provide any additional information. Some deed research was conducted at the Trumbull County Courthouse and the Mahoning County Courthouse. The Ohio Department of Natural Resources was also contacted concerning its database of dams in Ohio, and they were able to provide information on the Girard Mills Dam. The Mahoning County Historical Society was contacted but was not able to provide any additional materials. A literature search was also conducted at the Ohio Historic Preservation Office (OHPO).

The Ohio Historic Inventory (OHI), National Register, and Officially Determined Eligible files for Mahoning and Trumbull counties were reviewed to detect if any of the resources had been previously inventoried, or listed on or determined eligible for the National Register. OHI and National Register files were also reviewed to gauge a sense of how many dams and steel industry

related resources in the Youngstown-Warren area had been previously surveyed or listed on the National Register.

The Youngstown Public Library provided reports on the development of water resources in Youngstown, including dams, and other sources on the development of industry in the area. The Ohio State University Science and Engineering Library was also searched for sources and dam designs and types. The Ohio Historical Society provided histories of the Mahoning Valley and county survey maps and real-estate atlases that were useful in dating the dams and associated structures.

Overall, the level of surviving documentation for this resource was moderate. There was ample information on the history of water resource development in the area, especially as it related to the development of reservoirs and municipal water supplies. However, the amount of written documentary information located on the nine low-head dams was more modest, possibly because the structures were mainly built by private entities rather than federal, state, or local governments. The dams are also relatively small, modest structures, which might have contributed to the scarcity of written documentation.

The most useful sources of information on the dams were historic maps. Sanborn Insurance maps from 1884-1950 showed many of the dams and also various industrial or public utility buildings associated with the dams. U.S. Army Corps of Engineers survey maps from the 1930s were also used to refine construction dates for the dams and to gather insight into associated industrial facilities. Historic real-estate atlases from 1874 through 1915 were useful in refining construction dates for the structures and for tracing the physical development of buildings associated with the dams. Deed research was generally able to confirm that steel companies formerly owned the land on the shores of the Mahoning River where the sites of the dams were located. Water impounded by the dams was used by the plants as part of the steel production process.

Field reconnaissance was conducted from February 16-20, 2004. HDC staff took between two and ten high-quality digital photos of each dam, depending on the character of the dam and the amount of surviving historic fabric at each site. Notes were also made at each site about the characteristics of the dam and other relevant structures. An Ohio Historic Inventory form was completed for all nine dams.

NATIONAL REGISTER ELIGIBILITY CRITERIA

In order to be eligible for the National Register, a property must possess:

...the quality of *significance* in American history, architecture, archeology, and culture present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, *and*:

- (a) are associated with events that have made significant contributions to the broad patterns of our history; or,
- (b) are associated with the lives of persons significant in our past; or,

- (c) embody the distinctive characteristics of type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or,
- (d) have yielded, or may be likely to yield, information important in prehistory or history.

The properties were researched to determine if they were eligible under one of the above National Register criterion. Given the architectural nature of the resources, the criteria considered were (a), (b), and (c).

For Criterion (a), the sites were assessed for historic context associated with water resources and industrial development in the Youngstown-Warren area. Most of the dams were associated with the history of nineteenth-century water mills or the history of steelmaking in the Mahoning Valley. One dam was associated with the early history of the area's water and electrical utilities. Three dams were recommended as eligible under Criterion A:

- One dam in Warren associated with the early history of water utilities
- One dam in Girard associated with nineteenth-century water-powered mills
- One dam in Lowellville associated with the steel and iron industry.

For Criterion (b), research was conducted to determine if any outstanding historical figures were involved with the dams. No outstanding historical figures were found to be associated with any of the survey structures.

For Criterion (c), the dams were evaluated for form, architectural style, engineering technique, and cultural expression. Most of the dams are recommended as non-eligible for the National Register under Criterion (c). The majority of the dams were weirs constructed of loose rock and concrete fragments or were simple concrete weirs, or sets of concrete piers with sections of weir in between. These simple technologies were used commonly for dam construction in the United States during the time of construction of these dams. As common examples of poured-concrete or rubble low-head dams, seven of the nine dams do not have the architectural or engineering merit to warrant National Register eligibility under Criterion (c). Two dams were cited as eligible under Criterion C:

- One nineteenth-century concrete dam in Warren with early twentieth-century hydroelectric features
- One timber crib arch dam in Girard that dates from the nineteenth century

Given the nature of the resources, low head dams, Criterion (d) was not invoked for evaluation. Archeological excavation and testing was not part of this project.

RESULTS OF RESEARCH

Historic Context: Settlement and Water Resource Development on the Mahoning River in the Youngstown-Warren Area

Euro-American settlement in the Mahoning Valley began in earnest at the end of the eighteenth century. In 1799, the Connecticut Land Company authorized construction of a road to the new settlement of Warren, the first permanent road in the area (WPA 24). Some of the first industries were built on feeder streams that empty into the Mahoning. The first grist mill in the Youngstown area was built on Mill Creek about three miles southwest of the city (Williams, 365). The first iron furnace was reportedly established in the area in 1804, and in 1826, the first iron furnace in Youngstown was built on Mill Creek (Williams 370-372). In addition to the development on Mill Creek, many early industries also located along the Mahoning River. Circa 1804, a mill was established in the Village of Youngstown on the Mahoning River. Another grist mill had been established downstream at Lowellville ca. 1800 (Williams, 511).

As settlement increased in the early nineteenth century, transportation in the area was a problem, since highways of the time were crude and often difficult to travel on in wet conditions. The presence of the Mahoning River was an important factor in the establishment of Youngstown, Warren, and other communities in the Mahoning Valley, and the river was looked upon as early as the 1820s as the potential location of a canal that could connect the area with markets for its raw materials and other products. The years 1839-1840 saw the establishment of the Pennsylvania and Ohio navigation canal along the Mahoning River and other area water routes, linking the Ohio River with communities like Youngstown, Girard, and Warren. The canal company was founded in 1838, and by 1839, work was reportedly completed on the canal as far north as Warren. On May 28, 1839, the packet-boat Ontario traveled from Beaver, Pennsylvania, to Warren to open the canal. Reports indicate that the canal was completed to Akron by the fall of 1839 (Williams, 102-103).

Spurred on by the canal, industry grew in the Mahoning Valley in the decades before the Civil War; iron production in particular. The first iron furnace to use bituminous coal, the Eagle Furnace, and the first iron rolling mill, Youngstown Iron, were both established in 1846 (Williams, 370-372). The canal also led to stronger growth in Warren and Youngstown, and in recently platted villages like Lowellville (platted 1836) and Girard (platted 1837). With the completion of the canal, coal mining in the Girard vicinity began to develop, and a large grist mill was built next to the town in 1840 (Butler 503). A blast furnace was established in Lowellville in 1845-1846.

Railroads also came to the area in the pre-Civil War decades, which also stimulated the area's industrial growth. The Cleveland and Mahoning Railroad was chartered in 1848, and by 1856 the first trains were operating on the line from Cleveland to Youngstown. The Ashtabula and New Lisbon Railroad was incorporated in 1853 and built a line from Ashtabula to Niles. Additional railroads in the area were completed in the 1870s and 1880s (Williams 104-106).

With the post-Civil War era, the industry in the Mahoning Valley, especially iron production, began to grow rapidly. By 1874, there were nine iron-related operations on the banks of the Mahoning in the Youngstown vicinity. These included the Enterprise, Youngstown, and Brown-

Bonnell rolling mills, the Falcon and the Eagle iron furnaces, the Homer Hamilton and Ward Booth foundries, the Struthers Iron Company, and the Mahoning Iron Company in Lowellville (Lake 1874).

However, while these industries used Mahoning River water, there are no indications that they built dams across the river before 1900. Sanborn Insurance maps dating to 1884 and real-estate atlases dating to 1899 show that there were four dams across the Mahoning River between Warren and Lowellville in the late nineteenth century, but none were associated with the iron industry. Furthest upriver was the City of Warren Waterworks Dam, established at East Summit Avenue by 1884. A dam was clearly present at the waterworks site as early as 1899, and it is likely that a dam was constructed at this site in 1884 to ensure that sufficient water was impounded to supply the city's domestic needs (Sanborn 1884).

An arched dam was also present at a small mill that was located at Main and Dawson streets on the east side of the river in the south portion of the City of Warren. Downriver from Warren was the Girard Milling Company Dam, located on the west side of the Mahoning, across from downtown Girard. This mill had a dam across the Mahoning River and a tailrace that powered Morris Prindle's flour mill and the John Moser Sawmill. The site had also been built ca. 1831-1840, with locks that allowed river craft to pass through the dam site.

Further downstream in Youngstown, Homer Baldwin's City Mills near Mahoning Avenue on the river's west bank had a flour mill powered by what was described in 1884 as a three-tiered plank dam. Baldwin's mill and dam appear on a bird's-eye view of Youngstown that dates to 1871. Sources indicate that a mill had been built on this site as early as 1804, but the mill that existed in 1884 had been rebuilt in 1859 after a fire in 1855 (Williams, 369).

The clustering of settlements with various water-related industries and utilities along the Mahoning River also inevitably led to conflicts over water use. A U.S. Army Corps of Engineers report in 1915 indicated that a mill dam at Girard (likely the 1831-1840 Girard Mills Dam) had once caused significant anger by cutting off Youngstown's water supplies (Johnson 192). However, the conflicts between water-powered mills and municipal water utilities would soon be overshadowed by the issues of water scarcity and the heavy pollution of the Mahoning River, problems caused by the explosive growth of the steel-and-iron industry in the area in the early twentieth-century.

The iron industry was well established in the area by the mid-1870s. Starting in 1885, however, the area's iron industry began a period of decline. This decline was attributable to an economic slowdown that occurred ca. 1891, and to the lower demand for iron that resulted when steel became a stronger alternative (Butler, 690). The first steel plant in the area was established by the Ohio Steel Company in Youngstown in 1894, and this site later became Carnegie Steel's Ohio Works (Butler, 692). By the first two decades of the twentieth century, the iron and steel industries were rapidly expanding in the area, providing the majority of jobs in the region.

During 1899-1900, two of Youngstown's major steel industry players, Republic Steel and Youngstown Sheet and Tube (YS&T) were incorporated. The years 1912-1913 brought the establishment of Trumbull Steel's Warren Works, and the opening of the six-furnace open-hearth steel shop at YS&T's East Youngstown Plant (YS&T, 1). The industrial development of water

resources affected the area in several important ways. The steel plants used up a huge amount of water, and the plants therefore competed with local governments and water utility companies for the limited supply from the Mahoning River. The rapid growth of industry not only increased the area's population, making additional demands on the river's resources, but also increased water pollution, both through the release of industrial wastes and through the increased sewer output from the larger number of residents living in cities along the river.

In the twentieth century, dams and reservoirs were constructed to alleviate the area's problems with water supply. As early as 1905, a private corporation had built the stone masonry Lake Hamilton Dam on nearby Yellow Creek to provide additional water supplies. By 1915, steel and iron firms built three industrial check-dams on the Mahoning River between Warren and Lowellville to impound water for industrial use (Ohio State Planning Board [OSPB], 11). The Also by 1915, the Ohio Iron & Steel Company Dam at Lowellville, the YS&T Dam at Struthers, and the Republic Iron Works Dam at Youngstown (Gutknecht, pp. 20, 27, 30, 46) were in place. These dams were constructed by steel companies ca. 1900-1915 to ensure that an adequate pool of water was maintained for their plants. None of these dams appear on the 1899-1900 real-estate survey maps of the area that do show the older water-powered mill dams.

To eliminate the city's dependence on the polluted Mahoning River, Youngstown constructed the Milton Reservoir from 1916-1917. However, practical problems with this reservoir rendered it inadequate for the city's water supply, although it was useful for releasing additional water for the Mahoning River during times of low flow. Therefore, a second reservoir was built from 1930-1931 at Meander Creek, and this project was successful in providing water supplies for Youngstown and the nearby city of Niles (OSPB 10). Liberty Lake Dam (now Girard Dam) was also built in the Youngstown-Warren area from 1916-1917 by a private water utility company to supply additional municipal water.

However, the establishment of the Meander Creek reservoir and other impoundments of the 1905-1931 period did not solve all water supply problems on the Mahoning River. By the mid-1930s, at least twenty-five plants existed in the industrial district that existed along the Mahoning from Lowellville to Warren. In 1926, industrial plants in the area were estimated to have used approximately 800 million gallons of water per day. In addition, by the mid-1930s, it was reported that the water in the river often reached temperatures of over 100 degrees Fahrenheit. The overheating was due largely to the practice of releasing the water back into the river after it had been used in the steelmaking process. Thus, once the water passed Lowellville, it had been reused as many as thirteen times by multiple factories. It was further reported that the river was so polluted by the mid-1930s that industrial equipment sometimes became clogged or corroded because of contact with its water. At times of low flow, the river was black in color and exuded a strong stench. The heavy pollution was a mixture of industrial waste and untreated sewage released into the river by nine communities with a total population of over 270,000 (OSPB, 3).

In the 1930s and 1940s, there were additional efforts to increase the area's water supply. There were continuing fears that steel production in the area could be curtailed because of inadequate water supplies. The start of World War II meant that the industrial production of the Mahoning Valley was needed for the war effort; it was argued that inadequate water supplies for industrial production in the Mahoning Valley could harm the war-production effort if vital supplies like metal cable were not available for ships and aircraft. The U.S. Army Corps of Engineers opened

Berlin Dam and Reservoir in 1943 to augment the area's water supply. Subsequently, the U.S. Army Corps of Engineers began development of the area's Mosquito Creek reservoir in 1943, and after World War II, the West Branch Reservoir (Johnson, 221-223).

The primary use of the Mahoning River in the first half of the twentieth century was as a source of water and as a dumping area for municipal sewage and industrial waste. However, the transportation potential of the river was also considered. During the 1920s and 1930s, there was extensive discussion of developing a waterway from the Ohio River to Lake Erie. The Mahoning, Shenango, and Beaver Rivers were often cited as favorable routes for such a waterway. Congressional hearings were carried out on the subject and some funds were issued for feasibility studies. However, railroad interests, including a number of Pennsylvania communities heavily dependent on railroad-related employment, were opposed to the project. The railroads were concerned that their revenue would be reduced due to competition from the canal, and the area's major railroads organized to oppose the canal. The project was never initiated, despite the intense discussions and many feasibility studies that were completed in the 1930s and early 1940s (Johnson, 217-272).

The water scarcity issues that plagued the area in the first half of the twentieth century appear to have been eased by reservoir construction of the 1930s-1950s. However, while the 1950s saw the area's many reservoirs providing significant amounts of additional water, the pollution of the Mahoning River continued to be severe. It was only in the 1960s that emphasis on environmental cleanup brought about major measures to curtail the river's level of industrial pollution. At the same time, there were also fears that additional expenditures on environmental cleanup and pollution prevention might lead industries to leave the area, harming the local economy. A strong debate over this issue ensued in the local community, and the issue was much deliberated by state and federal officials.

By the late 1970s, many of the steel mills and other metals-related industries began scaling down or closing plants in the Youngstown-Warren area. The announcements by YS&T of massive layoffs in 1977 are widely seen as the beginning of this period of decline. Since then, the population of the Youngstown-Warren area has declined; with the loss of industrial jobs, a significant portion of the local population has moved elsewhere. WCI Steel's Warren Works is now the last major steel mill in the valley. While the departure of much of the region's heavy industry has had severe social and economic consequences, it has had a beneficial effect on the environmental health of the Mahoning River. The demands on, and pollution of, the Mahoning River have now been significantly reduced. As a result, the river is much cleaner than it was during the years when heavy industry had a stronger presence in the area and environmental regulations did not exist.

The U.S. Army Corps of Engineers is currently studying the feasibility of using dredging to help improve the Mahoning River's ecosystem from the City of Warren to the Pennsylvania state line, including the Youngstown-Warren metropolitan area. Possible actions include dredging the bottom of the river to remove the industrial-waste sediments that remain from past industrial pollution. The project could also involve removal or modification of some of the dams discussed in this study. The removal or alteration of some of the dams would reduce the trapping of sediments and would allow for more free movement of fish and aquatic animals in the river,

making it a desirable option (U.S. Army Corps of Engineers, *Mahoning River Environmental Dredging*, 1-12).

RESULTS OF RESEARCH: SPECIFIC SURVEY SITES

Ohio Iron and Steel Company Dam (MAH-1722-10), Lowellville, Mahoning County, First Street Vicinity

Project Location and Description

This dam is located in Lowellville, a small town just on the edge of the Youngstown metropolitan area (Plate 1). The dam is located north of Lowellville's First Street at Mahoning River mile 13.05. The dam is composed of eight short piers with square ends on the upstream side and pointed ends on the downstream side (Photos 1-3). A small triangular concrete abutment forms the termination of each end of the dam. The weir appears to be composed of poured concrete with thick timbers resembling railroad ties that are placed on top of the concrete to give the dam additional lift. Submerged portions of the weir may also be composed of timber cribs filled with stones or other materials. The area surrounding the dam contains vacant land on the west side of the river, and a semi-densely developed rural town on the east side. The concrete of the dam is somewhat deteriorated, with concrete spalling visible in some areas.

Specific History

Early Sanborn maps show a dam at Lowellville, but it is located well to the south, at Third Street, and was associated with a mill that had been established at that location ca. 1800. The current dam is clearly associated with an iron-and-steel plant that first appeared on the west bank of the Mahoning River, opposite Lowellville, in 1845-1846. At that time, Wilkes, Wilkeson, and Company of Pittsburgh established a blast furnace at the site. Alexander Crawford and Co. purchased the furnace in 1853, and it was sold to Hitchcock McCreary in 1864, to Mahoning Iron in 1871, and then to McCreary and Bell. In 1880, the plant was purchased by Ohio Iron & Steel Company. In 1917, the plant was purchased by the Sharon Steel Hoop Company of Sharon, Pennsylvania (Butler 690). It was reported in 1921 that this plant was producing pig-iron for use in open-hearth steel furnaces (Butler 719).

The dam does not appear on the Mahoning County atlases dating to 1874 and 1899-1900 that show other dams that existed in the area. The dam also does not appear on a 1908 USGS Youngstown Quadrangle map. The earliest appearance of the dam is on a 1915 atlas of Mahoning County (plate 2). The dam appears on this map in its present form with eight piers, two abutments, and nine sections of weir, and is labeled as the "Ohio Iron and Steel Company Dam" (Gutknecht 46).

The crest of the dam was represented in a 1933 U.S. Army Corps of Engineers study as being at 804 feet above sea level. The dam was associated with the Ohio Iron & Steel/Sharon Steel Hoop plant on the west side of the river. The Ohio Iron & Steel plant would have required water to operate, and the dam would have impounded the river at this point, giving the plant a deeper pool

of water to draw from. The 1915 Gutknecht atlas shows a water intake pipe just upstream from the dam, leading to the Ohio Iron & Steel Plant.

Land south of the dam appears to be the tract of real estate that the dam is associated with. This tract is currently owned by Sharon Slag, Inc. A prior deed reference for this property was not given in the most recent Mahoning County records. It is likely that Sharon Steel, parent company of Sharon Slag, has owned this land since Sharon Steel Hoop Company acquired the Ohio Iron & Steel site in 1917.

The earliest documentation for the dam is the 1915 Gutknecht Atlas, which also indicates that the dam had its current form at that time. Maps also show a dam with a crest at 804' above sea level at this site in 1933, and this crest level was reported as the same on maps made in 1937 and 1942. The poured-concrete construction of the dam and its absence on the 1908 USGS Map gives a construction date range for the dam of 1908-1915. This date range is consistent with the statement in the 1936 water-use study that the steel industry began constructing for check dams on the Mahoning ca. 1915(OSPB, 11).

A review of National Register listings for Trumbull and Mahoning Counties revealed only one dam listed on the National Register, the Lake Hamilton Dam, a stone-masonry gravity dam built in 1906 on Yellow Creek, a stream for the Mahoning River that feeds into the Mahoning River at a location that is within the project area. Hence, there is not a heavy representation of early twentieth-century dams on the National Register in Mahoning County at this point.

National Register Evaluation

Criterion A: The dam is associated with the twentieth-century steel industry in Youngstown and the history of water resource development along the Mahoning River, especially in relation to industrial water supply. The dam provided water impoundment that supported the Ohio Iron & Steel/Sharon Steel Hoop Plant that operated on the west bank of the Mahoning River in this area. The dam is a common concrete structure composed of standard concrete piers and concrete weir, but it does appear to have a very high level of integrity, since its overall configuration today perfectly matches the 1915 map. The resource is a well-documented structure associated with one of the oldest steel-and-iron manufacturing sites in the Mahoning Valley. Only one early twentieth-century dam, the Lake Hamilton Dam, is currently listed on the National Register in Mahoning County, so this property type is not heavily represented on the register in this county.

This dam is therefore recommended as eligible for the National Register as a highly intact reflection of the steel industry in the Mahoning Valley and of the history of the water needs of the steel-and-iron industry.

Criterion B: The dam does not appear to be associated with any persons of outstanding historical significance. It is not recommended as eligible under Criterion B.

Criterion C: As a simple concrete dam composed of concrete piers and small sections of concrete weir, this dam is not outstanding or unusual. It is an example of a common dam type that was standard technology for its time. A standard poured-concrete dam of conventional design dating to ca. 1900-1915, this dam does not have a high level of technological,

engineering, or aesthetic significance. This dam is recommended as non-eligible for the National Register due to its low level of engineering and aesthetic significance.

Criterion D: The dam does not show evidence of the possibility to yield more information. An archeological survey of the property has not been completed. The property is not recommended as eligible for the National Register under Criterion D.

Youngstown Sheet and Tube (YS&T) Company Dam (Mah-1723-5), Struthers, Mahoning County, Bridge Street Vicinity

Location and Description

This dam is located on the Mahoning River at the boundary between the City of Struthers, which is located on the southwest bank of the river, and the City of Campbell, which sits on the northeast side of the river. The dam is located at Mahoning River Mile (R.M.) 16.78 (Plate 4). The land to the west of the dam was once an active steel plant associated with the Youngstown Sheet and Tube Company (YS&T). By the 1930s, the structure was serving as a coke trestle. The trestle allowed coke to be transported to the main plant on the east side of the river from a coke-and-benzol plant on the west bank. The area is now composed of empty fields and a series of athletic fields built recently by the City of Struthers.

The structure was a series of five concrete piers that supported a coal trestle, with sections of concrete weir located in between the piers (Photos 4-6). Concrete abutments featuring long sections of retaining wall along the riverbank mark the termination points of the trestle/dam structure. The end pier on the northeast side of the bridge is wider than the other piers and has an opening in the middle. It may have accommodated a movable spillway gate that might have been used to regulate water flow. The trestle has now been removed, leaving the concrete piers and weir sections. Most of the buildings associated with the YS&T plant in the vicinity of the dam/trestle have been removed. The concrete is in somewhat deteriorated condition and, at the time of the field visit, a large amount of driftwood had piled up behind the structure.

Specific History

The YS&T Company dam does not appear on the 1908 USGS Youngstown Quadrangle map or real-estate atlases dating to 1899-1900. The structure does appear on Gutknecht's 1915 *Atlas of Mahoning County*. However, the dam as it appeared on the 1915 map is different from the structure that is present today. The 1915 map shows a simple linear weir crossing the river, connected to two long wall abutments on either bank of the river. The dam next appears on a 1933 U.S. Army Corps of Engineers survey covering a portion of the Mahoning River. However, the structure at that time was represented as a combination dam and coke-trestle. The dam had been modified to support the trestle between 1916 and 1933. The railroad trestle carried by the dam's piers connected the main YS&T plant on the north side of the river with the YS&T coke plant on the river's south bank. The 1937 U.S. Army Corps of Engineers map of the Mahoning River also characterized this structure as a dam and coke bridge (Plate 5).

The crest of the dam was recorded as 814.0 feet on the 1937 map. The dam and trestle appear to be described in a 1942 report on a proposed dam at Lowellville. The report states "just upstream from Yellow Creek, where an abandoned railroad trestle crosses the Mahoning River, the stream is backed up slightly by drift which has accumulated around the foot of the pile bents, forming somewhat of a pool for the Struthers Steel intake (Barnes, 12)." Clearly the trestle had already fallen into disuse by 1942. The 1937 Corps of Engineers map indicates that this structure served as both a dam and trestle. Therefore Barnes's 1942 observation that driftwood was forming the pool in this area must have been a mistake, possibly due to the concrete weir being obscured by the driftwood. It should also be noted that a very large quantity of driftwood was sitting on the upstream face of the trestle piers at the time of the site visit for this project.

The dam/trestle's main historical associations are with YS&T. The company was founded in 1900 and shortly thereafter purchased 117 acres of agricultural land along the Mahoning River three miles east of downtown Youngstown to build its main plant. It was reported that pig iron was first produced at the site in 1902. It was further reported that a six-furnace open-hearth steel-making shop was opened at this plant in 1913, joining two Bessemer furnaces. By 1916, three more furnaces had been added (YS&T, 1). Deed research indicates that land immediately north of the dam was previously owned by Republic Steel, which merged with Jones and Laughlin in 1984 to form LTV Steel (Mahoning Co. Record Book (RB) 60, p. 268). Jones and Laughlin had merged with YS&T in July 1981. LTV Steel approved a replatting of the land in 1993 for the Campbell Works Industrial Park (Mahoning County Plat Book (PB) 82, p. 217). The land is now owned by American Industrial Renovations Inc. The land south of the bridge and trestle also belonged to YS&T and was transferred to the ownership of Jones and Laughlin Steel as part of the 1981 merger (Mahoning Co. DB 1463, p. 29). The land was replatted by Jones and Laughlin for the Campbell Works Industrial Park, and was sold to the City of Struthers for \$1.00 in 2003 (Mahoning Co Property Database).

The dam was built between 1908 and 1915, and the trestle feature was added between 1915 and 1933. It is almost certain that the dam was built to impound additional water to support the 1907-1916 expansion of the YS&T works. With the addition of the open-hearth shop in 1913 and three additional furnaces in 1916, it appears likely that the plant's water needs became greater at this point, necessitating construction of a dam to impound more water on the Mahoning River. The coke bridge was likely added ca. 1916 to facilitate transport of materials in and out of the coke-and-benzol plant on the west bank of the river. This scenario is consistent with the 1936 water resources study statement that check-dam construction on the Mahoning River by steel companies began ca. 1915 (OSPB, 11).

YS&T's East Youngstown Plant was renamed the Campbell Plant in 1926 after YS&T president Jim Campbell. The Campbell plant received a 79" hot-strip steel mill in 1935, an investment that was said to have placed YS&T ahead of competitors in terms of manufacturing technology (YS&T, 1). The plant continued to operate at high capacity until YS&T started moving work to its Indiana Shores Plant near Chicago in 1977. Thousands of additional jobs were phased out in 1978 at the Campbell Plant, causing economic hardship in the Youngstown area. Today, some of the plant's largest buildings on the north side of the river remain, but most of the plant buildings in the vicinity of the trestle/dam have been demolished. It is not known at what point the coke trestle was removed from the bridge/pier structure. The dam portion of the structure still impounds water on the Mahoning River.

National Register Evaluation

Criterion A: The YS&T Company dam has historical associations with the steel industry in Youngstown, and was once a part of one of the valley's most important steel industry plants. However, the trestle/dam has lost integrity and much of its context. All of the industrial buildings in the immediate vicinity of the structure have been demolished. In addition, the steel trestle that formed an important part of the structure has been removed, leaving five piers that do not support anything. This dam is no longer part of the context of a steel plant, but is now an isolated ruin in the middle of empty fields. Its design is unremarkable, and it has been heavily altered by the trestle removal. The Ohio Iron and Steel dam in Lowellville is a better and less altered representation of an early twentieth-century steel-and-iron mill dam of the Mahoning Valley. Because of the lack of integrity and heavy alterations to the resource's context, HDC recommends this trestle/dam to be non-eligible for the National Register under Criterion A, due to the low level of historic significance and diminished integrity.

Criterion B: The dam does not appear to be associated with any persons of outstanding historical significance. It is not recommended as eligible under Criterion B.

Criterion C: As a simple concrete dam built ca. 1908-1915 with a ruined rail trestle dating to ca. 1916-1933, this bridge/dam combination used engineering technology that was commonplace at the time of its construction. The structure is unremarkable in terms of materials, design, and overall technological sophistication. In addition, a large portion of the resource, the trestle, has been removed. This trestle/dam is being therefore recommended by HDC as non-eligible for the National Register under Criterion C due to lack of engineering or aesthetic distinction, and as a structure that has lost integrity through the removal of an important character-defining feature.

Criterion D: The dam does not show evidence of the possibility to yield more information. An archeological survey of the property has not been completed. The property is not recommended as eligible for the National Register under Criterion D.

Republic Steel Campbell Works Dam (Mah-1724-4), Youngstown, Mahoning County, Center Street Vicinity

Project Location and Description

This dam is located at Mahoning River mile 18.2 (Plate 6). The dam is located in an area that is now dominated by large tracts of vacant land. The dam currently consists of a series of large rough rip-rap-like stones and fragments of concrete slabs strewn across the river to impound water (Photos 7-8). Some portions of the dam retain a wood flashboard weir that allows the dam to impound some additional water. The flashboards are held in place with metal stakes. No abutments or other support structures were visible.

Specific History

The Republic Steel Campbell Works Dam does not appear on real-estate atlases of Mahoning County dating to 1899-1900, or the USGS 1908 Youngstown Quadrangle map. It does appear on

a 1915 atlas of Mahoning County (Gutknecht 20). The dam was also recorded on a 1937 U.S. Army Corps of Engineers map with a crest of 819.0 feet above sea level (Plate 7). The dam was identified as having a crest at 819.7 feet and of being associated with Republic Steel in a 1942 feasibility study for a proposed new dam at Lowellville (Barnes 11). The dam is located at what was once the site of Youngstown's Republic Steel Hasleton Mills. The bulk of the Republic plant was located on the southwest side of the river, with a smaller number of buildings located on the northeast.

Republic Steel was incorporated in May 1899, formed from a group of twenty-four companies operating rolling mills and blast furnaces, and two iron-mining companies (Moody's Industrial, 1929). It was reported that the Hasleton Plant was purchased by Republic Steel from Andrews Brothers and Company in 1905. The Youngstown/Hasleton Plant had been equipped with two Bessemer furnaces by 1906, and additional furnaces were added in 1911 and 1917. An open area south of the dam was fully developed by 1928 (Sanborn 1928). Deed research indicates that the land surrounding the dam was part of a large number of parcels acquired by Republic Steel from 1902 through about 1921. These tracts were acquired from real-estate companies and private individuals. The land had been transferred from Republic Steel to LTV Steel during the 1984 merger that created LTV. The land surrounding the dam was sold to the City of Youngstown for \$1.00 by LTV Steel in 1993 (Mahoning Co. Official Record Book (OR) 1909, p. 82).

It is likely that the dam was constructed to impound additional water as the steel industry in Youngstown grew rapidly between 1900 and the beginning of the Great Depression. The 1936 water resources study for the area indicated that check dams were built on the Mahoning to impound additional industrial water starting in 1915 (OSPB, 11). The dam was clearly built between 1908 and 1915 based on USGS maps and real estate atlases of the area. It is not clear whether the original structure was a more substantial structure or the current pile of concrete and stone fragments that is present today. The dam is shown on the 1915 map as a straight weir. Considering the accurate depiction of the Ohio Iron and Steel Company dam on this same map, it seems likely that this depiction was an accurate representation of the dam as it existed at that time. The current structure therefore appears to represent the partially demolished ruins of the original dam.

National Register Evaluation

Criterion A: The Republic Steel Campbell Works Dam has historical associations with the steel industry in Youngstown, and was once a part of one of the valley's most important steel industry plants. However, the associated Republic Steel plant buildings in the immediate vicinity of the dam have been demolished so the dam has lost the architectural context that defined the dam's significance. As a pile of stones and broken concrete strewn across the river, the dam also is not a very distinctive resource and is not a very effective representation of the Mahoning Valley steel industry. The 1915 map shows a linear weir crossing the river at this site, suggesting that the current structure represents the collapsed or partially demolished remains of the original dam. The Ohio Steel & Iron Company Dam in Lowellville is a more intact representation of the twentieth-century Mahoning Valley steel industry and its water needs. The Republic Steel Hasleton Works Dam is recommended as non-eligible for the National Register under Criterion A since it appears to have a low level of integrity, and is a fairly poor representation of the Republic Steel plant and the Mahoning Valley steel industry.

Criterion B: The dam does not appear to be associated with any persons of outstanding historical significance. It is not recommended as eligible under Criterion B.

Criterion C: The dam consists of a small weir of unmortared stone and concrete fragments. This small weir represents either a crude method of dam construction technology, or it is the fragmentary remains of a concrete dam that existed on the site in 1915. It has no distinguishing engineering or aesthetic features. This dam is recommended as non-eligible for the National Register under Criterion C since it is not distinctive in terms of architectural design or engineering.

Criterion D: The dam does not show evidence of the possibility to yield more information. An archeological survey of the property has not been completed. The property is not recommended as eligible for the National Register under Criterion D.

Homer Baldwin City Mills Dam (Mah-1725-4), Youngstown, Mahoning County, Mahoning Avenue Vicinity

Project Location and Description

This dam is located just south of downtown Youngstown, and sits just north of the Mahoning Avenue Bridge, a steel-truss bridge supported on concrete piers. The dam is located at Mahoning River mile (RM) 22.11 (Plate 8). The area to the south of the dam is occupied by a grassy lawn and a parking lot. The dam consists of a weir composed of a series of stone and concrete fragments and slabs strewn across the river (Photos 9-10). No courses of masonry work were observed in connection with the dam, only fragments and isolated slabs. There is a small triangular concrete abutment on the east side of the river.

Specific History

The land adjacent to the dam on the west side of the river once accommodated the City of Youngstown's first grist mill. A mill was established on this site ca. 1804 by Caleb Plumb, who had been born in New York State. It was reported that Plumb built a "rude dam" on the site in 1804 and constructed log buildings for grist and saw mills at that time. The sawmill was eventually abandoned but the grist mill survived and continued to be used. The grist mill burned in 1855, and the land was purchased by Homer Baldwin in 1859 (Williams, 389). Baldwin's flour mill built ca. 1859 appears at this location on the west side of the Mahoning River in an 1871 "Bird's Eye View of Youngstown." A dam was also depicted at the site, although the print offers no clues as to the character of the dam.

The 1884 Sanborn Map of Youngstown shows the mill and identifies it as the Homer Baldwin City Mills (Plate 9). The complex was composed of the main mill structure and three smaller wood-frame sheds to the north. The main mill building had a shorter one-story, stone-masonry south wing that contained a 100-horsepower steam engine. The 1884 map also shows an arc-shaped dam crossing the Mahoning River at the site, and the dam is labeled as a "3-tier plank dam." Presumably the dam was a wood crib structure at that time. The map shows that a small

spillway adjacent to the dam let water through a wheelhouse that powered the main mill wheel. The Homer Baldwin City Mills appear on later Sanborn maps dating to 1889 and 1896 (Plate 10) and appear much the same as they were in the 1884 map. The main mill building was shown on the 1937 U.S. Army Corps of Engineers map of the Mahoning River (Plate 11), but was subsequently demolished at an unknown date. The dam was recorded on the 1937 map as having a crest at 827.0 feet. It appears from the 1937 map that the spillway structure still existed at that time.

A deed search for the former mill property indicated that the land was sold by George Vranches to the City of Youngstown in 1992 (Mahoning Co. RB 1641, p. 239). The deed indicates that the property was the northern portion of Youngstown City Lot 149. The 1992 deed does refer to Homer Baldwin as the prior owner of the property, but no prior deed reference was provided. Searches in Mahoning County grantor/grantee indexes for Homer Baldwin from the 1840s through the 1880s did not reveal Baldwin's transaction involving this property. The property was sold by the City of Youngstown to Anthony's on the River in 1995 (Mahoning Co. RB 2602, p. 13).

The current dam is a pile of rough, uncut natural stones and concrete fragments and slabs. No spillway structure is visible. Considering the 1884 Sanborn Map description of the dam and the presence of a spillway on that map, the current dam does not appear to be the original structure. The presence of poured-concrete fragments also suggests that the dam in its current form is a product of the twentieth century. It is very doubtful that the dam in its present state represents the original materials or design characteristics of the nineteenth-century mill dam. Sanborn maps from 1884 indicate that the dam at that time was an arched timber crib dam, and it appears that the dam may have been very similar to the Girard Mills Dam, which survives intact today with a timber crib structure, capped by a concrete weir. It is possible that the Baldwin Mills Dam was reinforced or repaired with concrete during the twentieth century. If the dam decayed and collapsed due to neglect, the concrete fragments and rocks may represent all that is left of the structure.

National Register Evaluation

Criterion A: This site of the Homer Baldwin City Mills Dam was occupied by one of Youngstown's early flour mills, which was present as early as 1804, rebuilt in 1859, and still in operation in 1896. However, the main mill, which was an arched timber crib structure in 1884, has been destroyed. The dam as it currently exists does not resemble the original dam as represented on 1884-1896 Sanborn maps. The existing structure appears to be a pile of stone and concrete that may represent a crude twentieth-century attempt to create a weir at this site. The stone and concrete could also be remains of a destroyed timber-crib dam, with the concrete representing twentieth century repairs to the dam. While the mill was significant in the history of Youngstown, the dam in its present condition does not appear to date from the nineteenth century and does not resemble original descriptions of the mill dam. The Girard Mills Dam that is being recommended as National Register eligible in this study is a better example of a nineteenth-century mill dam for Mahoning County. The Baldwin Mills Dam is therefore recommended as non-eligible under National Register Criterion A due to its low level of integrity and inability to adequately reflect the nineteenth-century period of significance for the mill site.

Criterion B: The dam does not appear to be associated with any persons of outstanding historical significance. It is not recommended as eligible under Criterion B.

Criterion C: As a small, simple weir constructed of chunks of stone and concrete, this dam does not represent any distinctive engineering techniques, materials, or design characteristics. This dam is a common example of a very crude, unsophisticated construction type. The dam is recommended as non-eligible for the National Register under Criterion C because it does not have any distinctive engineering or architectural design characteristics, and is a common, unsophisticated type of dam.

Criterion D: The dam does not show evidence of the possibility to yield more information. An OAI form was completed for this site as part of a previous study. Archeological survey of the site was not part of the scope of this project. Archeological testing would be needed to determine the potential of this site under Criterion D. The property is not recommended as eligible for the National Register under Criterion D as part of this study.

Carnegie-Illinois Steel, Ohio Works Dam (Mah-1726-4), Youngstown, Mahoning County, Crescent Street Vicinity

Project Location and Description

This dam is located west of downtown Youngstown in an industrialized area south of Oakland Avenue at R.M. 23.14 (Plate 12). The dam is surrounded on the south side of the river by a large network of railroad tracks that were established for Carnegie-Illinois Steel's Ohio Works, located southwest of the dam. The land immediately north of the dam is also dominated by railroad tracks. North of these railroad tracks, a steep hill leads to a bluff with a number of industrial buildings, some abandoned and some still in use.

The immediate site of the dam is marked by a large steel, early twentieth-century, railroad trestle that crosses a series of rail tracks and the Mahoning River at this site. The west abutment of the dam is underneath the trestle. The trestle crosses the Mahoning River at an angle, running southeast, while the dam has a more east-west orientation.

The dam itself is composed of poured concrete and is chevron-shaped, pointing upstream (Photos 11-12). The east half of the dam is a sloped concrete weir. The west half of the dam is a simple, wall-like concrete weir with wood flashboards at the top held in place by small steel poles. There are crude poured-concrete abutments on each bank. The abutments appear to be beds of concrete that were not finished at all after being poured. No other dam-related features were observed during the field visit.

Specific History

The Carnegie-Illinois Steel, Ohio Works Dam does not appear on the 1915 Gutknecht *Atlas of Mahoning County*. The earliest record of this dam located as part of this study was the 1937 U.S. Army Corps of Engineers maps of the Mahoning River. The crest of the dam was recorded on

the 1937 map as 833.2 feet above sea level. The dam was also recorded on maps associated with the 1942 Lowellville Dam feasibility study, and the crest was the same as reported in 1937.

The dam was associated with the large Carnegie-Illinois Steel Ohio Works located on the west bank of the Mahoning River. A blast furnace was first operated at this mill in February 1900. Six blast furnaces had been added to the site by 1909. The construction of a 40" steel mill was initiated at the plant in February 1907. Three open-hearth furnaces were completed at the plant in 1916 (Butler, 714).

Deed research indicates that land on the south side of the river associated with this plant is now owned by Youngstown Sinter, Inc. Youngstown Sinter had acquired the land for \$10.00 in 1989 from LTV Steel. Through corporate mergers, the ownership of the land can be traced from LTV Steel to Republic Steel, to U.S. Steel, and finally to Carnegie Steel (Mahoning Co. OR 904, p.10). The 1966 corporate transfer deed indicates that the land was one of a large number of tracts in the vicinity acquired from various private parties by National Steel and Carnegie Steel between 1902 and 1947 (Mahoning Co. DB 1075, p. 445).

The appearance of two different weir designs at this dam suggests that the structure was altered at some point during its existence. It was not possible to discern which portion of the dam was the oldest. It appears likely that half of the dam was demolished because of its deterioration and then rebuilt at some point with a different design than the original structure. It does not seem logical that a small concrete dam without gates or movable weirs would have been originally built using two different weir designs.

National Register Evaluation

Criterion A: The Carnegie-Illinois Steel, Ohio Works Dam has historical associations with the steel industry in Youngstown, and was once a part of one of the valley's most important steel industry plants. However, as a simple chevron-shaped concrete weir in a largely inaccessible point on the river, the dam is not a very distinctive resource and is not a very effective representation of the Mahoning Valley steel industry. It appears to have been built later in the history of steel plants in the valley, since its construction clearly post-dates 1915. The two halves of the dam represent different weir designs, suggesting that half of the dam may have been rebuilt at some point. The crude, unfinished character of the poured concrete abutments also suggests that very crude efforts to rebuild or repair the dam were made at some time. This dam is recommended as non-eligible for the National Register under Criterion A since it has a fairly low level of overall significance in the context of the Mahoning Valley steel industry, appears to have been partially reconstructed or crudely repaired to a design not matching the original, and is a fairly poor representation of the Carnegie-Illinois Steel Ohio Works. The Ohio Iron and Steel Company Dam at nearby Lowellville is a better, more intact representation of a steel mill water supply dam on the Mahoning River.

Criterion B: The dam does not appear to be associated with any persons of outstanding historical significance. It is not recommended as eligible under Criterion B.

Criterion C: As a simple chevron-shaped weir constructed of concrete, the dam does not appear to represent a distinctive type or construction method. It is a plain utilitarian structure and does

not have any distinctive engineering or aesthetic features. The dam is a common example of a simple, unsophisticated dam type. This structure is recommended as non-eligible under Criterion C because it lacks distinction and has no distinguishing or unusual architectural or engineering features, and is not representative of a distinctive dam type or type of construction.

Criterion D: The dam does not show evidence of the possibility to yield more information. An archeological survey of the property has not been completed. The property is not recommended as eligible for the National Register under Criterion D.

Girard Mills Lock and Dam (Tru-2744-24), Girard, Trumbull County, Liberty Avenue Vicinity

Project Location and Description

This dam is located at R.M. 26.97 and is within the city limits of Girard, Ohio (Plate 14). The dam sits in a low valley area just to the north of an early twentieth-century, Neoclassical, open-spandrel, concrete-arch bridge that carries Girard's Liberty Street over the Mahoning River and the associated river valley. The dam is bordered on the east (right) bank of the river by a series of railroad tracks that skirt the edge of downtown Girard. The west (left) bank of the river contains a large open field with a Greek Revival style wood-frame, 1½-story dwelling located about 1000' west of the dam. The area along the west bank of the Mahoning north of the dam is composed of thin secondary-growth woods. The bridge and its approach are immediately south of the dam.

This site contains an arched timber-crib dam with a concrete cap, a large west abutment, and an east abutment and wall (Photos 13-16). The dam itself arches as it crosses the river, with the curve pointing upstream to the north. The weir did not appear to have any slope at the time of the field visit, but appeared to be a straight drop-off. The weir appears to have a gap or sluice at its center where the weir is lower than the rest of the dam. Because of its location directly at the center of the dam, it appears that this gap is a part of the dam's design rather than evidence of damage or deterioration. The material of the dam was not readily visible during the site visit due to the large quantity of water running over it. However, a 1999 inspection report obtained from the Ohio Department of Natural Resources indicated that the dam was a timber-crib structure with a concrete cap.

Timber-crib dams were commonly built during the first three quarters of the nineteenth century on small rivers in the United States. Their purpose was to provide power to grist mills, and it was common for these dams to be modified with the addition of concrete weirs or caps during the early twentieth century. The Pennsylvania Historic Inventory, for example, contains a record of the Heishman Mill Dam, located near Carlisle. This dam was built from 1808-1810 and was a timber-crib structure. It was capped with concrete in 1920. The dam survives largely intact today, due mainly to the protection provided by the concrete cap, and the fact that continuous immersion in water has a tendency to preserve timbers for a long period of time. The Girard Mills dam appears to have a very similar development history to the Heishman Mills Dam.

One of the most interesting aspects of the Girard site is the dam's west abutment. The west end of the dam is attached to this structure, which rises about five feet above the surface of the river as its level during the field visit. The abutment is composed of a series of thick walls oriented at angles to form a five-sided, bay-like structure. The short south and north walls of the polygon are composed of early twentieth-century poured concrete. There is also a coping at the top of the polygon that is composed of early poured concrete. The other portions of the abutment, including the three sides of the structure that face the river, are composed of large blocks of cut sandstone. Most of the blocks have a diagonal chiseled pattern to the finish that is similar to that seen on nineteenth-century lock structures. A few of the stones are edged with an approximately one-inch border of vertical chisel marks. The large sandstone blocks appear to be mortared, but the mortar has been applied heavily and appears to have heavy quantities of Portland cement, indicating that it likely dates to the same time as the poured-concrete features of the abutment. The interior of the abutment appeared to be filled primarily with earth, although there was some evidence of poured concrete in some places. The abutment was approximately twenty-four feet from its north edge to its south edge, and about eighteen-feet deep when measured at its deepest point from east to west.

The third component of the site was a large wall that lined the riverbank at the dam's east termination. This wall was composed of about ten courses of large sandstone blocks with a rock-face finish. The stone wall extended slightly north of the dam, and extended as far south as the abutment of the Liberty Street Bridge that sits south of the site. Remaining portions of the wall appeared to be in good condition. A portion of the wall may have been removed as part of the construction of the bridge.

Overall, this was a multi-component site with large quantities of cut stone that appeared to date from the mid-to-late-nineteenth century. It was also clear that maintenance of the site had continued into the twentieth century, as evidenced by the early twentieth-century concrete features that had been added to the west abutment.

Specific History

The Girard Mills Lock and Dam was associated with a major nineteenth-century mill complex affiliated with the City of Girard. The Village of Girard was laid out in 1837, and the construction of the Pennsylvania and Ohio Canal on this section of the Mahoning River ca. 1839-1840 appears to have stimulated the development of the community. Part of this development was the construction of a large flour mill built on the west side of the river in 1840 by Jesse Baldwin and Abner Osborn. An inventory of the dam from the Ohio Department of Natural Resources gives a construction date of 1831. An 1884 Sanborn map shows the Morris Prindle & Company Girard Mills at the site (Plate 15). The mill complex was located on a race that drew water from above the dam and emptied back into the Mahoning River below the dam. The mill was composed of a wood frame 2½-story building with two turbine wheels. From the description in the 1884 map, it appears that this building served as a flour mill. To the south of the main mill building was a second structure that extended over the race. It was labeled on the 1884 map as the John Moser Sawmill, with an indication that the mill was water-powered. The sawmill was located in a one-story, wood-frame building.

By 1896, the flour mill building was much the same as it had been on the 1884 map, and was

labeled as the Girard Milling Company. The sawmill, now known as the Girard Saw and Planing Mill, had been relocated to the west, and was now composed of a building with woodworking machinery, an engine house, and two lumber sheds. The sawmill now appeared to be powered by a 60-horsepower engine. The complex was much the same when represented on the 1907 Sanborn maps of Girard.

By 1915, Sanborn maps indicate that the sawmill had been demolished, but the flour mill and mill race were still intact and owned by the Conneaut Land Company. A 1915 real estate atlas indicated that the owner of the flour mill site was the Conneaut Land Company, while a tract including the dam abutment and the site of the former sawmill was labeled as belonging to "Andrew McCartney's Heirs" (Gutknecht, 46).

The 1925 Sanborn maps of Girard identify the mill as the W.J. Zeller Feed Mill (Plate 16). Another source indicates that the mill had been taken over by Carnegie Steel, but was operated by Zeller (Butler, 503). The 1937 U.S. Army Corps of Engineers map of the Mahoning River shows the feed mill building and the portion of the race located south of the mill. However, the 1937 map seems to indicate that the northern portion of the race was filled in. A version of the 1925 Sanborn map of Girard that was updated to 1930, and that may have later updates, shows portions of the mill race, but the feed-mill buildings have been pasted over with blank paper, indicating their demolition. An arched dam is shown on the 1937 U.S. Army Corps of Engineers map with a crest of 843.2 feet above sea level (Plate 17).

Unfortunately, the dam is not shown on any of the Sanborn maps of the mill site. The dam does appear on 1899 and 1915 atlases with an arched form resembling its present configuration (Gutknecht, 46). Sanborn maps dating to 1884 of the Baldwin Mills Dam in Youngstown show an arched timber structure. Based on these maps, it appears that arched timber dams were commonly built on this part of the Mahoning River in association with early mill sites. While the Girard Mills Dam has undoubtedly been altered and repaired, the current arched timber-crib portion of the dam likely still retains original nineteenth-century construction fabric.

In addition, current tax maps of Trumbull County for the site are based on older survey maps and show a number of historic features of the site (Plate 18). The dam is shown with its arched form, and the location of the original flour/feed-mill building is located on these maps. The location of a set of abandoned canal locks is also indicated on the east bank of the river at the location of the current stone walls lining the river bank. An abandoned canal towpath is also marked on the map on the east bank of the river, running upriver from the site of the dam (Girard Tax Map Sheet 38). These features appear to be associated with the 1839-1940 Pennsylvania and Ohio Canal development.

The dam is no longer in use but appears to conform to the overall form represented in the 1915 Gutknecht Atlas, the 1937 U.S. Army Corps of Engineers map, and the Trumbull County tax parcel map. The abutment of the dam with its combination of heavy hand-finished sandstone masonry and early poured concrete seems to indicate that this structure had origins with the original 1839-1840 complex that included the mill, dam, and navigation lock. The presence of early twentieth-century concrete indicates that the dam was maintained and repaired by Carnegie Steel or other early twentieth-century owners of the site.

Mill-related sites are not heavily represented on the National Register for Trumbull and Mahoning counties. The only mill-related site in the area that is listed on the National Register is the 1845-1846 Lanterman Mill in Mill Creek Park, near Youngstown in Mahoning County. The nomination for this property indicates that the mill building is intact but does not mention a dam.

At any rate, there is not a heavy representation of nineteenth-century mill properties in the National Register for Trumbull and Mahoning counties.

National Register Evaluation

Criterion A: The Girard Mills Lock and Dam was associated with an important flour mill built ca. 1840 that served Girard until its destruction ca. 1942. The remains now visible at the site were part of a complex associated with the 1839-1840 Pennsylvania and Ohio navigation canal that was located along the river. The complex included the arched timber-crib dam, a navigation lock, and a towpath for barges and flatboats. The dam itself has the same arched form as is represented on 1899 and 1915 atlases and the 1937 U.S. Army Corps of Engineers map of the Mahoning River. The large polygonal abutment is an unusual cut-stone structure. It was modified with early concrete and the installation of a concrete weir on top of the timber-crib dam, representing later historic use and maintenance of the site during the early twentieth century. The stone walls on the east bank, which appear to be old lock walls associated with the Pennsylvania and Ohio Canal, are another reminder of the site's nineteenth-century history.

Overall, this is a remarkably intact multi-component historic site representing the early history of Girard, Ohio, and the early history of transportation of the Mahoning River. The concrete additions to the dam and abutment are obviously later modifications, but they appear to represent early twentieth century efforts to improve and maintain the dam, and now have historic significance in their own right. Only one mill-related resource in the Trumbull-Mahoning County area, the 1845-1846 Lanterman Mill near Youngstown, is listed on the National Register. The Girard Mills Dam is therefore recommended as eligible for the National Register under Criterion A for its association with early Mahoning River navigation, with the early history of Girard, Ohio, and with the history of early water-powered industries in Trumbull County. With its intact polygonal stone abutment structure, lock walls, and timber-crib arch dam, the site also appears to have a remarkably good level of integrity for a pre-Civil War mill and navigation lock and dam site.

Criterion B: The dam does not appear to be associated with any persons of outstanding historical significance. It is not recommended as eligible under Criterion B.

Criterion C: The dam was somewhat obscured by water during the field visit, so it was difficult to judge the design integrity and structural composition of the structure. However, considering the appearance of a number of arched timber-crib dams on nineteenth-century maps of the Mahoning River, and the tendency for immersion in water to preserve timbers for a long period of time, it appears likely that the current dam contains nineteenth-century timber crib construction fabric and follows the overall form of the original mill dam as it existed ca. 1900. Timber arch dams were characteristic of the early Mahoning River Valley, as there appear to have been at least three arched timber mill dams on the Mahoning between Warren and Lowellville in 1884. This example appears to be the only survivor. The Girard Mills Dam is a rare surviving example of an antebellum arched timber crib mill dam with a stone abutment and

stone lock-wall remains. This site is therefore recommended as eligible for the National Register under Criterion C for the craftsmanship in the stonework of the polygonal abutment, as an example of a nineteenth-century arched timber-crib mill dam with early twentieth-century modifications and repairs, and for its surviving section of stone embankment that appears to be a rare surviving lock wall associated with the Pennsylvania and Ohio Canal.

Criterion D: This site was recorded on the Ohio Archaeological Inventory in a past study. Archeological survey was not part of the scope of this study. The property is not recommended as eligible for the National Register under Criterion D as part of this study.

Republic Steel Warren Works Dam (Tru-2741-17), Warren Township

Project Location and Description

This dam is located outside of the city limits of Warren Ohio in Warren Township, at R.M. 36.79 (Plate 19). The site is bordered on the east (right) bank of the Mahoning River by industrial plants that still appear to be active, including WCI Steel's Warren Works. On the west bank, the dam borders an Ohio Edison electrical substation. To the east of the substation is Warren's Main Street, and an active coke plant is located on the west side of Main Street. The immediate site of the dam is an industrial area. A corbelled-brick industrial building with a gabled roof is located north of the dam on the east bank of the river. While the building does not appear to be related to the dam, it did appear to still be in use for industrial purposes and may be associated with the nearby WCI Warren Works.

The dam itself is a simple straight concrete weir that may also be supported in some areas by submerged timber cribs (Photos 17-19). The weir also includes some wood flashboards across the top, held in place by vertical metal pipes. There is an abutment at each end of the dam. The west abutment is a rectangular concrete structure. A concrete sewer outflow pipe is located below the abutment and is incorporated into the western portion of the dam. A heavy flow of water was coming out of the pipe during the field visit. Overall, the dam is a simple concrete wall across the river with small wall-like concrete abutments at each end.

Specific History

The Republic Steel Warren Works Dam site appears as open farmland on a ca. 1899 atlas of Trumbull County (American Atlas Co. 41). The dam does not appear on the 1908 USGS Warren Quadrangle map. This dam first appears on the 1937 U.S. Army Corps of Engineers map of the Mahoning River (Plate 20). Its crest was indicated on the map as 849.2 feet above sea level. The dam was associated with the Republic Steel Company's Warren Works.

The Warren Works began as the main plant of the Trumbull Steel Company, and was established in 1912. The plant was expanded in 1914 and again in 1916. In 1917, a modern open-hearth steel plant was added to the site (Butler 717). The plant appears on 1922 Sanborn Insurance maps of Warren as a large, well developed steel mill. On April 30, 1928, Republic Steel

acquired all properties and assets of Trumbull Steel. The Warren Plant continued operations under the Republic Steel's management. The plant appears on the 1937 U.S. Army Corps of Engineers map of the Mahoning River. Sanborn maps of the plant generally do not cover the location of the dam.

Deed research indicates that the land surrounding the dam was part of Warren Township Lot No. 42. In the takeover of Trumbull Steel in 1928, Republic Steel had acquired 62 parcels of land in the Warren Township area, including Lot 42 Trumbull Co. (DB 345, p. 82). The records indicated that before being acquired by Trumbull Steel, the land was owned by Catherine Lutz, who sold four tracts containing a total of 48.51 acres, for \$7,276.50 (Trumbull Co. DB 231, p. 602). No prior deed reference was recorded. The 1899 atlas of Trumbull County indicates that Lot 42 at that time was split up into three tracts, including a 157-acre tract owned by Hugh Sterling that appears to include the site of the dam's east abutment, and a small tract owned by Elizabeth O'Reilly that appears to include the site of the dam's west abutment. On this atlas, no buildings and no dam appear at the site of the present dam (American Atlas Company 41).

The purpose of the dam was to impound water for the Trumbull Steel/Republic Steel Warren Works. The 1937 U.S. Army Corps of Engineers map indicates that two water outlets and one intake for the Warren Works were located upstream from the dam. The crest elevation of the dam was 849.2 feet above sea level and the level of the Warren Works intake pipe was recorded as 845.2. The dam would have impounded water to be taken in by the intake pipe to be used in the steelmaking process at the Warren Works. The presence of two outlet pipes at the plant reflects the tendency to re-circulate the water into the river after it had been used, so that it could be used by other plants downstream. Due to its location upstream from the major steel plants in Youngstown, it was important for the Warren Works to re-release water back into the Mahoning to be used by the plants downstream. However, this continued industrial re-use of water created the problem of high water temperatures that plagued this part of the Mahoning River well into the second half of the twentieth century.

National Register Evaluation

Criterion A: The Republic Steel Warren Works Dam has historical associations with the steel industry in Warren Township and was once a part of one of the Mahoning Valley's most important steel industry plants, the Warren Works, operated by Trumbull Steel and later by Republic Steel. However, as a simple straight concrete weir in a mostly inaccessible point on the river, the dam is not a very distinctive resource and is not a very effective representation of the Mahoning Valley steel industry. The dam played a fairly minor role in the function of the Warren Works. The concrete outflow pipe may be a later addition to the dam. This dam is recommended as non-eligible for the National Register under Criterion A since it has a fairly low level of overall significance in the context of the Mahoning Valley steel industry, is a fairly poor representation of the Warren Works steel plant. The Ohio Iron and Steel Company Dam at Lowellville is an earlier, more intact example of a steel and iron industry check dam on the Mahoning River.

Criterion B: The dam does not appear to be associated with any persons of outstanding historical significance. It is not recommended as eligible under Criterion B.

Criterion C: As a simple concrete weir, this dam would have utilized technology that was standard for its time. No unusual or distinctive engineering features, techniques or materials were observed, and this utilitarian structure has no architectural or other aesthetic features. The dam is a common example of a standard dam type and is not distinctive or unusual, or representative of a specific style or mode of design of construction. This dam is recommended as non-eligible for the National Register under Criterion C as a common dam type that lacks distinction.

Criterion D: The dam does not show evidence of the possibility to yield more information. An archeological survey of the property has not been completed. The property is not recommended as eligible for the National Register under Criterion D.

Warren Water Works Dam (Tru-2742-17), Warren, Trumbull County, at Summit and Mahoning Avenues

Project Location and Description

This dam is located at R.M. 40.03, and is located northwest of downtown Warren, north of the intersection of Summit Avenue and Mahoning Avenue (Plate 19). The area to the west of the dam is a former water treatment plant site that is now vacant land. The area to the west of the dam contains a small park/overlook area, a parking lot, and a bar/restaurant. The area to the west of the bar and parking lot is a mixed-use area with commercial and industrial properties.

This site contains a number of components. The dam is a V-shaped concrete structure with a sloped concrete weir (Photos 20-21, 24). The V-shaped profile of the dam points north, which is upstream. The dam structure also includes an east abutment with a concrete river wall. The west end of the dam includes a large irregular concrete abutment. Immediately upstream from the west abutment, there is an opening for a spillway. There are two large metal gear wheels at the entrance to the spillway. The spillway passes by the dam and continues down the river. The spillway has a lower gate and a small tailrace below the gate. There are a number of concrete structures within the spillway as well. On top of the land wall of the spillway there is a one-story brick industrial style building with steel industrial windows, a corbelled brick cornice, and concrete copings (Photo 22). The building is somewhat deteriorated but appears to be largely intact on the exterior. A wall extending along the riverbank from the north end of the spillway forms the east wall of a large concrete basin that sits to the north of the brick building. Additional concrete basins sit to the west of the dam complex; these basins were likely associated with a water-treatment plant that formerly occupied the site. Some of the basins are deteriorated but still fairly intact, while some have been demolished.

Specific History

The site of the Warren Water Works has its origins as the city water plant of Warren, Ohio. Foreman indicates that the Warren Waterworks was built by Italian immigrants starting in 1887, but the water works appears on the 1884 Sanborn index map for Youngstown, although the specific site was not covered by an individual map sheet. Glasco indicates that the Warren Water

Company was incorporated in 1886, while the Warren Electric Light and Power Company was organized in 1889. The two companies were consolidated in 1904 (Glasco, 34). The 1889 Sanborn Maps of Warren indicated that the city had for its water system two duplex steam pumps and a 140-foot standpipe, with a capacity of 3 million gallons per 24 hours.

The 1893 Sanborn Map of Warren shows the powerhouse as a brick masonry building with a dynamo and pump equipment (Plate 22). Glasco also indicates that a dam was built at the site as part of the original 1880s development and that the first electric-arc streetlights for the City of Warren were powered by electricity generated at this site (ibid.). The 1893 Sanborn maps for Warren also show an arched dam at the site. By 1898, filtration beds and a small settling basin had been added to the complex on land adjacent to the dam, to the west of the pumphouse. The southern half of the pumphouse was occupied in 1898 by the Warren Water Company, and the northern half of the building was occupied by the Warren Electric Light and Power Company.

By 1902, the Warren Water Company had taken over the entire pumphouse building on the east (right) bank of the river (Plate 23). Meanwhile, the Warren Electric Light and Power Company had established a hydroelectric plant on the west bank of the river at the opposite end of the dam. The facility consisted of two intake pipes for the city water system, a spillway with a turbine, 8 dynamos, one 285 and one 600 horsepower engine. By 1915, the Trumbull Public Service Company, as it was now called, had added to their plant to provide for additional electrical generation (Plate 24). In 1920, the water works was sold to the City of Warren for \$687,500.00, but the utility kept its electrical generating plant on the west side of the river (City of Warren).

The 1922 Sanborn Maps indicate that the Warren Water Works had added a new filtration house on Mahoning Avenue and had constructed a larger settling basin to the north of the old pumphouse building. The 1937 U.S. Army Corps of Engineers map appears to show the dam with its present angled form (Plate 25). The 1950 Sanborn maps of the site show a large electrical power generation plant on the west bank owned by Ohio Edison (Plate 26). The small brick building visible at the dam site also appears on the 1950 Sanborn maps and is labeled as a screen house.

Today, the Warren Waterworks and the Ohio Edison plant have left the site. The buildings associated with Ohio Edison on the west bank of the river have all been demolished except for the brick screen house. On the east bank of the river, the settling basin and the original pump house are gone. The 1915-1922 filter house along Mahoning Avenue is still present, although it is fairly heavily altered (Photo 25). The 1928-1950 screen house is now vacant, while the filter house building is occupied by a bar and restaurant. The dam is still in place, and the concrete elements of the hydroelectric spillway appear to remain intact.

National Register Evaluation

Criterion A: This dam and the associated screen house and filter house are associated with the history of the City of Warren. The dam was either built to support the city's original 1884 water plant or built shortly thereafter. The spillway on the west side of the dam with its hydroelectric power features appears on historic maps as early as 1902. A large number of buildings on both sides of the river have been demolished. However, the concrete dam and hydroelectric spillway are still relatively intact. The presence of the mid-twentieth century screen house also adds to the

integrity of the site. The water plant filter house is also historically significant, but almost all original windows have been bricked in, and one bay of the building's Mahoning Street façade was demolished and replaced with plain cinder blocks. Based on this, it does not appear that the filter house has sufficient integrity to contribute to the site. The site is recommended as eligible for the National Register under Criterion A for its high level of integrity, and for associations with the history of public utilities in Warren, Ohio, and the early history of hydroelectricity, and water supply services.

Criterion B: The dam does not appear to be associated with any persons of outstanding historical significance. It is not recommended as eligible under Criterion B.

Criterion C: This complex is a group of resources complex representing a late nineteenth century concrete dam with a spillway equipped with hydroelectric turbines. The combination of a surviving early concrete dam paired with an early spillway set up to power a hydroelectric turbine is a distinctive representation of early public works engineering. This dam, the screen house and the spillway complex are recommended as eligible for the National Register under Criterion C as a good example of a late nineteenth century concrete dam equipped with a turn of the century hydroelectric spillway.

Criterion D: The dam does not show evidence of the possibility to yield more information. An archeological survey of the property has not been completed. The property is not recommended as eligible for the National Register under Criterion D.

Warren North River Road Dam (Tru-2743-17), Warren Township, Trumbull County

Project Location and Description

This dam is located on a bend in the Mahoning River at R.M. 42.99 (Plate 27). The dam is situated on the edge of the boundary between the City of Warren and Warren Township. The land south of the dam has been developed into a suburban neighborhood. The area immediately north of the dam contains a concrete outlet works with a small brick building that appears to be a pumphouse. This structure appears to date from ca. 1965-1980. North of the outlet works, there is a second structure that serves as the Franklin Substation of the Ohio Edison Company. North River Road sits to the north of the substation. The land immediately north of the dam is composed of mostly empty land, and an industrial plant is situated north of this tract. The boundary line between Warren Township and Champion Township, which sits to the north sits about 800' north of North River Road.

The dam itself is simply a low, linear weir of earth, gravel, and possibly slag, topped with natural rocks with a few concrete fragments mixed in (Photos 26-27). The rocks have irregular edges and show no sign of hand cutting or finishing. The stones do not appear to be mortared in place but sit loose in the riverbed on top of a bed of earth, gravel, and slag. Overall, this dam is little more than a linear pile of rocks and gravel strewn across the river. No abutments or any other concrete structures were observed.

Specific History

The site for Warren North River Road Dam was located too far north to appear on any of the U.S. Army Corps of Engineers maps of the Mahoning River in the Youngstown-Warren area dating to the 1930s. Since the area is outside the historical area of urban development for the City of Warren, Sanborn Insurance Maps also did not cover this site.

A real-estate atlas dating to 1899-1900 showed no dam at this site, and no mills or other buildings in the vicinity of the current dam site. The land north of the current dam site was shown on the atlas as a 114-acre farm tract belonging to Ester Gibbons. The land south of the dam was a 109-acre farm tract owned by F.A. Ernest (American Atlas Company 63). USGS Bristolville, Ohio, Quadrangle maps dating to 1905 and 1907 also do not show a dam or any other structures at or near this site. The earliest USGS map located that shows the dam and water intake structure is a 1970 photo-revised update of the 1960 Champion, Ohio, Quadrangle.

Current real-estate maps indicate that the south end of the dam sits within the River Estates subdivision, a suburban development that is divided into a series of small tract lots for housing. Trumbull County tax parcel maps do not show the dam (Plate 28). The land on the north side of the dam is currently a 334-acre tract owned by Warren Steel Holdings, Inc. (Warren Twp. Tax Map 6). Trumbull County real-estate records indicate that the tract was transferred from CSC Holdings, Inc. to Warren Steel Holdings on November 26, 2001 (Trumbull Co. OR 1066, p. 267-283). The prior deed reference for the property indicated that it was transferred from the Copperweld Corporation to Copperweld Specialty Steel for \$1.00 on June 30, 1973, and that the transaction involved a total of 502 acres. There was no prior deed reference listed.

The dam appears to have been constructed in association with the industrial plant to the north of the dam. This plant does not appear on the 1905 and 1907 USGS quadrangle maps for this area. It is not clear what, if any, purpose the dam is serving at this point.

National Register Evaluation

Criterion A: The Warren North River Road Dam is a pile of rocks and gravel/industrial-waste strewn across the Mahoning River to form a low weir that is not watertight. It is a very crude, makeshift, low dam. No major industries or mills appear to have been located in the area from 1900-1907. The dam appears to be a recent construction associated with the industrial plant to the north. The dam appears to have been built within the last fifty years and does not appear to have any important historical associations for Trumbull County, Warren, or the Mahoning Valley. This dam is recommended as non-eligible for the National Register because it is under fifty years old and has a very low level of historical significance.

Criterion B: The dam does not appear to be associated with any persons of outstanding historical significance. It is not recommended as eligible under Criterion B.

Criterion C: This dam is a simple, crude, structure that is essentially a small pile of rocks, gravel, and slag strewn across the Mahoning River. It has no distinctive design or engineering features. This dam lacks architectural and engineering distinction. As a crude utilitarian structure, it is recommended as non-eligible for the National Register due to its lack of engineering and aesthetic significance.

Criterion D: The dam does not show evidence of the possibility to yield more information. An archeological survey of the property has not been completed. The property is not recommended as eligible for the National Register under Criterion D.

SUMMARY OF RESULTS

Hardlines Design Company (HDC) completed its evaluation of the nine low-head dams from January-March 2004. After field examination of the resource and intensive literature research, HDC evaluated the dams for significance related to National Register criteria A, B, and C. Based on field examination and information gathered from literature review, the following conclusions were made.

Of the nine dams, two had historic associations with local nineteenth-century flour and saw mills, five were associated with the early- to mid-twentieth-century steel industry, and one dam was associated with city water supplies and hydroelectricity. One dam appeared to have associations with recent industrial infrastructure. Of the two dams with nineteenth century mill associations, the Girard Mills Dam (TRU-2744-24) was a fairly intact dam complex with a timber crib arch dam and remnants of nineteenth century locks. The second mill dam, the Homer Baldwin Mill Dam (MAH-1724-4) at Youngstown's Mahoning Avenue, appeared to be a twentieth-century stone-and-concrete rubble dam or possibly the ruins of a twentieth-century dam rebuilt on the site of an earlier mill dam.

Of the five dams associated with the twentieth-century steel industry, Youngstown's Carnegie Illinois Steel Ohio Works Dam (MAH-1725-4) at Center Street was a V-shaped concrete weir, and the Republic Steel Warren Works Dam (TRU-2741-17) at Warren's Main Street Substation was a straight, simple, concrete weir. The YS & T Dam (MAH-1723-5) at Bridge Street in Struthers consisted of the pier remains of a coke trestle with a concrete weir attached, and the Republic Steel Campbell Works Dam in Youngstown was a crude, low weir of unmortared rip-rap like sandstone chunks and concrete fragments. The Ohio Steel & Iron Company Dam (MAH-1722-10) in Lowellville was a series of 8 piers with two abutments and 10 sections of weir, all composed of concrete.

Of the two dams with nineteenth-century mill associations, the Homer Baldwin Mill Dam in Youngstown was recommended as non-eligible since it appeared to be a crude twentieth-century pile of concrete fragments and rubble stone on the site of the original mill dam. The Girard Mills Dam and associated structures are recommended as eligible for the National Register for associations with nineteenth-century mills, the early history of the City of Girard, early Mahoning River navigation, and as an example of a nineteenth-century timber crib arch dam with early

twentieth-century concrete repairs and modifications. Contributing elements to the Girard site include the arch dam, the west abutment, and the lock wall on the river's west bank. Only one dam and one mill site are listed on the National Register for Mahoning and Trumbull counties. The Girard Mills Dam therefore represents a resource type that is sparsely represented on the National Register for this area.

Of the five dams associated with the twentieth-century steel industry, four were found to be non-eligible for the National Register and one was found to be eligible. The Ohio Iron & Steel Company Dam in Lowellville was the oldest (ca. 1908-1915) and most distinctive of the dams, and had a very high level of integrity. It was cited as eligible for the National Register under Criterion A as the best preserved example of a steel/iron industry dam on the Mahoning River in the Youngstown-Warren area, and as a representation of the Mahoning Valley steel industry and its water supply needs. The Republic Steel Warren Works Dam in Warren Township, and the Carnegie-Illinois Plant Bridge in Youngstown were examples of simple, small, concrete low-head weirs. These dams are associated with the steel industry in Youngstown, but as simple concrete weirs, they do not appear to be a particularly good or distinctive representation of the steel industry in the Mahoning Valley, and the Carnegie-Illinois dam appears to have been partially reconstructed using a non-original design. The YS&T Dam in Youngstown was composed of a dam to which a coke trestle was added. This structure has lost its steel trestle and track structure, and associated steel mill buildings that provided the context for this structure have been demolished. It did not appear to have a high level of material integrity or integrity of setting. Finally, the Republic Steel Campbell Works Dam in Youngstown is also associated with a major steel plant in the Mahoning Valley, but as a weir/ruin of concrete and rocks, it is also a poor representation of the steel industry in the Mahoning Valley. All steel industry related dams except for the Ohio Iron and Steel Co. Dam at Lowellville were therefore recommended as non-eligible for the National Register. Only the concrete dam itself is recommended as a National Register-eligible resource at the Lowellville site. No historic buildings or other structures related to this dam were detected at its immediate site.

No intact early twentieth-century examples of concrete industrial water-supply dams have been listed on the National Register in Mahoning County. One intact industrial concrete arch reservoir dam, the 1926-1929 concrete arch McKelvey Dam near Youngstown, was recorded on the Ohio Historic Inventory for Mahoning and Trumbull counties. This dam was specifically built by the Ohio Water Service Company to provide water for the area's steel industry, but it is not listed on the National Register. Lake Hamilton Dam was built in 1906 by the Ohio Water Services Company, also to provide industrial water for the areas industries. Lake Hamilton Dam is listed on the National Register. This information indicates the existence of local industrial water supply dams that are larger than the Ohio Iron and Steel Co. dam at Lowellville. However, only one of these dams is listed on the National Register, and it is a stone masonry reservoir dam very different in character from the Ohio Iron and Steel Co. Dam. Due to scarcity of industrial water supply dams on the National Register listings for the area, eligibility of the Ohio Iron and Steel Company Dam as a particularly intact example of this property type is recommended.

The final two dams to be assessed were the Warren Water Works Dam at the intersection of Summit and Mahoning Avenues in the City of Warren, and the Warren North River Road Dam, located in a mixed-use suburban/industrial area north of the City of Warren in Warren Township. The Warren Water Works Dam is recommended as eligible for the National Register for

associations with the early history of electric and water utilities and as an example of a nineteenth-century water supply dam with an early hydroelectric spillway. This dam appears on maps as early as 1900 and may have been built as early as 1889. Resources recommended as National Register eligible are the concrete dam, hydroelectric spillway, and the brick one-story screen house on the river's west bank. The filtration house on Mahoning Avenue on the east bank did not have sufficient integrity to contribute effectively to the site.

The Warren North River Road Dam is recommended as non-eligible since it is a simple pile of rocks, gravel and slag in the river. Maps indicate that it is not associated with any of Trumbull County's early industries. This dam appears to be related to recent utility and industrial construction.

Overall, six (6) dams were recommended as non-eligible for the National Register, mostly due to lack of historic significance or loss of integrity and/or context. Three dams were recommended for the National Register, two in Trumbull County and one in Lowellville, Mahoning County. The three properties recommended as eligible are:

- The Girard Mills Dam in Girard
- The Warren Water Works Dam in the City of Warren
- The Ohio Iron and Steel Co. Dam in Lowellville

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