FINDING OF NO SIGNIFICANT IMPACT

PROPOSED DREDGING OF WHEELING CREEK
WHEELING, WEST VIRGINIA

As directed in the Fiscal Year 2001 and 2002 Energy and Water Development Appropriations Acts, and under authority of the Rivers and Harbors Act of March 3, 1827, the Pittsburgh District, U.S. Army Corps of Engineers is proposing to dredge the lower 1.5 miles of Wheeling Creek to enable boats to access Tunnel Green Park from the Ohio River. The proposed project is in conformance with the Heritage Port concept described in The Plan for the Wheeling National Heritage Area. An accessible Wheeling Creek is a key component of the Heritage Port concept because of its historical significance to the city, its value as an interpretive venue in the downtown area, and its potential use as a "water trail" linking the waterfront to Tunnel Green Park.

Under the National Environmental Policy Act, the District prepared and circulated a draft Environmental Assessment (EA) for the proposed action in June 2003. The District coordinated the draft EA with the U.S. Fish and Wildlife Service, the West Virginia Division of Natural Resources, the West Virginia State Historic Preservation Officer, and with other interested governmental and non-governmental parties. Comments received on the draft EA were addressed in a final EA. Copies of the final EA will be sent to those who received a copy of the draft report. In addition a notice of availability of the final EA has been added to the Pittsburgh District, Corps of Engineers website (www.lrp.usace.army.mil).

The Environmental Assessment considered two potential methods (mechanical and hydraulic) for accomplishing the proposed dredging and a "no action" alternative that would maintain the current shallow condition of lower Wheeling Creek. "No action" was ultimately rejected because it would lead to additional siltation and greatly limit small watercraft navigability on lower Wheeling Creek.

The Corps' construction contractor will have the option of selecting one of the above methods to conduct the dredging. The proposed dredging is considered to be a unique action that differs from the typical maintenance dredging that the Corps conducts on the Ohio River navigation system. The latter dredging was addressed in an Operation and Maintenance Environmental Impact Statement on the Ohio River that the Corps filed with the U.S. Environmental Protection Agency in February 1980.

The project complies with all applicable environmental laws and with Section 106 of the National Historic Preservation Act. Potential impacts have been assessed with regard to floodplains, vegetation, fish and wildlife habitat, regulated hazardous wastes, hydrology, water quality, wetlands, endangered species, cultural resources, scenic rivers, air quality, noise, and socio-economic resources. No Federally-listed endangered or threatened species of wildlife or vegetation, nor any State-designated species, are known to occur in the project area.

Based on an evaluation of the EA, it is my opinion that the proposed dredging project is not a major Federal action significantly affecting the quality of the human environment.

Considering all beneficial and detrimental aspects relating to this work, I have reasonably determined that there will not be any significant adverse impacts and that the public interest will be best served by completion of this project. The preparation of an Environmental Impact Statement under the National Environmental Policy Act is not warranted.

This Finding of No Significant Impact will precede a final decision on the proposed action.

February 17, 2004
Date

/s/
Raymond K. Scrocco
Colonel, Corps of Engineers
District Engineer

FINAL
ENVIRONMENTAL ASSESSMENT

PROPOSED DREDGING
OF
WHEELING CREEK
CITY OF WHEELING
OHIO COUNTY, WEST VIRGINIA

U.S. Army Corps of Engineers
Pittsburgh District
William S. Moorhead Federal Building
1000 Liberty Avenue
Pittsburgh, Pennsylvania 15222

January 2004

TABLE OF CONTENTS

FINAL
ENVIRONMENTAL ASSESSMENT

Proposed Dredging of
Wheeling Creek, West Virginia

1.0 BACKGROUND AND NEED FOR ACTION

1.1 Study Purpose
The proposed action is to remove accumulated silt and sediment by dredging the lower section of Wheeling Creek to enable boats to access Tunnel Green Park from the Ohio River. As required by the National Environmental Policy Act of 1969, the Pittsburgh District prepared this environmental assessment (EA), which describes the proposed project, the present environmental site conditions of the project area, alternatives to the recommended plan, and project-related impacts expected to occur should the project be implemented.

1.2 Study Authority
Authority for the Corps to perform this project is contained in the FY 2001 and 2002 Energy and Water Development Appropriations Acts as follows: Page 177, Conference Report 106-988 which accompanies H.R. 4635, under "Operations and Maintenance" states: "Provided further, that $500,000 of the funds appropriated herein for the Ohio River Open Channel, Illinois, Kentucky, Indiana, Ohio, West Virginia, and Pennsylvania Project are provided for the Secretary of the Army, acting through the Chief of Engineers, to dredge a channel from the mouth of Wheeling Creek to Tunnel Green Park in Wheeling, WV." Pages 6-7 of Conference Report 107-258, which accompanies H.R. 2311 for FY 2002, contains identical language as above except a specific amount was omitted. The tables in the FY 2002 legislation provided an additional $2,000,000 for a total appropriated amount of $2,500,000. Ohio River Open Channel work is authorized by the Rivers and Harbors Act of March 3, 1827, as amended. Since this would be operations and maintenance (O&M) work, no cost-sharing sponsor is required.

1.3 Study Area Location
Wheeling Creek is located in the Northern panhandle of West Virginia and enters the left descending bank of the Ohio River near river mile 90.8 at the City of Wheeling, in Ohio County (see FIGURE 1). The project area includes the confluence of Wheeling Creek and the Ohio River and extends approximately 1.5 miles upstream to Tunnel Green Park. The park is a small day-use facility with a ball field and tennis courts owned by the city (see FIGURES 2 and 3). This portion of Wheeling Creek lies within the pool backwater zone established by the Hannibal Locks and Dam. The proposed project will permit boaters to reach Tunnel Green Park from the Ohio River.

1.4 Agency Coordination and Consultation
Early coordination was conducted with agencies having responsibilities for and jurisdiction over resources in the Wheeling Creek project area. The Pittsburgh District

coordinated both formally and informally with the West Virginia Division of Natural Resources, the U.S. Fish and Wildlife Service, and the West Virginia State Historic Preservation Officer. Copies of formal correspondence with these agencies are in APPENDIX A. Copies of the draft environmental assessment were sent to these agencies for review and comment by letter dated June 12, 2003. This final environmental assessment has been modified to address all comments received.

2.0 EXISTING ENVIRONMENT

2.1 Physiography/Topography

West Virginia lies within the general geographic region of the United States known as the Appalachian Mountain System, which extends from Vermont to Alabama. Within the state are two physiographic provinces, the Ridge and Valley province in the extreme east and the Appalachian Plateau immediately to the west. Approximately 83% of the state lies within the Appalachian Plateau. The Appalachian Plateau in the Western portion of West Virginia rises and falls irregularly across a succession of deep "V"-shaped river valleys separated by steep sided upland areas creating dendritic drainage patterns.

As seen in FIGURE 3, the topography of the left descending bank of Wheeling Creek is extremely steep-sided from the upper limit of the proposed dredging across from Tunnel Green Park down to where Route 250 crosses the stream in the lower portion of the project area. Elevations along the left bank range from approximately 1200 feet above National Geodetic Vertical Datum (NGVD) on the surrounding hilltops to approximately 620 feet above NGVD at the stream surface. The relief exhibited on the right bank, although still somewhat hilly, is less severe, and contains a major portion of the City of Wheeling.

2.2 Hydrology and Other Watershed Characteristics

The drainage area of Wheeling Creek is 298 square miles. The creek is formed by the merging of Dunkard Run and Enlow Fork near the Pennsylvania-West Virginia state line and flows northwest for approximately 28 miles to its confluence with the Ohio River. At its mouth, the Wheeling Creek embayment is about 12 feet deep, and the normal pool elevation created by the Corps of Engineers Hannibal navigation dam is 623 feet above National Geodetic Vertical Datum (NGVD). The Wheeling Creek watershed can be divided into four sub-watersheds: Big Wheeling Creek, Middle Wheeling Creek, Little Wheeling Creek, and the mainstem Wheeling Creek. The watershed is located in Marshall and Ohio Counties, West Virginia (covering 191 square miles) and Greene and Washington Counties, Pennsylvania. The watershed empties into the Ohio River in Ohio County, West Virginia and extends southward into Marshall County, West Virginia (Big Wheeling Creek) and eastward into Pennsylvania to encompass Middle Wheeling and Little Wheeling Creeks. The watershed is typical of eastern United States watersheds in that within its boundaries one can find agriculture, extractive mining, urban settlement, dredging activities, and dams. The watershed is far from pristine due to long-term and cumulative urban, industrial, and agricultural impacts. The Natural Resources Conservation Service has constructed seven single-purpose floodwater-retarding dams in the basin. Five dams are located in West Virginia and two are located in Pennsylvania.

2.3 Hazardous, Toxic, and Radiological Waste Analysis

2.3.1 Stream Sediment Analysis

In April 2002, the District completed an analysis of stream sediments within the Wheeling Creek project area to characterize the accumulated streambed materials scheduled for removal. This analysis included testing for the following hazardous, toxic, and radiological waste (HTRW) parameters:

a. Petroleum Contamination Testing [Gasoline Range Organics (GRO) and Diesel Range Organics (DRO)]
b. Volatile Organics (soils only)
c. Semi-volatile Organics
d. Target Analyte Metals (Totals)
e. PCBs, Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260
f. Pesticides.

In addition to chemical testing for HTRW, the District analyzed the material to characterize its physical (geotechnical) characteristics. The purpose of this analysis was to determine if it could be reused for other purposes after removal from the stream.

2.3.1.1 Testing Results – Chemical

TABLE 1 is a summary of the chemical analysis comparing the soils at the proposed disposal site to the sediments that would be removed from Wheeling Creek and placed upon the disposal area. The table also provides the Environmental Protection Agency (EPA) standard limits for these chemicals at residential and industrial sites.

Polychlorinated biphenyls (PCBs) and pesticides were detected within the disposal site soil samples and stream sediment samples. However, they were present at levels below EPA's risk-based concentration standards for residential sites.

2.3.1.2 Testing Results – Geotechnical

Geotechnical testing indicates that the creek bed material largely consists of a poorly-graded to well-graded gravel with sand that is fairly uniform in characteristics over the length of the creek where the proposed dredging would occur. Reusing this free draining material as fill to backfill holes and low-lying areas and as a good check base for roads or building foundations after it has drained is feasible.

2.4 Aquatic Resources of Wheeling Creek

2.4.1 Fishery

Corps of Engineers personnel from the Pittsburgh District assessed the fishery resources within Wheeling Creek on the night of June 11, 2002 by conducting four ten-minute electrofishing surveys at four stream segments between the

Tunnel Green Park trail bridge and the Ohio River. The survey entailed 40 minutes of electrofishing covering a distance of 2,760 feet. A total of 138 fish weighing 19.17 kilograms were collected. All 24 fish species collected were relatively common and found in medium-sized to large Ohio River tributaries. This investigation found no federally listed endangered or threatened species. Complete results are in Appendix B.

2.4.2 Water Quality

Wheeling Creek confluences with the left descending bank of the Ohio River, at river mile 90.8, in urbanized, downtown Wheeling, WV, and the drainage area is 298 square miles. Between its confluence with the Ohio River and approximate stream mile 0.9, Wheeling Creek forms a backwater embayment, which is about 12 feet deep at its mouth. As previously stated, through legislation adopted in FY 2001, Congress authorized the U.S. Army Corps of Engineers (USACE) to dredge a channel along lower Wheeling Creek. The project would extend from the mouth of Wheeling Creek (stream mile 0) upstream to Tunnel Green Park (stream mile 1.5).

Wheeling Creek has suffered from a plethora of urban, industrial, and agricultural problems, including: acid drainage from abandoned mines; waste water treatment effluent; failing septic systems; septic waste seepage; combined sewer overflows; agricultural runoff; hazardous, toxic, and radiological waste problems, and urban runoff (Ref. 1). While USACE collected no water quality data in support of this project, others have collected data throughout the Wheeling Creek basin. As presented in TABLE 2, water quality surveys have been conducted by the WV Department of Environmental Protection (WV DEP), Division of Water and Waste Management since 1993 (Ref. 2); the Department of Biology, Wheeling Jesuit College (WJC) (Ref. 4); and the City of Wheeling, WV (Ref. 5). USACE collected fishery data for the Wheeling Creek project in 2002 (Ref. 9) and both the WV DEP (Ref. 2) and WJC (Ref. 4) collected benthic macroinvertebrate data along Wheeling Creek, in 1993 and 2000, respectively (Table 3). Although these data may not be totally comparable since methodologies, sampling frequency, and parameters analyzed are somewhat different, general characterization of stream water quality within the project area was possible.

Wheeling Creek has been included on West Virginia's Section 303 (d) list of impaired waters, primarily because of sewage pollution and potential contamination by PCBs. Once impaired water bodies are identified, they are prioritized based on the severity of pollution and the uses (such as aquatic life, recreation, or water supply) of the water. The WV DEP must develop a restoration plan, called a "Total Maximum Daily Load" (TMDL), for each impaired water segment. The TMDL of a stream is the total concentration of a pollutant assimilated by the receiving water while still achieving water quality standards. TMDLs consist of the sum of individual wasteload allocations for point sources, load allocations for non-point sources, and natural background levels. The Ohio River Valley Water Sanitation Commission (ORSANCO)

developed the Ohio River TMDL report on behalf of EPA Region III. A TMDL lawsuit settlement agreement and consent decree required that West Virginia develop TMDLs for 44 priority waters included on West Virginia's 1996 Section 303(d) list by September 30, 2002. (Ref. 6).

As discussed earlier, the Texas Eastern Holbrook Compressor Station, an historic non-point source of PCB pollution and a permitted discharger, is located in the headwaters of the Wheeling Creek basin. Specifically, it is located in Richmond Hill, Greene County, PA. A statewide Consent Order and Agreement (CO&A) required Texas Eastern to remove PCB contaminated soil, and to collect and treat contaminated groundwater. The facility currently discharges treated groundwater to Dunkard Fork Creek, a tributary of Wheeling Creek (Ref. 7).

The WV DEP conducted the first of a 5-year rotational water quality survey for development of the Wheeling Creek TMDLs on July 31, 2000 (Ref. 2). Samples were collected at Wheeling Creek mile 3.3, which is a cleaner, less urbanized stream point than that of the Wheeling Creek dredging study reach (mile 0 to 1.5). The TMDL report was not yet complete, but raw biological and chemical data was available (Ref. 2). In addition, the Hilsenhoff Family Biotic Index (HFBI), a biological matrix that characterizes macroinvertebrate communities, and the West Virginia Stream Condition Index (WVSCI) score, a sum of results of multiple macroinvertebrate matrices utilized to characterize and classify stream quality, were also available (Ref. 4).

The WV DEP also collected chemical and macroinvertebrate data from, and developed a WVSCI score for Kings Creek at mile 2.2 in 2000. In addition, USACE conducted fish and macroinvertebrate surveys at Kings Creek and developed environmental quality metrics, including the HFBI and the Index of Biotic Integrity (IBI), in 1995. These indices characterized fish species diversity and populations (Ref. 8). Water quality data utilized for this USACE survey were collected by the U.S. Geological Survey (USGS) during 9 surveys conducted between 1992 and 1993. Parameters analyzed and results of chemical analyses for both surveys are presented in Table 2 and a summary of the results of biological surveys is presented in Table 3.

The WVSCI scores for both Wheeling and Kings Creeks were very comparable: with scores of 62.16 and 62, respectively, where a score of 60.6 is on the threshold of impairment. As seen in TABLE 3, although these scores were barely above the impairment level, neither Wheeling Creek at mile 3.3 nor Kings Creek at mile 2.2 can be considered degraded.

The Hilsenhoff Family Biotic Index scores also show that, while macroinvertebrate communities of both streams were similar, rated good to moderately degraded, that of Wheeling Creek was a bit healthier. Macroinvertebrate diversity was also similar for both streams (25 taxa for Wheeling Creek vs. 27 for Kings Creek), but abundance was greater in Kings

Creek (179 vs. 26 organisms/square foot) and the percent of organisms intolerant to pollution was greater in Wheeling Creek (68% vs. 17%).

In June 2002, the USACE conducted a fishery survey along four separate reaches of Wheeling Creek located throughout the project area (Ref. 9). The overall IBI score for all four reaches was 40, a good rating where streams with an IBI score of 50 to 60 are considered exceptional quality and a score below 16 is considered poor. Kings Creek at mile 2.2 supported an exceptional value, cool/warm water fishery, with IBI score of 60, even though water quality and the invertebrate community were considered somewhat stressed (Ref. 8). In spite of these differences in IBI scores and productivity, fish community diversity was comparable between the two streams, with 24 species of fish observed within the Wheeling Creek study reach, and 23 species at Kings Creek. We attribute this to the fact that, while transient Ohio River fish utilized both streams, most of the Wheeling Creek survey was conducted within the Wheeling Creek embayment of the Ohio River. Ohio River transients were considered to comprise 45 percent of the fish species observed along Wheeling Creek (11 out of 24), while only 21.7 percent of the species observed along Kings Creek were considered transients (5 out of 23). Had fish surveys been conducted upstream of Wheeling Creek mile 2.5, the Wheeling Creek IBI score may have been more comparable to that of Kings Creek. Results of the USACE fishery survey, by sample reach rather than overall, supports this supposition, since the highest catch rates and diversity were observed in the upstream section of the project reach while lower catch rates and diversity were observed further downstream (Ref. 9).

Kings Creek is characterized as a good quality, moderately mineralized, hard, and alkaline stream relative to other local streams draining the Appalachian Plateau (Ref. 8). At mile 3.3, Wheeling Creek water quality is comparable to Kings Creek, and can be characterized as good to slightly stressed, moderately mineralized and hard, and alkaline. In May and June 1993, WJC conducted a one time, water quality and biological survey of the Wheeling Creek basin, collecting water quality samples at 110 sites located throughout the watershed, and benthic macroinvertebrate samples at 98 sites (Ref. 4). One of WJC's sampling sites was located at stream mile 1, near the upstream end of our project reach in Tunnel Green Park. Water quality data presented in TABLE 2 were collected from this site and from sites located upstream to Wheeling Creek mile 3. Biological data from these same locations are shown in TABLE 3.

As can be seen in these tables, even though only a few samples were collected throughout our study reach, a trend towards degradation of both water quality and the macroinvertebrate community downstream from the WV DEP's sampling site at mile 3.3 was apparent. In fact, results of the WJC survey revealed that Wheeling Creek at mile 3.0 was one of the higher quality sites on the Wheeling Creek mainstem (Ref. 4). This is not surprising considering that, downstream of stream mile 3, the Wheeling Creek watershed level of urbanization reflects increasing levels of sewage pollution. Between stream miles 3 and 1, percent

saturation of dissolved oxygen, total number of organisms, total number of taxa, and total number of intolerant organisms decreased, while conductivity and alkalinity increased.

In addition, data collected by the City of Wheeling, WV also demonstrated a trend towards decreasing water quality from upstream to downstream throughout the project reach. In accordance with their NPDES permit for control of point source pollution issued by WV DEP, the City of Wheeling completed a report on the impacts of the City's combined sewer overflows (CSOs) on the water quality of Wheeling Creek in 1998 (Ref. 5). A total of 211 combined sewer overflows (CSOs) were identified in the Wheeling Creek basin, 29 of which were located along the 1.5-mile long study reach. To document impacts of these CSOs and leaking sanitary sewers (SSOs) on receiving waters, 38 water quality surveys were conducted between August 1993 and January 1998. Twenty-one were conducted during dry weather and 17 during wet weather. Seventeen sampling sites were selected throughout the entire Wheeling Creek basin, including tributaries, the Ohio River mainstem, and CSO outfalls.

Results of analyses from only two of the City of Wheeling's sampling sites will be analyzed here: the first located at the downstream end of the Wheeling Creek dredging project area, stream mile 0.1, at the Main Street bridge (WC 4) and the second located at stream mile 1.3, upstream of the project reach (WC 1). TABLE 4 presents parameters analyzed and results of statistical analyses comparing upstream and downstream water quality during both wet (CSOs) and dry (SSOs) weather. In addition, results were compared to criteria for the waters of WV, established by Title 46, Series 1 of Legislative Rules, where designated uses include public water supply, protection and maintenance of fish and other aquatic life, and water contact recreation. To facilitate comparison with Wheeling Creek data collected by others, a summary of this data is also included in TABLE 2.

As can be seen in TABLE 4 and as would be expected in sewage polluted waters, during both dry and wet weather, biochemical oxygen demand (BOD), total coliform, fecal coliform, ammonia nitrogen, and total oil and grease increased in a downstream direction throughout the project reach. The highest concentrations of these parameters occurred during wet weather, likely attributable to CSO contributions, but the greatest differences between upstream and downstream sampling stations occurred during dry weather, likely attributable to SSO contributions. During both wet and dry weather, fecal coliform and ammonia nitrogen occasionally exceeded state water quality criteria. Metal concentrations, including lead, copper and cadmium, were elevated both upstream and downstream and generally exceeded state water quality criteria during both wet and dry weather, possibly attributable to mine drainage from basin tributaries. Dissolved oxygen also occasionally dropped below the state minimum criteria of 5 mg/l at both the upstream and downstream sampling sites during wet weather.

Although impacts to Wheeling Creek water quality may be from drainage from reclaimed mine tailings located in basin tributaries or PCB contamination from the Texas Eastern Holbrook Compressor Station (Ref. 7), sewage pollution is likely the primary cause of degradation. As mentioned earlier, 211 combined sewer overflows (CSOs) were identified in the Wheeling Creek basin, 29 of which were located along the 1.5-mile long study reach (Ref. 6).

While no water quality surveys were conducted in conjunction with the Wheeling Creek dredging project in 2002, USACE did conduct an assessment of the lower Wheeling Creek fishery. Additionally, water quality and macroinvertebrate community surveys have been conducted by the WV DEP (Ref. 2), the Department of Biology, WJC (Ref. 4), and the City of Wheeling, WV (Ref. 6). Although these data may not be highly comparable, since methodologies, sampling frequency, and parameters analyzed are somewhat different, general characterization of stream water quality within the project area was possible.

Compared to another Ohio River tributary, Kings Creek, the water quality of Wheeling Creek at stream mile 3.3 can be characterized as slightly stressed, moderately mineralized and hard, and alkaline. Biological indices developed by the WV DEP also indicate that the stream in this reach is good to moderately stressed and data collected by both the City of Wheeling and WJC clearly demonstrate that Wheeling Creek at mile 3.0 was one of the higher quality sites on the mainstem. However, downstream of this site, as the watershed becomes more urbanized with increasing levels of sewage pollution, chemical and biological data both demonstrate a distinct trend towards decreasing water quality. Between a site located at the upstream end of the project reach (stream mile 1) and a site located at the mouth of Wheeling Creek (stream mile 0.1), BOD, total coliform, fecal coliform, ammonia nitrogen, and total oil and grease all increased during both wet and dry weather, as would be expected in sewage polluted waters. In addition, dissolved oxygen occasionally dropped below the state minimum criteria of 5 mg/l during wet weather and fecal coliform and ammonia nitrogen occasionally exceeded state water quality criteria during both wet and dry weather.

In spite of high levels of sewage pollution, the fish community rating of lower Wheeling Creek was good, which was much better than expected. Fish diversity was exceptional, likely attributable to the fact that the Wheeling Creek embayment is heavily utilized by transient Ohio River fish.

2.4.3 Benthic Macroinvertebrates – Mussel Survey

The Corps of Engineers performed a mussel survey of the Wheeling Creek project area in the early fall of 2001. The sampling area included the 1.5-mile reach between the Ohio River and Tunnel Green Park; an additional 1.0 mile upstream of the park; and approximately 0.5 mi of the left descending bank of the Ohio River (River Miles 90.8 to 91.3) immediately downriver of the mouth of Wheeling Creek. The survey consisted first of a preliminary reconnaissance of

the entire area by boat and by foot to gather empirical evidence of mussels. After this initial overview, sites were searched for mussels using waders in water less than 0.5 meters and with divers for waters deeper than 0.5 meters.

A total of six hours (actual search time) were expended searching for mussels at 11 sites in the Ohio River and in Wheeling Creek downstream of Tunnel Green Park. Nine mussels and six species were collected at these 11 sites. All mussels retrieved were common in small to medium sized rivers in the central United States. We found no federally listed endangered or threatened mussel species. Approximately 3 hours were spent looking for mussels upstream of Tunnel Green Park. No live mussels or shells were found in this stream reach.

2.5 Terrestrial/Riparian Flora and Fauna and Wetlands

The District conducted a cursory survey of riparian vegetation present within the Wheeling Creek project area on May 30, 2001. The survey focused primarily on the riparian areas lying between the stream channel and the ordinary high water line (approximately 6 vertical feet above the stream channel).

2.5.1 Survey Methods

As seen in FIGURE 4, a total of eight sampling sites were selected where access was available, primarily at bridges and sewer line crossings. Sites were located along the left descending bank at stream miles 0, 0.01 to 0.1, 0.11, 0.2, 0.25, 0.5, 0.9, and 1.45 to 1.5. The upstream end of the project reach was observed from the former C&O Railroad Bridge located at stream mile 1.6. We noted floral species distribution patterns, diversity, and relative abundance at each inspected site.

All unique vascular plants were keyed to species, with nomenclature according to *Grays Manual of Botany* (Ref. 11). We estimated the relative abundance for each species as dominant, locally dominant, abundant, locally abundant, common, scattered, or few. We obtained verbatim habitat characterizations and information on regional distribution for each species from regional botanical manuals, *The Flora of West Virginia* (Ref. 12), and *The Plants of Pennsylvania* (Ref. 13). Wetlands were classified according to the U.S. Fish and Wildlife Service's (USF&WS) *Classification of Wetlands and Deepwater Habitats of the United States* (Ref. 14).

The USF&WS national wetland inventory indicator was noted for each plant species. According to the USF&WS, "Plant species that occur in wetlands, as used in the *National List,* are defined as species that have demonstrated an ability to achieve maturity and reproduce in an environment where all or portions of the soil within the root zone become, periodically or continuously, saturated or inundated during the growing season" (Ref. 15). The USF&WS developed a wetland fidelity system where obligate (OBL) species are those restricted to wetlands (>99%); facultative wet species (FACW) are those that usually occur in wetlands (67-79%); facultative species (FAC) are those that equally occur in wetlands and non-wetlands (34-66%); and facultative upland plants (FACU) are

species that usually occur in non-wetlands (67-99%) but are occasionally found in wetlands (1-33%).

Percent dominance of plant communities by exotic species was estimated because increasing numbers of exotic species are indications of degraded ecosystems. Aggressive invasive exotic species tend to colonize disturbed areas, out competing native species while offering lower habitat value. Exotic species can readily out-compete native species in disturbed areas and since riparian areas are naturally disturbed, they are particularly vulnerable to invasion by exotic plants. For comparison, of the 3,400 different kinds of vascular plants found growing spontaneously in Pennsylvania, 33% are believed to be exotic (Ref. 13). Locally, in highly disturbed areas, exotic plants may represent a much higher percentage of the total flora.

We also noted habitat condition and presence of wildlife during the survey.

2.5.2 Survey Results

2.5.2.1 Riparian Environment – Wheeling Creek

The banks along Wheeling Creek in the project area are very steep, consist of fill in many places, and along the first 0.9 miles are generally supported by sandstone walls. In addition, only a few sandbars were observed. A large wooded sandbar was located along the left descending bank between mile 0.1 and 0.2. In addition, two sparsely vegetated, 50-foot long sandbars were located on the insides of meanders, along the right descending bank near miles 0.8 and 1.0. A non-vegetated sandbar was located at the upstream end of the project area, in Tunnel Green Park, downstream of the old C&O Railroad (now a rails-to-trails path). Broad, vegetated shoreline benches were located only near Tunnel Green Park (upstream of mile 1).

Few emergent wetlands or aquatic beds were observed in the study area. Narrow bands of reed canary grass were randomly located along stream edges and two very small, sparse water willow dominated aquatic beds were observed growing on the sandbars at miles 0.8 and 1.0. All are classified as riverine emergent wetlands according to the USF&WS.

The floodplain forest plant community was similarly structured throughout the study reach, with a total of 70 plant species observed. Riparian areas of non-impaired regional streams generally support greater than 200 plant species, so comparatively, diversity along the Wheeling Creek study area was very low. As many as 241 plant species were identified even in the riparian corridor of Nine Mile Run, a degraded urban stream tributary to the Monongahela River in Allegheny County, PA (Ref. 16). However, the canopy of the Wheeling Creek riparian area is mature and moderately diverse. A total of 14 species of trees were identified in the canopy, of

which 21% were exotic species, dominated by the native species black willow, boxelder, sycamore, cottonwood, and silver maple. Of note were the mature cottonwood trees, abundant along the left descending 0.4 miles of stream along both the top of the sandstone wall and on the sandbar. Many of these trees had a diameter at breast height (dbh) > 12 inches. The understory was generally less healthy, dominated by exotic species (primarily Japanese knotweed), and, as expected, became more diverse as one moved upstream and away from the more urbanized mouth. Thirteen woody species were identified in the sub-canopy (23% exotic). Dominant sub-canopy species included native dogwood, spicebush, poison ivy, common elder, slippery elm, and grapes, and exotic common privet. Additionally, 42 species of ground cover were identified, of which 60% were exotic. Dominant ground cover species included native touch-me-not, snakeroot, and exotic garlic mustard.

2.5.2.2 Upland Environment – Disposal Area at Celeron Plaza

Celeron Plaza - The vegetation at Celeron Plaza has been completely disturbed by past industrial development. At one time, the Plaza supported five rail lines. Although the tracks are no longer present, the abandoned railroad bridges that cross Wheeling Creek from the Plaza are evidence that they existed. Three of the bridges are in a state of disrepair. The fourth bridge, which is nearest the stream mouth, was rehabilitated and now a walking trail traverses it. The fifth bridge was associated with an elevated rail line located at the back (landward) side of the Plaza. The cut stone, bridge abutments, and supporting walls remain intact but the bridge itself is removed. The surface soils are typical of former industrial sites and include waste gravels from old concrete, and asphalt. Planted grass is growing sparsely on the majority of the site. The landward-most portion of the Plaza has been paved with asphalt for a parking lot.

2.5.2.3 Birds and Wildlife

At least 17 species of birds were casually observed along the riparian corridor of Wheeling Creek during this survey and evidence of three mammal species was noted. Additional information is provided in Appendix D.

2.6 Threatened and Endangered Species

No federally listed endangered or threatened species or species of concern were observed during the May 30, 2001 survey. The USF&WS identified four listed species in the Ohio River Islands National Wildlife Refuge (ORINWR): bald eagle, Indiana bat, pink pearly mussel, and fanshell mussel. In 2001, the Corps of Engineers Waterways Experiment Station (WES) observed 6 species of mussels in the Wheeling Creek study area, none of which were listed as either endangered or threatened (Ref. 18). The USF&WS also located 39 plant species of special status within the ORINWR, none of which was observed along Wheeling Creek.

2.7 Cultural Resources

The District Archeologist conducted a pedestrian reconnaissance of the project area in September 2002. At the mouth of Wheeling Creek, there are five extant abandoned railroad bridges, including one at the confluence with the Ohio River that has been recently rehabilitated and put in use as part of a Rails-to-Trails project [At one time, this area contained several sets of tracks that spanned Wheeling Creek (following the Ohio River)]. All five of these bridges are supported by a single central pier in the middle of the creek. Immediately east of these bridges is the Celeron Plaza disposal area. All dredged material will be placed at this location. Observations along a maintenance road leading from Celeron Plaza to an existing manhole along the Ohio River indicate that the entire profile of this parcel consists of fill.

Between the Ohio River and the project terminus at Tunnel Green Park, there are several additional road crossings over the creek and another abandoned rail line located approximately 2,500 feet upstream from the mouth of the creek. The bridge piers will be protected as part of this project by the placement of stone rip-rap. Industrial development and flooding have heavily altered both banks of Wheeling Creek. As a result, large sections of this portion of the valley consist of high sandstone block walls.

The area currently known as Tunnel Green Park was once the location of the community of Goosetown. It was relocated and the structures were razed as part of the State Route 2 expansion project in the 1960s. A temporary access ramp from the parking lot of the park to the creek will be constructed for construction access. The parking lot will also be utilized as a contractor's laydown area.

2.8 Air Quality

As identified in the Comprehensive Conservation Plan for the Ohio River Islands National Wildlife Refuge (Ref. 17), most areas within and adjacent to the upper Ohio River segment from Mile 0 (Pittsburgh, PA) to Mile 437 (Meldahl Dam) currently meet Federal air quality standards for the six "criteria pollutants," which are ozone, carbon monoxide, sulfur dioxide, particulates, lead, and nitrogen oxides. Non-attainment areas (defined as an area that does not meet national primary or secondary ambient air quality standards, or that contributes to ambient air quality in a nearby area that does not meet standards) are located in Beaver County, PA (part of the Pittsburgh-Beaver Valley ozone non-attainment zone) and in Boyd County, KY. The project area is not identified as part of a non-attainment area.

2.9 Prime Farmlands

The project area is primarily urban. No prime farmlands are present.

2.10 Socio-Economic Conditions

2.10.1 Population/Demographics

According to data from the 2000 U.S. Census, the City of Wheeling has a population of 32,541. The City is located within Ohio County, which has a population of 47,427. Nearly 70% of the population of Ohio County is located

within Wheeling. Within Ohio County, the population consists of 25,250 (53.2%) females and 22,177 (47%) males. The median age of Ohio County residents is 40.6 years. Twenty three percent of the population were 65 years and older. In 2000, there were 19,733 households in Ohio County. The average household size was 2.27 people. According to a 1997 model-based estimate for Ohio County, median household income was $31,941; persons below the poverty level totaled 13.5%, with 20.3% of children living below poverty. Since 1960, there has been a net out-migration of persons with the greatest population decline occurring in the 1980's, caused by the loss of steel manufacturing jobs.

2.10.2 Environmental Justice

Executive Order 12898 requires that extensive outreach and opportunity for involvement will address concerns of all communities and that minority residents and low-income residents receive fair and equitable consideration for any potential adverse health and environmental effects from proposed actions. Demographic information indicates no differential impact based on cultural factors.

2.10.3 Economics and Employment

In Ohio County, in 2000, for the employed population, the leading industries were education, health, and social services (29%), retail trade (11.6%), and arts, entertainment, recreation, accommodation and food services (10.8%). TABLE 5 below shows the percent of the population employed in various industries.

2.10.4 Transportation

The primary highway corridors to and through Wheeling are Interstate Routes 70 and 470 that run east to west. The National Road, Route 40, also runs east to west through Wheeling. The major north-south routes are U.S. 250 and West Virginia Route 2 that runs along the Ohio River. The Wheeling-Ohio County Airport is served by one charter service.

2.10.5 Land Use

Within the project area, land use is predominantly urban in character. Businesses are predominant except for the upstream area near Tunnel Green Park where the environment assumes a more natural character.

2.10.6 Aesthetics

The aesthetic character of the stream corridor is highly urbanized. The stream gently meanders through a portion of the City of Wheeling. In the lower third of the project area, the stream is lined with large, discontinuous stone walls. On either side of the stream on the bank tops is the City of Wheeling. Landward of the wall are numerous commercial and residential establishments along with parking lots, paved asphalt streets, railroad tracks, and bridges that cross the stream (supported by bridge piers in the stream).

As one progresses upstream, the aesthetic character becomes less urbanized and disturbed, with vegetated stream banks and fewer buildings. In the upper end of the project area, the stream provides an almost rural ambience for a short distance.

3.0 PROPOSED ACTION AND ALTERNATIVES CONSIDERED

3.1 Proposed Action

The proposed project would produce a channel in a trapezoidal shape with a bottom width of 20 feet, top width of 40 feet, and side slopes at 2H:1V to an elevation of 618. Dredging would be accomplished using mechanical or hydraulic dredging equipment.

3.1.1 Mechanical Dredging

Prior to dredging activities, a temporary access ramp must be constructed at Tunnel Green Park and a spoil area must be prepared at Celeron Plaza before the site can accept dredged material. The following describes the access ramp, spoil area, and mechanical dredging method.

Access Ramp: Prior to any dredging activities, a temporary access ramp would be constructed at Tunnel Green Park. The ramp would be used during dredging operations for access to the creek. The ramp would be 12 feet wide and approximately 220 feet long with a maximum 16% slope. The ramp's surface would be constructed of stone that is placed 18 inches thick over 6 inches of filter material. The top 9 inches of the stone layer would have its voids filled with concrete and the bottom 9 inches of the stone layer would have its voids filled with stone spalls. Approximately 3,100 cubic yards of material would be excavated from the right bank of Wheeling Creek to construct the concrete sealed ramp and protect the side slopes of the ramp. The ramp's side slopes would be protected with R-4 stone (d/100=12 inches) on both sides, beginning at the bottom of the ramp and extending to approximate elevation 630. A vegetated turf reinforcement mat would be utilized between approximate elevation 630 (where the stone ends) and the top of the ramp (elevation 652). The material excavated for the ramp would be spoiled at the Celeron Plaza site.

Spoil Area: Prior to placing the dredged material on the spoil area at Celeron Plaza, minor site grading of high spots would be necessary at the site to assure positive surface drainage of the site to a system of ditches and barriers. A system of ditches and concrete safety barriers would be constructed around the perimeter of the site along with a sediment trap. Any material excavated for the construction of the ditches and sediment trap would be placed and graded in the spoil area to assist in obtaining positive drainage. The site would then be lined with an impermeable geomembrane [such as 60-mil thick High Density Polyethylene (HDPE)] that would prevent runoff from contacting the existing soils. The ditches, sediment trap, and barriers would also be lined with the same geomembrane and would be used to direct the runoff to a sediment trap with a culvert that would convey the runoff to the Ohio River. An estimated 20,000 cubic yards of material would be placed on the spoil area. If mechanical dredging

methods are used for dredging, the contractor would have access to an existing ramp that is located on the site and is owned and used by the City of Wheeling Department of Public Works. Trees may be removed from the bank of the Ohio River near the ramp to obtain clearance for equipment to offload the dredged material from the deck of a barge or pontoon.

Dredging: The dredging of Wheeling Creek can commence after the temporary access ramp is constructed and the erosion and sediment control features are installed at the spoil area. Mechanical dredging is one method that can be employed to dredge the creek. Mechanical dredging methods would produce a channel in a trapezoidal shape with a bottom width of 20 feet, top width of 40 feet, and side slopes at 2H:1V to an elevation of 618. An estimated 16,300 cubic yards of sediments would be dredged from Wheeling Creek and 600 cubic yards of material would be excavated for the placement of stone protection around bridge piers and abutments. Dredge equipment, such as a crane with a clamshell or an excavator with a bucket, would remove the sediments from the creek bottom. This equipment is placed on a floating work platform, such as a deck barge or modular pontoon. An additional barge or pontoon would receive the dredged sediment from the clamshell or bucket. The receiving barge or pontoon is placed alongside the work platform wherever it is most advantageous (front, back, or side).

It is anticipated that the receiving deck barge or modular pontoon would have "coaming" (36-or 42-inch solid fencing) installed around its perimeter so that it would be able to contain the dredged material. Each dredge load is placed onto the receiving barge/pontoon, where it would be drained through filtered openings in the coaming. Free water would be allowed to flow out of the receiving barge after being filtered through filter fabric or some other filtration system.

Transportation: When the receiving containment barge/pontoon is full according to capacity or draft limits, it would be towed downstream to the Ohio River at the mouth of Wheeling Creek. An excavator or crane with a clamshell would be placed on the bank of the Ohio River at the Department of Public Works manhole access ramp. An excavator or crane would then remove the material from the barge/pontoon and transfer the material to a truck. Some clearing of trees may be necessary near the offloading area to provide clearance for an excavator or crane to convey the dredged material from the containment barge/pontoon to a truck. The truck would drive back up the access ramp and place the material on the spoil area at Celeron Plaza.

Placement: As a Best Management Practice, silt fence would be placed around the entire placement site, a sediment pond would be constructed, and a rock construction entrance would be installed. The dredged material would be spread and graded on the spoil area using a bulldozer. It is anticipated that the footprint of the spoil material would be approximately 65,000 square feet in area (1.5 acres) and approximately 10 feet high with 2H:1V side slopes. The contractor

would be required to assure that the geomembrane is not damaged during the placement activities. The placed dredged material is assumed to contain little or no free water. It is anticipated that the dredged material would be dewatered while on the deck of the containment barge/pontoon and through evaporation. However, as a precaution in case of a storm event, the perimeter trenches/barriers (as mentioned above) would be constructed to collect and control the flow of the water. The trenches/barriers would then direct the runoff into a sediment pond where it would be filtered again before entering the Ohio River. The spoil area would be compacted to meet erosion and sediment control requirements. The compaction requirements would be minimal for stability and would not meet structural fill requirements.

3.1.2 Hydraulic Dredging

Prior to dredging activities, a temporary access ramp must be constructed at Tunnel Green Park and a spoil area must be prepared at Celeron Plaza before the site can accept dredged material. The following describes the access ramp, spoil area, and hydraulic dredging method.

Access Ramp: Prior to any dredging activities, a temporary access ramp would be constructed at Tunnel Green Park. The ramp would be used during dredging operations for access to the creek. The ramp would be 12 feet wide and approximately 220 feet long with a maximum 16% slope. The ramp's surface would be constructed of stone that is placed 18 inches thick over 6 inches of filter material. The top 9 inches of the stone layer would have its voids filled with concrete and the bottom 9 inches of the stone layer would have its voids filled with stone spalls. Approximately 3,100 cubic yards of material would be excavated from the right bank of Wheeling Creek to construct the concrete sealed ramp and protect the side slopes of the ramp. The ramp's side slopes would be protected with R-4 stone (d/100=12 inches) on both sides, beginning at the bottom of the ramp and extending to approximate elevation 630. A vegetated turf reinforcement mat would be utilized between approximate elevation 630 (where the stone ends) and the top of the ramp (elevation 652). The material excavated for the ramp would be spoiled at the Celeron Plaza site.

Spoil Area: Prior to placing the dredged material on the spoil area at Celeron Plaza, minor site grading of high spots would be necessary at the site to assure positive surface drainage of the site to a system of ditches and barriers. A system of ditches and concrete safety barriers would be constructed around the perimeter of the site. Any material excavated for the construction of the ditches would be placed and graded in the spoil area. The site would then be lined with an impermeable geomembrane (such as 60-mil thick HDPE) that would prevent runoff from contacting the existing soils. The ditches and barriers would also be lined with the same geomembrane and would be used to direct the runoff to a culvert that would convey the runoff to the Ohio River. It is estimated that 20,000 cubic yards of material would be placed on the spoil site.

Dredging: The dredging of Wheeling Creek can commence after the temporary access ramp is constructed and the erosion and sediment control features are installed at the spoil area. Hydraulic dredging is one method that can be employed to dredge the creek. The hydraulic dredger would cut a channel in a trapezoidal shape with a bottom width of 20 feet, top width of 40 feet, and side slopes at 2H:1V to an elevation of 618. It is estimated that 16,300 cubic yards of sediments would be dredged from Wheeling Creek and 600 cubic yards of material would be excavated for the placement of stone around bridge piers and abutments. At the furthest point from the placement site (adjacent to Tunnel Green Park), the discharge line for the dredger would be approximately 1.5 miles in length. Throughout the dredging operation, it is anticipated that this line would follow the path of the creek (floating in the water or placed on the bank) until it exits at a point near Celeron Plaza. If the line is placed on the bank of Wheeling Creek, no trees with diameters greater than 12 inches would be cut down for clearing a path for the discharge line.

Placement: The discharge line from hydraulic dredging operations would end at the spoil area at Celeron Plaza. With the hydraulic dredging method, the spoil area is the location where the sediment and water mixture from the dredging operation would be dewatered using geotubes. A coagulant solution would be added to the mix of water and sediments in the discharge line prior to where the line enters the geotube. The geotube is a geotextile material that is sewn together to form a tube, similar to a pillow shape. The dredged mixture with coagulant would be pumped into each geotube. Water filters out of the geotube while the solids are retained (aided by the coagulating/flocculating solution). Since ditches/barriers and a geomembrane material contain the spoil area, the filtered water would be directed to flow into a culvert that would convey the water to the Ohio River. Once the geotube is filled with sediment and the water is filtered out, the geotube would be cut open, and the sediment would be graded and compacted within the footprint area to meet erosion and sediment control requirements. The compaction requirements would be minimal for stability and would not meet structural fill requirements. Approximately 2,710 LF of geotubes (circumference = 60 feet; tube height = 6 feet; tube width = 27 feet) would be required for the Wheeling Creek project. The geotubes would range in length from 60 LF to 270 LF. Approximately 15 to 20 geotubes would be needed to dewater 16,300 cubic yards of dredged material. After the spoil material has been graded and compacted, it is anticipated that the footprint of the material would be approximately 65,000 square feet in area (1.5 acres) and approximately 10 feet high with 2H:1V side slopes. The contractor would also be required to assure that the geomembrane is not damaged during the placement activities.

3.2 Channel Maintenance

Following completion of the proposed work, all future maintenance would be the responsibility of the City of Wheeling.

3.3 No Action
The no action alternative would be maintenance of the status quo (existing) condition.

3.4 Other Alternatives
Given the physical constraints of the project site, no other practicable alternatives exist for accomplishing the proposed work.

4.0 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

4.1 Aquatic Resources of Wheeling Creek
The proposed dredging project would result in moderate to severe, but short term impacts on water quality, benthic macroinvertebrates, resident fish populations, and in-stream and riparian habitat. The adversity of impact would be highest during the period of active stream dredging and would diminish in severity as stream recovery processes occurred following the cessation of dredging. Specific areas of impact are discussed below. The results of early coordination and other relevant investigations are contained in Appendices A-E.

4.1.1 Water Quality
Because of the previously identified sewage stresses on lower Wheeling Creek, dredging would be expected to generate locally higher levels of turbidity, suspended solids, and BOD downstream of the active dredging operation. Ambient dissolved oxygen levels would be reduced by dredging, especially during the warmer, low-flow summer-fall season. Impacts would be reduced and dissipate upon the mixing of Wheeling Creek flows with the Ohio River. The proposed work would require that the Corps apply for a National Pollutant Discharge Elimination System (NPDES) construction permit. Prior to implementing this project, either a 401 Water Quality Certification must be acquired or conditional approval granted by the state of West Virginia.

4.1.2 Benthic Macroinvertebrates – Mussels
The disruption and removal of stream bottom habitat by dredging would adversely impact any resident macrobenthic populations. The previously described mussel survey did not identify any endangered, threatened, or otherwise uncommon species of mussel in the short reach of stream proposed for dredging. After the cessation of dredging, the dredged area would gradually repopulate with recruitment from upstream reaches of Wheeling Creek and the Ohio River. The species composition initially would be expected to be of a lesser diversity, indicative of a more uniform stream bottom habitat following dredging.

4.1.3 Fish
The proposed dredging would pose a more indirect impact upon the fish community inhabiting lower Wheeling Creek. Locally reduced visibility due to higher turbidity levels, the elimination of feeding and hiding habitat, removal and disruption of benthic invertebrates, and reduction of dissolved oxygen would

result in an out-migration of fish from the dredging impact area. However, no dredging would be conducted during the prime spawning season from ice-out through June. Because of the substantial source of recruitment available from the Ohio River, the fish population is expected to quickly recover following the completion of dredging. Full recovery would be expected to occur within one year following the conclusion of the proposed dredging.

4.2 Hydrology

Hydraulic analyses revealed high velocities during flood events in Wheeling Creek. The proposed dredging would create some marginal increases in stream velocities. As part of the proposed work, erosion protection would be provided at several bridge piers and abutments where the dredging would create higher scour potential. Three of the 14 bridges that cross the project area would require stone protection.

4.3 Wetlands and Floodplains

No significant emergent wetlands or aquatic beds were observed in the study area. Narrow bands of reed canary grass were randomly located along stream edges and two small, sparse water willow dominated aquatic beds were observed growing on sandbars at creek miles 0.8 and 1.0, all classified as riverine emergent wetlands by the U.S. Fish and Wildlife Service. However, both the U.S. Fish and Wildlife Service and West Virginia DNR have reported that no jurisdictional wetlands are found in the study area. The proposed work would not structurally alter existing floodplains.

4.4 Wild and Scenic Rivers

Wheeling Creek is not a federally designated wild or scenic river, and is not listed on the Natural Streams Preservation System of West Virginia.

4.5 Terrestrial/Riparian Flora and Fauna

The riparian corridor, even in downtown Wheeling, is basically intact and contiguous. Wheeling Creek water quality has been characterized as moderately degraded (Ref. 1); most of the study reach is channelized with little in-stream structure or habitat; and there are no wetlands. The canopy understory is degraded, with low diversity and dominated by exotic plant species.

The bottomland hardwoods along the riparian corridor are mature and moderately diverse. According to the USF&WS' *Ohio River Islands National Wildlife Refuge Draft Conservation Plan and Environmental Assessment* (Ref. 17), "Bottomland hardwood forest is the principal habitat targeted for restoration because it is the most important and limited habitat type in the acquisition area (Ohio River from Pittsburgh to Cincinnati).

The dredging/construction activities proposed for Wheeling Creek could further degrade the Wheeling Creek Embayment, or could provide multiple opportunities for improvements to the aquatic ecosystem. Enhancement or improvements of the Wheeling Creek ecosystem would support the goals of the COE's 2000 Ohio River Mainstem System Study (ORMSS), to "…restore and protect ecological resources impaired by human activities along the Ohio River Corridor" (Ref. 19). ORMSS proposes the

restoration of 25,000 acres of bottomland hardwood forest and 25,000 acres of wetlands along the Ohio River. In addition, the primary focus of the *Waterfront Development at the Confluence of Wheeling Creek and the Ohio River, Wheeling Creek, WV, Special Project Report, August 2000* (Ref. 1), was to "…identify potential restoration and protection actions, to conserve and improve natural resources, and to evaluate the likely effects of various improvement alternatives and their effects on the use of improvement functions" thereby providing the "…potential for restoration of Wheeling Creek and the adjacent waterfront for ecosystem restoration and increased public access." This report also emphasized that waterfront development could result in improved fish habitat, improved water quality, and the removal of potentially contaminated in-stream sediments.

4.6 Threatened and Endangered Species

The U.S. Fish and Wildlife Service, Elkins Field Office, in a letter dated February 1, 2002, stated that no federally listed endangered and threatened species or species of concern are expected to be impacted by the project.

4.7 Cultural Resources

The District coordinated all aspects of this project with the West Virginia Division of Culture and History (WVDCH) in compliance with Section 106 of the National Historic Preservation Act. The WVDCH concurred with the District's opinion that there are no significant cultural resources that would be adversely affected by the proposed project.

4.8 Noise

There would be temporary increases in ambient noise levels from the operation of the dredging equipment and increased truck traffic if needed to transport dredged sediment. The District would stipulate hours of operation to minimize noise impacts to local residents and business owners.

4.9 Air Quality

The actions that would affect air quality are those associated with exhaust emissions from dredging equipment and trucks that would be needed to move the dredged materials to the disposal area. Any movement of dredged materials would have to meet stringent requirements to ensure that the dredged materials in either a wet or dry condition do not leak from the trucks. The dredged materials would be seeded with a temporary mix that quickly grows to minimize fugitive dust that may arise during windy days as the dredged spoil material dries out over time.

No significant adverse impacts are expected to result from the proposed dredging project. The added exhaust emissions from heavy equipment (dredger and trucks hauling disposal material) would be negligible compared to the background emissions already caused by normal traffic in and around the City of Wheeling. Measures would be implemented in the disposal areas, to ensure that the areas immediately adjacent to the disposal piles are not subject to nuisance fugitive dust emissions caused by wind picking up drying dredged material. These measures would include grading and compaction of dredged material at the disposal site.

4.10 Hazardous, Toxic, and Radiological Waste

The results of the HTRW analyses generally reflect the background conditions that lie within a reasonable proximity to Wheeling Creek. The data contained in TABLE 1 indicates that the stream sediments are actually less contaminated than the soils upon which the dredged materials would be placed. Consequently, the dredged material would serve as a cleaner cover for the soil at the Celeron Plaza disposal site.

4.11 Prime Farmlands

There are no prime farmlands in the project area.

4.12 Socio-Economic Impacts

The primary socio-economic benefits related to the proposed dredging include the restoration of stream volume in lower Wheeling Creek through the removal of sediment and obstructions, the use of the dredged material for site improvement at Celeron Plaza, and the resultant increased boating and visitor access to Wheeling Creek and Tunnel Green Park from the Ohio River. These actions are components of a strategy (Ref. 1) for Wheeling Creek that would focus on improving and developing habitat for fish and benthic organisms, enhancing its use as a recreational resource, and serving as an attraction for visitors and economic redevelopment on or near its banks.

The Plan for the Wheeling National Heritage Area (Ref. 20) promotes the creation of a Heritage Port, which would bring the Port of Wheeling "back to life." The Heritage Port would be "an interpretive and development infrastructure which includes a revitalized and accessible waterfront to serve residents, national visitors, and tourists." An accessible Wheeling Creek is a key component of the Heritage Port concept because of its historical significance to the city, its value as an interpretive venue in the downtown area, and its potential use as a "water trail" linking the waterfront to Tunnel Green Park.

4.12.1 Population

Because the proposed work would be undertaken within the lower channel of Wheeling Creek, with disposal of dredged material at a nearby vacant property, significant local or regional population impacts are not foreseen. Short-term disruptions caused by mobilization and use of dredging equipment and loading, off-loading, and placement of dredged material would be expected. Public use of Tunnel Green Park may be limited or restricted until dredging and de-mobilization of equipment are completed.

4.12.2 Economics and Employment

According to the U.S. Bureau of the Census (Census 2000), the total population of the City of Wheeling is 31,419. The primary employment categories are: educational, health and social services (29.2%); arts, entertainment, recreation, accommodation and food services (11.3%); and retail trade (11.3%). This is indicative of the growing importance of service-related employment to the economy of the City of Wheeling. Further, Wheeling currently has an active and growing tourism-based economy. The Plan for the Wheeling National Heritage

Area (Ref. 20) states that its economic objective is "to provide for a richer array of attractions and encourage more total visitors to come to Wheeling and to increase the length of stay of the considerable number of visitors already coming to Wheeling for recreation and tourist activities." The proposed project would enhance the attraction of Wheeling to a variety of visitors and further bolster the growing service sector of the City's local economy.

4.12.3 Housing

The project area is mostly older, single-family residences and commercial buildings with public water and sewage service. No relocations or other impacts upon housing are anticipated in conjunction with the proposed project.

4.12.4 Transportation

Wheeling is located on the Ohio River and is serviced by an excellent highway system. The highways servicing Wheeling are I-70, I-470, US-40, US-250, and WV-2. None of the highways would be impacted by the proposed work. The dredging of Wheeling Creek would provide an additional water corridor for smaller boats that would link the Ohio River to Tunnel Green Park.

4.12.5 Land Use

Local and regional land use patterns would not be adversely impacted by the proposed project. The proposed work and induced development would be in conformance with the Heritage Port concept for the City of Wheeling.

4.12.6 Aesthetics

Mobilization and use of dredging equipment and loading, off-loading, and placement of dredged material would cause a temporary adverse impact to local, project area aesthetics. Removal of equipment following dredging and disposal site stabilization and reseeding practices would alleviate much of the adverse aesthetic impact. However, prior to development and reuse, the final "footprint" of dredged material placed at Celeron Plaza would have an extended adverse visual impact.

4.12.7 Environmental Justice

The proposed work would not pose a disproportionate impact (direct or indirect) upon minority or low-income residents of the City of Wheeling.

4.13 Comparison of Alternatives

Other than no action, the only options for achieving the proposed channel deepening are the two methods proposed for dredging: mechanical or hydraulic. The environmental impacts on Wheeling Creek would be essentially similar for each dredging method. However, the handling and placement of dredged material differs considerably for the two methods. The dewatering of the dredged material largely occurs in the receiving barge during mechanical dredging and at the placement site during hydraulic dredging. The disposal site controls and other best management practices described in Section 3

would greatly mitigate any differences in environmental impact attributed to the two dredging methods.

4.14 Mitigative Actions

Special note will be made in the dredging contract to prevent cutting of mature trees and limit clearing of underbrush along the banks to minimize any damage to vegetation in the riparian zone. To further minimize disturbance to any riparian vegetation, the contractor will not be permitted to cut haul roads into any banks other than the designated area in the park (because it will provide flatter access than any other location along the project area). No dredging will occur during the prime spawning season from ice-out (1 March) through June to minimize impact to resident fish.

4.15 Cumulative Impacts

Since authority for the Corps of Engineers to dredge lower Wheeling Creek is limited to a one time effort, cumulative impacts associated with repetitive dredging projects by the Corps would not occur. The need for future maintenance would be determined by and be the responsibility of the City of Wheeling. Any future dredging undertaken by the City of Wheeling would have to be in full conformance with applicable Federal and State regulatory requirements. The use of the channel by recreational boaters would subject the shorelines to wave action. However, because of the relatively narrow width of the channel, it is likely that a "no wake" regulation would be established, which would minimize shoreline disturbance. No other sources of cumulative impact are anticipated.

5.0 STATUS OF ENVIRONMENTAL COMPLIANCE WITH ENVIRONMENTAL PROTECTION STATUTES

TABLE 6 lists the Federal statutes with which the Corps of Engineers complies.

6.0 LIST OF PREPARERS

The following Corps of Engineers team members participated in the development of this environmental assessment:

Edward J. Smith - Plan Formulation Section
Larry Moskovitz - Plan Formulation Section
Rose Reilly - Water Quality Section

7.0 SUMMARY AND CONCLUSIONS

This environmental assessment did not find the potential for significant adverse impacts upon the human environment associated with the proposed dredging of the lower 1.5 miles of Wheeling Creek, or in relation to the proposed use of a brownfield area within Celeron Plaza for disposal of dredged and excavated material. The inclusion of mitigative features, such as the avoidance of dredging during the prime fish spawning season and previously described Best Management Practices for the handling and placement of dredged material, assist in limiting the severity and duration of impact associated with the proposed work. Based on the above, the proposed project would not warrant preparation and circulation of an environmental impact statement (EIS).

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16. U.S. Army Corps of Engineers, Pittsburgh District, 2000. Nine Mile Run, Allegheny County, Pennsylvania, Aquatic Ecosystem Restoration, Water Quality and Aquatic Life Report, Pittsburgh, Pennsylvania.

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18. U.S. Army Engineer Research and Development Center, 2001. Wheeling Creek Mussel Survey.

19. U.S. Army Corps of Engineers, 2000. Draft Ohio River Mainstem System Study (ORMSS), Ohio River Ecosystem Restoration Program Integrated Decision Document and Environmental Assessment.

20. Lane, Frenchman and Associates, Inc., 1992. Plan for the Wheeling National Heritage Area, Prepared for The Wheeling National Heritage Area Task Force, The City of Wheeling Department of Development, and The National Park Service.

Table 1.
HTRW Summary

Analyte (maximum detected)	Disposal Area Soils PPM	Stream Sediment PPM	EPA Residential Site Standard PPM	EPA Industrial Site Standard PPM
Diesel Range Organics	Above State Limits*	Below State Limits		
Inorganic Analytes (TAL Metals)				
Arsenic**	32.1	29.4	0.430	3.82
Volatile Organic Compounds	Not Present	Not Present	N/A	N/A
Semi Volatile Organic Compounds				
Benzo (a) anthracene	5.20	3.0	0.875	7.84
Benzo (b) fluoranthene	20.0	2.20	0.875	7.84
Benzo (k) fluoranthene	11.0	1.3	0.875	7.84
Benzo (a) pyrene	11.0	2.3	0.087	0.784
Dibenzo (a,h) anthracene	3.9	0.520	0.087	0.784
a Indeno (1,2,3-cd) pyrene	13.0	1.0	0.875	7.84
Pesticides				
alpha-BHC	0.0002	0.0004	0.10	0.45
beta-BHC	0.023	0.023	0.35	1.60
alpha-Chlordane	0.026	0.002	1.8	8.2
gamma- Chlordane	0.26	0.002	1.8	8.2
4,4'-DDD	0.005	0.006	2.66	11.92
4,4'-DDE	0.003	0.001	1.88	8.42
4,4'-DDT	0.034	0.002	1.88	8.42
Dieldrin	0.013	0.001	0.04	0.18
Endosulfan	0.002	0.003	469.0	6132
Endrin	0.018	0.001	23.46	307
Heptachlor	0.014	0.008	0.14	0.64
Heptachlor epoxide	0.005	0.0004	0.07	0.31
PCBs				
Arochlor 1254	Not Detected	0.051	0.32	2.9
Arochlor 1260	Not Detected	0.12	0.32	2.9

* Exceeded West Virginia's limits for leaking underground storage tanks.
** Only TAL metal at Disposal Site and in sediment above EPA's standard for Residential Sites
Table values represent maximum concentrations measured in the referenced mediums.

Table 2.
Wheeling Creek and Kings Creek Water Quality

Parameter	Units	Wheeling Creek								Kings Creek	
		City of Wheeling, WV (Ref. 5)				Wheeling Jesuit College (Ref. 4)				USACE / USGS (Ref. 8)	WV DEP (Ref. 2)
		August 1993 to Janurary 1998 Mean Values				May-June 1993				1992-1993 Mean Values	31-Jul-2000
		Mile 0.1		Mile 1.3		Mile 1.0	Mile 2.0	Mile 2.5	Mile 3.0	Mile 2.2	Mile 3.3
		dry	wet	dry	wet						
		n=19	n=49	n=19	n=49	n=1	n=1	n=1	n=1	n=1	n=1
pH (field)	pH units	7.95	7.88	8.33	8.16	8.1	8.4	8.4	8.1	7.1	7.96
Dissolved oxygen	mg/l	8.98	8.46	10.15	9.45					12.4	8.34
Dissolved oxygen % Saturation	%					52	66	101	95		
Conductivity	us/cm					455	450	448	448	482	502
Fecal coliform	cols/100 ml	313	4163	1358	3676					666	15000
Total coliform	cols/100 ml	4020	8044	2360	7218						
BOD 5-day	mg/l	13.2	24.98	13.1	23.51						
Oil & grease	mg/l	2.107	6.254	2.926	1.07						
Hot peroxide acidity	mg/l as $CaCO_3$										<1
Total Alkalinity	mg/l as $CaCO_3$					170*	199*	199*	170*	69.6	13.4
Total hardness	mg/l as $CaCO_3$	152	191	171	189	240*	257*	240*	240*	173	173.521
Total sulfates	mg/l										71
Dissolved sulfate	mg/l									114	
Total chloride	mg/l										25.6
Dissolved chloride	mg/l									13	
Total suspended solids	mg/l	13	21	14	106						25
Total dissolved solids	mg/l									254	
Total phosphorus	mg/l										<0.01
Dissolved phosphorus	mg/l									0.015	
NO2 + NO3	mg/l as N										0.12
Dissolved NO2+NO3	mg/l as N									0.513	
Ammonia nitrogen	mg/l as N	0.441	0.443	0.348	0.382						
TKN	mg/l as N										<0.01
Total calcium	mg/l										53
Dissolved calcium	mg/l									49	
Total Magnesium	mg/l										10.0
Total Aluminum	mg/l										1.20
Dissolved Al	mg/l									.020	<0.05
Total cadmimum	mg/l	0.03	0.02	0.02	0.02						
Total Cu	mg/l	0.04	0.04	0.04	0.04						0.007
Dissolved Cu	mg/l										<0.001
Total Fe	mg/l										1.52
Dissolved Fe	mg/l									0.014	<0.05
Total lead	mg/l	0.11	0.1	0.1	0.1						
Total manganese	mg/l										0.10
Dissolved manganese	mg/l									0.011	
Total Zinc	mg/l	0.03	0.03	0.02	0.04						<0.005
Dissolved Zinc	mg/l										<0.005

n = number of observations

* LaMotte field titration kit utilized for alkalinity and hardness determination

Table 3.
Comparison of Environmental Quality Metrics

Metric	Wheeling Creek						Kings Creek	
	USACE (Ref. 9)	Wheeling Jesuit College (Ref. 4)				WV DEP (Ref. 2)	USACE (Ref. 8)	WV DEP (Ref. 2)
	11-Jun-02	May-June 1993				31-Jul-00	June-July 1995	29-Aug-01
	Mile 0.1 to 1.5	Mile 1.0	Mile 2.0	Mile 2.5	Mile 3.0	Mile 3.3	Mile 2.2	Mile 2.3
Benthic Macroinvertebrate								
Total # organisms/ sq ft		40	50	60	105	26	179	87
Total # families						12	14	11
Total # taxa		8	11	16	21	25	27	
Hilsonoff Biotic Index						5.23	4.6	4.77
Total EPT organisms						160	17	
% EPT organisms		1	5	6	35	68	73	77.16
% AC organisms						26.4	9.3	4.13
WV Stream Condition Index (WVSCI)*						62.13		62
Fish								
Total # species	24						23	
% species considered Ohio River residents	45.8						21.7	
Total # fish / hour	270						1522	
Total Kilograms/ hour	28.8						84	
Index of Biotic Integrity (IBI) **	40						54	

* www.dep.state.wv.us/docs/536WV-index.pdf

Threshold of impairment = 60.6 (Ref.3)

** Ohio Environmental Protection Agency (Ref.9)

Table 4.
Summary of Wheeling Creek, WV Water Quality Data Collected During Dry and Wet Weather by the City of Wheeling Water Pollution Control Dept.*
August 1993 to January 1998

Parameter	WV Ohio River Instream Water Quality Criteria	Station WC 4, Wheeling Creek mile 0.1, at downstream end of project area				Station WC 1, Wheeling Creek mile 1.3, upstream of the project area				% difference between Average Upstream and Downstream Station Values
		mean	maximum	minimum	# obs	mean	maximum	minimum	# obs	
		Dry weather				Dry Weather				
		Wet Weather				Wet Weather				
pH (pH units)		7.95	8.60	6.90	19	8.33	8.80	7.60	18	-5
		7.88	8.50	6.00	49	8.16	8.70	6.60	49	-3
Dissolved Oxygen (mg/l)	5.0	8.98	12.80	5.45	9	10.15	16.66	6.48	10	-12
		8.56	14.83	3.20	34	9.45	28.00	3.37	35	9
Fecal Coliform (col/100 ml)	200	313	1350	20	19	1358	6000	180	19	-77
		4163	70000	20	49	3676	14000	40	49	13
Total Coliform (col/100 ml)		4020	12500	800	4	2360	3000	1500	4	70
		8044	38000	500	16	7218	24800	600	16	11
BOD 5-day (mg/l)		13.20	49.40	0.90	19	13.10	55.00	0.60	19	1
		24.96	205.50	0.60	49	23.51	125.00	0.09	49	6
Total oil & grease (mg/)		2.107	3.610	0.068	3	2.926	6.024	1.116	3	-28
		6.254	7.177	4.699	3	1.070	1.278	0.731	3	485
Total Suspended Solids (mg/l)		13	34	2	19	14	36	2	19	-6
		21	76	2	48	106	2976	2	48	80
Total Hardness (mg/l as $CaCO_3$)		152	290	34	19	171	376	32	19	-11
		191	462	84	49	189	376	102	49	1
Ammonia Nitrogen (mg/l)	0.050	0.441	2.030	0.090	19	0.348	1.820	0.020	19	27
		0.443	2.380	0.010	49	0.382	1.950	0.010	49	16
Cd (mg/l)	0.001	0.03	0.11	0.01	19	0.02	0.10	0.01	19	80
		0.02	0.14	0.01	49	0.02	0.14	0.01	49	8
Cu (mg/l)	0.015	0.04	0.04	0.04	19	0.04	0.05	0.04	19	-1
		0.04	0.07	0.04	49	0.04	0.07	0.04	49	2
Zn (mg/l)	0.135	0.03	0.11	0.02	19	0.02	0.07	0.02	19	18
		0.03	0.12	0.02	49	0.04	0.30	0.02	49	25
Pb **(mg/l)**	0.005	0.11	0.59	0.03	19	0.10	0.53	0.06	19	10
		0.10	0.45	0.06	49	0.10	0.43	0.06	49	5
Zn (mg/l)	0.135	0.03	0.11	0.02	19	0.02	0.07	0.02	19	18
		0.03	0.12	0.02	49	0.04	0.30	0.02	49	25

*** Reference 5**

yellow highlight = does not meet Ohio River instream water quality criteria

Table 5.
Employment by Industry in Ohio County, WV in 2000

INDUSTRY	NUMBER OF EMPLOYED PERSONS	PERCENT OF EMPLOYED POPULATION
Agriculture, forestry, fishing, hunting, and mining	282	1.4
Construction	1,025	5.0
Manufacturing	1,661	8.0
Wholesale trade	772	3.7
Retail trade	2,396	11.6
Transportation, warehousing, information and utilities	1,055	5.1
Information	495	2.4
Finance, insurance, real estate, and rental and leasing	1,021	4.9
Professional, scientific, management, administrative, and waste management services	1,689	8.2
Education, health and social services	5,976	29.0
Arts, entertainment, recreation, accommodation and food services	2,237	10.8
Other services (except public administration)	1,242	6.0
Public administration	803	3.9
	20,654	100%

*Source: U.S. Census Bureau

Table 6.

Status of Compliance with Appropriate Federal Statutes

FEDERAL STATUTES	NO-ACTION	RECOMMENDED PLAN
Archeological and Historic Preservation Act as amended, 16 U.S.C. 469, et seq.	FC	FC
Clean Air Act as amended, 42 U.S.C. 7401, et seq.	FC	FC
Clean Water (Federal Water Pollution Control Act) as amended, 336 U.S.C. 1251, et seq.	FC	FC
Endangered Species Act as amended, 16 U.S.C. 1531, et seq.	FC	FC
Federal Water Project Recreation Act as amended, 16 U.S.C. 406-1 (12), et seq.	FC	FC
Fish and Wildlife Coordination Act as amended, 16 U.S.C. 661, et seq.	FC	FC
Land and Water Conservation Fund Act as amended, 16 U.S.C. 4601-4601-11, et seq.	FC	FC
National Environmental Policy Act as amended, 42 U.S.C. 4321, et seq.	FC	In Process
National Historic Preservation Act as amended, 16 U.S.C. 470a, et seq.	FC	FC
Rivers and Harbors Act, 33 U.S.C. 401, et seq.	FC	FC
Rivers and Harbors Act, 91 U.S.C. 122, et seq.	FC	FC
Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, et seq.	FC	FC
Wild and Scenic Rivers Act as amended, 16 U.S.C. 1271, et seq.	NA	NA
EXECUTIVE ORDERS, MEMORANDA, ETC.		
Floodplain Management (E.O. 11988)	FC	FC
Protection of Wetlands (E.O. 11990)	FC	FC
Protection of Children (E.O. 13045)	FC	FC
Analysis of Impacts on Prime and Unique Farmland	FC	FC
State and Local Policies	FC	FC

FC – full compliance; NA – not applicable

Figure 1.
Wheeling Creek, West Virginia Dredging Project
General Location Map

Figure 2.
Wheeling Creek, West Virginia Dredging Project
Study Area Map

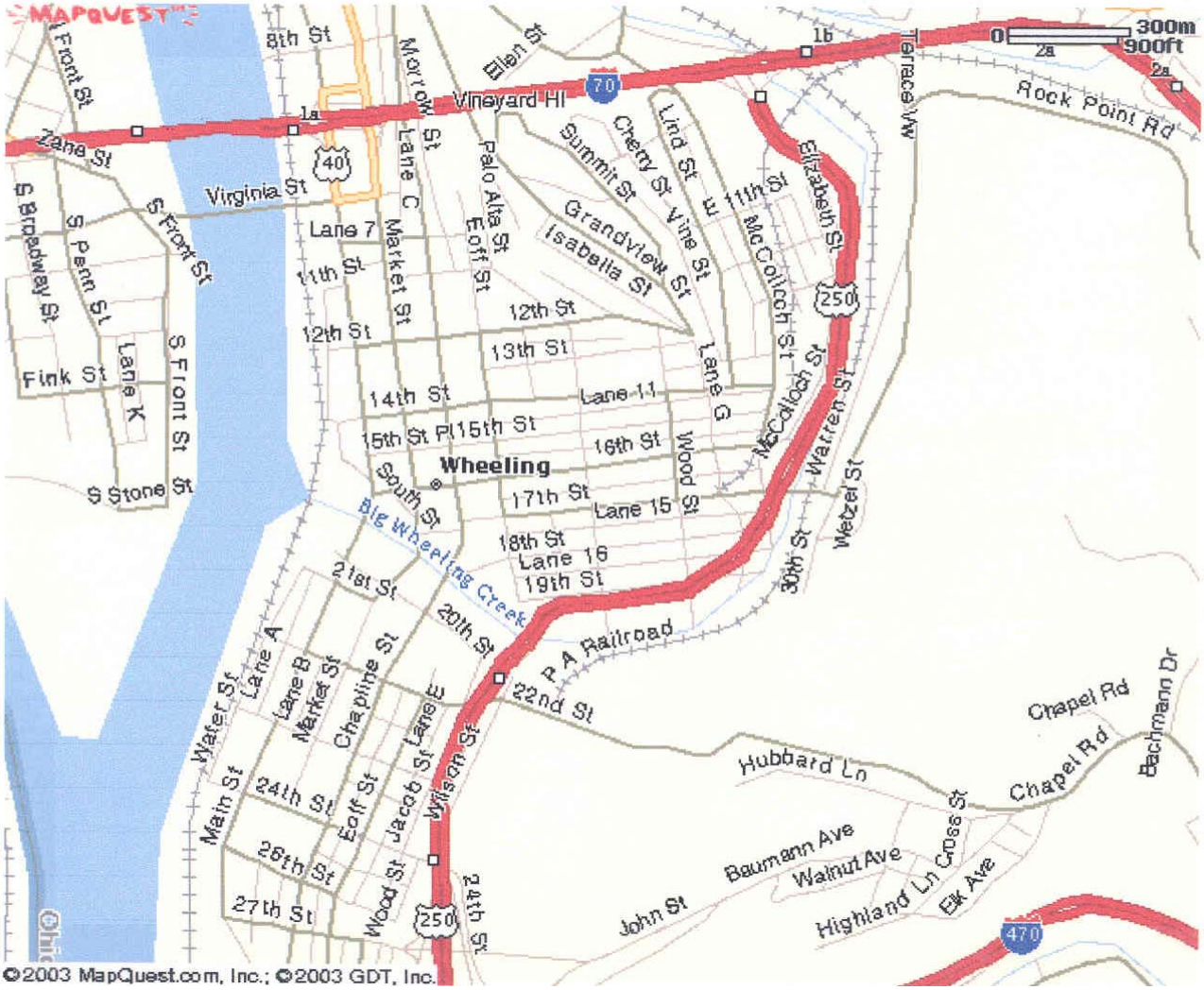


Figure 3.
Wheeling Creek, West Virginia Dredging Project
Project Area Map

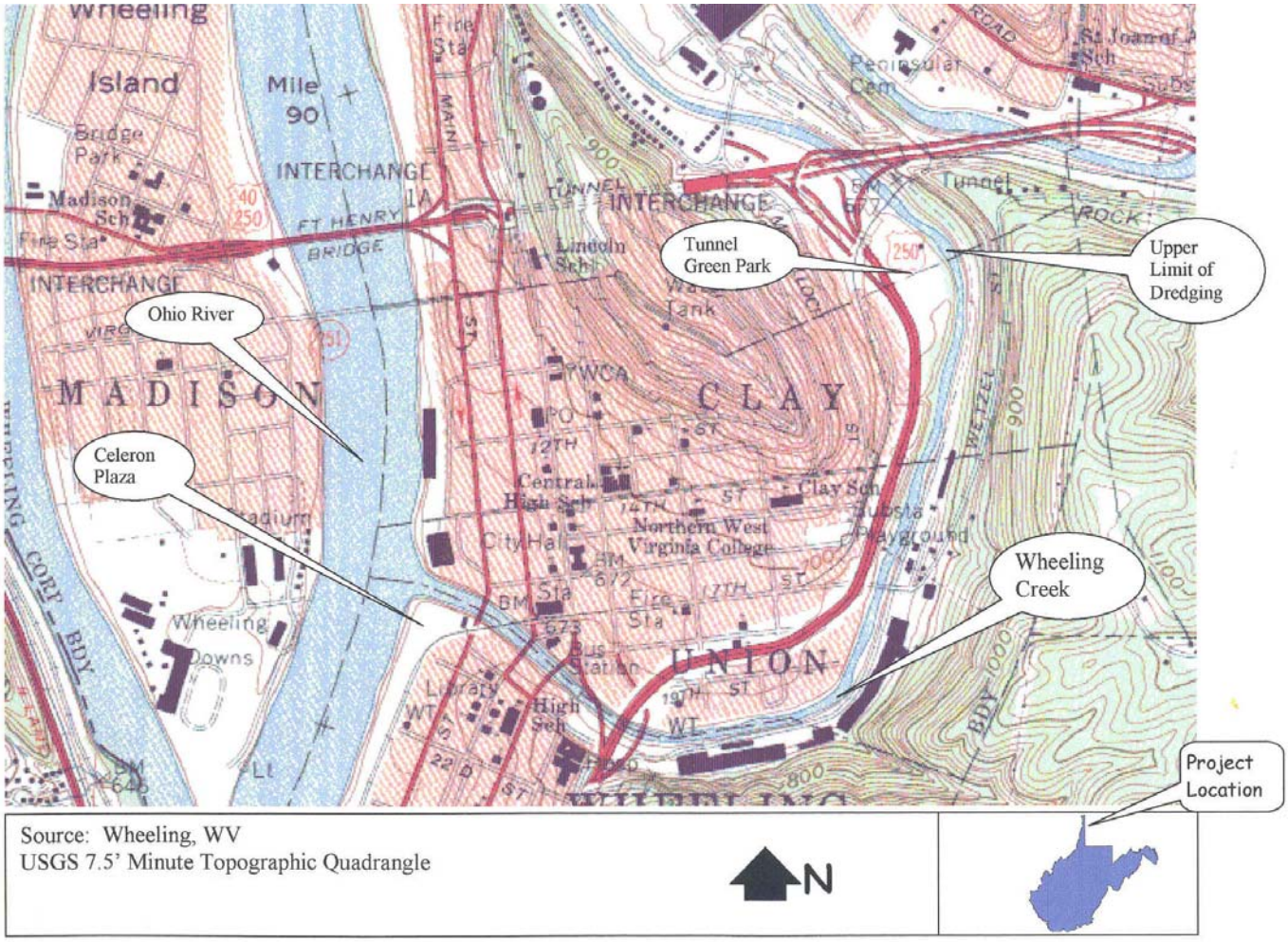
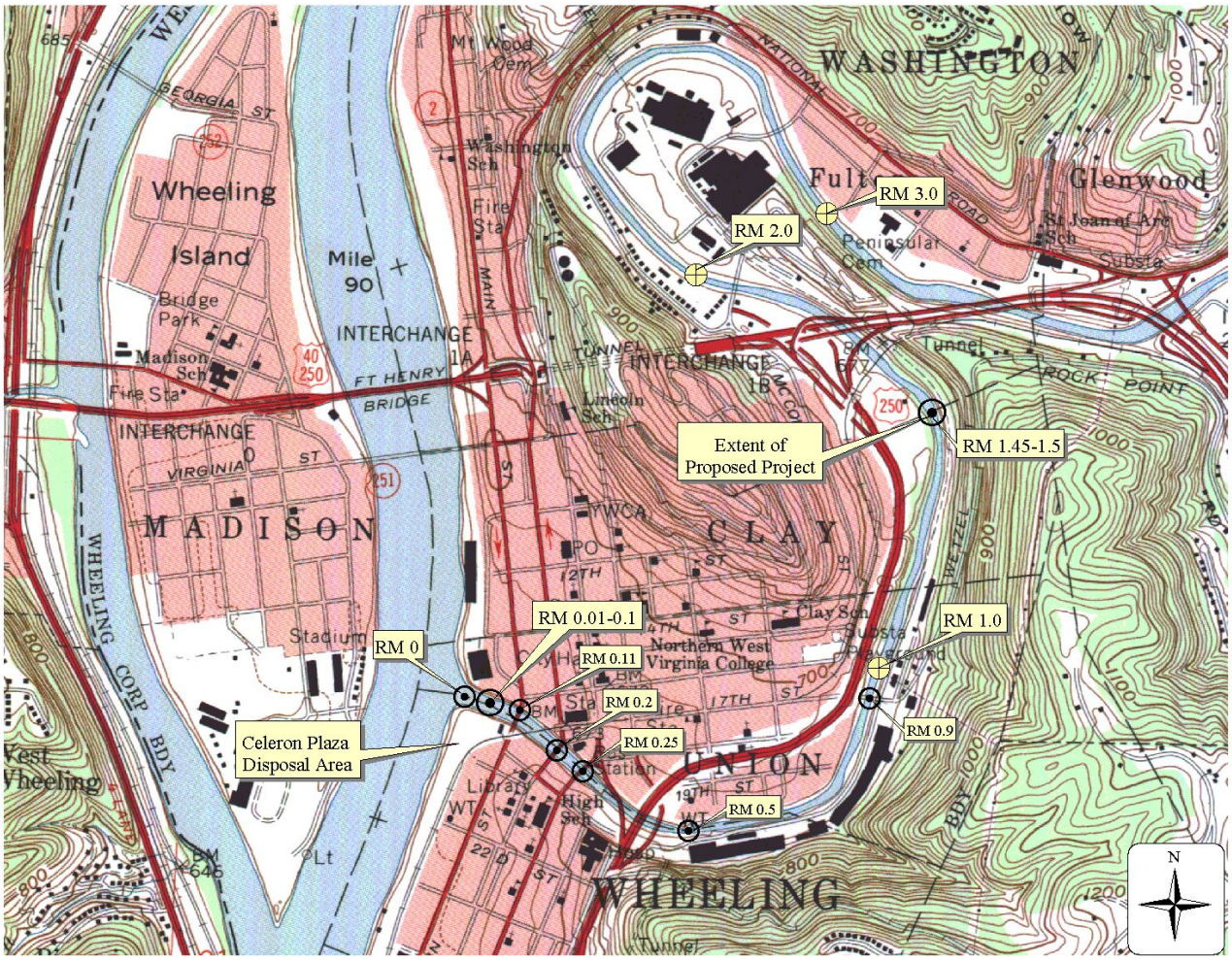


Figure 4.
Wheeling Creek, West Virginia Dredging Project
Vegetation and Aquatic Habitat Survey Sites
May 30, 2001



APPENDIX A

Early Coordination Letters

DIVISION OF NATURAL RESOURCES
Wildlife Resources Section
Operations Center
P.O. Box 67
Elkins, West Virginia 26241-3235
Telephone (304) 637-0245
Fax (304) 637-0250

Bob Wise
Governor

Ed Hamrick
Director

April 5, 2002

Mr. Carmen A. Lebder CAL rec'd 10 apr 02
Department of the Army
Corps of Engineers
William S. Moorhead Federal Building
1000 Liberty Avenue
Pittsburgh, PA 15222-4186

Dear Mr. Lebder:

We have reviewed our files for information on rare, threatened and endangered (RTE) species and sensitive habitats for the area of the proposed Wheeling Creek dredging project in Wheeling, WV.

We have no known records of any RTE species or wetlands within the project area. The Wildlife Resources Section knows of no surveys that have been conducted in the area for rare species or rare species habitat. Consequently, this response is based on information currently available and should not be considered a comprehensive survey of the area under review.

Enclosed please find an invoice.

Thank you for your inquiry, and should you have any questions please feel free to call upon us.

Sincerely,

Barbara Sargent
Environmental Resources Specialist
Wildlife Diversity Program
Wildlife Resources Section

enclosure

United States Department of the Interior

FISH AND WILDLIFE SERVICE

West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

February 12, 2002

CAL rec'd 13 Feb

Mr. Carmen A. Lebder, P.E.
Chief, Plan Formulation Section
U.S. Army Corps of Engineers
Pittsburgh District
Williams S. Moorhead Federal Bldg.
1000 Liberty Avenue
Pittsburgh, Pennsylvania 15222-4186

Dear Mr. Lebder:

We have reviewed your response dated February 7, 2002, to our February 1, 2002 request for additional information on the mussel survey conducted in Wheeling Creek, in conjunction with your proposed dredging project. The additional details you provided answered all of our remaining questions. Thank you for your prompt response.

The U.S. Fish and Wildlife Service has no remaining concerns over the conduct of this project. Should project plans change, or if additional information becomes available, this determination may be reconsidered.

If you have any questions or comments please have your staff contact Linda Smith of my staff, or contact me directly, at (304) 636-6586, or at the letterhead address.

Sincerely,

Jeffrey K. Towner

Jeffrey K. Towner
Field Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE

West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

FEB 01 2002

CL rec'd 5Feb02

Mr. Carmen A. Lebder, P.E.
U.S. Army Corps of Engineers, Pittsburgh District
William S. Moorhead Federal Building
1000 Liberty Avenue
Pittsburgh, PA 15222-4186

Dear Mr. Lebder:

This is in response to your letter of December 21, 2001 regarding the Corps of Engineers' proposed plan to prepare an Environmental Assessment for the Wheeling Creek dredging project. You requested that the U.S. Fish and Wildlife Service (Service) prepare a Planning Aid Letter describing the environmental conditions within the project area and to address any issues regarding federally-listed species pursuant to Section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). You also requested that the Service review and comment on the assessment of mussel resources for this project area conducted by the U.S. Army Engineering and Research Development Center, Waterways Experiment Station, Vicksburg, Mississippi. The Service has reviewed the Assessment of the Mussel Resources in Lower Wheeling Creek, West Virginia, and a Short Reach of the Ohio River, dated October 2001, and we offer the following comments.

Due to only minor resource concerns we have related to this project, the Service will not request a transfer of funds to prepare a Planning Aid Letter pursuant to the Fish and Wildlife Coordination Act. No federally listed endangered and threatened species or species of concern are expected to be impacted by the project. Therefore, no Biological Assessment or further Section 7 consultation under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) is required with the Fish and Wildlife Service. Should project plans change, or if additional information on listed and proposed species or species of concern becomes available, this determination may be reconsidered.

In order to make an informed determination about the likelihood that any important mussel beds would not be adversely impacted by the dredging project, a mussel survey was requested by the Service in the project impact area. We understand that at least some of the mouth of Wheeling Creek is likely to be impacted by fine sediments and therefore may not have good mussel habitat. However, we requested a mussel survey for the project impact area because we considered that

the area downstream of the project potentially has good mussel habitat. This area could be impacted by incidental dredge deposition during dredging activity so we requested that about one-half mile of the Ohio River downstream of the project be surveyed for mussels. Our rationale for requesting that a mussel survey also extend upstream of the project was that this area may have good mussel habitat, and the proposed project could indirectly impact the area via recreational boating. The Service reviewed the Scope of Work for the mussel assessment done in June, 2001.

The mussel survey was conducted at a total of 17 sites (four on the left descending bank of the Ohio River and 13 sites in Wheeling Creek) by wading and diving. Nine live mussels representing six species were collected at five sites. According to the report, no threatened or endangered mussels or important mussel beds were found.

The Service requests that the following additional information be provided on the mussel survey:
1) the time of year the survey was done.
2) survey site conditions (visibility was reported as "limited") and water depth and velocity. (Storm events causing movement of large sediment loads and cold weather and poor visibility could affect sampling efforts.)
3) size or length of the sampling area (transects or spot checks). In the Ohio River sites, the distance out from the riverbank where the survey began and the distance out into the river that the survey extended was not given. The width of Wheeling Creek or the transect length was not provided.
4) rationale for the selection of the survey sites and the number of sites.
5) description of the substrate at the survey sites.
6) results for six survey sites upstream of the dredging (not in table).
7) site 1 is not shown on the map, but the table shows L. cardium was found at this site.

We will withhold our concurrence on the mussel survey until this information is provided.

You indicated in your letter that dredged material would either be temporarily stored at a brownfield that is located in Wheeling to later use for municipal projects or permanently disposed of in a commercial landfill. We request that the Corps caution the City of Wheeling that any municipal projects that would place fill material in a water of the U.S., including wetlands, must first receive a permit from the Corps of Engineers.

If you have any questions regarding this letter, please contact Linda Smith of my staff at (304)636-6586, or at the letterhead address.

Sincerely,

Jeffrey K. Towner

Jeffrey K. Towner
Field Supervisor

WEST VIRGINIA DIVISION OF
CULTURE AND HISTORY

December 05, 2002

Mr. Curtis Meeder
Department of the Army COE
W. Moorehead Federal Building
1000 Liberty Avenue
Pittsburgh, PA 15222

RE: Dredge lower section of Wheeling Creek
FR#: 01-1351-OH-1

Dear Mr. Meeder:

We have reviewed the above mentioned project to determine its effects to cultural resources. As required by Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

Archaeological Resources:
Thank you for submitting additional information pertaining to possible sewer line relocations in conjunction with the dredging of Wheeling Creek. Your letter indicates that the only line to be relocated lies within the waters of Wheeling Creek. Due to this, we are of the opinion that there is little possibility of intact archaeological deposits within the project area. We have also determined that no known archaeological sites listed on or eligible for inclusion in the National Register will be affected by this project. If, however, cultural materials are encountered during construction, all such activities shall cease and our office shall be contacted immediately.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please call Rachel Black, Staff Archaeologist at (304) 558-0240.*

Sincerely,

Joanna Wilson
Senior Archaeologist

reb

THE CULTURAL CENTER • 1900 KANAWHA BOULEVARD, EAST • CHARLESTON, WEST VIRGINIA 25305-0300
TELEPHONE 304-558-0220 • FAX 304-558-2779 • TDD 304-558-3562
EEO/AA EMPLOYER

DIVISION OF NATURAL RESOURCES
Wildlife Resources Section
Operations Center
P.O. Box 67
Elkins, West Virginia 26241-3235
Telephone (304) 637-0245
Fax (304) 637-0250

Bob Wise
Governor

Ed Hamrick
Director

September 28, 2001

Mr. John N. Goga, P.E.
Chief, Planning Branch
Pittsburgh District
U.S. Army Corps of Engineers
1000 Liberty Avenue
Pittsburgh, PA 15222-4186

Re: Request for Preliminary Comments, Lower Wheeling Creek Dredging Project, Wheeling, Ohio County, WV.

Dear Mr. Goga:

This letter was prepared in response to your August 15, 2001 request for preliminary comments related to proposed dredging of the lower 1.5 miles of Wheeling Creek in Wheeling, Ohio County, West Virginia. The reported project purpose is to make the lower reach of the stream more accessible for recreational boating. Wheeling Creek and the Ohio River are High Quality Streams that support excellent warmwater fisheries.

Questions and concerns that are related to possible impacts to wildlife resources that should be addressed in an Environmental Assessment (EA) are listed below.

1. A ***Project Need*** section should be included in the EA. In this section, historic recreational boating access should be reported, alternatives to the proposed section stated and explained and a cost:benefit ratio calculated and presented.

2. The project EA should identify sediment sources and provide possible means of reducing amounts of sediment entering the stream. Otherwise, explain how continuing deposition would be addressed.

3. Dredging will alter some components of stream morphology and hydrology. We believe hydraulic alterations that reduce energy necessary for sediment transport could accelerate sediment accretion.

4. Questions relative to channel maintenance should be addressed including anticipated frequency of such maintenance and which agency or municipality would be responsible.

5. Questions relative to contaminants in the sediment that could be suspended in the water column when disturbed by dredging and related construction activities should be addressed.

6. Issues relative to mussels in the proposed impact zone should be addressed in the EA. The Wildlife Resources Section (WRS) considers the impact zone to include the dredging area and areas downstream that will have increased siltation and sedimentation due to substrate disturbance. If mussels are present within the impact zone, mitigative options should be proposed and evaluated.

7. The WRS will require that no in-stream disturbance be permitted during the fish spawning season, April 1 through June 30.

8. Issues relative to material removal and disposal should be addressed. The WRS will require that the material be placed in an upland site in a manner that would preclude its re-entry into the waters of the State. The WRS would oppose the placement of the waste material in wetlands.

9. The anticipated duration of the project, considering the restriction for in-stream work during fish spawning season, possible delays due to high water and possible delays associated with mitigation if mussel beds are found in the area should be addressed.

10. The impact to water quality in Wheeling Creek and the Ohio River resulting from anticipated increases in recreational boat traffic through the proposed reach should be addressed.

11. A significant increase in bank erosion has been correlated with the wave action from recreational boat traffic on sections of the Mississippi River. The EA should address any possible impact to the banks of Wheeling Creek if recreational boat traffic increases in the proposed dredging area are expected.

Thank you for the opportunity to comment on the proposed project EA. If you have questions regarding our comments, please contact Kerry Bledsoe at (304)367-2720 or by email at bledsk@mail.wvnet.edu.

Sincerely,

for

Cutis I. Taylor, Chief
Wildlife Resources

CIT/abk

WEST VIRGINIA DIVISION OF
CULTURE AND HISTORY

August 31, 2001

Mr. John Goga
Department of the Army COE
W. Moorehead Federal Bldg
1000 Liberty Avenue
Pittsburgh, PA 15222

RE: Dredge lower section of Wheeling Creek
FR#: 01-1351-OH

Dear Mr. Goga:

We have reviewed the above mentioned project to determine its effects to cultural resources. As required by Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

Thank you for submitting information pertaining to the dredging of portions of Wheeling Creek. As a preliminary comment, a search of office site files and maps located no known archaeological sites within the immediate vicinity of Wheeling Creek. Therefore, we anticipate that no known archaeological resource will be affected by the actual dredging. However, the possible relocation of sewer lines has the potential to affect archaeological resources. Therefore, before any lines are relocated, please afford our office the opportunity to comment. We look forward to receiving the Environmental Assessment and will complete our review at that time.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please call Rachel Black, Staff Archaeologist at (304) 558-0220.*

Sincerely,

Joanna Wilson
Senior Archaeologist

reb

THE CULTURAL CENTER • 1900 KANAWHA BOULEVARD, EAST • CHARLESTON, WEST VIRGINIA 25305-0300
TELEPHONE 304-558-0220 • FAX 304-558-2779 • TDD 304-558-3562
EEO/AA EMPLOYER

Appendix B.
Assessment of Fishery Resources
Lower Wheeling Creek, West Virginia

ASSESSMENT OF FISHERY RESOURCES
LOWER WHEELING CREEK,
WEST VIRGINIA

Prepared by:
U.S. Army Corps of Engineers
Pittsburgh District
October 2002

Assessment of Fishery Resources in Lower Wheeling Creek West Virginia

Background

Through legislation adopted in FY 2001, Congress earmarked funds and authorized the U.S. Army Corps of Engineers to dredge a four to six-foot deep channel along Wheeling Creek, in Wheeling West Virginia. The project would extend upstream from the mouth of Wheeling Creek at Ohio River Mile 90.8 to Tunnel Green Park; a small recreation facility located approximately 1.5 miles (2.59 kilometers) above the stream's mouth. Dredging will permit recreational boaters to access Tunnel Green Park and the recently completed rails to trails bikeway/walkway that passes adjacent to the park.

The U.S. Army Engineer District, Pittsburgh, and West Virginia Division of Natural Resources (WVDNR) have concerns that dredging might negatively affect the fishery resources and habitat in Wheeling Creek between Tunnel Green Park and the Ohio River. The purpose of this assessment was to evaluate the fishery resources of the lower 1.5 miles of Wheeling Creek.

As discussed by Koryak et al. (2002), Koryak et al. (2001) and USACE (1994), tributaries of the Ohio, Monongahela and Allegheny Rivers are utilized by various transient river fish. Because fish are highly mobile and have a wide range of spawning, refuge and foraging habitat requirements, lower Wheeling Creek has the potential for substantial fish diversity and overall biomass as a result of being tributary to the Ohio River. The fish community composition can be used as an indicator of habitat conditions. In addition, use by endangered, threatened, or species of special concern was to be evaluated.

Methods

Three biologists from the Pittsburgh District Water Management Section (EC-WW) and Fish & Wildlife Team (OR-TR) assessed the fishery resources within the Wheeling Creek embayment on the night of June 11, 2002 by conducting four ten-minute electrofishing surveys at four stream segments between the Tunnel Green Park trail bridge and the Ohio River. At 2100 hours, the Wheeling Creek gage at Elm Grove was 2.14 feet (313 cfs) and the Ohio River gage at Dashields Lock and Dam was 15.79 feet (39,200 cfs). The staging area for the survey was the Wheeling Island Boat Launch.

Work was accomplished using a sixteen-foot johnboat, powered by a 15 horsepower Johnson outboard. A 3,500-watt Honda generator supplies the alternating current (AC) and a Coffelt variable voltage pulsator (VVP-15) controls AC output. Three stainless steel electrodes, each four feet long, transfer the electricity to the water. Two individuals collected fish off the bow platform with dip nets, while the third operated the boat, VVP and lights. The fish were placed in a live well for processing. Lengths to the nearest millimeter (mm) and weights to the nearest gram were recorded for all fish. Except for some shiners (*Notropis* spp.) taken back to the

laboratory for more careful identification, all fish were released after processing with negligible apparent mortality. Environmental consulting scientist and fish taxonomist Patrick Boniflawsky volunteered to participate in the identification of preserved specimens. Fish data summaries, station descriptions, and background water quality details for each station are included in Tables 1-4.

The four sites were sampled, each for a ten-minute period as directed by WVDNR, while traveling downstream. The first station (Station #1) was sampled at dusk (2030-2040 hours), adjacent to Tunnel Green Park where there was visible flow and the water was less than four-feet deep. The 680-foot sample was initiated at the end of a long gravel bar, 100 feet downstream of the Tunnel Green Park footbridge (station 1+00), and ended at the first powerline crossing downstream (station 7+80). The remaining sampling sites were surveyed after dark. Electrofishing at Station #2 was initiated at the second powerline crossing (station 28+50) and ended at the third powerline crossing (station 35+50). Survey time and distance were 2130-2140 hours and 700 feet, respectively. Station #3 started at a gravel bar created by a small left descending bank tributary (station 47+00) and ended 400 feet upstream of the abandoned RR Bridge (station 54+00). Survey time was 2205-2215 hours and once again survey distance was 700 feet. The last site (Station #4) started on the upstream side of the Market Street Bridge (station 74+40) and ended on the downstream side of the first railroad bridge downstream of the Main Street Bridge (station 81+20). Survey time was 2235-2245 hours and survey distance was 680 feet.

Results

A total of four sites along lower Wheeling Creek were electrofished for a total effort of 40 minutes (0.67 hours) covering a total distance of 0.84 kilometers (2,760 feet or 32.5% of the project length). A total of 138 fish weighing 19.17 kilograms were collected representing 24 species (Table 5). All fish were relatively common and are typically collected in medium-sized to large rivers tributary to the Ohio River. No Federally listed endangered or threatened species were found.

Station #4 had the highest diversity with 13 species collected. Emerald and sand shiners were the only species collected at all four stations. Smallmouth bass, white bass, golden redhorse, gizzard shad and longnose gar were collected at three stations. Largemouth bass, spotted bass, smallmouth buffalo and freshwater drum were each collected at two stations, and the remaining thirteen species were each collected at only one station. Black redhorse and hog suckers, typically stream fish, are relatively pollution intolerant and were collected only at Station #1.

Numerically, emerald (48) and sand (29) shiners far outnumbered any other species of fish. However, their numbers were much higher than the surveys indicate. Hundreds of *Notropis* individuals were observed in the water during the sampling. However, probably because of the high conductivity of the stream, these small fish were not effectively impeded by the electric field. Combined, these two shiner species represented 55.8% of the fish collected. In order of abundance, smallmouth bass and white bass were next with six fish each, then black redhorse, golden redhorse, smallmouth buffalo and longnose gar with five fish each. These six species

combined represented 23.2% of the fish. The eight species mentioned in this paragraph combined represented 79.0% of the fish and 59.5% of the total biomass. Species with the highest total biomass were smallmouth buffalo (4,849g), carp, (2,800g), longnose gar (1,945g), smallmouth bass (1,669g) and golden redhorse (1,333g). These five species represented 66.9% of the total weight of all fish, but only 15.9% of the total number of fish.

Species suspected of being residents of the Ohio River but collected in Wheeling Creek were spotted bass, white bass, flathead catfish, channel catfish, walleye, quillback, smallmouth buffalo, freshwater drum, gizzard shad and longnose gar. Combined (31 fish weighing 11.66 kilograms) they represented 22.5% of the total number and 60.8% of the total biomass of all fish collected. These ten transient species dominated the catch by weight and considerably augmented the species richness of lower Wheeling Creek.

Fish were also placed into groups as shown in Tables 1-4. Table 6 is a data summary of the fish collected in lower Wheeling Creek by station and combined by groups. Overall, the catch rates were 207.0 fish per hour, 28.75 kilograms per hour, 164 fish per kilometer and 22.79 kilograms per kilometer. The highest station numerical catch-per-unit-effort (CPUE) was observed at station #3 (353.3 fish per hour) and the highest biomass CPUE was observed at Station #1 (40.54 kilograms per hour). The lowest catch rates and species diversity were observed at Station #2. As indicated earlier, minnows dominated the catch numerically. However, the carp/sucker group had the greatest biomass except at Station #3 where a nice group of sport fish was collected. Interestingly, the CPUE for sport fish increased as we approached the Ohio River, whereas the carp/sucker group CPUE was exactly the same at Stations #2 through #4. Three species of darters were collected consisting of only one fish per species. It is suspected that daytime surveys upstream of Tunnel Green Park would show that darters have a greater prominence in the Wheeling Creek fishery than observed during the surveys of 11 June. The longnose gar was collected at nearly every station, and may have become a permanent resident of lower Wheeling Creek.

Results from this survey can be contrasted with data from other streams tributary to the Ohio River which were sampled using the backpack electrofishing technique on free flowing portions of the streams just upstream of their embayments. For example, catch rates for lower Kings Creek (USACE, 1995) were 1,522 fish and 83.97 kilograms per hour, and Montour Run (Koryak et al., 1997) catch rates were 62.9 fish and 54.4 kilograms per hour. Kings Creek enters the Ohio River at Weirton, WV, has a 48 square mile drainage basin and is a high quality stream with a highly diverse fishery. Montour Run enters the Ohio River 9.4 miles downstream of Pittsburgh in Coraopolis, PA, has a 36.6 square mile drainage basin and is a highly polluted stream. In eleven minutes of electrofishing at Kings Creek eighteen species of fish were collected while at Montour Run only seven species were collected in a twenty-one minute sample. It appears that lower Wheeling Creek, with a drainage area of 298 square miles, has a habitat value somewhere in between that of lower Montour Run and lower Kings Creek. The extensive Wheeling Creek embayment, however, in contrast to the embayments at Kings Creek and Montour Run that are small, provides a unique and apparently productive fishery resource.

To further characterize the lower Wheeling Creek Fishery an Index of Biotic Integrity (IBI), using the boat electrofishing metrics (Ohio, 1988) listed in Table 7, was computed. This single numerically value is used to evaluate and compare fisheries in various aquatic environments. A score of 50-60 is exceptional and any thing less than 16 represents a very poor community condition. The IBI score for lower Kings Creek was 54 indicating exceptional community and habitat conditions, and the score for lower Montour Run was 23 indicating a poor community and habitat conditions. The IBI score for lower Wheeling Creek was 40 indicating good community and habitat conditions, which in the rating system is one-step down from exceptional and two-steps above poor.

On the day of the survey, two anglers were observed fishing Wheeling Creek upon entering the mouth of the embayment, two anglers were in a bass boat en route from Tunnel Green Park, and several anglers were observed fishing at the Main Street Bridge during the survey at Station #4. This level of angler use is a good indication that the fishery in lower Wheeling Creek is relatively good.

It is also important to note that evidence of probable natural reproduction was observed in the embayment. At Station #1, three small hog suckers (59-76mm), an 81-mm smallmouth bass and a 134-mm black redhorse were collected. At Station #2, a 76-mm largemouth bass was collected. These were likely young-of-the-year fish. And finally at Station #4, a 182-mm smallmouth bass and a 101-mm bluegill were collected, which were probably one-year old fish.

Summary

A survey using an electrofishing boat was conducted on 1.5 miles of lower Wheeling Creek. Four ten-minute effort stations were sampled within areas that will be directly and indirectly affected by dredging for recreational purposes. A total of 40 minutes were expended sampling the fishery, one dusk survey in the flowing portion of the stream adjacent to Tunnel Green Park and three night samples within the backwater embayment. Nearly thirty-three percent of the sample stretch was surveyed. A total of 138 fish weighing 19.17 kilograms were collected representing 24 species. The IBI score for lower Wheeling Creek was 40, giving the stream fish community and habitat conditions a good overall rating. All fish collected are common in small- to medium sized rivers in the Ohio River drainage, and the apparent natural reproduction of four species of fish was observed. No uncommon or federally listed endangered or threatened fish species were found.

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Table 1. FISH DATA SUMMARY, **Wheeling Creek Station #1**, 11 June 2002.

SPECIES	TOTAL NO.	CATCH PER HOUR	% BY NO.	RANGE (mm)	TOTAL WEIGHT (grams)	% OF TOTAL WEIGHT	KILOGRAMS PER HOUR	NUMBER PER KILOMETER	KILOGRAMS PER KILOMETER
SPORT FISH									
Smallmouth bass	2	11.98	7.14%	81-289	304	4.49%	1.82	10	1.47
White bass	1	5.99	3.57%	283	262	3.87%	1.57	5	1.26
CARP/SUCKERS									
Carp	1	5.99	3.57%	560	2,800	41.35%	16.77	5	13.51
Smallmouth buffalo	1	5.99	3.57%	392	860	12.70%	5.15	5	4.15
Quillback	1	5.99	3.57%	360	585	8.64%	3.50	5	2.82
Black redhorse	5	29.94	17.86%	134-310	813	12.01%	4.87	24	3.92
Freshwater drum	1	5.99	3.57%	323	470	6.94%	2.81	5	2.27
Hog sucker	3	17.96	10.71%	59-76	12	0.18%	0.07	14	0.06
MINNOWS									
Emerald shiner	1	5.99	3.57%	58	1	0.01%	0.01	5	0.00
Sand shiner	10	59.88	35.71%	42-65	11	0.16%	0.07	48	0.05
DARTERS									
Logperch	1	5.99	3.57%	136	23	0.34%	0.14	5	0.11
GAR									
Longnose gar	1	5.99	3.57%	660	630	9.30%	3.77	5	3.04
TOTALS	**28**	**167.66**			**6,771**		**40.54**	**135**	**32.67**
SPORT FISH	3	17.96	10.71%		566	8.36%	3.39	14	2.73
CARP/SUCKERS	12	71.86	42.86%		5,540	81.82%	33.17	58	26.73
MINNOWS	11	65.87	39.29%		12	0.18%	0.07	53	0.06
DARTERS	1	5.99	3.57%		23	0.34%	0.14	5	0.11
GAR	1	5.99	3.57%		630	9.30%	3.77	5	3.04

SURVEY PARAMETERS

Date 11 June 2002	Effort - hours 0.167	Time: 2030-2040		
Survey Participants:	Koryak, Stafford, Hoskin	Stream Length Sampled:	680 feet	0.207 kilometers
Flow: low and clear	pH: 8.61	Stream temp: 24.6 C		Air Temp:
Dissolved Oxygen: 9.53 mg/L	Conductivity: 405 umhos/cm	Secchi - 5.0 feet		70's F

NOTES: Daylight sample conducted in flowing water portion, maximum depth four feet. Sample initiated at end of long gravel bar 100' downstream of Tunnel Green Park footbridge (1+00). Survey ended at 1st power line crossing (7+80) & CSO within Tunnel Green Park.

Table 2. FISH DATA SUMMARY, **Wheeling Creek Station #2**, 11 June 2002.

SPECIES	TOTAL NO.	CATCH PER HOUR	% BY NO.	RANGE (mm)	TOTAL WEIGHT (grams)	% OF TOTAL WEIGHT	KILOGRAMS PER HOUR	NUMBER PER KILOMETER	KILOGRAMS PER KILOMETER
SPORT FISH									
Largemouth bass	1	5.99	5.88%	76	5	0.27%	0.03	5	0.02
White bass	3	17.96	17.65%	164-230	296	15.80%	1.77	14	1.39
Rock bass	1	5.99	5.88%	145	58	3.10%	0.35	5	0.27
CARP/SUCKERS									
Smallmouth buffalo	1	5.99	5.88%	308	357	19.06%	2.14	5	1.67
Golden redhorse	3	17.96	17.65%	183-355	958	51.15%	5.74	14	4.49
Gizzard shad	1	5.99	5.88%	276	183	9.77%	1.10	5	0.86
MINNOWS									
Emerald shiner	5	29.94	29.41%	50-90	13	0.69%	0.08	23	0.06
Sand shiner	2	11.98	11.76%	54-57	3	0.16%	0.02	9	0.01
DARTERS	0								
GAR	0								
TOTALS	**17**	**101.80**			**1,873**		**11.22**	**80**	**8.78**
SPORT FISH	5	29.94	29.41%		359	19.17%	2.15	23	1.68
CARP/SUCKERS	5	29.94	29.41%		1,498	79.98%	8.97	23	7.02
MINNOWS	7	41.92	41.18%		16	0.85%	0.10	33	0.07
DARTERS	0								
GAR	0								

SURVEY PARAMETERS				
Date 11 June 2002	Effort - hours 0.167	Time: 2130-2140		
Survey Participants:	Koryak, Stafford, Hoskin	Stream Length Sampled:	700 feet	0.213 kilometers
Flow: low and clear	pH: 8.79	Stream temp: 24.51 C		Air Temp:
Dissolved Oxygen: 9.43 mg/L	Conductivity: 406 umhos/cm	Secchi - refer to Station #1		70's F

NOTES: Sample initiated at 2nd powerline crossing (28+50)and completed at 3rd powerline crossing above bend (35+50).
Numerous mayflies and caddisflies attracted to lights.

Table 3. FISH DATA SUMMARY, **Wheeling Creek Station #3**, 11 June 2002.

SPECIES	TOTAL NO.	CATCH PER HOUR	% BY NO.	RANGE (mm)	TOTAL WEIGHT (grams)	% OF TOTAL WEIGHT	KILOGRAMS PER HOUR	NUMBER PER KILOMETER	KILOGRAMS PER KILOMETER
SPORT FISH									
Smallmouth bass	3	17.96	5.08%	244-360	1,290	27.04%	7.72	14	6.05
Spotted bass	1	5.99	1.69%	268	246	5.16%	1.47	5	1.15
Flathead catfish	2	11.98	3.39%	190-310	401	8.40%	2.40	9	1.88
Channel catfish	1	5.99	1.69%	395	533	11.17%	3.19	5	2.50
Walleye	1	5.99	1.69%	263	125	2.62%	0.75	5	0.59
CARP/SUCKERS									
Gizzard shad	2	11.98	3.39%	245-351	507	10.63%	3.04	9	2.38
Golden redhorse	1	5.99	1.69%	179	70	1.47%	0.42	5	0.33
Freshwater drum	2	11.98	3.39%	262-268	431	9.03%	2.58	9	2.02
MINNOWS									
Emerald shiner	32	191.62	54.24%	57-91	70	1.47%	0.42	150	0.33
Sand shiner	11	65.87	18.64%	52-61	16	0.34%	0.10	52	0.07
DARTERS									
Greenside darter	1	5.99	1.69%	58	2	0.04%	0.01	5	0.01
GAR									
Longnose gar	2	11.98	3.39%	450-708	1,080	22.64%	6.47	9	5.06
TOTALS	**59**	**353.29**			**4,771**		**28.57**	**277**	**22.36**
SPORT FISH	8	47.90	13.56%		2,595	54.39%	15.54	37	12.16
CARP/SUCKERS	5	29.94	8.47%		1,008	21.13%	6.04	23	4.72
MINNOWS	43	257.49	72.88%		86	1.80%	0.51	202	0.40
DARTERS	1	5.99	1.69%		2	0.04%	0.01	5	0.01
GAR	2	11.98	3.39%		1,080	22.64%	6.47	9	5.06

SURVEY PARAMETERS					
Date 11 June 2002	Effort - hours 0.167	Time: 2205-2215			
Survey Participants:	Koryak, Stafford, Hoskin	Stream Length Sampled:	700 feet	0.213 kilometers	
Flow: low and clear	pH: Omitted	Stream temp: Omitted			Air Temp:
Dissolved Oxygen: Omitted	Conductivity: Omitted	Secchi - See Station #1			70's F

NOTES: Sample initiated at bar of left descending bank tributary (47+00) and ended 400' above RR bridge (54+00).

Table 4. FISH DATA SUMMARY, **Wheeling Creek Station #4**, 11 June 2002.

SPECIES	TOTAL NO.	CATCH PER HOUR	% BY NO.	RANGE (mm)	TOTAL WEIGHT (grams)	% OF TOTAL WEIGHT	KILOGRAMS PER HOUR	NUMBER PER KILOMETER	KILOGRAMS PER KILOMETER
SPORT FISH									
Smallmouth bass	1	5.99	2.94%	182	75	1.30%	0.45	5	0.36
Largemouth bass	2	11.98	5.88%	252-312	638	11.09%	3.82	10	3.08
Spotted bass	2	11.98	5.88%	262-272	486	8.44%	2.91	10	2.34
White bass	2	11.98	5.88%	148-182	106	1.84%	0.63	10	0.51
Bluegill	1	5.99	2.94%	101	18	0.31%	0.11	5	0.09
CARP/SUCKERS									
Gizzard shad	1	5.99	2.94%	293	235	4.08%	1.41	5	1.13
Golden redhorse	1	5.99	2.94%	296	305	5.30%	1.83	5	1.47
Smallmouth buffalo	3	17.96	8.82%	343-560	3,632	63.11%	21.75	14	17.52
MINNOWS									
Emerald shiner	10	59.88	29.41%	55-60	13	0.23%	0.08	48	0.06
Sand shiner	6	35.93	17.65%	50-57	8	0.14%	0.05	29	0.04
Mimic shiner	2	11.98	5.88%	45-48	2	0.03%	0.01	10	0.01
DARTERS									
Fantail darter	1	5.99	2.94%	61	2	0.03%	0.01	5	0.01
GAR									
Longnose gar	2	11.98	5.88%	403-458	235	4.08%	1.41	10	1.13
TOTALS	**34**	**203.59**			**5,755**		**34.46**	**164**	**27.77**
SPORT FISH	8	47.90	23.53%		1,323	22.99%	7.92	39	6.38
CARP/SUCKERS	5	29.94	14.71%		4,172	72.49%	24.98	24	20.13
MINNOWS	18	107.78	52.94%		23	0.40%	0.14	87	0.11
DARTERS	1	5.99	2.94%		2	0.03%	0.01	5	0.01
GAR	2	11.98	5.88%		235	4.08%	1.41	10	1.13

SURVEY PARAMETERS

Date 11 June 2002	Effort - hours 0.167	Time: 2235-2245		
Survey Participants:	Koryak, Stafford, Hoskin	Stream Length Sampled:	680 feet	0.207 kilometers
Flow: low and clear	pH: 8.72	Stream temp: 24.54 ^{o}C		Air Temp:
Dissolved Oxygen: 9.36 mg/L	Conductivity: 412 umhos/cm	Secchi - See Station #1		70's F

NOTES: Sample initiated on upstream side of Market Street Bridge (74+40) and ended at the downstream side of the 1st RR bridge downstream of the Main Street Bridge (81+20).

TABLE 5. Wheeling Creek Fish Species List
Boat Electrofishing Results by Station
Summary by Species
June 11, 2002

Species	Number of Fish by Species				Total # of Stations Collected	Species Total Number	Species Total Weight
	Station #1	Station #2	Station #3	Station #4			
Largemouth bass		1		2	2	3	643
Smallmouth bass	2		3	1	3	6	1,669
Spotted bass			1	2	2	3	732
White bass	1	3		2	3	6	664
Rock bass		1			1	1	58
Bluegill				1	1	1	18
Flathead catfish			2		1	2	401
Channel catfish			1		1	1	533
Walleye			1		1	1	125
Black redhorse	5				1	5	813
Golden redhorse		3	1	1	3	5	1,333
Hog sucker	3				1	3	12
Carp	1				1	1	2,800
Quillback	1				1	1	585
Smallmouth buffalo	1	1		3	2	5	4,849
Freshwater drum	1		2		2	3	901
Gizzard shad		1	2	1	3	4	925
Emerald shiner	1	5	32	10	4	48	97
Sand shiner	10	2	11	6	4	29	38
Mimic shiner				2	1	2	2
Logperch	1				1	1	23
Greenside darter			1		1	1	2
Fantail darter				1	1	1	2
Longnose gar	1		2	2	3	5	1,945
Total Species	12	8	12	13	**24**		
Total All Fish	28	17	59	34		**138**	**19,170**

TABLE 6. Wheeling Creek Data Summary
Boat Electrofishing Results by Group
June 11, 2002

Fish Group	Catch Per Hour				Percent of Total Number				Percent of Total Weight				Kilograms Per Hour				Number Per Kilometer				Kilograms Per Kilometer			
	Station #1	Station #2	Station #3	Station #4	Station #1	Station #2	Station #3	Station #4	Station #1	Station #2	Station #3	Station #4	Station #1	Station #2	Station #3	Station #4	Station #1	Station #2	Station #3	Station #4	Station #1	Station #2	Station #3	Station #4
Sport Fish	17.96	29.94	47.9	47.9	10.71%	29.41%	13.56%	23.53%	8.36%	19.17%	54.39%	22.99%	3.39	2.15	15.14	7.92	14	23	37	39	2.73	1.68	12.16	6.38
Carp/Suckers	71.86	29.94	29.94	29.94	42.86%	29.41%	8.47%	14.71%	81.82%	79.98%	21.13%	72.49%	33.17	8.97	6.04	24.98	58	23	23	24	26.73	7.02	4.72	20.13
Minnows	65.87	41.92	257.49	107.78	39.29%	41.18%	72.88%	52.94%	0.18%	0.85%	1.80%	0.40%	0.07	0.1	0.51	0.14	53	33	202	87	0.06	0.07	0.4	0.11
Darters	5.99	0	5.99	5.99	3.57%	0%	1.69%	2.94%	0.34%	0%	0.04%	0.03%	0.14	0	0.01	0.01	5		5	5	0.11		0.01	0.01
Gar	5.99	0	11.98	11.98	3.57%	0%	3.39%	5.88%	9.30%	0%	22.64%	4.08%	3.77	0	6.47	1.41	5		9	10	3.04		5.06	1.13
Station Total	167.66	101.8	353.29	203.59									40.54	11.22	28.57	34.46	135	80	277	164	32.67	8.78	22.36	27.77

Survey Totals	Catch Per Hour	Percent of Total Number	Percent of Total Weight	Kilograms Per Hour	Number Per Kilometer	Kilograms Per Kilometer
Sport Fish combined	36.00	17.39%	25.26%	7.26	29	5.76
Carp/Suckers combined	40.50	19.57%	63.74%	18.33	32	14.53
Minnow combined	118.50	57.25%	0.71%	0.21	94	0.16
Darters combined	4.50	2.17%	0.14%	0.04	4	0.03
Gar combined	7.50	3.62%	10.15%	2.92	6	2.31
Sample Total	207.00			28.75	164	22.79

TABLE 7: Index of Biological Integrity (IBI) Score and Boat Electrofishing Metrics Utilized

Metric	Value	Score
1. Total Number of Species	24	5
2. Percent Round-bodies Suckers	9.4%	1
3. Number of Sunfish Species	2	3
4. Number of Sucker Species	5	3
5. Number of Intolerant Species	2	3
6. Percent Tolerant Species	0.7%	5
7. Percent Omnivores	4.3%	5
8. Percent Insectivorous Species	73.2%	5
9. Percent Top Carnivores	19.6%	1 *
10. Percent Simple Lithophils	46.4%	3
11. Percent DELT Anomalies	0.0%	1 *
12. Number of Large River Species	5	5
TOTAL		**40 Good** (Manuel 36-48 equals Good)

* Note - Score reduced as directed by Manuel Guidelines (less than 200 individuals collected)

Appendix C.
Assessment of Mussel Resources
Lower Wheeling Creek, West Virginia,
And a Short Reach of the Ohio River

Assessment of the Mussel Resources in the Lower Wheeling Creek, WVA And a Short Reach of the Ohio River

Oct 2001

Environmental Laboratory
U.S. Army Engineering and Research Development Center
Waterways Experiment Station
Vicksburg, Mississippi 39180-6199

Andrew Miller

Assessment of the Mussel Resources in the Lower Wheeling Creek, West Virginia, and a Short Reach of the Ohio River

Background

Through legislation adopted in FY 2001, Congress earmarked funds and authorized the U.S. Army Corps of Engineers to dredge a four to six-foot deep channel in Wheeling Creek, in Wheeling West Virginia, from its mouth at Ohio River Mile 90.8, to Tunnel Green Park, a small recreation facility located approximately 1.5 miles above the stream's mouth. Dredging will permit recreational boaters to access Tunnel Green Park and the recently completed rails to trails bikeway/walkway that passes adjacent to the park. Preliminary, screening level investigations conducted in 2000 indicate that dredging will generate approximately 11,000 cubic yards of sediment. Studies are currently underway to accurately determine the amount of sediment requiring removal. Current plans are to place the dredged material at either Celeron Plaza, a brownfield located adjacent to the left bank of the mouth of Wheeling Creek or in a commercial landfill. There are no plans for open water disposal. The preliminary schedule calls for dredging to start in the late summer of 2002.

The U.S. Army Engineer District, Pittsburgh, has concern that dredging and disposal of dredged material could negatively affect freshwater mussels (Family: Unionidae) and their habitat in Wheeling Creek between Tunnel Green Park and the Ohio River. Concern was also expressed that increased recreational activity for 1.0 mile upstream of the park could affect mussels, if present. Finally, the District requested that a short reach of the Ohio River, which could be affected by dredging and the disposal of dredged material, be evaluated for mussels.

In medium- to large-sized rivers, freshwater mussels usually reach their highest density in moderately shallow water outside the navigation channel. They are most common in sand/gravel substratum that is kept relatively free of silt with moderate- to high-velocity water, 0.5 to 1.5 ft/sec. Mussels are virtually non-motile, require a fish host to successfully reproduce, and feed by filtering organic matter out of the water column. Shells of many species were used to make buttons before the advent of plastics; today shells of certain species are used in the cultured pearl business. Because they are long-lived and feed on particulate matter in the water, mussel population dynamics and community composition can be used as an indicator of habitat conditions. Williams (1993) listed nearly 300 species of freshwater mussels in this country; 71.7% are considered to be endangered, threatened, or of special concern.

Them purpose of this work was to evaluate the mussel resource in the lower 2.5 miles of Wheeling Creek. This included the reach between the Ohio River and Tunnel Green Park, plus an additional 1.0-mile upstream of the park. In addition, approximately 0.5 miles of the Ohio River (River Miles 90.8 to 91.3), Left Descending Bank (LDB), immediately downriver of the mouth of the creek was surveyed for mussels.

Methods

Three individuals made a preliminary reconnaissance of the study area before the survey began. Shallow water and the bank were searched visually and by hand for live mussels and shells. Work was accomplished with a 23-foot boat, and in shallow areas by walking to the sites and wading. The sampling sites surveyed for mussels are listed in Table 1 and displayed on Figure 1.

Four sites were searched along the LDB of the Ohio River (Numbers 15-18). Seven sites were searched along Wheeling Creek downstream of Tunnel Green Park (1,2, 10-14). The remaining 6 sites (4-9) were located upstream of Tunnel Green Park. Two individuals walked to these sites. Total search time for sites upstream of the park was not recorded on the tables, but approximately 30 min per site for a total of three hours. A total of 17 Waypoints are listed in Table 1; there is no Site 3.

Divers were used to search for mussels in water deeper than 0.5 m (Miller et al. 1993). Two divers worked simultaneously and searched for live mussels by moving their hands across the substratum since visibility was limited. All live mussels encountered were placed in a mesh bag, brought to the surface, identified, and then returned to the river. Typically each diver expended 15 min, so a total of 30 min was spent at each site.

For this survey only qualitative, timed searches were used to collect mussels. Quantitative, total substratum sampling was not done because the total density of mussels was so low (probably less than 1 mussel per 10 – 100 square meters).

Results

A total of 17 sites were searched for mussels using waders and divers (Table 1, Figure 1). The total amount of time expended searching for mussels in lower Wheeling Creek and the Ohio River was 360 minutes (6 hours). Two hours were spent in the Ohio River, whereas 4 hours were expended searching in Wheeling Creek at 6 sites located downstream of Tunnel Green Park.

Only 9 live mussels, representing 6 species were collected (Table 2, 3). All mussels were common and are typically collected in medium-sized to large rivers in the central and southern United States. No Federally listed endangered or threatened species were found.

Collecting rate was extremely low for all sites. Live mussels were found at only 5 sites, and the collection rate varied from a low of 0.02 individuals per minute to a high of 0.13 individuals per minute. Average collecting rate for all sites that were searched for mussels was 0.03 individuals per minute.

Results from this survey can be contrasted with data from other areas in similar sized streams. For example, the North Fork Hughes River near Harrisville, WV, is similar in

size to Wheeling Creek. In the North Fork Hughes River a total of 705 min were spent searching and during this time 786 live mussels representing 17 species were collected. Mean collecting rate was slightly greater than 1 individual per minute (Miller and Payne 2000). Although a greater effort was expended in the North Fork Hughes River than in Wheeling Creek, it should be obvious that the latter waterbody is not a valuable habitat for freshwater mussels.

Summary

A survey for freshwater mussels using divers and waders was conducted in 2.5 miles of Wheeling Creek and 0.5 miles of the Ohio River immediately downstream of the Creek. Studies were conducted at an area that will be directly and indirectly affected by dredging for recreational purposes. A total of 360 m in were expended searching for mussels at 11 sites in the Ohio River and in Wheeling Creek downstream of Tunnel Green Park. Nine mussels and 6 species were collected at these 11 sites. All mussels were common in small-to medium sized rivers in the central United States. No uncommon or federally listed endangered or threatened mussel species were found. Approximately 3 hours were spent looking for mussels upstream of Tunnel Green Park. No live mussels or shells were found.

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Table 1. Sites surveyed for Freshwater Mussels in lower Wheeling Creek and upper Ohio River, Sep 01. See Figure 1 for location of waypoints.

Location	Survey	Latitude	Longitude	Waypoint
Wheeling Creek	Waders	40.068528	80.709611	1
Wheeling Creek	Waders	40.070567	80.709064	2
Wheeling Creek	Waders	40.074171	80.706784	4
Wheeling Creek	Waders	40.074483	80.716108	5
Wheeling Creek	Waders	40.074944	80.710931	6
Wheeling Creek	Waders	40.078570	80.715228	7
Wheeling Creek	Waders	40.077127	80.719788	8
Wheeling Creek	Waders	40.079874	80.719825	9
Wheeling Creek	Divers	40.062354	80.722202	10
Wheeling Creek	Divers	40.060412	80.718055	11
Wheeling Creek	Divers	40.063866	80.711542	12
Wheeling Creek	Divers	40.065894	80.710384	13
Wheeling Creek	Divers	40.068244	80.709611	14
Ohio River	Divers	40.062675	80.726091	15
Ohio River	Divers	40.061672	80.726702	16
Ohio River	Divers	40.061243	80.726820	17
Ohio River	Divers	40.060261	80.727276	18

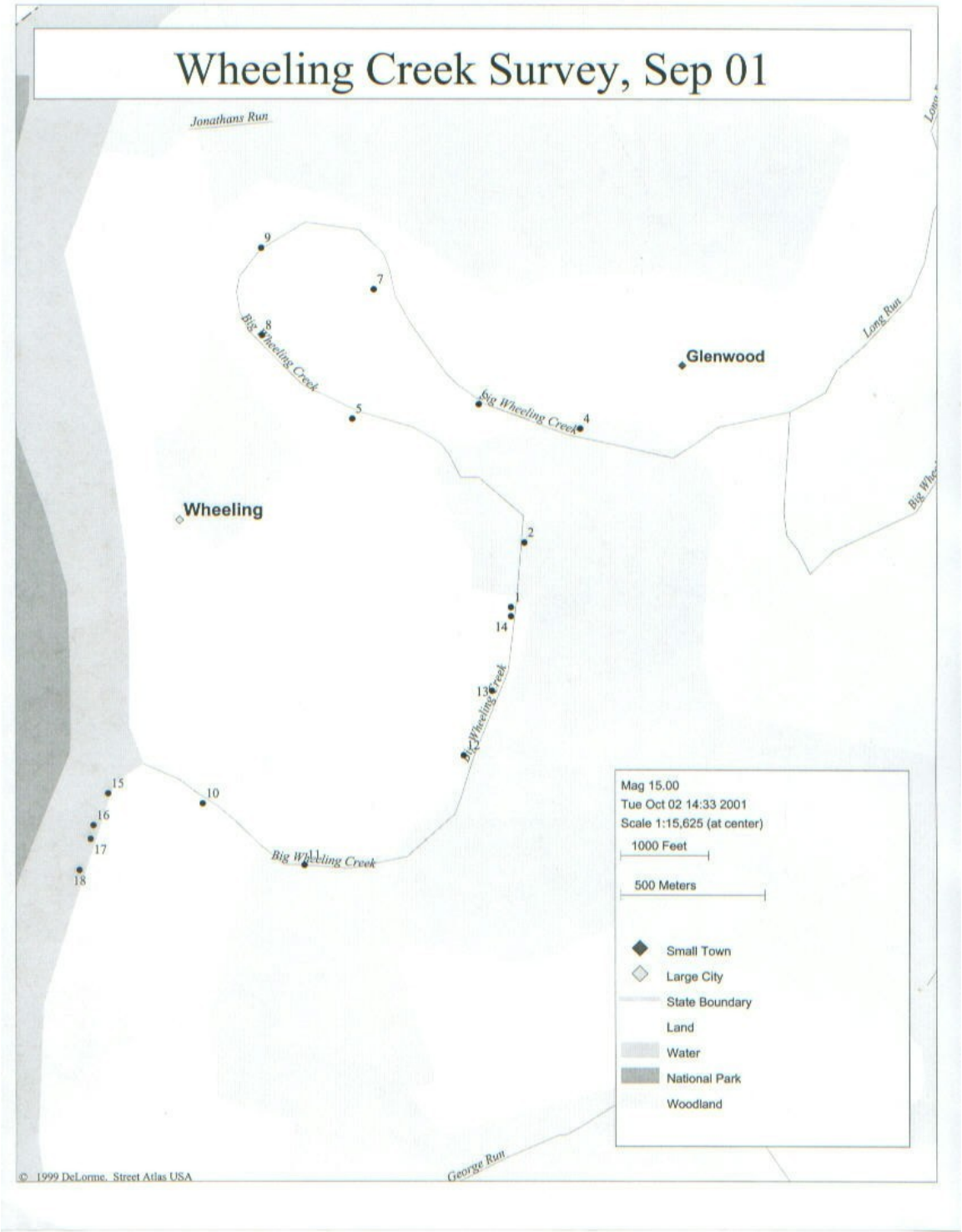
Table 2. Results of Qualitative Searches for Mussels in Wheeling Creek Downstream of Tunnel Green Park and the Ohio River Immediately Downriver of Wheeling Creek, WV, Sep 01.

	Waypoint Number											Total
	Wheeling Creek							Ohio River				Mussels
Species	**1**	**2**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
L. costata					2							2
Q. quadrula								2				2
P. alatus								2				2
L. cardium	1											1
L. complanata						1						1
A. plicata										1		1
Total individuals	1	0	0	0	2	1	0	4	0	1	0	9
Total species	1	0	0	0	1	1	0	2	0	1	0	6
Time, min	45	45	30	30	30	30	30	30	30	30	30	360
Ind/Min	0.02	0.00	0.00	0.00	0.07	0.03	0.00	0.13	0.00	0.03	0.00	0.03

Table 3. Summary Information from Qualitative Searches for Mussels in Wheeling Creek Downstream of Tunnel Green Park and in the Ohio River Downriver of Wheeling Creek, WV, Sep 01

Species	Mussels	%	Count	%
L. costata	2	22.2	1	10.0
Q. quadrula	2	22.2	1	10.0
P. alatus	2	22.2	1	10.0
L. cardium	1	11.1	1	10.0
L. complanata	1	11.1	1	10.0
A. plicata	1	11.1	1	10.0
Total individuals	9			
Total species	6			
Time, min	360			
Ind/Min	0.03			

Figure 1. Sites surveyed in Wheeling Creek and the Ohio River, WV, Sep 01.



Appendix D.
Wheeling Creek, WV Embayment Dredging
Vegetation and Aquatic Habitat Survey

Wheeling Creek, WV Embayment Dredging
Vegetation and Aquatic Habitat Survey

INTRODUCTION

On May 30, 2001, Larry Moskovitz PM-PF and I conducted a cursory riparian vegetation and aquatic habitat survey of lower Wheeling Creek in Wheeling, West Virginia, to supplement the EA for the Wheeling Creek, WV dredge project. As presented in the report *Waterfront Development at the Confluence of Wheeling Creek and the Ohio River, Wheeling Creek, WV, Special Project Report, August 2000* (Ref 1), dredging is proposed between miles 0.7 or 0.89 and 1.48 of Wheeling Creek, to either a 4 or 6 foot clearance, in order to promote recreational boat traffic.

STUDY AREA

The drainage area of Wheeling Creek is 298 square miles. Wheeling Creek confluences with the left descending bank of the Ohio River, in urbanized, downtown Wheeling, WV. At its mouth, the Wheeling Creek Embayment is about 12 feet deep and the normal pool elevation is 623 ft National Geodetic Vertical Datum (NGVD). On May 30th, the elevation of the Hannibal Pool of the Ohio River was 624.2 ft NGVD and the backwater reach of Wheeling Creek extended from the confluence of Wheeling Creek with the Ohio River at mile 0, upstream to approximately mile 0.9. The study area extended from the mouth of Wheeling Creek, upstream to approximately mile 1.6 at Tunnel Green Park, focusing primary on the riparian areas lying between the stream channel and the ordinary high water line (approximately 6 vertical feet above the stream channel).

METHODS

Sampling sites were selected where access was available, primarily at bridges and sewerline crossings, because the survey was conducted from the shore rather than by boat. Sites were located along the left descending bank at stream miles 0, 0.01 to 0.1, 0.11, 0.2, 0.25, 0.5, 0.9, and 1.45 to 1.5. The most upstream end of the project reach was observed from the C&O Railroad bridge located at stream mile 1.6. At each site, a visual vegetation survey was conducted, where species distribution patterns, diversity, and relative abundance were noted.

All unique vascular plants were keyed to species, with nomenclature according to plants *Grays Manual of Botany* (Ref. 2). Relative abundance for each species was estimated as dominant, locally dominant, abundant, locally abundant, common, scattered, or few. Verbatim habitat characterizations and information on regional distribution for each species were obtained from regional botanical manuals, *The Flora of West Virginia* (Ref. 3), and *The Plants of Pennsylvania* (Ref. 4). Wetlands were classified according to the US Fish and Wildlife Service's (USF&WS) *Classification of Wetlands and Deepwater Habitats of the United States* (Ref 5).

The USF&WS national wetland inventory indicator was noted for each plant species. According to the USF&WS, "Plant species that occur in wetlands, as used in the *National List*, are defined as species that have demonstrated an ability to achieve maturity and reproduce in an environment where all or portions of the soil within the root zone become, periodically or continuously, saturated or inundated during the growing season" (Ref. 6). The USF&WS developed a wetland fidelity system where obligate (OBL) species are those restricted to wetlands (>99%); facultative wet species (FACW) are those that usually occur in wetlands (67to79%); facultative species are those that equally occur in wetlands and non-wetlands (34-66%); and facultative upland plants (FACU) are species that usually occur in non-wetlands (67-99%) but are occasionally found in wetlands (1 to 33 %).

Percent dominance of plant communities by exotic species was estimated because increasing numbers of exotic species are indications of degraded ecosystems. Aggressive invasive exotic species are usually "weedy" and tend to colonize disturbed areas, out competing native species while offering lower value. Exotic species can readily out compete native species in disturbed areas and since riparian areas are naturally disturbed, they are particularly vulnerable to invasion by exotic plants. For comparison, of the 3,400 different kinds of vascular plants found growing spontaneously in Pennsylvania, 33% are believed to be exotic (Ref. 4). Locally, in highly disturbed areas, alien plants may represent a much higher percentage of the total flora.

Habitat condition and presence of wildlife were also casually noted. A more thorough survey was planned by canoe for the fall of 2001, but was cancelled due to funding restraints.

RESULTS

There appeared to be little aquatic habitat diversity or structure in the Wheeling Creek study area and, for the first 0.9 mile in the Ohio River backwater area, the stream was basically channelized. Banks along this reach were very steep, had been filled in many places, and were generally supported by sandstone walls. Upstream of the Route 70 Bridge, however, the stream channel began to widen. Only two riffles were observed in the study area, at miles 0.9 and 1.4. In addition, only a few sandbars were observed. A large wooded sandbar was located along the left descending bank between mile .1 and .2; two, sparsely vegetated, 50 ft long sandbars were located on the insides of meanders, along the right descending bank near miles 0.8 and 1.0; and a non-vegetated sandbar was located at the upstream end of the project area, in Tunnel Green Park, downstream of the old C&O (rails to trails) Railroad. Broad, vegetated shoreline benches were located only in the vicinity of Tunnel Green Park (upstream of mile 1).

Wheeling creek has suffered from a plethora of urban, industrial, and agricultural problems, including: waste water treatment effluent, failing septic systems, septic waste seepage, agricultural runoff, HTRW problems, and urban runoff (Ref 1). However, Wheeling Creek water quality appears to be improving as a recent Wheeling Jesuit University study characterized Wheeling Creek benthos as "good" (Ref 1). In support of

these findings, during our survey, we observed water striders, pinheads, and swarms of emerging aquatic flies and stoneflies. In 2001, the WV Department of Environmental Protection (WVDEP) was scheduled to conduct a 5-year rotational water quality survey of Wheeling Creek for the State's 303(d) list of impaired water bodies, and this data may now be available.

Few emergent wetlands or aquatic beds were observed in the study area. Narrow bands of reed canary grass were randomly located along stream edges and two small sparse water willow dominated aquatic beds were observed growing on the on sandbars at miles 0.8 and 1.0, all classified as riverine emergent wetlands according to the USF&WS. Although the USF&WS and the WV Department of Natural Resources (WVDNR) have reported no jurisdictional wetlands in the study area (Ref. 1), their conclusions were based on the USF&WS' National Wetland Inventory Maps and were not field verified.

The floodplain forest plant community was similarly structured throughout the study reach, with a total of 70 plant species observed (Table 1). Riparian areas of non-impaired regional streams generally support greater than 200 plant species, so comparatively, diversity along Wheeling Creek study area was very low. Even in the riparian corridor of Nine Mile Run, a degraded urban stream tributary to the Monongahela River in Allegheny County, PA, 241 plant species were identified (Ref. 7). However, the canopy of the Wheeling Creek riparian area was mature and moderately diverse. A total of 14 species of trees were identified in the canopy, of which 21% were exotic species, dominated by the native species black willow, boxelder, sycamore, cottonwood, and silver maple. Of note were the mature cottonwood trees, abundant along the left descending 0.4 miles of stream both along the top of the sandstone wall and on the sandbar, many of which had a diameter at breast height (dbh) > 12 inches. The understory was generally less healthy, dominated by exotic species (primarily Japanese knotweed), and, as would be expected, became more diverse as one moved upstream and away from the more urbanized mouth. Thirteen woody species were identified in the sub-canopy (23% exotic). Dominant sub-canopy species included native dogwood, spicebush, poison ivy, common elder, slippery elm, and grapes, and exotic common privet. Additionally, forty-two species of ground cover species were identified, of which 60% exotic. Dominant ground cover species included native touch-me-not and snakeroot and exotic garlic mustard.

Embayments provide excellent habitat (food and cover) for migratory and resident wildlife and act as nurseries for Ohio River fish like bass and sunfish. The USF&WS has identified over 60 species of birds within the Ohio River Islands National Wildlife Refuge (ORINWR) and 25 species of waterfowl and other water birds feeding in the embayments. Wading birds utilize shallow water habitat and mallards, Canada geese, and wood ducks raise broods in embayments (Ref. 8). The ORINWR extends along the reach of the Ohio River between Pittsburgh, PA and Cincinnati, OH, and includes selected embayments and islands. At least 17 species of birds were casually observed along the riparian corridor of Wheeling Creek during this survey and evidence of 3 mammal species was noted (Table 2).

While no federally listed species of concern were observed during this survey, the USF&WS identified 4 listed species in the ORINWR: bald eagle, Indiana bat, pink pearly mussel, and fanshell mussel. These species could potentially be found within the Wheeling Creek study area. In 2001, WES observed 22 species of mussels in the Wheeling Creek study area, none of which were listed (Ref. 9). The USF&WS also located 39 plant species of special status within the ORINWR, none of which were observed along Wheeling Creek. Although it is not anticipated, there is also a potential that rare State species could utilize the Wheeling Creek embayment (7 species of fish, henslow sparrow, etc.).

DISCUSSION/CONCLUSIONS

Wheeling Creek water quality has been characterized as moderately degraded (ref. 1); most of the study reach is channelized with little in-stream structure or habitat; and there were very few wetlands. The canopy understory was degraded, with low diversity and dominated by exotic plant species. However, the riparian corridor, even in downtown Wheeling, was basically intact and contiguous.

Regardless of its degraded condition, Ohio River tributary embayments like Wheeling Creek can potentially provide exceptional aquatic habitat. The bottomland hardwoods along the riparian corridor are mature and moderately diverse. According to the USF&WS' *Ohio River Islands National Wildlife Refuge Draft Conservation Plan and Environmental Assessment* (Ref. 8), "Bottomland hardwood forest is the principal habitat targeted for restoration because it is the most important and limited habitat type in the acquisition area (Ohio River from Pittsburgh to Cincinnati)." This report also emphasized the value of Ohio River embayments, stating that "Aquatic habitats associated with the islands and their back channels comprise less than 1% of the open water acreage of the Ohio River in the study area but provided some of the regions highest quality riverine wetland and bottomland habitat." and that "Most of the remaining shallow water wetlands in the floodplain occur in the embayments and drowned tributary mouths inundated by backwater from the impounded Ohio River."

The dredging/construction activities proposed for Wheeling Creek could further degrade the Wheeling Creek Embayment, or could provide multiple opportunities for improvements to the aquatic ecosystem. Enhancement or improvements of the Wheeling Creek ecosystem would support the goals of the COE's 2000 Ohio River Mainstem System Study (ORMSS), to "…restore and protect ecological resources impaired by human activities along the Ohio River Corridor." (Ref.10). ORMSS proposes the restoration of 25,000 acres of bottomland hardwood forest and 25,000 acres of wetlands along the Ohio River. In addition, the primary focus of the *Waterfront Development at the Confluence of Wheeling Creek and the Ohio River, Wheeling Creek, WV, Special Project Report, August 2000* (Ref 1), was to "…identify potential restoration and protection actions, to conserve and improve natural resources, and to evaluate the likely effects of various improvement alternatives and their effects on the use of improvement functions." thereby providing the "…potential for restoration of Wheeling Creek and the adjacent waterfront for ecosystem restoration and increased public access." This report also emphasized that waterfront development could result in improved fish habitat,

improved water quality, and the removal of potentially contaminated in-stream sediments.

A few suggestions to enhance/protect the aquatic ecosystem of the lower Wheeling Creek and the Wheeling Creek embayment follow.

- Conduct a more intensive wetland/riparian vegetation survey of the study area, including jurisdictional and non-jurisdictional (shoreline) wetlands.
- Protect existing in-stream habitat, structure, and features, including riffles, sandbars, and shoreline reaches with gentle slopes or low benches throughout the study area. Existing wetlands were observed in these areas, as were the oldest cottonwood trees. Select the 4-foot clearance option rather than the 6-foot clearance.
- Increase biological diversity by enhancing and/or creating habitat and wetlands: provide structure by building gravel shoals, benches, riffles, and/or bars; provide winter high velocity shelter for fish and woody debris piles; and assure canopy shade.
- Protect the existing contiguous vegetated riparian corridor, and in particular, all the mature bottomland forest trees.
- The Ohio River shoreline is an integral component of the biological health of the Wheeling Creek embayment. Protect the riparian buffer and the floodplain along the Ohio River both upstream and downstream of the mouth of Wheeling Creek. Consider building/enhancing a vegetated delta (wetland) downstream of the mouth or along shorelines. Avoid filling the floodplain to assure connectivity with the river. Hopefully, the amount of fill needed to bring Celadon Plaza above the 100 year floodplain will not drive the selection of the deep dredge option.
- For optimum environmental benefits, maximum water depth at the mouth of the embayment should be approximately 8 feet with habitat shelter and benches along perimeters.
- Bring the stream back to the community by providing safe, environmentally friendly, public access. Although there is currently no public access along Wheeling Creek or the Ohio River main stem in the study area, there was extensive evidence of very determined fishermen. Stairs and fishing platforms were carved out of steep banks, shoreline vegetation was cleared, and well-trodden trails were obvious under bridges and adjacent to sewer lines. This project may potentially provide opportunities to remedy this.
- Where possible, augment and support both the COE's (as outlined in ORMSS) and the US F&WS' environmental restoration plans/efforts for the Ohio River.
- Control the spread of invasive exotic species in all disturbed areas.

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Table 1. Wheeling Creek, WV Embayment, Riparian and Wetland Vegetation Inventory
May 30, 2001

Scientific Name	Common Name	Location				Origin	Habitat	Wetland Indicatior
		Canopy	Understory		Emergent Wetland			
			Sub-canopy	Ground Cover				
EQUISETACEAE								
Equisetum arvense	common horsetail; devil's guts			few		native	waste places	FAC
ACANTHACEAE								
Justicia americana	Water-willow				dom	native	river beds & margins	OBL
ACERACEAE								
Acer negundo	box-elder	dom				native	stream banks	FAC
Acer saccharinum	silver maple	dom				native	stream banks	FACW
ANACARDIACEAE								
Rhus typhina	staghorn sumac		occ			native	open hillsides	UPL
Toxicodendron (Rhus) radicans	poison-ivy		dom			native	thickets	FAC
APIACEAE								
Conium maculatum	poison hemlock			few		Euorpe	waste places	FACW
Daucus carota	Queen-Anne's-lace; wild carrot			ab		Europe	waste places	
ASTERACEAE								
Rudbeckia laciniata	tall coneflower; cutleaf coneflower			dom		native	moist places	FACW
Solidago canadensis (altissima)	Canada (tall) goldenrod			occ		native	low waste places	FACU
Verbesina alternifolia	wingstem			dom		native	rich soil	FAC
Arctium minus	common burdock			occ		Eurasia	waste places	FACU
Eupatorium fistulosum	common Joe-Pye-weed			occ		native	bottomlands	FACW
Eupatorium rugosum	white snakeroot			dom		native	rich woods	
BALSMINACEA								
Impatiens capensis	Jewelweed; spotted touch-me-not			dom		native	stream banks	FACW
Impatiens pallida	pale jewelweed; touch-me-not			occ		native	stream banks	FACW
BIGNONIACEAE								
Catalpa speciosa	northern catalpa	occ				Gulf states	escaped	FAC
BRASSICACEAE								
Alliaria petiolata (officinalis)	garlic-mustard			dom		Euorpe	waste places	FACU
Cardamine impatiens	bitter-cress			ab		Euorpe	escaped, moist woods	
Hesperis matronalis	dame's rocket			occ		Europe	escaped	FACU
CAPRIFOLIACEAE								
Lonicera tatarica	tartarian honeysuckle		occ			Asia	escaped	FACU
Sambucus canadensis	common elder; American elder		occ			native	rich moist soil	FACW
CORNACEAE								
Cornus amomum	kinnikinik; red-willow, silky dogwood		ab			native	swamps, streams	FACW
FABACEAE								
Gleditsia triacanthos	honey-locust		occ			native	rich woods	FAC
Coronilla varia	crown-vetch			L. dom		S. Euorpe	escaped	
Robinia pseudo-acacia	black locust	few				native	old fields	FACU
FAGACEAE								
Quercus rubra	northern red oak			few		native	woods	FACU
LAMIACEAE								
Prunella vulgaris	heal-all; self-heal			few		Europe	waste places	FACU
Glechoma hederacea	gill-over-the-ground; ground-ivy			ab		Eurasia	waste places	FACU
LAURACEAE								
Lindera benzoin	spicebush		occ			native	streams, woods	FACW
MORACEAE								
Morus alba	white mulberry	few				Asia	escaped	UPL
Morus rubra	red mulberry	few				native	rich woods	FACU
OLEACEAE								
Fraxinus americana	white ash	ab				native	rich moist woods	FACU
Fraxinus pennsylvanica	green ash, red ash	few				native	low areas, streams	FACW
Ligustrum vulgare	common privet		dom			Europe	escaped	FACU
ONAGRACEAE								
Oenothera biennis	common evening-primrose			ab		native	waste places	FACU
OROBANCHACEAE								
Calystegia sepium	hedge bindweed			occ		Europe/native	waste places	FAC
OXALIDACEAE								
Oxalis europa	European yellow wood-sorrel			ab		Europe	waste places	UPL
PHYTOLACCACEAE								
Phytolacca americana	pokeweed			occ		native	open ground	FACU
PLANTAGINACEAE								
Plantago major	broadleaf plantain			ab		Europe	waste places	FACU
PLATANACEAE								
Platanus occidentalis	sycamore; buttonwood	dom				native	wet woods	FACW

Table 1. Wheeling Creek, WV Embayment, Riparian and Wetland Vegetation Inventory
May 30, 2001
(Continued)

Scientific Name	Common Name	Location				Origin	Habitat	Wetland Indicatior
		Canopy	Understory		Emergent Wetland			
			Sub-canopy	Ground Cover				
POLYGONACEAE								
Polygonum cuspidatum	Japanese knotweed; Mexican bamboo			dom		Japan	escaped	FACU
Polygonum persicaria	lady's-thumb; heart's-ease			ab		Europe	waste places	FACW
Rumex obtusifolius	broad-leaf dock; bitter dock			occ		Europe	waste places	FACU
Rurnex crispus	curly dock			occ		Europe	waste places	FACU
RANUNCULACEAE								
Ranunculus repens	creeping buttercup			occ		Europe	escaped, wet	FAC
ROSACEAE								
Prunus serotina	wild black cherry	ab				native	woods	FACU
Rosa multiflora	multiflora rose		ab			Asia	escaped, thickets	FACU
Rubus allegheniensis	common blackberry		occ			native	clearings	FACU
Rubus occidentalis	black-cap; black raspberry		occ			native	woods, old fields	
SALICACEAE								
Populus deltoides	cottonwood	dom				native	streams	FAC
Salix nigra	black willow	dom				native	stream banks	FACW
SCROPHULARIACEAE								
Cymbalaria muralis	Kenilworth ivy			occ		Europe	waste places	
Linaria vulgaris	butter-and-eggs			occ		Eurasia	waste places	UPL
Verbascum blattaria	moth mullein			occ		Erasia	waste places	UPL
Verbascum thapsus	great mullein; flannel-plant			occ		Europe	waste places	UPL
SIMAROUBACEAE								
Ailanthus altissima	tree-of-heaven	ab				Asia	escaped	
SOLANACEAE								
Solanum dulcamara	deadly nightshade; bittersweet			scattered		Europe	moist waste places	FAC
TILIACEAE								
Tilia americana	American linden; basswood	few				native	bottomlands	FACU
ULMACEAE								
Ulmus rubra	slippery elm; red elm		dom			native	rich soil	FAC
URTICACEAE								
Boehmeria cylindrica	false nettle;bog-hemp			ab		native	rich woods	FACW
Urtica dioica	stinging nettle; common nettle			ab		Europe	escaped	FACU
VERBENACEAE								
Verbena urticifolia	white vervain			ab		native	waste places	FACU
VITACEAE								
Parthenocissus quinquefolia	Virginia creeper			occ		native	woods, hillsides	FACU
Vitis riparia	river-bank grape		ab			native	stream banks	FACW
POACEAE								
Dactylis glomerata	orchard grass			occ		Euorpe	waste places	FACU
Eleusine indica	goosegrass; wiregrass			occ		tropics	waste places	FACU
Leersia virginica	white grass			dom		native	wetlands, streams	FACW
Muhlenbergia frondosa	wirestem muhly			ab		native	streams, waste places	FAC
Phalaris arundinacea	reed canary grass				dom	Europe/native	low grounds	FACW
Total Number of Species	**80**	**14**	**13**	**41**	**2**			
% Exotic species		**21**	**23**	**60**	**0**			

dom = dominant
occ = occasional
U = unpland

ab = abundant
L = Locally
W = wet

com = common
FAC = facultative wetland
OBL = obligate wetland

Table 2.
Wheeling Creek, WV
Observed Wildlife
May 30, 2001

BIRDS		MAMMALS	
Scientific Name	**Common Name**	**Scientific Name**	**Common Name**
Icterus galbula	Northern oriole	Procyon lotor	Raccoon
Dendroica petechia	Yellow warbler	Ondatra zibethicus	Muscrat
Parus atricapillus	Black-capped chicadee	Odococoileus virginianus	White-tailed deer
Anas platyrhynchos	Mallard		
Vireo sp.	Verio		
Riparia riparia	Bank swallow ?		
Cardinalis cardinalis	Northern cardinal		
Passer domesticus	House sparrow		
Turdus migratorius	American robin		
Quiscalus quiscula	Common grackle		
Sturnus vulgaris vulgaris	Starling		
	Feral duck		
Dumetella carolinensis	Grey catbird		
Myiarchus crinitus	Great creasted flycatcher		
Cyanocitta cristata	Blue jay		
Buteo jamaicensis	Red-tailed hawk		
Thryothorus ludovicianus	Carolina wren		

Appendix E.
Wheeling Creek Sediment Characterization Results

CELRP-EC-GD 18 JUNE 2002

SUBJECT: Wheeling Creek Sediment Characterization Results

Six samples and one duplicate sample were collected from Wheeling Creek in Wheeling, West Virginia between April 23 and 25, 2002. The samples were distributed throughout the length of the proposed dredging project.

Four soil samples and one duplicate sample were collected from the two proposed sediment placement sites.

1. TESTING FOR EACH SAMPLE INCLUDED:

a. Petroleum Contamination Testing (Gasoline Range Organics (GRO) and Diesel Range Organics (DRO)
b. Volatile Organics (soils only)
c. Semi-volatile Organics
d. Target Analyte Metals (Totals)
e. PCBs, Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260
f. Pesticides
g. Geotechnical testing for compactibility

2. **RESULTS OF ANALYTICAL TESTING FOR SOILS**:

a. DRO are well above the standard threshold limits under the WEST VIRGINIA DEP GUIDANCE DOCUMENT FOR LEAKING UNDERGROUND STORAGE TANK (LUST) SITE ASSESSMENTS AND CORRECTIVE ACTIONS, dated 2001.

b. None of the 35 Volatile Organic Compounds (VOCs) were identified in any of the five soil samples.

c. With the exception of Arsenic, all inorganic analytes (TAL metals) meet the EPA Risk Based Concentration Standards for residential sites.

The highest arsenic sample result is 32.1 ppm, which exceeds the EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update (EPA) standard of .430 ppm and the Industrial Standard of 3.82 ppm.

d. Of the extensive list of Semi-volatile compounds only a few were detected at concentrations of potential concern.

The highest Benzo (a) anthracene sample result is 5.20 ppm, which exceeds the EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update (EPA) standard of 0.875 ppm and is below the Industrial Standard of 7.84 ppm.

The highest Benzo (b) fluoranthene sample result is 20 ppm, which exceeds the EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update (EPA) standard of 0.875 ppm and the Industrial Standard of 7.84 ppm.

The highest Benzo (k) fluoranthene arsenic sample result is 11 ppm, which exceeds the EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update (EPA) standard of 8.75 ppm and is below the Industrial Standard of 78.4 ppm.

The highest Benzo (a) pyrene sample result is 11 ppm, which exceeds the EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update (EPA) standard of 0.087 ppm and the Industrial Standard of 0.784 ppm.

The highest Dibenzo (a,h) anthracene sample result is 3.9 ppm, which exceeds the EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update (EPA) standard of 0.087 ppm and the Industrial Standard of 0.784 ppm.

The highest a Indeno (1,2,3-cd) pyrene sample result is 13 ppm, which exceeds the EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update (EPA) standard of 0.875 ppm and the Industrial Standard of 7.84 ppm.

e. All PCBs are well below the EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update.

f. All pesticides detected were below their comparable EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update.

3. RESULTS OF ANALYTICAL TESTING FOR SEDIMENTS

a. DRO are below the standard threshold limits under the WEST VIRGINIA DEP GUIDANCE DOCUMENT FOR LEAKING UNDERGROUND STORAGE TANK (LUST) SITE ASSESSMENTS AND CORRECTIVE ACTIONS, dated, 2001.

b. With the exception of Arsenic all inorganic analytes (TAL metals) meet the EPA Risk Based Concentration Standards for residential sites.

The highest arsenic sample result is 29.4 ppm, which exceeds the EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update (EPA) standard of .430 ppm, and the Industrial Standard of 3.82 ppm.

c. Of the extensive list of Semi-volatile compounds only a few were detected at concentrations of potential concern.

The highest Benzo (a) anthracene sample result is 3.00 ppm, which exceeds the EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update (EPA) standard of 0.875 ppm and is below the Industrial Standard of 7.84 ppm.

The highest Benzo (b) fluoranthene sample result is 2.20 ppm, which exceeds the EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update (EPA) standard of 0.875 ppm and is below the Industrial Standard of 7.84 ppm.

The highest Benzo (k) fluoranthene arsenic sample result is 1.3 ppm, which is below the EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update (EPA) standard of 8.75 ppm.

The highest Benzo (a) pyrene sample result is 2.3 ppm, which exceeds the EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update (EPA) standard of 0.087 ppm and the Industrial Standard of 0.784 ppm.

The highest Dibenzo (a,h) anthracene sample result is 0.520 ppm, which exceeds the EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update (EPA) standard of 0.087 ppm and is below the Industrial Standard of 0.784 ppm.

The highest a Indeno (1,2,3-cd) pyrene sample result is 1.0 ppm, which exceeds the EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update (EPA) standard of 0.875 ppm and is below the Industrial Standard of 7.84 ppm.

d. All PCBs are well below the EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update.

e. All pesticides detected were below their comparable EPA Region III Risk-Based Concentration Table for residential sites - October 2001 Update.

4. GEOTECHNICAL PROPERTIES OF SOIL COLLECTED FROM WHEELING CREEK (Second Sampling Effort)

Six sediment samples were collected from Wheeling Creek on April 23-25, 2002 and analyzed for Water Content (ASTM D-2216), Sieve Analysis (ASTM D-422) and Relative Density (ASTM D-4253). The soil in this round of sampling has consistent geotechnical properties when compared to the first group of samples collected from Wheeling Creek on October 10, 2001. This is important because it indicates that the creek bed material has similar soil characteristics over the length of the creek where dredging will occur.

The soil is a poorly-graded to well-graded gravel with sand. This material can be classified according to the Unified Soil Classification System (USCS) as follows:

- GP – Poorly graded gravels, gravel-sand mixtures (non-plastic fines).
- GW – Well-graded gravels, gravel sand mixtures (non-plastic fines).
- SP – Poorly graded sands, gravelly sands (non-plastic fines).

The geotechnical data shows that the soil that will be removed from Wheeling Creek is a good fill, free draining gravel (with some sand) that can be used to backfill holes and low lying areas, or serve as a road base/building foundation material.

5. CONCLUSION: Review of the chemical data indicates that deposition of the tested sediments from Wheeling Creek on the placement sites should result in generally lower concentrations of most detected target compounds and analytes in surface soils; thereby, potentially resulting in reduced risks to human health compared to existing conditions. The data results appear to represent past coal mining and steel production activities.

It is likely that that the results of this investigation reflect the general background condition within a reasonable proximity of Wheeling Creek.

Moderately significant ecological and human health risks are associated with the properties in and around Wheeling Creek, though the risk of incurring CERCLA Liability through property acquisition is insignificant.