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Pittsburgh District

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Draft
Detailed Project Report
And
Integrated Environmental Assessment

North Park Lake
Allegheny County, PA
Section 206 Aquatic Ecosystem Restoration Project

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EXECUTIVE SUMMARY

1. Authority

The North Park Lake aquatic ecosystem restoration project is being conducted under the authority of Section 206 of the Water Resources Development Act of 1996 (WRDA '96), Public Law 104-303.

2. Local Sponsor

The local sponsor is the County of Allegheny, Pennsylvania.

3. Description of Ecosystem Problem

When first constructed in the 1930's, the surface area of North Park Lake was approximately 75 acres and its depth was approximately 24 feet near the dam face. Uncontrolled surface runoff carrying sediment to the lake from residential and commercial development in the Pine Creek basin in the mid to late 20th Century resulted in a permanent loss of 12 acres of open water and a loss of about half of the lake's original depth. Due to enrichment from the excessive runoff, the lake has become eutrophic and filled with an overgrowth of aquatic vegetation. These factors have not only reduced the size of the original lake but also severely degraded the remaining aquatic habitat. If nothing is done to ameliorate past degradation, the County will eventually lose the lake and the aquatic resources it provides.

4. Alternative Formulation to Restore Aquatic Ecosystem

A number of alternatives were considered during the course of the investigation. Initial alternatives considered ways to reduce the sediment load to maintain what aquatic habitat remains. Studies performed on these alternatives revealed that this approach was infeasible largely because of the lack of sufficient area upstream of the lake to construct properly sized sediment basins. After these alternatives were abandoned, the District decided to explore ways to remove accumulated sediment to restore open water habitat. It was determined that removing accumulated sediment to original contours would give a useful project life of approximately 100 years with regular maintenance before sediment would again have to be removed. Various levels of dredging were investigated to determine cost effectiveness.

5. Findings and Conclusions

Through detailed investigations, the District determined that sediment removal was feasible and that the most cost effective method would be to drain the lake and use land based equipment to excavate the sediment, load it onto trucks, and haul it to nearby sediment placement areas. In addition to sediment removal, the District will add structure to the lake after it is dredged to provide aquatic cover for fish and benthos; increase wetland habitat around the perimeter of the lake in specific locations; and treat the sediment placement areas to increase their value for wildlife over existing conditions.

Removal of 100 percent of the sediment from the open water areas of the lake was determined to be the most cost effective plan. However, preliminary estimates indicated that the cost to remove this amount of sediment ($12 Million) exceeded the maximum amount that could be cost shared under the Section 206 program ($5 Million Federal and $2.69 Million Local for a total of $7.69 Million). Because the local sponsor desires to implement the most cost effective plan (100 percent of the sediment removed) it is willing to pay 100% of the cost in excess of the maximum cost-shared amount.

This integrated Detailed Project Report and Integrated Environmental Assessment fulfills the Corps of Engineers reporting requirements for feasibility level reports as well as its reporting and coordination responsibilities established under the National Environmental Policy Act.

1.0 INTRODUCTION

1.1 Study Authority

The North Park Lake aquatic ecosystem restoration project is being conducted under the authority of Section 206 of the Water Resources Development Act of 1996 (WRDA '96), Public Law 104-303. Under this authority, the Secretary of the Army may carry out aquatic ecosystem restoration projects, if the Secretary determines that:

1. The project will improve the quality of the environment and is in the public interest.
2. The project is cost effective.
3. The project has a willing non-Federal cost-sharing sponsor who shall provide 35% of total project study and construction costs to include the provision of all lands, easements, rights-of-way, and necessary relocations.
4. The cost-sharing sponsor has entered into a binding agreement with the Secretary to pay the non-Federal 35% share plus 100 percent of the cost of operation and maintenance, replacement and rehabilitation.

As is demonstrated in this detailed project report and environmental assessment, the North Park Lake project as proposed will meet the four primary objectives as listed above. The project will improve the degraded aquatic ecosystem of North Park Lake in a cost effective manner, and Allegheny County (Sponsor) will cost share the project with the Corps. The Sponsor and Pittsburgh District will execute a legally binding Project Cooperation Agreement after higher Corps authority approves this report and when the next phase of the study (Plans and Specifications) is nearly complete.

1.2 Study Purpose

The purpose of this phase of the project is to produce an integrated, feasibility level, detailed project report and environmental assessment, (DPR&EA) that recommends an effective solution to restore the degraded structure, function and dynamic processes of the North Park Lake aquatic ecosystem to a less degraded, more natural condition. The DPR&EA considers and describes historic and existing conditions and forecasts future "without-project" and "with-project" conditions. The future without-project conditions forms the basis for which alternatives are formulated and impacts are assessed. Evaluation of the formulated alternatives determines which effectively generates the highest level of ecosystem benefits for the least cost. Additionally, the alternative analyses establishes which plan minimizes environmental impacts and disruptions to the park during construction. The culmination of the alternative analyses identifies the most cost effective plan, known as the National Ecosystem Restoration (NER) Plan.

1.3 Study Area – General

North Park Lake is located within North Park, a County-operated recreation facility that lies about 10 miles north of the City of Pittsburgh, Pennsylvania within north central Allegheny County in McCandless, Pine and Hampton Townships. Covering over 3,000 acres of diverse habitat, North Park is the largest and most heavily used park in Allegheny County. North Park Lake is located entirely within McCandless Township. The Pine Township/McCandless Township Line divides Marshall Lake, a small lake located upstream of North Park Lake on the North Fork of Pine Creek in the northwestern section of the park. A small portion of the southeastern section of the park located just downstream from North Park Lake lies within Hampton Township. See PLATES 1 and 2 showing the general location of North Park Lake and the primary highway network surrounding the park. PLATE 3 shows North Park Lake on a portion of a USGS Quadrangle map. All PLATES and APPENDICES are located on the CD containing this report.

1.4 Project Sponsor

As mentioned in paragraph 1.1, the local sponsor for this project is Allegheny County. As indicated in their letter of intent, (see APPENDIX 1 – Letters of Coordination), the County is a willing sponsor in favor of this ecosystem restoration project and will pay for their 35% share of the cost. A Project Cooperation Agreement (PCA) will be executed during the end of the next phase of study (Plans and Specifications). A model of the PCA is presented in APPENDIX 2. The local sponsor will provide their share of the project cost to the District after PCA execution, which occurs sometime towards the end of the next phase of study (Plans and Specifications).

1.5 Prior Studies and Reports

In July 1999, the Pittsburgh District, Corps of Engineers completed a Preliminary Restoration Plan (PRP), prepared under the authority of Section 206 of WRDA ’96 that described a proposal to construct a porous rock dike across the Pine Creek arm of the lake. The section of the lake upstream of the dike (approximately one third of the lake area) would have been sacrificed to act as a sedimentation basin to help reduce the sediment load that would otherwise enter and degrade the remainder of the open water habitat within the lake. Hydrologic investigations performed after the PRP was completed revealed that the proposed sedimentation basin would not have been large enough to effectively control lake sedimentation. Consequently, the District and local sponsor decided to pursue other treatment methodologies to restore and enhance the lake’s aquatic habitat.

1.6 Agency Coordination and Consultation

For this project, the District consulted with the U.S. Fish and Wildlife Service to meet its responsibilities under the U.S. Fish and Wildlife Coordination Act and Section 7 of the

Endangered Species Act. In addition, the District coordinated with the Pennsylvania Department of Conservation and Natural Resources' Bureau of Forestry, the Pennsylvania Fish and Boat Commission, and Pennsylvania Game Commission. Copies of correspondence from these agencies are contained in APPENDIX 1. Earlier in the study, representatives of the Pennsylvania Fish and Boat Commission participated in field investigations at North Park with the District and Local Sponsor. Section 10 of this report, "Public Involvement", contains a mailing list showing which agencies received copies of this report for review and comment.

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2.0 AFFECTED ENVIRONMENT – EXISTING CONDITIONS

2.1 General

2.1.1 Eco-Region

Southwestern Pennsylvania, which includes Allegheny County, is located within the Appalachian mixed mesophytic forest eco-region of North America. This region, which includes the moist broadleaf forests that cover the plateaus and hills west of the Appalachian Mountains, includes portions of northwest Alabama, east central Tennessee, eastern Kentucky, western North Carolina, most of West Virginia, southeastern Ohio and finally southwestern Pennsylvania. This eco-region is rich in biodiversity with numerous trees, shrubs, herbaceous plants, and a vast assemblage of birds, reptiles, amphibians, and mammals. It is one of the most biologically diverse temperate regions of the world.

As residential, agricultural, commercial, and industrial development proliferated during the settlement of southwestern Pennsylvania, and specifically, Allegheny County, the original forests disappeared. Within the southwestern section of the Commonwealth, Allegheny County exhibits the most dense urban/suburban development. The limited forested areas that remain within the County consist of second and third growth trees that are primarily located in public parks, small private woodlots, and in relatively narrow bands along undeveloped portions of steep stream and river banks. The wide variety of native flora and fauna that was present when the first Europeans settled in the County has now been permanently changed and degraded by heavy and expansive industrial, commercial and residential development and the introduction of exotic species.

2.1.2 Land Use

Over time, as the northern section of Allegheny County was settled, the original forests in the Pine Creek watershed were largely removed to provide lands for farming and lumber. The watershed surrounding North Park Lake, when originally constructed in 1936, consisted primarily of rural agricultural fields, pastures, and isolated woodlots. Subsequent to the completion of North Park Lake in the late 1930's, urbanization quickly progressed outward from the City of Pittsburgh, especially in the latter half of the

Twentieth Century. Today, the watershed exhibits the ravages of unhindered suburban expansion where formerly open fields and woodlots have been replaced by dense residential and commercial development and major and secondary highway networks. The intensive development along the highways includes a multitude of outdoor strip malls, a host of individual commercial retail establishments including numerous automobile sales lots, gas stations, commercial office complexes as well as various public and private schools, medical facilities and churches and their associated parking lots.

2.1.3 Pine Creek/North Fork Pine Creek Watershed Characteristics

The watershed of Pine Creek and the North Fork of Pine Creek is relatively hilly. Elevations range from approximately 1,300 feet above National Geodetic Vertical Datum (NGVD) on the ridges to approximately elevation 960 feet above NGVD at North Park Lake. The total drainage area of Pine Creek at its mouth at the Allegheny River is 67.5 square miles. Pine Creek upstream of North Park Dam (exclusive of the North Fork of Pine Creek drainage) has a drainage area of approximately 14.2 square miles and an average channel slope of 34 feet per mile. The North Fork of Pine Creek drains 10 square miles and has an average slope of 35 feet per mile.

2.1.4 Description of Pine Creek Dam and North Park Lake

Pine Creek dam, which forms North Park Lake, backs up water from Pine Creek flowing from the west and the North Fork of Pine Creek flowing from the northwest. The dam is about 15 miles upstream of the mouth of Pine Creek, which empties into the Allegheny River near Etna at river mile 4.7. As shown on PLATE 3, the North Fork of Pine Creek flows first into Marshall Lake and then into North Park Lake.

Pine Creek Dam is an earthen embankment approximately 1,130 feet long and 33 feet high; it has a 60-foot wide crest with a two horizontal to one vertical slope on both the upstream and downstream faces. It has an impervious core consisting of a concrete cutoff wall. Over the years, fill has been placed on the eastern (downstream) side of the dam's crest increasing its width approximately 400 feet. A four-lane road (Babcock Boulevard) crosses the crest and is a main thoroughfare through North Park. Completed in 1936, the dam was constructed under the Works Progress Administration Program.

The flood discharge facilities of the dam consist of a combined primary and emergency spillway located near the left abutment (looking downstream). The spillway structures include an arc-shaped ogee crested weir that discharges into a rectangular concrete discharge channel. The crest of the ogee overflow section of the spillway is located at an elevation approximately 10 feet below the lowest point of the dam's crest.

The outlet works consist of an intake tower and a 560-foot long reinforced concrete conduit through the embankment. The conduit is rectangular in cross section with inside dimensions of 5 feet by 5 feet. A manually operated sluice gate located at the intake tower controls flow to the conduit. This outlet system constitutes the emergency draw down facility of the dam.

The lake is maintained at elevation 960 feet NGVD, which is the elevation of the uncontrolled spillway crest. At this elevation, the lake, when initially constructed, was 75 acres in size and approximately 24 feet deep near the face of the dam. Due to sedimentation, the lake now provides about 63 surface acres of open water and has lost approximately half of its depth. (For more detail about sedimentation and its effect on the lake, see Section 2.10).

2.1.5 Early Development of North Park (Provided by Allegheny County)

In the 1920's, a tide of industrialization swept the Greater Pittsburgh area, and rapid urbanization began to show itself in the rural communities surrounding the business districts of Allegheny County. One county commissioner, Edward V. Babcock, urged the preservation of rural lands in their natural states. His idea for a two-park system in the north and south regions of the county became the basis for the present system, which he then turned over to the county at cost (a procedure that was to be repeated later when the regional parks were assembled). The Department of Parks was organized on April 14, 1927, in Babcock's phrasing, for "the purpose of establishing, making, enlarging, extending, operating and maintaining public parks within the county and for enforcing rules and regulations established by the county for patrons." It is important to remember that in 1927, the farmlands destined to become parks were not the woodlands and picnic groves we see today. The "people's country clubs," as the parks were called, had to be physically created. Native trees, maples, oaks, beeches, mixed with dogwoods, cherry trees, and pear trees were used to create color and fragrances in the springtime. Behind much of the landscaping was the thinking of the talented Paul B. Riis, who was recruited in 1927 from the Rockford, Illinois, Parks. He had helped develop Yellowstone and other national parks, creating stone lodges and other amenities, and now he was being paid the princely sum of $7,200 per year (a high salary much debated by county officials) to lay the groundwork for North and South Parks. The public enjoys many of his efforts today, including the major landscaping, the road systems, and the golf courses, and North Park Lake.

In December of 1928, plans were made to build outstanding golf courses at both North and South Parks. Spacious and well planned, the golf courses were an immediate success. The year 1929 saw many changes in the parks, including 35 new picnic groves, 14 dance pavilions, and the installation of oven shelters in many of the groves. By 1931, North and South Parks were in the last phase of their early development, which included additional bridal trails, nature trails, groves, horseshoe courts, ball diamonds, and tennis courts. North Park received additional parcels of land that were used to develop a beaver meadow, a bird sanctuary, and a primitive trail.

North Park, at 3,010 acres, is the largest park in the Allegheny County Park system, more than 1,000 acres greater than its sister facility, South Park. North Park Lake, the largest man-made body of water in Allegheny County, originally pooled over 75 surface acres. The idea of North Park Lake, and of fishing in the lake, was advanced by then County Commissioner John J. Kane.

The three historic photos below depict what North Park Lake and Marshall Lakes looked like in 1937.

Historic Photo #1 – View of the Pine Creek arm of the lake looking downstream toward the dam

Historic Photo #2 – View of the North Fork Pine Creek arm of the lake looking downstream. The boathouse is in the center of the photo.

Historic Photo #3 – View of Marshall Lake looking upstream from the lake's lower end.

2.2 Flora and Fauna of North Park

2.2.1 Wetlands – North Park Lake

In 2001, the District conducted a cursory vegetation survey of existing wetlands immediately adjacent to North Park and Marshall Lakes. The first and largest of the wetland areas surveyed was along the isolated upper arm of Pine Creek located between the intersection of Kummer Road and Lake Shore Drive and the J.C. Stone Field along Lake Shore Drive. These wetlands were exceptional, diverse, palustrine, willow dominated wooded wetlands, according to the U.S. Fish and Wildlife Services' wetland classification system. At minimum, 59 species of primarily native obligate, wetland plants were observed. Only a few exotic plant species were located, and they were uncommon. An abundance of wildlife was also noted and included at least 14 species of birds; two frog species; various dragonflies; raccoon; muskrat; and deer. Wood ducks were particularly abundant.

Adjacent to Ingomar Road, Pine Creek exhibits heavy braiding due to ongoing sedimentation. In this area, there were multiple exposed sandbars, which supported exceptional quality wetlands. These wetlands were classified as lacustrine system, marsh purslane, and swamp milkweed dominated emergent wetlands. Sandbar vegetation was immature at the time of the survey (May 2001), indicating that the pool was lower (exposing more shoal) than it had been a few weeks earlier. Shoreline wetlands in this reach were classified as lacustrine system, black willow dominated, wooded wetlands. A total of 26, primarily obligate, native plant species in this area were observed. APPENDIX 3, photos 21, 22, and 23 contain several photographs of the wetlands around North Park.

2.2.2 Wetlands – Marshall Lake

The upper reaches of North Fork of Pine Creek, located between the North Park Ice Rink and Marshall Lake in the vicinity of Pearce Mill and Brown Roads was also surveyed. This reach is degraded because floodplain wetlands are extensively mowed, sometimes including riparian buffers along shoreline edges. Mowing not only degrades wetlands, compromising wetland functions, such as the attenuation of storm water flows and sediment filtering, but also destabilizes stream banks, resulting in increasing erosion. Shoreline erosion and undercutting is occurring throughout this reach, which can likely be attributed both to changes in the upstream hydrology as a result of rapid new development in the basin and compromised riparian buffers. Mowing also creates preferred Canada goose habitat. Hundreds of geese utilize the lawns adjacent to the stream and Marshall Lake, exacerbating eutrophication problems in the Lake and increasing levels of fecal coliform bacteria. The wetlands in this area that are not mowed were classified as riverine and palustrine, emergent, scrub-shrub, and wooded, wetlands. Again, these unmowed wetlands appeared to be quite diverse (25 plant species minimum), dominated by native species, such as forget-me-not, wing stem, ninebark, alder, arrowwood, elderberry, black willow, and green ash.

2.2.3 Summary of Existing Aquatic Life Resources and Water Quality

In April 1997, the Pennsylvania Fish and Boat Commission prepared a report describing the fishery of North Park Lake, and in 2002 the Commission prepared a report describing angler use, harvest and the results of an opinion survey. The Commission classified the lake as a shallow, eutrophic, turbid lake that suffers from a siltation problem. This description has been confirmed by the District's August 2002 analysis. District biologists also noted that North Park lake is a warm, shallow, mineralized, nutrient rich, eutrophic impoundment. [Eutrophication is a natural process in which lakes become shallower and excessively productive through the introduction and cycling of nutrients.] Both lakes in North Park suffer from cultural eutrophication, caused by human activity which speeds up the rate of addition of nutrients and sediments and the eutrophication process. During the District's August 2002 survey, significant vertical thermal and chemical stratification patterns had developed in North Park Lake and dissolved oxygen was totally depleted in the hypolimnion (bottom) of the lake. Within the chemically reduced environment of the hypolimnion, soluble metals (especially iron and manganese), and chemically reduced nitrogen and sulfur species such as ammonia and hydrogen sulfide had accumulated. (See APPENDIX 10 for more technical water quality details.)

The lake contains both warmwater and coolwater fish species. According to the Commission, the lake contains an indigenous population of largemouth bass of above average density. The panfish population consisting of bluegill, pumpkinseed, black crappie, and white crappie is overcrowded and stunted. Also present in undesirable abundance were gizzard shad, a forage species. The Commission stocks fingerling channel catfish, fingerling walleye, and fingerling muskellunge hybrids (muskellunge x northern pike hybrids, known as tiger musky) to attempt to control the stunted panfish populations. So far, this has not been very successful; it is thought that the turbid waters interfere with predation by the predatory species. Although the Commission plans to continue stocking these species, they do not feel that the population of these predators will ever grow high enough to make a significant difference in the overcrowded panfish populations. The lake also contains brown bullheads, yellow bullheads, rock bass, white sucker, common carp, golden shiner, and central stoneroller.

The PA Fish and Boat Commission considers North Park Lake an approved urban trout water and stocks the lake with legal size rainbow trout, brown trout and trophy golden rainbow trout in preseason and rainbow and brown trout several times in-season. Trout normally do not survive the summer due to elevated temperatures, shallow water, and excessive siltation. However the Commission continues to stock the lake with trout due to its high popularity, ease of shoreline access, and resultant heavy fishing pressure that it receives. The Pennsylvania Fish and Boat Commission also manages the 15-mile reach of Pine Creek downstream of the dam as "approved trout waters."

2.2.4 Terrestrial (Upland) Habitat

According to Mr. Joseph Grom, a former naturalist at North Park's Latodomi Nature Center, North Park is the largest of all of the County Parks within Allegheny County and contains a wide variety of habitats that range from very dry upland woods to mud flats

and wetlands within and surrounding North Park Lake and Marshall Lake. Above the wetland areas surrounding the lake the park contains a variety of terrestrial habitat types that range from regularly mown fields located around many picnic groves, to abandoned agricultural fields in various stages of ecological succession, to small groves of hemlock in steep ravines to maturing oak/maple forests.

2.2.4.1 Upland Habitat That Could Be Affected By the Proposed Project.

A number of upland sites within North Park and one upland area adjacent to but outside the Park boundary have been identified that may be needed to complete an ecosystem restoration project. Depending upon the project alternative ultimately selected to restore the lake, these areas would be used for heavy equipment staging and access and for sediment placement. The locations of these upland areas, referred to as "sites" are shown on PLATES 4a and 4b; their present habitats are, described below:

2.2.4.2 County Site

The first site is a previously used disposal area, known as the "County" site. It is located immediately east of the Pine Creek Dam crest and is adjacent to Babcock Boulevard. This area was formerly used to dispose sediments that were hydraulically removed from the lake by a "Mudcat," which is a small, self-propelled cutter head dredge. This site is 13.1 acres in size. Currently this site supports a vegetative cover of grasses and forbs typically found on disturbed sites. In wet years, a small poor quality wetland develops within a swale on the site that follows a sewer line that runs across the property.

2.2.4.3 Bull Pen Site

The second area, the "Bull Pen" site is a 8.13 acre area located on a knoll between the two arms of the lake. Allegheny County currently disposes leaves on this site collected during the fall. A large portion of the site's central area is paved with a thin veneer of asphalt. The remaining area supports grasses and forbs. A very thin band of young sumac and locust trees surrounds the perimeter of the site. Behind this thin band is a maturing growth of predominantly oak, hickory and maple with a sparse understory of various shrubs. This maturing vegetation is typical of many of the forested areas within North Park.

2.2.4.4 Deer Pen Site

The third site, called the "Deer Pen" is an approximate 4-acre site located along the upper end of the right descending bank of the North Fork Pine Creek arm of the lake. North Park maintenance personnel regularly mow this area that was formerly used to house deer for exhibition at the park. Regular mowing maintains this site in a perpetual grassy state.

2.2.4.5 Latodami Site

The fourth and largest site within the Park is located above the Park's Latodomi Interpretive Nature Center building complex (See PLATE 4a). Enthusiasts who flew radio-controlled model airplanes once used part of this 32.24-acre site. Due to complaints received about the noise associated with flying two-stroke, gas engine powered model planes, the runway was closed several years ago.

The Allegheny County Parks Comprehensive Master Plan notes that the 1994 Allegheny County Natural Heritage Inventory designates the Latodomi Farm as a significant biological zone. The Latodomi Interpretive Nature Center is the focus of the Latodami Farm. The biological zone includes a wide variety of habitats including maturing hardwood forests, abandoned agricultural fields, in various stages of succession, a small farm pond, small stream habitat, and areas that are purposefully being mowed and brushed to maintain various ages and stages of succession.

The portion of the Latodomai Farm that could be used for the project consists of abandoned agricultural fields located atop a hill well above the Nature Center buildings. A zone of maturing hardwood forest separates the upslope sediment placement site from the Nature Center buildings. As noted on PLATE 4a, this site is not close to the more heavily used recreation areas within the park, which are primarily adjacent to Marshall and North Park Lakes. Because this site is not regularly mowed, a large portion of it has been allowed to revert to an old-field condition that supports a dense growth of various brambles as well as a large percentage of exotic species, such as teasel, Canada thistle, multiflora rose and autumn olive. Because of the density of this "old field" vegetation, the site is neither used nor suitable for athletic recreation. It is used for wildlife observation and birding primarily from an unimproved road which transverses the center of the site.

North Park personnel and volunteers have placed bluebird boxes throughout the site to encourage nesting by this desirable native species. During one site visit in the late summer of 2002, large numbers of goldfinches were seen feeding on the densely growing thistle and teasel. During another site visit in the early spring of 2003, bluebirds were seen flying around and landing upon the nest boxes in preparation for nesting. In the spring of 2002, the lower portion of the sediment placement area was sprayed with an herbicide and later planted with native prairie grasses as a demonstration project that the Park conducted in conjunction with the University of California, PA. Their desire is to replace the vegetation now growing at the site, which contains many undesirable non-native species with native vegetation. Unfortunately, due to the presence of exotic seed in the soil, the prairie grasses were out competed by non-native species. At the end of the growing season, this site supported a large percentage of non-native exotics [See APPENDIX 10 for more detail].

2.2.4.6 Wildwood Road Site

This site is located about 1.5 miles downstream of Pine Creek Dam just off of Wildwood Road. A narrow portion of this sediment placement site abuts North Park at its most

extreme eastern end at the "Round Top" picnic grove located along South Ridge Road. See PLATE 4b. The Wildwood site is an approximate 57-acre reclaimed coal waste (gob) pile that was covered with fly ash, heavily fertilized and planted with grass to help prevent surface erosion. Currently, the majority of the site is grass covered. The hillside that extends from the Round Top Picnic grove down to the area of reclaimed gob pile is deciduous woodland.

2.2.4.7 Babble Brook Site (Access/Staging Area)

The Babble Brook site is located adjacent to the intersection of Ingomar Road and Babcock Boulevard just upstream of Pine Creek Dam on its right descending bank. This is a grassy day use area that currently contains picnic benches and a shelter. It is regularly mown.

2.2.4.8 Gold Star Site (Access/Staging Area

The Gold Star site is located on the left descending bank of the Pine Creek arm of the lake near its upstream end. See PLATE 4a. This half-acre picnic area is regularly mown and contains large, maturing conifers. This site would be used for staging during initial construction and also to maintain the area behind the wetland protection dike discussed in Section 6.1.6.

2.2.4.9 Mars Site (Access/Staging Area)

The Mars site, is located on the right descending bank of the North Fork of Pine Creek immediately adjacent to the uppermost reach of the Lake. See PLATE 4a. This potential 2-acre staging area, also adjacent to Lakeshore Drive, is currently a grassy day-use area that contains picnic benches.

2.2.4.10 Pearce Mill Road Site (Access Area)

The Pearce Mill Road site is a 0.16-acre area located just upstream of the Dam on the left descending bank. It currently supports grass, small trees, such as sumac, and an assortment of weeds and brush. See PLATE 4a.

2.2.4.11 Rose Barn Site (Access Area)

The Rose Barn site is located near the handicapped-fishing pier just downstream from the boathouse. It is immediately adjacent to Pearce Mill Road. This 0.2-acres site is regularly mown.

2.2.4.12 The Point Site (Access Area)

The last area, called the Point, is located adjacent to Lakeshore Drive on the right descending bank of the North Fork of Pine Creek just upstream from where Pine Creek

and the North Fork of Pine Creek merge within the lake. See PLATE 4a. and APPENDIX 3. This area is a typical picnic area within the park that is regularly mown.

The table below lists each of the above sites and what they could be used for during project construction.

Site	Sediment Placement	Equipment Storage and Staging	Lake Access
County	**X**		
Bull Pen	**X**		
Deer Pen	**X**		
Latodami	**X**		
Wildwood	**X**		
Babble Brook		**X**	**X**
Gold Star		**X**	**X**
Mars		**X**	**X**
Pearce Mill Road			**X**
Rose Barn			**X**
Point			**X**

2.2.5 Pennsylvania Modified Habitat Procedure

The U.S. Fish and Wildlife Service developed the Habitat Evaluation Procedure (HEP) to standardize a reproducible methodology of quantifying habitat value. The HEP has been modified for use in the Commonwealth of Pennsylvania, and is known by the acronym PAM-HEP, (Pennsylvania Modified HEP). The evaluation procedure generates numerical values or habitat units for the existing habitat (base value) of a given area, and permits projecting habitat values for the year of construction as well as out-years. This numerical system helps professional planners determine to what extent an action will negatively or positively impact habitat.

To conduct a PAM-HEP at the proposed sediment placement sites, the District assembled a team of expert biologists and natural resource personnel. The team was composed of two Corps biologists, the North Park naturalist employed by Allegheny County Department of Parks and Recreation, several assistants to the naturalist (including a volunteer from the local group, “Friends of Latodami”, and a biologist from the Pennsylvania Game Commission. Additionally, a representative of the U.S. Fish and Wildlife Service was consulted regarding the organization of the PAM-HEP.

2.2.6 Summary Results of the PAM-HEP Study

Sediment placement sites were examined in the PAM-HEP and included the Bull Pen site, County site, Deer Pen site, Latodami site, Round Top picnic grove and Wildwood site. The Round Top picnic grove directly abuts the Wildwood site. The hillside that

leads down from the Round Top grove to the Wildwood site would be used for both sediment placement and access to the Wildwood site. These areas were considered as one site for the PAM-HEP and wildlife studies. The team conducted all PAM-HEP fieldwork on 6/16/03 and 6/17/03. After the fieldwork was completed, Corps personnel finished the data analysis and summarized the results.

As expected, the PAM-HEP revealed that there would be an initial loss of habitat units or value at all of the sediment placement sites at the year of construction or baseline year. However, the PAM-HEP also showed that the losses in habitat quantity and quality would recover to levels above that which was determined to exist at baseline at all sites, except at the Deer Pen site. Including specific site restoration and reclamation guidelines in project specifications would ensure that post-construction habitat conditions would provide adequate wildlife habitat in the future. The restoration of dredge material placement sites giving priority to wildlife enhancement will result in net gains in habitat for the 6 evaluation species used in the PAM-HEP assessment. To achieve the net gains in habitat value, the following post-construction reclamation plans, at minimum, were recommended by the PAM-HEP team:
(1) Preclude exotic plants from post-construction vegetation
(2) Plant native herbaceous, shrub and tree species in carefully designed patterns,
(3) Provide for strip cutting of vegetation up to 3 times annually on sections of certain sediment placement sites,
(4) Stipulate the installation of bluebird boxes on certain sediment placement sites, and
(5) Return the topography on certain sites to a condition of "enhanced near-original contour".

2.2.7 Breeding Bird Census and Small Mammal Trapping

In addition to the PAM-HEP study, breeding bird fixed plot surveys and live trapping were also used to characterize avian and small mammal populations, respectively. Corps personnel conducted small mammal live trapping and breeding bird surveys during 3 time periods in 2003: 6/1 - 6/4, 6/15 - 6/18, and 7/22 - 7/25. Breeding bird surveys consisted of standard fixed-radius point counts conducted by 2 observers. Line transect sampling, with Sherman live traps, were used to document information regarding small mammals. No state or Federal threatened, endangered or other special status species were observed during the breeding bird surveys or the small mammal trapping studies.

The results of the wildlife studies conducted by Corps biologists indicate that temporary negative impacts to wildlife populations and habitats would occur at all sites from proposed placement of dredge material. Breeding bird surveys showed sites (Bull Pen, Deer Pen and Wildwood) where the ratio of bird species observed on the herbaceous open areas, versus adjacent shrub and woodland habitats, is less than 1:1, meaning that less than 50 percent of the total number of observations at these sites were associated with the vegetative cover that would be directly affected by dredge material placement. One site (Latodami) had a ratio greater than 1:1. However, approximately 70 percent (200 of 285) of the bird observations made in the primary habitat (herbaceous vegetation) at the Latodami site were species associated with the 400-meter (m) hedge that bisects the

site or were associated with 3 species of cavity nesters using the many nesting boxes placed at that location. These factors suggest that dredge sediment placement activities would not likely result in major impacts to species richness (i.e. number of species) or breeding bird densities over time. In the case of Latodami, installing bluebird-nesting boxes during post-construction site reclamation would lessen impacts. A total of 62 species was observed at all of the sites combined. Species richness ranged from 23 at Bull Pen to 44 at Wildwood. Adjacent habitat, not subject to direct disturbances from proposed project activities, contributed from 28 percent of the bird observations made at Latodami to 77 percent at the Bull Pen site.

Five species of small mammals, totaling 74 individuals were captured and released at the 6 sites. However, 84 percent of the total captures were meadow voles (*Microtus pennsylvanicus*). Sub-adults were observed at 4 of the 6 locations, with only Round Top and Deer Pen lacking immature small mammals. Low diversity in the small mammal captures and absence of young at several sites suggests low relative value of habitat in the herbaceous areas of the proposed sediment placement sites and adjacent wooded areas. Poor habitat for small mammals adjacent to the sediment placement areas suggests that little potential exists for post-construction recruitment to come from these areas. However, incorporating sequential placement of fill and sequential site restoration will provide escape habitat for small mammals, preserving at least part of the populations for post-construction colonization.

2.2.8 Vegetation Survey of Sediment Placement Areas

The dominant vegetation cover type at all of the sites was herbaceous rangelands with scattered shrubs. Cool season grasses and several legume species dominated this vegetation type. Uneven-aged woodlands bordered all sites with an assortment of deciduous trees in the canopy and a moderately diverse understory. A variety of invasive exotic plants are established at all sites, appearing in both herbaceous grasslands and in the surrounding woodlands, especially in the understory. The hillside at the edge of the Round Top picnic grove that leads to down to the Wildwood site was the only area dominated by deciduous woodland cover, consisting primarily of mature trees. Invasive exotic plants are established in this area also, but not to the extent evident at the other 5 potential sediment placement sites. The effect of exotic plant influence on existing wildlife habitat quality was not quantified. However, because of the dominance of exotic vegetation at most sites, it is believed to have significant negative effects on both small mammal and breeding bird populations utilizing the sites. See APPENDIX 10, Vegetation Survey, for more detail.

See APPENDIX 9 at the end of this report for a complete discussion of the PAMHEP study as well as the breeding bird survey and small mammal trapping.

2.3 Threatened and Endangered Species

According to the June 6, 2006 letter received from the U.S. Fish and Wildlife Service, no Federally listed threatened or endangered species or their habitat would be affected by the

proposed project. An April 12, 2006 preliminary search of the Pennsylvania Natural Diversity Index provided by the Pennsylvania Bureau of Forestry on its WEB site revealed that there were was potential for state listed species to be present within the project area. Following this preliminary search of the PNDI Index, the District supplied the Bureau with additional detail, who responded by letter dated May 11, 2006 that the state-listed rare *Trillium nivale* (snow trillium), could be present at the Wildlwood, County and Bull Pen sediment placement areas. Copies of the above correspondence are contained in APPENDIX 1 of this report. They requested that the District examine these areas to determine if the specie was present. Accordingly, the District coordinated with Meg Scanlon, the North Park naturalist who along with two recognized expert botanists, Ms. Ester Allen and Ms. Shirley Mutz surveyed the areas in question. According to Ms. Scanlon, they carefully searched these areas and did not find the snow trillium or other species of concern.

2.4 Prime Farmlands

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land or other land but not urban built-up land or water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable alkalinity, acceptable salt and sodium content and few or no rocks. They are permeable to water and air and are not excessively erodible or saturated with water for long periods of time and do not flood frequently or are protected from flooding.

The soils survey of Allegheny County was examined and compared with a list of prime farmland soils obtained from the Natural Resources Conservation Office (NRCS) in Beaver County, which also serves Allegheny County. Based upon the soil surveys and information obtained from the NRCS, two areas, the Bull Pen and Latodami sediment placement sites, identified as potential sediment placement areas within the park contain prime farmland soils. The Bull Pen site contains approximately 6.5 acres of Gilpin Silt Loam soils and the Latodami site contains about 29.6 acres of Gilpin Silt Loams and Wharton Silt Loam soils, which are both considered prime farmland soil types.

2.4.1 Prime Farmland Ratings

The District coordinated with the NRCS office in Beaver and explained that the information they sent confirmed that prime farmland soils were located on two sediment placement sites. To comply with the Farmland Protection and Policy Act, the District completed its portion of a Farmland Conversion Impact Rating form (AD-1006), obtained from the NRCS, Beaver, PA office. This form provides a numerical rating of the value of the prime farmland soils that will be affected by a project. The form is completed in three steps. First, the District partially completes its portions of the form. Next, the

NRCS reviews the data contained on it, completes their analysis, and sends it back to the District for consideration. The final point rating for each prime farmland site is then calculated based upon the two agencies ratings. A copy of this completed form showing the information requirements from each agency is provided for information in FIGURE 1 below.

FIGURE 1

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request: JUNE 19, 2003
Name Of Project: SECTION 206 North Park	Federal Agency Involved: US Army Corps of Engineers
Proposed Land Use: Lake sediment placement	County And State: ALLEGHENY, PA
PART II *(To be completed by NRCS)*	Date Request Received By NRCS: 6-23-03

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).* Yes: X No: ☐

Acres Irrigated	Average Farm Size
None	68

Major Crop(s)	Farmable Land In Govt. Jurisdiction	Amount Of Farmland As Defined in FPPA
CORN	Acres: 211,180 % 45	Acres: 133,160 % 28.6
Name Of Land Evaluation System Used: FEDERAL	Name Of Local Site Assessment System: NONE	Date Land Evaluation Returned By NRCS: 7-7-03

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	29.6	6.5		
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site	~~0.0~~ 29.6	~~0.0~~ 6.5	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	12.0	6.5		
B. Total Acres Statewide And Local Important Farmland	14.2	0		
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	2.002	2.002		
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	16	16		
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	0 39.7	0 55	0	0

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use		10	12		
2. Perimeter In Nonurban Use		4	8		
3. Percent Of Site Being Farmed		0	0		
4. Protection Provided By State And Local Government		0	0		
5. Distance From Urban Builtup Area		1	3		
6. Distance To Urban Support Services		0	0		
7. Size Of Present Farm Unit Compared To Average (68 Acres)		0	0		
8. Creation Of Nonfarmable Farmland		10	10		
9. Availability Of Farm Support Services		1	1		
10. On-Farm Investments		0	0		
11. Effects Of Conversion On Farm Support Services		0	0		
12. Compatibility With Existing Agricultural Use		0	0		
TOTAL SITE ASSESSMENT POINTS	160	~~0~~ 26	0 34	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	~~0~~ 34.7	~~0~~ 55	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	~~0~~ 26	0 34	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	~~0~~ 65.7	~~0~~ 89	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used?
		Yes ☐ No ☐

Reason For Selection:

(See Instructions on reverse side) **Form AD-1006 (10-83)**

This form was electronically produced by National Production Services Staff

The above form in FIGURE 1 was developed by the USDA to generate a numerical rating to be used to determine the relative importance of affected prime farmland. As can be seen, out of a total maximum of 260 rating points, the Latodami site (Site "A" on the form) earned a total of 65.7 points. The smaller Bull Pen site, which is now partially paved with asphalt, (Site "B"), earned 89 points. Because of the relatively low rating of the Latodami site and the low rating and present condition of the Bull Pen site (partially asphalt paved), it is the opinion of the District that although rated as prime farmland soils their importance to the area as potential farmland is minimal.

2.5 Noise

The noise within North Park is generated primarily by automobile traffic. Within the Park, noise levels near Pine Creek Dam are generally the highest in the vicinity of Ingomar Road and Babcock Boulevard, which crosses over the top of the dam's crest. See PLATES 4b and 4c for road locations. Babcock Boulevard is a heavily used north/south road that local residents use to access the park and other locations within the North Hills of Allegheny County. Ingomar Road, which runs along the park's southern border along the Pine Creek arm of the lake, turns into Wildwood Road at its intersection with Babcock Boulevard. Ingomar/Wildwood Road is a busy east/west access route connecting Route 8 and McKnight Road/Route 19. As would be expected, noise levels from everyday traffic where these routes border the park are high and sustained. Within the park in areas away from these two roads, noise levels reduce due to reduced traffic volumes and speed limits. Obviously during weekends in warm weather, when the park receives its highest use, noise levels from traffic and recreational activities increase throughout the park.

2.6 Air Quality

Allegheny County is in a seven-county area in southwestern Pennsylvania that is classified as a moderate non-attainment area for the U.S. Environmental Protection Agency's 1-hour ozone standard. This area does meet the EPA's ambient air quality standards for all other parameters.

2.7 Hazardous and Toxic and Radiological Waste

In November 2002, the District completed a Phase 1 Environmental Site Assessment (ESA) for lands in North Park that could be used during construction of the North Park Lake project. In February 2004, a Phase 1 ESA was also completed for one offsite location that may also be used for the project, namely the Wildwood reclaimed gob pile located adjacent to the Park's southern boundary. Corps policy requires environmental site clearance concerning hazardous, toxic, and radiological waste to prevent future environmental liability through real estate chain of title and worker safety. ESAs identify any environmental contamination that may have occurred or that currently exists in a given project area. To complete an ESA, on-site investigations are conducted and

numerous databases and records are consulted to determine the potential for toxic materials to be present on project lands. The Phase 1 ESA for the North Park project concluded that no sources of contamination are present in the project area and that additional HTRW investigations are not warranted. For more detail, consult APPENDIX 5 that contains the text of the final ESA completed for the North Park Lake project.

2.8 Cultural Resources

The District completed preliminary research to determine the presence of previously recorded archaeological sites within the project area including the sediment placement areas. A review of Carnegie Museum archeological site records by District archaeologists revealed that in 1979 Museum staff conducted a survey of North Park. This survey revealed the presence of five archeological sites within two placement sites considered for sediment placement. Two sites were recorded at the Deer Pen placement area and three were recorded within Latodami field. Other than minimal information on the individual site forms themselves there was no information recorded concerning site size, number of artifacts or the presence and distribution of subsurface features, such as post molds and fire pits. For unknown reasons, no formal report of the investigation was ever produced. Neither were field notes available from which facts could have been gleaned to help provide additional information about the sites.

Through coordination with personnel from the Pennsylvania Bureau of Historic Preservation (BHP), the District developed a Phase I/II investigation work plan to determine the presence of cultural resources within the areas containing recorded sites. These studies would be necessary to relocate the recorded sites and to determine their significance. Discussions with the BHP concluded the entire park was most likely surveyed in 1979 including the remaining placement and staging areas within the park. The BHP indicated that no further work would be required within the project area except at the Deer Pen and Latodami sites.

The Wildwood site was a former gob (coal waste) pile that was reclaimed in 2002. Due to its history of disturbance, it would not contain any extant cultural resources. See APPENDIX 8 for more detail.

2.9 Socio-Economic Conditions

2.9.1 Population

According to year 2000 data from the U.S. Census Bureau, Allegheny County had a household population of 1,241,049: 652,911 (53%) females and 588,138 (47%) males. The median age was 39.8 years. Twenty three percent of the population were 65 years and older. For people reporting one race, 86% were White; 12% were Black or African American; less than 0.5 % were American Indian or Alaska Native; 2 % were Asian; less than 0.5% were Native Hawaiian or other Pacific Islander; and less than 0.5% were some

other race. One percent of the people in Allegheny County were Latino or Hispanic. People of Hispanic origin may be of any race. In 2000, there were 530,012 households in Allegheny County. The average household size was 2.34 people.

2.9.2 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Population and Low-Income Populations* (Executive Order, 1994), directs federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority population and low-income populations. When conducting NEPA evaluations, the Corps incorporates environmental justice considerations into both the technical analyses and the public involvement in accordance with EPA and Council on Environmental Quality guidance (CEQ, 1997)

The CEQ guidance defines "minority" as individual(s) who are members of the following population groups: American Indian or Alaskan native, Asian or Pacific Islander, Black, not of Hispanic origin, and Hispanic (CEQ, 1997). The Council defines these groups as minority populations when either the minority population of the affected area exceeds 50 % or the percentage of minority population in the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis.

Low-income populations are identified using statistical poverty thresholds from the Bureau of the Census Current Population Reports, Series P-60 on Income and Poverty (USBC, 2000). In identifying low income populations, a community may be considered either as a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect. The threshold for the 2000 census was an income of $17,761 for a family of four (USBC, 2000). This threshold is a weighted average based on family size and ages of the family members.

The two spreadsheets below show the percentage of population by race and percent of families below the poverty level for the country, state, county and local townships near North Park Lake

	PERCENTAGE OF POPULATION BY RACE							
Location	**White**	**Black or African American**	**American Indian and Alaska Native**	**Asian**	**Native Hawaiian and Other Pacific Islander**	**Some other race**	**Two or more races**	**Total**
United States	75.14%	12.32%	0.88%	3.64%	0.14%	5.46%	2.43%	100.00%
Pennsylvania	85.37%	9.97%	0.15%	1.79%	0.03%	1.53%	1.16%	100.00%
Allegheny County	84.33%	12.41%	0.12%	1.69%	0.03%	0.34%	1.07%	100.00%
Hampton Township	97.66%	0.67%	0.05%	1.23%	0.01%	0.12%	0.27%	100.00%
McCandless Township	94.58%	1.29%	0.05%	3.19%	0.01%	0.14%	0.74%	100.00%
Pine Township	97.16%	0.79%	0.07%	1.12%	0.03%	0.16%	0.68%	100.00%
Municipality Total	95.94%	1.02%	0.05%	2.26%	0.01%	0.14%	0.58%	100.00%

Families Below Poverty Level – 2000 Census

		Number of Families	**% Families**
Location	**Families**	**Below Poverty Level**	**Below Poverty Level**
United States	72,261,780	6,620,945	9.2%
Pennsylvania	3,225,707	250,296	7.8%
Allegheny County	333,898	26,527	7.9%
Hampton Township	4,917	107	2.2%
McCandless Township	8,001	173	2.2%
Pine Township	2,124	76	3.6%
Municipality Total	15,042	356	2.4%

As can be seen in the above spreadsheets, the immediate project area's minority and low income populations are well below the national, state, and county averages. For example the percent minority population of the three townships is about 4%. The percent minority populations for the country, state and county are approximately 25%, 15%, and 16%, respectively. Similar statistics hold for the percentage of families below the poverty level, i.e., 2.4% for the municipalities near North Park, versus 9.2%, 7.8% and 7.9% for the country, state and county, respectively.

2.9.3 Economics and Employment

In Allegheny County, in 2000, for the employed population 16 years and older, the leading industries were Services (47%) and retail trade (13%). Table 1 below shows, in ascending order, the percent of the population employed in various industries.

TABLE 1 – Employment Summary

Industry	Percent of Employed Population 16 years and over *
Agriculture, Forestry, Fishing, Hunting	0%
Mining and Utilities	1%
Wholesale Trade	4%
Public Administration	4%
Construction	5%
Transportation, Warehousing, Information, Communication	8%
Finance, Insurance, Real Estate, Leasing	8%
Manufacturing	10%
Retail Trade	13%
Services	47%
	100.%

*Source: U.S. Census Bureau

2.9.4 Housing

In 2000, Allegheny County had 583,646 housing units, 9.2% of which were vacant. Of the total housing units, 69% were in single-unit structures, 30% were in multi-unit structures, and 1% were mobile homes. Five percent of the housing units were built since 1990. The median monthly housing costs for specified mortgaged owners was $949, non mortgaged owners, $331 and (specified) renters $519. Twenty five percent of homeowners with mortgages, 12 % of owners without mortgages, and 37% of renters in Allegheny County spent 30% or more of household income on housing.

2.9.5 Transportation

Allegheny County has an intricate network of highways that are increasingly utilized as commercial and residential development expands in suburban areas outside the city limits of Pittsburgh. As shown on the general location maps, PLATES 1 and 2, the primary arteries that carry traffic through the county are the Pennsylvania Turnpike (U.S. Route 76 running east-west) and U.S. Route 79 running north/south. The primary multi-lane access highways to the City of Pittsburgh include Interstate Route 279 (Parkway North), Interstate Route 376 (Parkway East) and (Parkway West). In addition to these primary highways, several very heavily used secondary routes also afford access to the City of Pittsburgh and include State Routes 28, 8, and 19 from the north, State Routes 19 and 51 from the south, and State Route 30 from the east.

The most heavily used highways near the North Park project area are State Route 19 (Perry Highway) and McKnight Road that are located west of the park and run north-south. State Route 910 borders North Park on its north, Babcock Boulevard and Route 8

on its east, and Ingomar Road on its south, all of which (except for Route 8) can be reached via Route 19.

Except for a short stretch of Babcock Boulevard located atop the dam and a portion of Ingomar Road that runs along Pine Creek near the dam, the roads within the park are two lanes wide with a 15 or 25 mile per hour speed limit depending on locations. The heaviest-used access routes within the park are Ingomar Road, Pearce Mill Road and Lake Shore Drive. Further out from the lake, a number of other roads are also used to access sections of the park and include Kummer Road, Walter Road, McKinney Road, Brown Road and North Ridge Road. South of Ingomar/Wildwood Road, South Ridge Road serves a separate segment of the Park containing the swimming pool, several ball fields, and many picnic groves. Most of these roads have wide shoulders, which are separated by lane markers for pedestrian and non-motorized vehicle traffic. All of the roads mentioned above are shown on PLATES 1, 3, 4b, and 4c.

2.9.6 North Park Demographics

Based upon information obtained from Allegheny County, the following table provides an estimate of the number of people paying to use various facilities within the Park on an annual basis.

TABLE 2
Shelter, Building and Field Usage 1997-2005
(Data Provided by Allegheny County Department of Parks and Recreation)

	1997	1998	1999	2000	2001	2002	2003	2004	2005
Number of Fields Rented	2,347	2,133	1,764	1,014	870	942	1,667	1,556	1,778
Number Using Fields	293,375	266,625	216,692	121,680	104,400	113,040	200,040	186,720	213,360
Number of Facilities Rented	4,221	3,831	3,955	3,815	3,100	3,457	2,781	2,814	2,749
Number Using Facilities	505,698	409,624	305,393	301,385	244,900	237,142	219,778	222,385	217,171

As can be seen in Table 2 there was a dramatic decline in the parameters from 1997 through 2001. County personnel could offer no explanations or obvious reasons why there was such a steady decline at North Park. Data obtained from the County for their other parks for this period did not show a similar trend. The renting and usage of facilities at other County parks for the same period was relatively constant as would be expected. After 2001 the sharp declines in the usage rate moderated. The data in the table above only depicts facilities that were rented; it does not represent total usage of the park by visitors during the year. The County does not have any methodology in place that would permit the recording of what this number would be.

2.9.7 Aesthetics

2.9.7.1 North Park Lake

Determining the aesthetic quality and character of a given area is admittedly very subjective and dependent upon personal views and biases. However, there are some obvious characteristics of degraded aesthetic character that most would agree upon, such as areas that have been disturbed by construction that have not been reclaimed or restored. That said, the following discussion, describes, in the view of the author of this report, the general aesthetic character of North Park Lake and the proposed sediment placement and staging areas.

North Park and North Park Lake, located amidst dense suburban residential and commercial development, is a popular recreation area not only for local North Hills residents, but also for residents of Allegheny and southern Butler Counties. The country-like character of the Park provides a high quality, temporary respite for those seeking a relatively tranquil outdoor experience that provides relief from the congestion and activity of the City of Pittsburgh and its adjacent, crowded suburbs. Because of ongoing sedimentation, North Park Lake's 75 acres of open water has, since its initial construction in the 1930's, been transformed into a 63 acre shallow, turbid (muddy) lake that is filling with vegetated mudflats and wetlands. The lake's value as an aesthetic resource is important due to the scarcity of similar habitat elsewhere in the County.

The aesthetics typically associated with wetlands are quite different than open water habitat. Shrub/scrub and bottomland hardwood wetlands (which would eventually manifest at North Park Lake if no action is taken to restore the open water habitat) typically give an area a rough, wild appearance. Placid lakes in rural or landscaped park settings inherently promote an impression of tranquility and serenity as seen above in an older photo of North Park Lake looking at the boathouse. The open water of North Park Lake, although turbid, still provides an appealing, relaxing, and picturesque focal point for park users. However, without intervention to restore the open water habitat, the lake will eventually succumb to the process of sedimentation and be totally lost. Preservation of open water lake habitat is, therefore, critical to maintain the aesthetic qualities that the lake contributes to the park.

2.9.7.2 Placement and Staging Areas

The Bull Pen Site and County sites have been severely degraded by past construction practices. The Bull Pen site has been partially paved with asphalt and is used for the storage of large piles of discarded leaves collected in the fall from surrounding

communities. The County site was used to dispose sediment taken from the lake and was never properly reclaimed. Today the County site looks like a typical, abandoned vacant lot with grass and weeds growing on it with construction equipment (large pipes) strewn on the ground in various places. The aesthetic quality of both of these areas is poor.

The Deer Pen site exhibits aesthetic character that is typical of North Park's picnic open groves consisting of mown lawn surrounded by woodland. This type of setting is common and quite widespread throughout the park.

The Latodami site is a large, abandoned agricultural field that currently supports grasses, various forbs, brambles and woody exotic shrubs such as autumn olive and multiflora rose. Its aesthetic character is fair; it is a disturbed area that is now recovering from being regularly plowed. The lower half of the site was sprayed with an herbicide in the spring of 2002, which killed all of the existing vegetation. This area was then experimentally planted with native prairie grasses. Non-native seed sources left within the soil after spraying (primarily foxtail) germinated and out-competed the planted native grasses. As a result, the prairie grasses largely failed to establish and a monoculture of foxtail developed. If left alone, natural vegetative succession would eventually change the Latodami field, including the area taken over by foxtail from open land to forest. Left to itself without disturbance, the aesthetic character would slowly improve as the site gradually turns into woodland and loses its disturbed appearance. This process could take anywhere from 25 to 50 years to occur.

The Mars and Babble Brook staging areas and Point and Rose barn Access areas adjacent to the lake are typical park-like open areas that are regularly mowed (See APPENDIX 3). The Gold Star staging area is also mowed but is slightly more scenic and aesthetically pleasing due to the presence of maturing red and white pine trees that were planted there decades ago. The Pearce Mill Road access area near the dam is on a much steeper gradient than the other access areas and supports primarily brush with a few trees. Because of the steep slope, the area cannot be mowed. Aesthetically this site appears to be disturbed. The slope acts as a natural vegetative barrier separating Pearce Mill Road from the lake.

The Wildwood Road Mine Site was a gob (coal waste) pile that was covered in fly ash, overtopped with a very thin layer of soil and planted with grasses to prevent erosion. The site's present aesthetics are poor being typical of reclaimed strip-mined areas that exhibit broad expanses of land with monocultures of grass. If left alone in its present condition, the site's aesthetic character would likely change little over time due principally to poor, infertile soil. APPENDIX 3 provides photos of all the staging and sediment placement areas described above.

2.10 History of Sedimentation

The drainage area of the Pine Creek basin upstream of the dam is approximately 24 square miles. North Park Lake, when originally constructed in 1936 had a capacity of 568 acre-feet of water and a surface area of 75 acres. (The volume of an acre-foot of

water is one acre one foot deep.) The runoff and soil erosion associated with the expansive development in the Pine Creek basin greatly increased the sediment load of both Pine Creek and the North Fork of Pine Creek. As sediment-laden waters flowed into North Park Lake, flow velocities significantly decreased, which permitted sediment particles to settle on the lake bottom. This sedimentation process over the last seventy years has virtually eliminated over 12 acres of the lake's original 75 acres of valuable open water habitat. Today, due to sedimentation, the volume has been reduced nearly 50 percent to approximately 297 acre-feet, and the available surface acreage has been reduced to about 63 surface acres of open water. The depth of the lake near the dam when originally constructed was approximately 24 feet. It is now roughly 10 feet deep at it deepest location. See APPENDIX 7, Hydraulics and Hydrology for more detail.

2.11 Sediment Characterization

The District utilized the services of an outside firm (ALTECH Environmental Services, Louisville, KY) to sample and test the sediment within North Park Lake to determine if the sediments contain any chemical contaminants at a concentration that could pose a significant risk to human health or the environment if the dredged sediments were placed in an upland area. To make this determination, ALTECH developed a detailed sampling and analysis plan (SAP) to control the variables that effect data precision, accuracy and representativeness to within prescribed levels. The plan was designed to acquire a sufficient quantity and quality of data to properly characterize the chemical content of the sediments by direct comparison of the results to the Pennsylvania Department of Environmental Protection [Draft] Dredging Guidelines, Clean Fill, Safe Fill and Act 2 Medium Specific Concentration criteria.

In accordance with the sampling plan, North Park Lake was subdivided into eight hypothetical Management Units (MU-1 through MU-8), representing nearly equal volumes of sediment proposed to be dredged. (PLATE 1 in APPENDIX 5 shows the lake divided up into management units). Four borings were scheduled in each MU for the collection of a variety of samples for geotechnical and chemical analyses. Samples for chemical analysis were subdivided into three categories, Primary, Secondary and Tertiary. All Primary Samples were to be composite samples comprised of representative portions of all four borings in the MU and were scheduled for analysis for the presence of Total Petroleum Hydrocarbons (TPH), Total Extractable Organic Halogens (EOX), Polychlorinated Biphenyls (PCBs), chlordane, total chlorides and Target Analyte List (TAL) metals.

The analysis of Secondary and Tertiary Samples was contingent upon the results of analysis of the Primary Samples. There were four Secondary Samples from each MU for potential analysis; each was a composite of the material from the total length of one of the four borings in the MU. The Tertiary Samples were for potential analysis of USEPA Target Compound List Volatile and/or Semi-Volatile Organic Compounds (VOCs and/or SVOCs) if high values of the indicator parameters TPH and/or EOX were detected.

All field sampling of sediment was accomplished from a floating plant between October 1 and October 11, 2002 in close compliance with the approved SAP. A Corps of Engineers certified laboratory in accord with rigorous quality control requirements conducted all chemical laboratory analyses. Remarkably consistent geotechnical and chemical results were obtained.

A total of 36 borings were drilled, four in each of the Management Units. Depths of the borings into ranged from about 4 feet to 18 feet. The borings were drilled from a small floating plant and were advanced using hollows stem augers and split spoon sampling.

2.11.1 Geotechnical Analysis Results

The Altech field geologist systematically examined and documented the characteristics of the soil and sediment from each boring. An estimate of consistency was made, and the sample color and grain size characteristics were denoted in a field logbook, along with blow count records, percentage of recovery in sample intervals, depth of water and other relevant information and observations.

Fairly consistent subsurface conditions were encountered in the borings in Management Units 1 through 5 of North Park Lake (the Pine Creek Arm of the lake). The sediment was generally very soft, greenish gray, silty clay with organics. It was generally designated as CL type soil according to the Unified Soil Classification System (USCS). Near the sediment surface, soil particles were nearly in suspension. There was apparent increase in density with depth and measurable decrease in moisture content with depth. Percent recovery in split-spoon samples from each boring also increased with depth of sample interval.

The thickness of these very soft silty clays in Management Units 1 through 5 extended to greater than 11 feet. Very loose silty sand, generally designated as SM according to the USCS, was encountered beneath the very soft silty clay in most of the borings where geotechnical samples were procured. All moisture content values for the underlying sand at these locations were significantly lower than the overlying clays. The consistent greenish gray sediment color indicated the presence of algae and a pervasive reducing environment where anaerobic decomposition of organic matter is occurring.

In Management Units 6 through 8 (North Fork arm of North Park Lake), subsurface conditions were noticeably different from those encountered in Management Units 1 through 5. The thickness of very soft sediment encountered was generally less than two feet before denser, apparently non-lacustrine sediments and soils were encountered. The soils encountered in Management Units 6 through 8 in North Park Lake varied from high plasticity clays with virtually no coarse fraction to silty sands to clayey gravels. USCS designations included; CH, CL, SM, SC and GC type soils. The soils encountered in Management Units 6 through 8 in North Park Lake were generally denser, exhibited more variable grain size distribution characteristics and lower natural moisture content values than the values found for samples from the Management Units up the Pine Creek Arm and in the area adjacent to the dam (Management Units 1-5).

The consistent greenish gray coloring found in all but one surficial sample in Management Units 1 through 8 borings indicated that presence of algae is ubiquitous throughout North Park Lake and that the lake is eutrophic. The yellow-orange clayey sand and gravelly clay encountered in borings AD-7a and AD-7c appear anomalous, but these conditions likely reflect native soil environments near the shore rather than the reducing environment that pervades the lake bottom.

2.11.2 Chemical Analysis Results

Ten Primary Samples were analyzed, one from each of the nine MUs (PS-1 through PS-9), plus one field duplicate from MU-5, labeled PS-10. (Note, Management Unit 9 was in Marshall Lake which will not be dredged) There were no PCBs, chlordane or EOX detected in any of the ten samples, and none of the detected values of TPH, TAL Metals or Chloride indicated the presence of any chemical contaminants at a toxic concentration. However, TPH concentrations detected in samples PS-1, PS-3, MU-5, PS-5 and PS-10 exceeded the "Unrestricted Use" criteria (120mg/kg) specified in the [Draft] Dredging Guideline. Total lead concentrations detected in samples PS-3, PS-5 and PS-10 also exceeded the [Draft] Dredging Guideline of 45 mg/Kg.

The four Secondary Samples from MU-3 and eight from MU-5 were subsequently analyzed for both TPH and total lead, and the four Secondary Samples from MU-1 were analyzed for TPH. Following the [Draft] Dredging Guideline procedure, the mean concentration for the Primary and four Secondary Sample results from each MU was then calculated and substituted into the original data set for the initial primary Sample value to establish a mean and upper confidence level for the mean concentration of TPH and lead found in the subject sediment. For instance, the mean concentration value of the PS-1, SS-1a, SS-1b, SS-1c and SS-1d results for TPH was substituted into the original set of Primary Sample results for the PS-1 value.

Following this procedure, the mean value of TPH in the combined North Park Lake and Marshall Lake samples was calculated to be 59 mg/Kg, and the 95% upper confidence level for the mean concentration was 95 mg/Kg, well below the "Unrestricted Use" criteria. For North Park Lake alone, the mean TPH value was 63.5 mg/Kg and the 95% upper confidence level value was 104 mg/Kg, still well below the applicable "Unrestricted Use" criteria of 120 mg/Kg.

The mean value of lead in the combined North Park Lake and Marshall Lake samples was calculated to be 36.6 mg/Kg, and the 95% upper confidence level for the mean concentration was 49.3 mg/Kg, which is above the "Unrestricted Use" criteria of 45 mg/Kg. For North Park Lake alone, the mean lead value was 38.2 mg/Kg and the 95% upper confidence level value was 52.7 mg/Kg, again above the applicable criteria. While the lead data reflects levels that may be above naturally occurring lead levels, the results do not indicate significant contamination. The table of, "Trace Chemical Element Content of Natural Soils," published by the USEPA OSWER in 1983 indicates the common range of lead concentrations in soil is 2 mg/Kg to 200 mg/Kg, with an average value of 10 mg/Kg. The numerical standard proposed in the Safe Fill policy is 450

mg/Kg, 8-10 times higher than 95% upper confidence level values calculated for the mean concentration of lead in the subject sediments.

The chemical analyses results corresponded to the boring observations and geotechnical laboratory results, indicating that albeit low, nearly each measured level of each target chemical was consistently higher in MU-1 through MU-5 samples, than in MU-6 through MU-8 or MU-9 samples. The results of the sediment characterization provide defensible quantitative data to indicate that if dredged sediments from North Park Lake or Marshall Lake are placed in upland areas of the park for landscaping or recreational purposes, the in-place sediments will pose no significant risk to human health or the environment.

For More detailed information regarding the characterization of sediment within North Park Lake, see the geotechnical appendix, APPENDIX 5.

2.12 Sedimentation and Aquatic Ecosystem Habitat Degradation

Sediment accumulation in most lakes, ponds, and impoundments is an unavoidable geologic condition. Dams create effective stilling basins where sediment is afforded the opportunity to slowly settle to the bottom. The rate of accumulation is governed by complicated interacting factors, such as, but not limited to: soil conditions around the impoundment, along tributary banks and within a watershed; watershed development; stream flow and weather regimes in a given region; and water retention time in an impoundment. At North Park Lake, sedimentation has been significant due primarily to continuous urbanization within the watershed. Since the creation of the lake in 1936, over 12 acres of open water habitat have been totally lost in the upper reaches of the Pine Creek arm of North Park Lake due to sediment accumulation. The remaining open water habitat has been adversely affected by the estimated loss of one half of its original depth due to sedimentation.

Sedimentation negatively affects fish species by smothering the eggs of breeding fish and amphibians, and reducing the ability of sight oriented predator fish, such as largemouth bass, tiger musky, channel catfish, and walleye from successfully capturing food. In 1997, the Pennsylvania Fish and Boat Commission observed through sampling that the bass fishery in the lake was slow growing for all age classes, even though gizzard shad and sunfish were available in abundance for forage. They surmised that the lake's high turbidity levels negatively affected the foraging ability of the largemouth bass since they are sight feeders. As sedimentation progresses there will be a continual loss of open water habitat and a commensurate loss of lake depth. This continual loss of habitat will eventually reduce its capacity to support even a warm water sport fishery.

As the lake becomes increasingly shallow, its water temperature will rise more sharply in the spring as the weather warms making it less suitable for cool water species, such as stocked trout that are placed in the lake by the Pennsylvania Fish and Boat Commission. Without action to restore depth and open water habitat, the lake will grow increasingly shallow and eventually become too warm for trout to survive, even for short periods of time. As a result, the lake will no longer be suitable for stocked trout and the stocking

program at North Park Lake will be curtailed. Continued sedimentation will over time make the lake too shallow to support even a warm water sport fishery.

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3.0 PLAN FORMULATION

3.1 Study Goals and Objectives

The primary objective of this study is to prescribe a treatment methodology that will restore open water aquatic habitat within North Park Lake that has been degraded by silt and sediment deposition. Other objectives include increasing the amount of wetland habitat in various locations around the perimeter of the lake by using COIR logs and to introduce fish structure to further improve the aquatic habitat once the lake is dredged. The ultimate goal of the project is to meet the stated objectives in a manner that will be the most cost effective and least disruptive to the users of North Park during construction. In short, the treatment option ultimately recommended must be effective, economically feasible, environmentally sound, socially acceptable, and fully supported by the local sponsor who is responsible for the costs of continued operation and maintenance.

3.2 Planning Constraints

The primary goals of the local sponsor, Allegheny County, is to restore the open water of North Park Lake, increase the diversity and productivity of the aquatic ecosystem, and maintain the lake's value as an aesthetic and recreation resource. Considering that the affected lake is within the largest and most heavily used park in Allegheny County, the impetus propelling the sponsor to cost share this effort is clearly recreational. Recreation benefits derived from a given Section 206 ecosystem restoration project can and often do indirectly occur; however, the Section 206 program philosophy and focus is geared not toward recreation, but rather, to ecosystem re-establishment. The two goals (recreation and ecosystem restoration) may or may not be compatible in every circumstance.

In this case, the local sponsor's recreational management concerns at North Park Lake and the philosophy and purposes of the Section 206 program dovetail. North Park Lake provides open water lake habitat that is uncommon in Allegheny County. Without some action, this habitat and the aquatic biological community that it supports will be permanently lost. Restoring the lake is, therefore, a worthwhile ecosystem objective that is both environmentally sound and justifiable as a Federally cost shared project under the Corps' Section 206 program. Through the restoration of the lake's aquatic ecosystem, the County will realize its objective of saving an irreplaceable recreational resource.

The planning constraints of ecosystem restoration at North Park Lake require the Corps to formulate a plan that optimizes habitat creation and restoration and minimizes impacts to recreation and, most importantly, maintains public safety during construction. The plan must be acceptable to the local sponsor; must be engineering and economically

feasible; must effectively restore the aquatic ecosystem notwithstanding the constraints imposed by continuing human disturbance on and around the lake; and must generate sufficient benefits to justify its costs. The following sections evaluate various measures that the District has considered to meet the planning challenges of this project.

Another planning constraint is the Section 206 program and its restricted cost limitations. The Federal cost share of any 206 project is, by regulation, limited to a maximum of 5 million dollars. When including the 35% local share, this limits any 206 project to a maximum cost of approximately 7.69 million dollars.

3.3 Future Without Project Conditions

Without intervention to alleviate the accumulation of silt and sediment within North Park Lake, the amount of available open water aquatic habitat will continue to decline and the health of the lake's aquatic ecosystem will progressively deteriorate. Silt and sediment deposition will cause the lake to become increasingly shallow resulting in increased water temperatures, decreased dissolved oxygen levels, increased nutrient enrichment and its attendant consequences of unwanted algae blooms and excessive growths of other forms of aquatic vegetation that will clog the lake. As the lake's ecosystem degrades, its ability to support a diverse and productive fishery will commensurately degenerate.

Generally, trout do not survive in waters whose temperature rises above 20 degrees Celsius (68 degrees Fahrenheit). The length of time that stocked trout can survive will diminish as the lake waters become increasingly shallow and warmer for longer periods during the year. Due to habitat loss and deterioration, the trout-stocking program conducted by the Pennsylvania Fish and Boat Commission at North Park Lake will eventually be terminated. The loss of the "put and take" trout fishery would be a significant adverse recreational impact to the region. Moreover, as the open water, aquatic habitat degrades from sedimentation and siltation, the lake will ultimately lose most of its capacity to support a warm water fishery.

Under the "without project" condition, wetlands will continue to expand in a downstream direction as sediment accumulates on the lake bottom making the lake shallower. As deposition continues, areas of open water will become braided with the gradual appearance of more sediment "islands" and emergent vegetation. The entire lake area will continue to revert to wetland except in the immediate areas where Pine Creek and the North Fork of Pine Creek wend their way downstream through thickening vegetation.

As soils accumulate and build within the lake, obligate wetland vegetation, such as marsh purslane, swamp rose, bedstraw, and water plantain will gradually be replaced with facultative species tolerant to moist soil conditions, such as various sedges, grasses and mints, jewelweed, boneset, arrow wood, red osier dogwood, and Joe Pye weed. This process of natural vegetative succession will continue until a bottomland hardwood forest complex composed of such species as swamp white oak, sycamore, box elder, silver maple and various willows is established where open water habitat is located today. In

essence, the long-term, future "without project condition" will be North Park without North Park Lake.

3.4 Alternative Formulation

Since the development of the initial Section 206 preliminary restoration plan, the District has considered alternative methods to preserve and restore the open water aquatic habitat at North Park Lake. The plan formulation process was approached from two varying points of view. To keep project costs down, the District first evaluated methods to reduce ongoing sedimentation and simply preserve what open water remained within the lake. The second, more costly, approach considered alternatives to restore as much open water as practicable to re-establish the lake's aquatic productivity and long term viability. As required in all Corps studies, the alternative of "No Action" was also evaluated. All of the alternatives considered during the plan formulation process are described below:

3.4.1 Alternative 1 - No Action

The No Action alternative is the least expensive option. In the short term, it will cost the local sponsor nothing. If pursued, this option will permit the open water habitat within North Park Lake to continue to degrade and shrink in size as sediment slowly builds. In place of open water, emergent wetlands that are currently expanding within the lake will continue to mature and extend downstream towards the dam and spillway as the lake grows shallower. As natural plant succession and soil accumulation continue unabated, vegetation in the lake area will eventually change from obligate wetland species to bottomland hardwoods. (See also Section 3.3) Under these conditions, the flows from Pine Creek and North Fork Pine Creek will form narrow, braided channels in the area that is now open lake. This progression of vegetal growth and loss of open water habitat will admittedly take years to occur, but the process is sure. A perfect picture of what the lake will eventually look like can be seen in the picture above of the upper Pine Creek arm of North Park Lake that has reverted to wetlands.

3.4.2 Alternative 2 – Upstream Sedimentation Basins

Early in the study, the District first considered constructing sedimentation basins in various places to help remove the sediment from feeder streams before they entered the lake. To accomplish this, the areas upstream of the lake on County-owned property were

evaluated. A sedimentation basin was planned in a narrow, shallow sloped valley between Ingomar Road and Lake Shore drive within the park. This area along Pine Creek is located just upstream of the original open water area of the lake as it existed when first constructed. The sedimentation basin would have controlled the sediment entering the lake from Pine Creek, which enters the southern portion of the park. Another sedimentation basin was proposed for an area upstream of Marshall Lake along the North Fork of Pine Creek between Pearce Mill Road and Kummer Road. Engineering evaluations of these basins however indicated that they were not sufficiently large enough to trap sediment, and that most of the sediment entering the basins would have remained suspended until it entered North Park Lake. Due to this deficiency, this alternative was dropped from further study.

3.4.3 Alternative 3 – In Lake Sedimentation Basins

This second construction alternative considered sacrificing a large portion of the Pine Creek arm of the lake to act as a sedimentation basin. A rock dike constructed across the lake would have permitted about half of the existing arm of the open water area to act as a large sedimentation basin. Wetlands would have been allowed to develop upstream of the dike as sediment settled out within the basin. This alternative would have required regular removal of the accumulated sediment from the basin. Unfortunately, like Alternative 1 above, studies indicated that the basin would not have been large enough to permit the efficient capture of suspended sediment. Like Alternative 1, this plan was also abandoned due to its lack of effectiveness.

3.4.4 Sediment Removal Alternatives

After concluding that the first three alternatives were either not feasible or acceptable to the local sponsor, the District and local sponsor pursued a different approach to solving the aquatic habitat loss at North Park Lake. Instead of trying to minimize sedimentation, the District and local sponsor determined that the next most logical, effective, and environmentally sound approach to aquatic habitat restoration would be to restore the lake to its original contours. This will require removing approximately 400,000 cubic yards of accumulated sediment from the lake.

Based upon past rates of sedimentation during the last 40 years, it appears that sedimentation has peaked and is leveling off. Therefore, since it took over 60 years for the lake to reach its current state of open water habitat loss, it can be reasoned that removing the sediment to the original lake bottom contours (minus the wetland areas already developed within the lake) would provide the lake approximately 100 years of useful lake life. The sediment removal alternatives evaluated to achieve this goal are listed in the table below:

TABLE 3
SEDIMENT REMOVAL ALTERNATIVES

Alt. No.	Alternative Description
4	Drain the lake to let the sediment dry sufficiently to allow land based equipment to excavate and remove sediment by truck.
5	Use land-based equipment mounted on floating platforms to mechanically excavate sediment.
6	Hydraulically dredge the sediment using floating equipment and pumping the sediment to an off-lake location.
7	A combination of 4 and 6 above: Partially drain the lake to allow land based equipment to access and remove sediment from the shallower sections of the lake, and then hydraulically dredge the deeper portions of the lake near the dam face using floating equipment.

Each sediment removal option has its attendant merits and problems. The section below will first briefly describe each alternative and then compare and contrast each of them with regard to specific benefits and impacts and costs to determine the most cost effective, least disruptive plan acceptable to the local sponsor.

3.4.5 Alternative 4 – Draining the Lake

Under this sediment removal option, the District would completely drain the lake, allow the sediment to dry sufficiently to permit land-based equipment to enter the lakebed, and excavate the accumulated sediment. Prior to draining the lake, the area around the outlet control gate will have to be dredged because this gate and the intake control structure are buried in sediment. At this time, the condition and operability of the outlet control gate is unknown. This will have to be determined after the sediment is removed from around the structure. If the gate is inoperable, it will have to be repaired to drain the lake.

It is estimated that the lake would be drained at a rate of approximately one half to one foot per day; however it could be drained faster as shown in APPENDIX 7, TABLE 12 to reduce fishery impacts. The slower a lake is drained the more fish are subject to crowded conditions for longer periods of time, which could cause dissolved oxygen problems.. If the lake is drained faster, the fish will move more quickly through the gate downstream with less impact. This issue will be studied in greater detail in the next phase, Plans and Specifications.

Drying times to allow low pressure vehicles to enter the lake will vary depending upon the time of year and weather conditions. Drying could take a number of weeks to several months. The sediment would be removed by a front-end loader or hydraulic excavator and placed directly into dump trucks and hauled to selected and approved sediment

placement sites. The sediment placement areas would be graded in a manner to allow the moist sediment to further drain and dry. Any runoff water from the drying sediment would be collected into a sediment trap, and then after clarification will be either returned to the lake or released downstream depending upon the location of the sediment placement area. (For more detail on sediment dewatering options, see Section 3.7) After the sediment dries sufficiently, the placement site would be final graded and seeded with an approved seed mix. The sponsor, at his discretion, could reuse the dried material as fill for projects within the park. The Commonwealth of Pennsylvania may require that each truck move through an automatic undercarriage wash as it leaves the site to minimize the tracking of mud on local roads. Prior to the initiation of any construction, the District will complete an erosion and sediment control plan and coordinate with the appropriate officials within the Commonwealth to obtain all necessary permits. The development of such a plan and the obtaining of permits are common to all construction alternatives.

3.4.6 Alternative 5 - Mechanical Removal of Sediments – No Lake Draining

Alternative 5 would utilize land-based equipment to remove accumulated sediments but from floating platforms or shallow draft barges and would eliminate the need to drain the lake. Excavators with long articulated arms would be employed with wide buckets to scrape the sediment from the lake bottom. The wet sediment removed from the bottom would then be loaded into shallow draft barges. After filling, the barges would be towed to shore and the sediment unloaded into trucks by a small front-end loader for upland sediment placement. Under this alternative, trucks would have to be outfitted with special tailgate seals to keep the extremely wet sediment from draining onto local roadways during transport. After placement, the material and placement site would be treated as in Alternative 4.

3.4.7 Alternative 6 - Hydraulic Dredging

This alternative would employ floating hydraulic dredging equipment to remove the accumulated sediment within the lake. The equipment would most likely consist of a floating hydraulic dredge that utilizes a soil cutter placed at the head of a long boom that can be maneuvered to cut through sediment to a desired depth. One type of cutter head loosely resembles a horizontal drum with teeth mounted on its surface. As the revolving cutter head loosens and removes bottom sediment it is vacuumed away as a water/sediment slurry mixture and pumped through a pipeline to a dewatering area. The efficiency of the hydraulic dredge depends upon a number of factors, which include the type and power of the equipment and the physical properties of material being removed. Normally hydraulic cutter head dredges remove a water/sediment slurry mixture containing approximately 80 to 90 percent water and 10 to 20 percent solids.

Because of the high volume of water utilized in this method, the sediment placement area would require special treatment. This is described in Section 3.7

3.4.8 Alternative 7 – Partial Lake Draining and Hydraulic Dredging

Alternative 7 is a combination of Alternatives 4 and 6, noted above. Under Alternative 7 the lake would be partially drained allowing land based equipment to access and remove sediment from the more shallow portions of the lake. Near the dam, where the lake is deeper, a floating dredge will be employed to hydraulically remove the sediment as in Alternative 6.

3.5 Sediment Placement, Staging and Access Sites

All sediment removal alternatives have the same problem in common, i.e., where to put the material after it is removed from the lake. Studies were conducted during the feasibility study to find and examine potential sediment placement areas that would minimize adverse effects to the park and its environment. To keep sediment transport and real estate costs down, County officials initially felt that dredged material placement sites should be identified solely within the park. Consequently, a number of sites in the park were examined, and four were selected by the Corps and Local Sponsor that initially appeared acceptable, namely the County, Bull Pen, Deer Pen, and Latodami sites. (These were previously described in Section 2.2.4)

Because of opposition voiced by a group of concerned citizens regarding the use of the Latodami site, (an abandoned agricultural field) the Corps expanded their search for potential placement areas up to a five-mile radius outside the park. It was determined that a haul distance greater than five miles would increase sediment transport costs to a level that would make the project economically infeasible. Within this radius, all potential sediment placement areas were field checked including a large reclaimed coal waste pile that was initially brought to the Corps' attention during an evening public meeting held at the Park in February 2003. This site, referred to as the Wildwood site, is located on private property near the southeastern border of the Park near South Ridge Road adjacent to the Round Top picnic Grove. All of the above sites are identified on PLATES 4a and 4b.

In addition to the sediment placement sites, the County and Corps identified three contractor staging areas early in the study that would be used to access the lake and to lay down equipment and supplies during construction. These sites are the Mars, Babble Brook, and Gold Star day use areas. Photographs of all the sediment placement, access and staging areas are contained in APPENDIX 3.

During the alternative formulation process, three additional access areas were proposed to allow the construction contractor more efficient, access to the lake. These additional areas are called the Point Access, Pearce Mill Road Access, and the Rose Barn Access. The Point Access is located off of Lakeshore Drive near the "Point" picnic grove. The Pearce Mill Road Access is located on Pearce Mill Road just upstream of the Irwin Run tributary that enters the lake's left descending bank near the spillway. The Rose barn Access is located further up Pearce Mill Road near the present handicapped fishing

access and parking lot. Photos of these access sites are provided in APPENDIX 3 and are also shown on PLATES 4a and 4b

The brief site descriptions provided below supplement the habitat descriptions contained in Section 2.2.4.

3.5.1 County Site

This 13.1acre site located directly across Babcock Boulevard, is a former sediment placement site that can accommodate approximately 38,000 cubic yards of fill. Only about 3.6- acres of the site can be used for permanent fill. Sediment removed from the lake would be placed within the parcel up to the level of an existing manhole above a municipal sewer line that runs within a swale.

3.5.2 Bull Pen Site

The 8.13 acre Bull Pen site located on a knoll between the two arms of the lake can hold approximately 115,000 yards of material. As previously mentioned, part of the site has been paved with asphalt and is currently used to store leaves collected from surrounding communities.

3.5.3 Deer Pen Site

The third site, called the "Deer Pen" as noted on PLATE 4a is an approximate 6-acre site located along the upper end of the right descending bank of the North Fork Pine Creek arm of the lake. This site can be modified to hold approximately 50,000 cubic yards of fill.

3.5.4 Latodami Site

This 32.24-acre site located in the extreme northern edge of the park is the largest sediment placement site located within North Park. Studies have determined that it could accommodate 350,000 cubic yards of sediment.

3.5.5 Wildwood Road Site

This site is located about 1.5 miles downstream of Pine Creek Dam just off of Wildwood Road. Part of the site abuts North Park at the Round Top picnic grove at the parks southern boundary across (south of) Wildwood Road. The Wildwood site is an approximate 57-acre reclaimed coal waste (gob) pile that could hold most of the sediment to be removed from the lake.

3.5.6 Sediment Placement Area Access

To reach any of the of the sediment placement sites, local park roads will have to be traversed by truck or at least crossed by a pipeline, depending upon the type of sediment removal equipment that will be used. To access the "Latodami" sediment placement site, trucks will travel along either Lake Shore Drive or Pierce Mill Road and will turn left (coming from the south) onto Brown Road. From Brown Road, trucks will have to negotiate a sharp right turn onto Reynolds Road (See PLATES 4a and 4c), which runs adjacent to the western edge of the sediment placement area. The turnoff from Brown Road to Reynolds Road is currently at an extremely sharp angle and would have to be modified to allow safe access. An alternative route would be to drive along Pierce Mill Road through the park to Route 910. The trucks would travel west on Route 910 for less than a mile and turn left onto Reynolds Road to access the Latodami sediment placement site.

Access to the Bull Pen site will be along Lakeshore Drive to Walter Drive up to St Paul's Church. The access road to the site is opposite the church. The Bull Pen could also be accessed from a logging road that leads from the "Point" access area. The Deer Pen site is at the intersection of Lakeshore Drive and Walter Road at the upper end of the North Fork Pine Creek arm of the lake. The County site is easily accessed from Babcock Boulevard.

To access the Wildwood Road site, trucks could use two routes. The first would have trucks traveling on local park roads to the intersection of Babcock and Ingomar/Wildwood Roads, and then turn left onto Wildwood Road for approximately 1.5 miles and turnoff into a private entrance to a large local flea market that is held on weekends. The trucks would have to wind through a narrow paved road to a parking lot and then across a bridge over Pine Creek to access the sediment placement area. Because the sediment placement area and the roads leading to it are privately owned, the Local Sponsor would have to acquire an easement from the property owner to enter the site and use it for sediment placement.

The second route to the Wildwood site would have trucks cross over Ingomar Road and travel south on Babcock Boulevard for a short distance and make a left onto Hemlock Drive that leads into the southern portion of North Park near the swimming pool. Trucks would then turn onto South Ridge Road to the Round Top picnic grove, which is situated directly adjacent to the northernmost section of the Wildwood Road sediment placement site. This route would avoid placing heavy trucks on Wildwood Road and the road leading to the flea market. See PLATE 4b.

3.5.7 Staging and Access Areas

The Babble Brook day-use area is located adjacent to the intersection of Ingomar Road and Babcock Boulevard just upstream of Pine Creek Dam on its right descending bank. Use of this area for staging will require the removal of a portion of the guardrail along Ingomar Road and flagmen to regulate traffic to prevent accidents with construction

vehicles. A temporary access ramp will have to be constructed from Ingomar Road to the lake.

The half-acre Gold Star day-use area located on the left descending bank of the Pine Creek arm of the lake near its upstream end provides easy access to the lake. An existing spur from Lakeshore drive provides access to an asphalt-paved parking area that would provide an ideal location for equipment storage. To access the lake will require the construction of a permanent roadway from the Lake Shore Drive to the lake. (Permanent access is needed to access and maintain wetland protection dike – See Section 6.1 6.3.) Several of the large maturing confers that occupy the area between the parking lot and lake will have to be removed so that heavy equipment can access the lake. Access to and from this staging area onto Lakeshore Drive will require flagmen or some type of automated traffic control to ensure public safety.

The 2-acre Mars staging and access site, is located on the right descending bank of the North Fork of Pine Creek immediately adjacent to the uppermost reach of the Lake. See PLATE 4a. Similar to the other sites, flagmen will be needed to direct traffic and maintain public safety for park as trucks move into and out of the site during construction.

3.5.8 Additional Areas for Lake Access

During the formulation of alternatives, it was decided that additional lake access was needed to allow construction equipment to more efficiently move from the lake to local roads and sediment placement areas. To this end, three additional access areas were selected and are described below:

A fourth access area is the Pearce Mill Road site. This 0.16-acre located just upstream of the Dam on the left descending bank will permit trucks to enter the lake area from near the intersection of Babcock Boulevard with Pearce Mill Road. (See PLATE 4a for site location.) Traveling north, trucks will turn left onto Pearce Mill Road, cross the bridge over Irwin Run and then turn left onto the new access leading to the lake. This access road will be temporary and will be removed after the project is completed.

The fifth access site is the Rose Barn access, located near the handicapped-fishing pier just downstream from the boathouse. It will also be reached from Pearce Mill Road. This 0.2-acres site would be used by trucks for access to the upper reaches of the North Fork arm of the lake.

The sixth access area is called the Point. It is located adjacent to Lakeshore Drive on the right descending bank of the North Fork of Pine Creek just upstream from where Pine Creek and the North Fork of Pine Creek merge within the lake. SEE PLATE 4a. and APPENDIX 3. The primary use of this 0.2-acre site will be to access the Bull Pen sediment placement area, which is located on top of the hill above it. Access to the Bull Pen would be from a logging road that leads from the Point access site up the hill. This logging road would have to be improved to permit heavy trucks to travel on it.

PLATES 4a and 4b show the general location of all of the access sites, staging areas and dredged material placement sites.

3.6 Real Estate Requirements for Alternatives

Prior to any construction activity proceeding, the District will have to obtain easements to work within the lake itself and to access and use the various staging and sediment placement areas. To complete the project, both temporary road easements and temporary work easements will be obtained from property owners. The Local Sponsor already owns or will own most of the land needed for the project, which will make obtaining any necessary easements relative simple. However, temporary easements totaling 7.98 acres will also be required from several private property owners to allow access to the Wildwood sediment placement area. The list below shows the real estate requirements to access and use the identified alternative staging and sediment placement areas and temporary road easements.

Area	Acreage
Lake Dredging	61.29 acres
County Sediment Placement Area (total)	13.10 acres
County Sediment Placement Area - Permanent Fill	3.6 acres
County Sediment Placement Area -Permanent Fill on Sewer Line	0.55 acres
Bull Pen Sediment Placement Area Permanent Fill	8.13 acres
Bull Pen Temporary Road Access from Walter Road	3.23 acres
Bull Pen Temporary Road Access from the " Point"	2.14 acres
Latodami Sediment Placement Area - Permanent Fill	32.24 acres
Wildwood Sediment Placement Area - Permanent Fill	57.13 acres
Wildwood Temporary Road Access	7.98 acres
Goldstar Lake Access and Staging Area	0.45 acres
Mars Lake Access and Staging Area	1.99 acres
Rose Barn Temporary Road Access	0.19 acres
Pearce Mill Road Temporary Road Access	0.11 acres
Wetland Protection Barrier	2.08 acres

See APPENDIX 6, Real Estate Plan, for more detail

3.7 Dewatering Mechanically Removed Sediments

The material removed from the lake by land based equipment will be wet and will, therefore, require time to drain and dry sufficiently to permit it to be properly graded and seeded. The sediment placement areas in the park will be constructed to allow water from the wet sediment to drain through some type of filter material, such as fabric silt barrier fencing. This clarified water will then be allowed to passively drain into either Pine Creek, the North Fork of Pine Creek or into their small-unnamed tributaries so that

the drain water eventually returns to the lake. Water from sediment disposed at the County site will be allowed to filter into Pine Creek downstream of the Lake through existing under-drains. These under-drains were constructed when the site was formerly used to dewater sediment removed from the lake.

If the Wildwood site is used for sediment placement, similar State-approved erosion and sediment controls developed for the "in-park" sites will be constructed to filter runoff before it flows into Pine Creek below North Park Lake.

3.7.1 Dewatering Hydraulically Dredged Sediments - Option 1 Sedimentation Basins

To dewater dredged sediments that are hydraulically removed from the lake will require more extensive sediment placement site preparation than for sediments that are mechanically removed. Hydraulically dredged sediment will be removed from the lake as a thin water/sediment slurry that will consist of approximately 80%/90% water and 10%/20% solids. The high percentage of water is necessary to effectively pump the sediment to a sediment placement area. The water acts as a transport agent that moves the sediment held in suspension through a ten or twelve inch diameter pipeline.

To dewater sediment pumped from a hydraulic dredge would require the construction of large settling basins surrounded by dikes to confine the slurry as shown on FIGURES 2 and 3 below. As material is pumped into the containment areas, coarser materials fall out of suspension quickly. The fine-grained materials (silt and clay) continue to flow through the containment area where they would settle out of suspension at a slower rate.

As water clarifies it would be discharged from the containment area over an adjustable weir. The weir would function to regulate the release of clarified ponded water from the containment areas. The weirs would be designed to provide selective withdrawal of the clarified upper water layers containing low levels of suspended solids. This discharge would then be returned to North Park Lake by either gravity or by pump. Because of the huge volume of water that will require removal during dredging operations, return waters from the sediment placement areas would be necessary to replenish the lake to prevent it from becoming too shallow to support the floating dredging equipment.

When dredged material slurry is disposed in a well-designed, well managed containment area, the vast majority of the solids will settle out of suspension and be retained within the settling basin. However, gravity alone will not remove 100 percent of the suspended solids. Some very fine-grained material suspended in the ponded water above the settled solids will be discharged in the effluent water. Different methods can be employed to enhance the retention of suspended solids within a basin. These include intermittent pumping, temporarily discontinuing operations or coagulation and flocculation.

Coagulation/flocculation is a process where chemicals are added to the water, first to neutralize the charge on the particles and then to aid in making the fine-grained suspended solids collide and adsorb by attractive electrostatic charge so they coalese,

form large particles called flocs and settle to the lake bottom. The charge neutralization is termed coagulation and the building of large flocs from the small particles is called flocculation.

The removal of excess water in a sediment placement area through active management is an important consideration during the life of the dredging project. Although a significant amount of water will run off through the overflow weir of the containment area, the confined fine-grained sediments may (depending upon their physical properties) only consolidate to a semifluid consistency within the containment areas that would still contain large amounts of water. This excess water would prohibit this material from being used as fill. To eliminate this excess water, and make any remaining material more stable, several actions can be employed that are listed below:

a. Allowing the fine material to dry to a crust while gradually lowering the internal water table within the confinement area.

b. Promoting good surface drainage to rapidly remove precipitation and prevent ponding of surface waters.

c. Trenching the fine material within the containment area to promote good drainage.

FIGURE 2
Plan View of Typical Diked Dredged Material Sediment placement Area

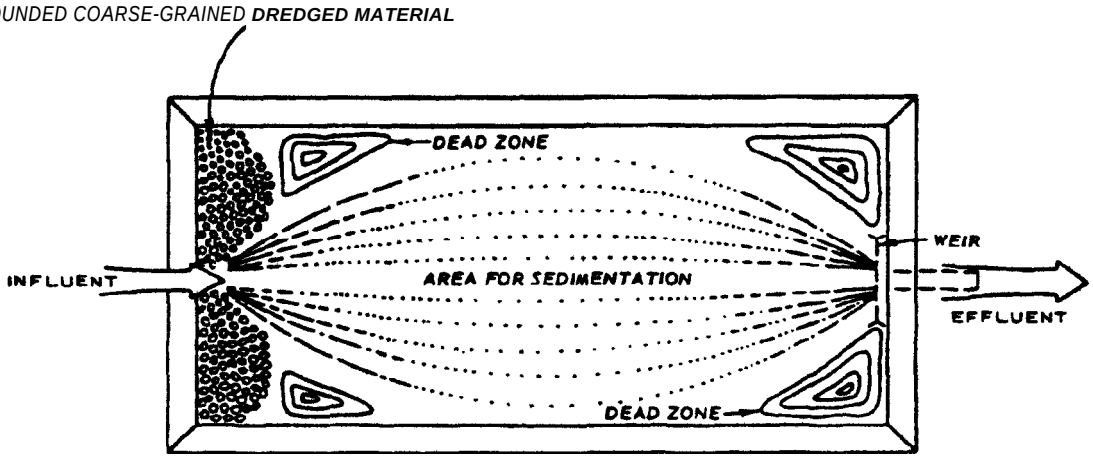
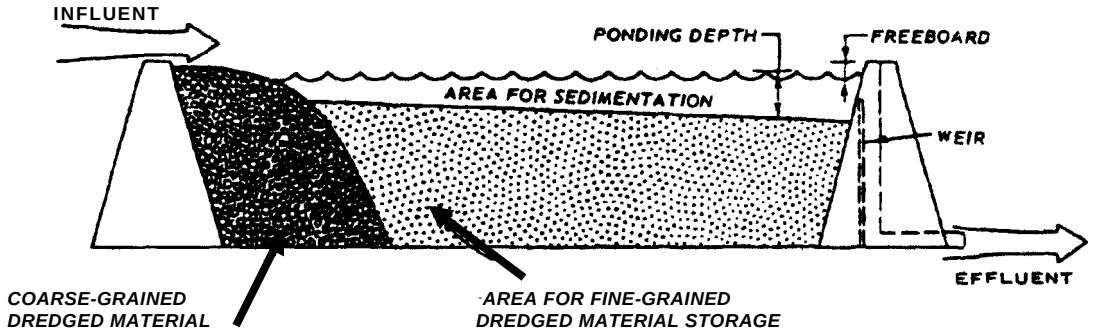


FIGURE 3
Typical Cross Section of Diked Dredged Material Sediment placement Area



To convey the slurry to the sediment placement areas will require that continuous piping be laid from the operating dredge to each site. The piping would be placed in a manner to cause as little disruption to traffic and pedestrians as possible. Booster pumps will be required to pump the slurry to the upper Latodomi or Wildwood sites shown on Plates 4a and 4b. These pumps would operate in conjunction with the pumps located on board the dredging equipment.

3.7.2 Dewatering Option 2 – Geotubes

Using geotubes is another dewatering option that is being considered for the North Park Lake project. Geotubes are large bags constructed of geotextile fabric and are filled with the water/sediment mixture pumped from a hydraulic dredge. Geotubes can be over two hundred feet long and over 12 feet wide by 6 feet high. A picture of a geotube being filled with dredged sediment is shown in APPENDIX 3. Geotubes can easily be custom manufactured to meet site requirements. Geotube fabrics are selected based upon the type and particle size of material needing to be dewatered. The proper selection of fabric allows the geotubes to act as effective filters to contain the solid dredged materials and permit excess water to drain away.

Because of their effectiveness, geotubes minimize the amount of land needed for dewatering, and could, therefore, be located near the lake to take advantage of the sloping topography at the shoreline that would allow clarified effluent to effectively drain back into North Park Lake. Sedimentation basins require large areas and time to dewater. Complete dewatering within sedimentation basins could take over a year or more before the material is sufficiently dried to support land-based equipment for regrading and seeding. Conversely, geotubes provide a timely method to dewater sediment that does not require the construction of sedimentation basins as described in the above section. Geotubes dewater in several days or weeks depending upon the sediment characteristics. Gravels and sands will dewater within hours; silts, clays and organic materials will take longer due to the much smaller particle sizes. After dewatering, the tubes would be cut

open and the sediment would then be removed by front-end loader, placed into trucks and hauled to a sediment placement area where it would be graded and seeded. The sediment may require some working and spreading to encourage additional drying depending upon its moisture content after geotube-dewatering.

3.7.2.1 Hanging Bag Test

To determine if geotubes could be used at North Park Lake, a hanging bag test was conducted in the spring of 2003. This test was designed to simulate filtering and drying of the slurry concentration within a geotube that would be filled from a hydraulic dredge operating in North Park Lake. To conduct the test, water and sediment samples were removed from the lake and taken to a laboratory. Under controlled conditions, the water and sediment samples taken from the lake were mixed together to the concentration of soil solids that would result from hydraulic dredging. The water and sediment were mixed with an industrial mixer in a 55 gallon drum into which a non-toxic polymer was added to help suspended material settle out and allow water to flow through the geotube bag with minimal solids. The same polymer would be added to the geotubes at North Park Lake should this alternative be selected as the recommended plan.

After repeatedly analyzing samples of the slurry contained in the 55-gallon drum to ensure that the solids concentrations were correct, a miniature geotube, hung in a supporting frame beneath the 55-gallon drum, was filled with the slurry by gravity flow. The geotube was constructed of the similar fabric that would be used for the full-scale project. The water seeping from the pores of the geotube was collected in a plastic basin placed beneath it. Samples of the drain water were analyzed for total solids content at predetermined time intervals. The bag was allowed to drain into the container for 35 days.

After 35 days the bag was cut open and the moisture content of the solid material was measured. The test revealed that the material on the outside of the bag was considerably drier than the material in the center. When mixed together, the moisture content was approximately 12.6 percent, which is about 6 percent drier than optimal. The test concluded that the use of geotubes was feasible. See APPENDIX 5 for more detail.

3.7.3 Alternative (Beneficial) Sediment Placement Methods/Locations

Late in the feasibility study, discussions with the local sponsors and interested citizens revealed two additional sediment placement options: 1) providing all of the sediment or a portion of it to the Horticultural Society of Western Pennsylvania for their use at a proposed comprehensive botanical garden, and 2) the direct injection of the sediment into inactive/abandoned deep mines.

3.7.3.1 Botanical Garden Placement Site

The botanical garden, now in the planning stages, will be located on a 452-acre tract of land in western Allegheny County near Oakdale at Settlers Cabin Park. The proposed garden will be the region's first comprehensive botanic garden that will display trees, shrubs and flowers in a landscaped setting. Representatives from the Horticultural Society indicated to the Corps that the sediment, after amendment could be used to help fill portions of their site. Since the sediment is primarily inorganic silt, it would have to be amended by the addition of organic material and other soil enhancing elements, such as lime to increase its suitability for landscaping. The costs to amend the soil would be borne by the Society. The shortest haul distance from the lake to the botanical garden is approximately 30 miles. The cost to haul this material over and above what it would cost to haul it to one of the Corps selected sites would be $16 per cubic yard for a total cost of about $1,600,000. Due to the haul distance and limited number of trucks that could be diverted to their site, approximately 360 to 400 cubic yards could be delivered per day. At this pace, it would take approximately one year to deliver the 100,000 cubic yards requested.

The society would incur the total 1.6 million dollar cost over and above that, which will be incurred to take the material to the preferred placement site. Prior to any fill placement, the Society would have to conduct the investigations necessary to meet the requirements of NEPA, Section 106 of the NHPA, Section 7 of the Endangered Species Act and HTRW requirements.

3.7.3.2 Mine Injection

The District coordinated with personnel in the Pennsylvania Department of Environmental Protection, Bureau of Abandoned Mine Reclamation to discuss the feasibility of injecting the sediment from the lake directly into an existing abandoned coal mine located in the immediate vicinity of North Park Lake. On the surface this alternative appeared to be a simple and logical solution to the problem of disposing a large volume of sediment. However, after a number of discussions with personnel from the Commonwealth's Bureau of Abandoned Mine Reclamation, serious and insurmountable problems were identified which made this alternative both environmentally and economically infeasible.

The mine that would receive the sediment is the abandoned Wildwood Mine located in the vicinity of North Park. Mine maps obtained indicated that the most of the mine lies east of the park and varies from 225 to 445 feet beneath the surface (The mine bottom elevation varies from elevation 750 to 780 NGVD).

Injection of backfill into underground mines may be accomplished using hand, gravity, mechanical, pneumatic, and hydraulic placement methods. The most popular methods are pneumatic and hydraulic. Hand, gravity and mechanical methods, such as belt or sling packing machines, are restricted to construction of selected supports from within a mine. In pneumatic backfilling operations, backfill material is transported into a mine

through a well or pipeline in a stream of continually flowing air, either in a vacuum or under pressure. Hydraulic backfilling is the practice of filling mine voids with backfill material by washing or pumping the backfill material as a slurry through a well or pipeline into the mine.

These various placement methods for depositing the dredged sediments into the abandoned mine have their unique problems. The most logical method, hydraulic backfilling would be conducted in conjunction with hydraulic dredging of the lake. This method would also appear to be the most economical because the sediment slurry would be handled only once. The material would be pumped from the dredger directly to the injection site and into the mine. However this would require extremely large volumes of water, which, as for hydraulic dredging, would eventually make the lake too shallow for floating equipment unless the water removed during dredging is replaced to replenish the lake.

The fact that highly alkaline and metal laden effluent from the Wildwood mine is currently being treated by an active facility located on Pine Creek just downstream of the Wildwood Road sediment placement site proves that at least part of the mine is already flooded. More importantly, hydraulic backfilling the sediment slurry into the mine would increase the flow into the existing treatment facility and overwhelm its capacity. More importantly the increased head created by the placement of additional water in the mine could very well cause mine drainage to blowout in unexpected places. Because of the potential impacts to the existing treatment facility and the high risks and liability associated with of causing mine blowouts elsewhere, hydraulic backfilling was abandoned.

Other methods of mine injection considered included gravity, mechanical and pneumatic filling techniques. To utilize any of these methods would require extensive exploratory drilling to determine and verify where the mine voids exist and to what extent the mine is flooded. The cost for one exploratory borehole is estimated to be approximately $20,000. A complete subsurface geotechnical investigation may require a hundred or more borings, escalating this cost to well over $2,000,000. If after conducting these exploratory borings it was determined that there were areas within the mine large enough to contain the sediment, other problems would have to be overcome. One borehole location cannot be used to inject 400,000 cubic yards of sediment into the mine using the above systems. Due to the height of the coal seams in this area, (average height is about 6 feet) the sediment, injected by these methods will form cones as it fills the voids and will not spread out evenly. Literally hundreds of injection points would be required to complete the job. Costs to acquire additional real estate to gain access to the injection sites would be required. Other factors, such as compliance with NEPA and Section 106 of the National Historic Preservation Act and additional HTRW investigations would have to be conducted at each exploratory and injection-drilling site driving up the cost even further.

The economic and environmental liabilities described above make injecting the lake sediment into the abandoned Wildwood Mine completely infeasible.

3.8 Plan Modifications Resulting From the Formulation Process:

3.8.1 Sediment Placement Areas

Under Corps regulations, the Local Sponsor must provide all lands, easements, rights of way, relocations and sediment placement areas for a given cost shared project. Because of the large volume of sediment to be removed, District and local sponsor personnel made numerous field trips to identify alternative sediment placement areas. During an evening public information meeting held at North Park in February 2003, sediment placement was also the primary concern of local citizens.

Up until the time of the public meeting, the Local Sponsor and District focused on identifying potential sediment placement sites within the park to minimize sediment placement costs. As previously mentioned, four sites were identified within North Park, Latodami, Deer Pen, Bull Pen and County sites. The Latodami site was the largest, was the farthest away from day use recreational areas, and, based upon preliminary examinations by Corps biologists, did not possess high wildlife habitat value. Hence, early in the study this site became the recommended sediment placement area.

During the February 2003 public meeting, a number of concerned citizens vehemently objected to the use of the Latodami field and indicated that a nearby reclaimed gob pile (the Wildwood Site) located just south of North Park should be considered as a potential sediment placement site. Because of the voiced objections, the Corps examined a five-mile radius outside the Park to find alternative sediment placement sites. These studies revealed that the former Wildwood gob pile was the only off-Park site available for sediment placement close enough to North Park to be economically feasible.

Subsequent field trips to the Wildwood Site by the Corps personnel, the local sponsor, concerned citizens, and state personnel were conducted. The Wildwood site was determined to be large enough to contain most of the sediment to be removed, and access was favorable; however, it was privately owned. During the formulation process, the County approached the owner of the Wildwood site to determine if it could be used for sediment placement. After negotiations, the property owner indicated a willingness to discuss the sale of that portion of it required for sediment placement.

Preliminary cultural resource investigations conducted by Pittsburgh District staff revealed that both the Latodami and Deer Pen sediment placement areas contain previously recorded archaeological sites. To use these sites for sediment placement would, therefore, require the conduct of potentially expensive cultural resource investigations to meet the requirements of Section 106 of the National Historic Preservation Act.

Later in the study, the District revised its list of alternative sediment placement sites because of the problems associated with the pubic perception of using Latodami field; the presence of cultural resources at both the Latodami field and the Deer Pen site; the

relative small size of the Deer Pen site; and the availability of the Wildwood site. Due to the above, the Deer Pen site was dropped from further consideration and the Wildwood site became the primary site to receive the majority of the sediment.

3.8.2 Staging Areas

The Babble Brook staging area is located at the busy intersection of Babcock Boulevard and Ingomar Road. Due to both pedestrian and vehicular congestion at this intersection, ingress and egress by heavy construction vehicles would be both difficult and potentially dangerous. Consequently, this site was also eliminated from further consideration.

The Pearce Mill Road, Rose Barn and Point access areas, previously described in 3.5, were added later in the plan formulation process to facilitate access to the lake and help reduce truck traffic on park roads during the period of construction.

3.8.3 Sediment Transport - Wildwood Site

The access route to the Wildwood Site was initially proposed along Wildwood Road. To eliminate construction vehicles from tying up traffic on this busy, two lane highway, the District determined that the least disruptive route to the Wildwood site would be to cross over Wildwood road from the dam and travel the short distance south along Babcock Boulevard to Hemlock Road which leads to the entrance of the southern portion of North Park. From Hemlock Road, truck traffic would be routed along South Ridge Road past the swimming pool to the Round Top picnic area. South Ridge Road is currently one way. During construction, a portion of South Ridge Road would be closed to allow truck traffic to move in the opposite direction to more quickly access the Round Top picnic grove, which is directly adjacent to a portion of the Wildwood site. Trucks could then easily access the Wildwood site for sediment placement operations. This route was suggested by the Corps and accepted by the Local Sponsor.

3.8.4 Elimination of Partial Lake Draining Alternative

During the formulation process, it was determined that the lowest elevation of the lake bottom near the dam is 950 feet NGVD. For a dredge to operate optimally, a depth of about 4 to 5 feet would be needed. At a pool elevation of 955 feet NGVD at the dam, shallow water would remain over most of the current lake area designated for dredging. The amount of exposed lake bottom accessible for mechanical removal of sediment by land based equipment with a pool at elevation 955 feet NGVD would be so small as to make this alternative impracticable.

Another partial lake draining option would be to hydraulically dredge near the dam first to remove the deepest sediments. Afterwards, the lake would be partially drained and then the upper portion lake would be mechanically dredged after sufficient drying time. However, the concern in adopting this option is that the sediment at the upper end would likely move or slide back into the previously hydraulically dredged area by the dam. Another problem with this alternative is that costs would increase due to hydraulic

dredging (which is more expensive than mechanical dredging) and increased time needed to allow for sediments to dry after the initial hydraulic dredging. As a result, this alternative was eliminated and received no further consideration.

3.9 Wetland Habitat Creation

3.9.1 North Fork of Pine Creek

As mentioned in Section 2.2 there are disturbed wetlands located immediately adjacent to the left descending bank of the North Fork of Pine Creek in the northwestern portion of the park adjacent to Pearce Mill Road. Much of this wet area is mown. Because this low-lying area remains wet for a good portion of the year and retains water after storms, its usefulness for picnicking and other recreation is limited. To enhance the diversity and productivity of these areas, the District has recommended that the County stop all mowing along the North Fork of Pine Creek and let wetland vegetation re-establish. This action will have several benefits.

As wetland vegetation begins to reestablish it will provide excellent habitat for native songbirds and wildlife tolerant to nearby human activity. The wetland vegetation will help attenuate storm water runoff and reduce the sediment load entering the North Fork of Pine Creek. It will also help alleviate and arrest the ongoing stream bank erosion that is occurring in several places due principally to mowing to the top of bank.

North Park is a haven for Canada geese, which seek out mown lawn habitat near water for grazing. The reestablishment of wetland vegetation, which is not favored by the geese, will effectively reduce their numbers on the land bordering the stream. This will help reduce the nutrient load entering the North Fork from geese droppings, which is currently at extreme nuisance levels. Along this reach of the North Fork, it is virtually impossible to avoid stepping on goose droppings while walking the mown lawn area adjacent to the stream.

The January 2002, Allegheny County Parks Comprehensive Master Plan also recommends a change to the mowing patterns in this general area to control Canada Geese and limit sheet flow across the slope to minimize erosion.

3.9.2 North Park Lake

As described earlier in Section 2.2, high quality wetlands have developed in the upper portion of the Pine Creek arm of North Park Lake. Regardless of the sediment removal alternative selected, these wetlands will be protected during dredging operations. (See Section 6.1.6 for more detail). To increase wetland habitat and stabilize eroding shoreline from excess foot traffic and mowing, the District is proposing to install coir logs. Coir logs, constructed up to 12 inches in diameter, are manufactured out of specially treated coconut fibers that make them resistant to ultraviolet radiation. They are used as a bioengineering technique to control stream bank erosion. They can be planted

with wetland vegetation, which will root through the rolls and into the shoreline. As coir logs deteriorate over time, the wetland vegetation matures and fills in the space left by the slowly decomposing coir logs and, thus, continues to provide natural bank erosion protection.

The District is proposing to install coir logs along approximately 7,000 feet of shoreline at North Park to stabilize the lake banks that have been adversely impacted by years of intensive foot traffic. The coir logs will allow selected, low growing wetland vegetation to establish. This action will help generate an aesthetically pleasing shoreline with a thin, linear "belt" of attractive wetland vegetation that will help stabilize the lake banks and create habitat beneficial for amphibians, insects, small fish, and wading birds. The coir logs will also help reduce the sediment load of the lake by trapping sediment that enters the lake through overland sheet flow.

3.10 Fish Habitat

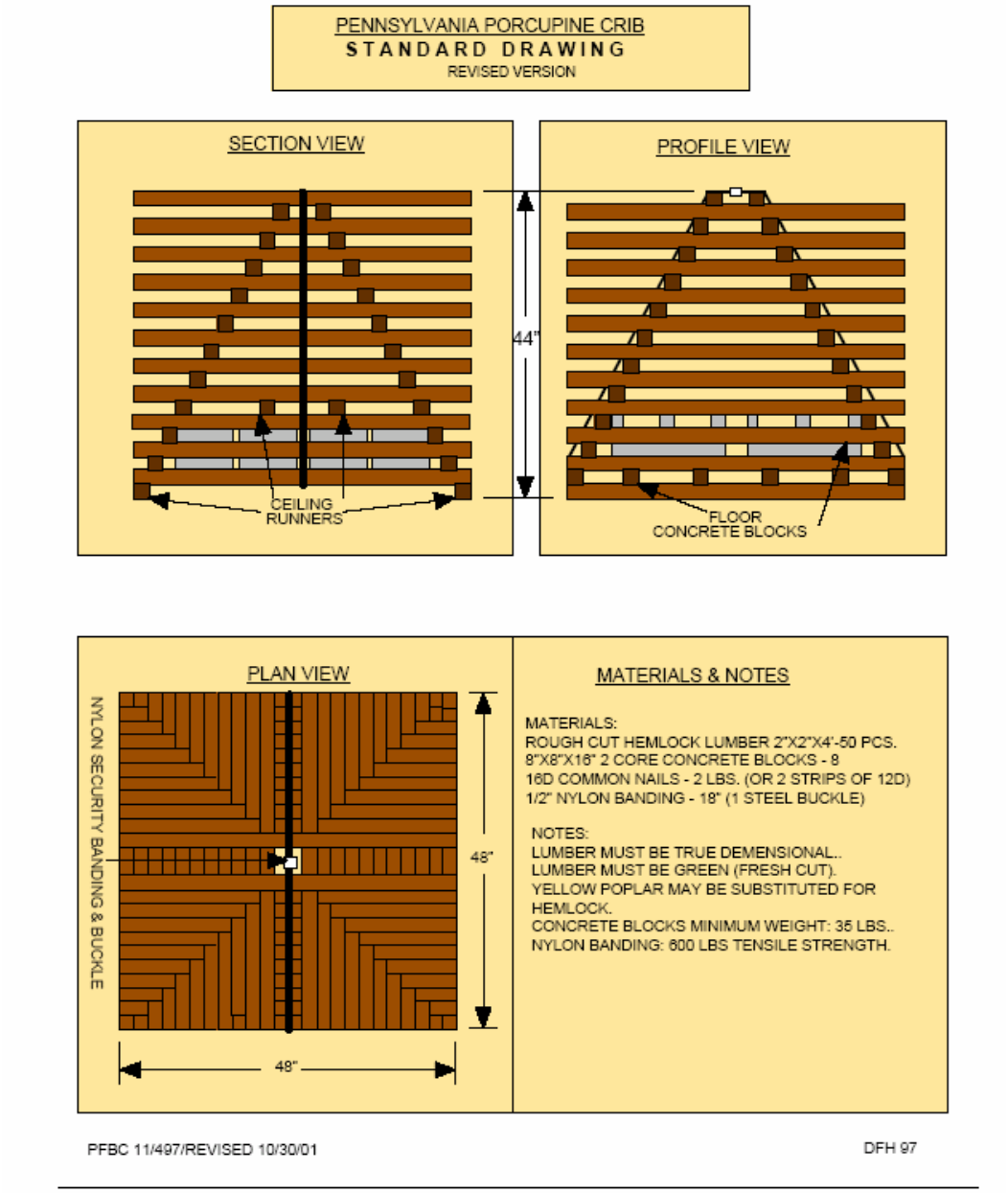
After the dredging project is completed there will initially be greater depth created within the lake that increases open water habitat but will be devoid of vegetation or bottom structure needed to provide cover. Aquatic plants and weeds will have been removed along with the excess bottom sediment. To initially provide structure for fish, the District proposes to install wooden "porcupine" cribs in the lake that will create "instant" cover.

Porcupine cribs are types of artificial fish habitat designed by Pennsylvania Fish & Boat Commission (PFBC) for use in lakes and reservoirs. The openings on a crib are only two inches high and provide baitfish and young gamefish protection from predators. These structures described below also make ideal spawning habitat for many species of fish.

3.10.1 Full Size Porcupine Cribs

Each full size crib is constructed of fifty 2"x2"x 4' hemlock sticks, and eight - 8" cement blocks. The cribs are built in two sections. When the lower section is completed, it is placed on special rollers on the deck of a work barge, and the blocks are placed inside. After the top section is nailed on, and a nylon strap fastened around the entire crib it is pushed overboard at the appropriate location. See FIGURE 4 below.

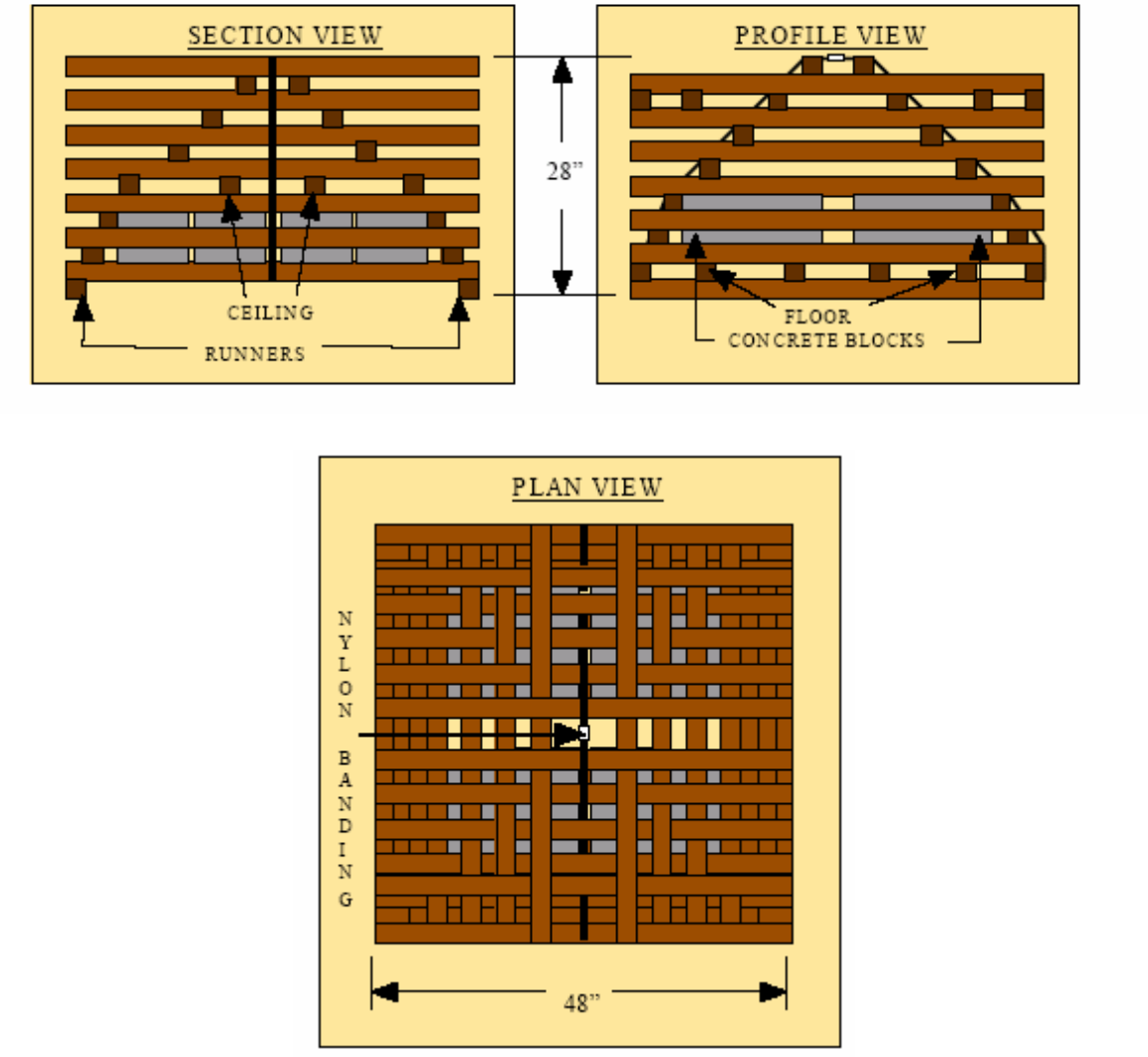
FIGURE 4
FULL SIZE PORCUPINE CRIBS



3.10.2 Porcupine Crib Juniors

These structures are very similar to standard "Porcupine" cribs. They are 28" high, compared to 44" for a standard crib, and use about 38 hemlock sticks instead of 52. They were adapted from the standard crib design by PA Fish and Boat Commission PFBC for use in shallow water. See Figure 5 below

FIGURE 5
PORCUPINE CRIB JUNIORS



3.10.3 Rock Rubble Piles and Sunken "Christmas" Trees

Two additional, inexpensive but effective methods to increase fish habitat are to place rock rubble humps or piles and weighted "Christmas" trees in the lake. Rock rubble piles will provide good habitat for benthic macroinvertebrates as well as breeding and brooding habitat for forage fish. After the Christmas season, discarded evergreen trees, typically spruce or white pine can be recycled. These make excellent cover for all species of fish. The trees are simply weighted with cement blocks and strategically sunk in the lake. Experience has shown that the trees typically last about 10 years submerged.

To enhance the habitat value of the lake's aquatic ecosystem, the District proposes to place these structures in strategic locations within the deeper areas of the lake and near the lakeshore. At these locations, the habitat structures will consist of a combination of rock rubble humps, porcupine cribs, or the recycling of used "Christmas trees". The rock rubble humps would consist of 1 to 2 tons of rock rubble placed in a pile in various locations at the 4 to 7-foot deep contours around the lake. In addition, rock used for construction activities, such as ramps and roads will be left in place below elevation 960 NGVD to further increase the amount of useful aquatic structure within the lake.

3.11 Treatment of Sediment Placement Areas

Regardless of the dredging method selected to remove sediment from the lake, after it is placed, it will need to be planted with vegetation to keep the it from eroding and to provide native cover and food sources for wildlife. To ensure that the restoration of dredge disposal sites will result in net gains in habitat for the 6 evaluation species used in the PAM-HEP assessment (SEE APPENDIX 9) post-construction reclamation plans will include the following 5 specifications:
(1) Preclude exotic plants from post-construction vegetation,
(2) Plant native herbaceous, shrub and tree species in carefully designed patterns,
(3) Provide for strip cutting of vegetation up to 3 times annually on sections of certain disposal sites,
(4) Stipulate the installation of bluebird boxes on certain disposal sites, and
(5) Return the topography on certain sites to a condition of "enhanced near-original contour". Final selection of specific species of vegetation to be planted and the patterns of placement will be developed in concert with the local sponsor during the next phase of study, Plans and Specifications. Precluding exotic plants from establishing and annual strip cutting would be a responsibility of the local sponsor as part of post construction operation and maintenance activities.

3.12 Additional Wildlife Habitat Features

In addition to the aquatic habitat and wetland features described above, Allegheny County Park personnel requested that two osprey nesting platforms be constructed at North Park - one in each arm of the Lake. The Pittsburgh District has previously constructed osprey nesting platforms at its reservoir projects, and Ospreys have successfully used them to fledge their young. A physical description of these platforms is described below:

Each nesting platform would be constructed of steel, circular in shape with a diameter of approximately 40 inches. It would be mounted atop a wooden telephone pole with four braces lag bolted into the top of the poles. The platform would be slightly offset to one side to facilitate climbing access to the side of the structure for checking the nest, banding young, etc. The platforms would be attached to the poles while they were still on the ground in a horizontal position. Each platform, thus attached would be installed as a unit

by a utility line vehicle that has an augur. For every 6 feet of pole, one foot will be placed below ground to provide stability. At North Park, two 45-foot poles would be used and sunk 7.5 feet into the lakebed. The platforms should last 15 years or longer without any maintenance. They should, however, be inspected annually to note any deterioration.

To make the nesting platforms more attractive to ospreys, about 12-18 sticks, 4 feet long by 1 inch in diameter will be wired into each platform after they are attached to the top of the utility poles. Due to the constant din of human disturbance at North Park from noise and nearby pedestrian and vehicular traffic, fishermen, dogs, etc, it may take years for ospreys to attempt a nest and successfully raise their young. However, since the cost of these structures is minimal, (about $2,500 each) the potential future use of a nesting platform at North Park by a pair of osprey would be well worth the investment.

3.13 Alternative Summary Table

The table below is a summary of the alternative dredging methodologies considered during the development of the Feasibility Report.

TABLE 4 - Comparison of Alternative Dredging Plans

Alternative	Sediment Removal Method	Dewatering Requirements
Alternative 4 - Mechanical Sediment Removal -Drain the Lake	Removal by land-based equipment traveling on the lakebed.	Sediment loaded into trucks and transported to the placement site. Excavated sediment spread directly on placement area.
Alternative 5 - Mechanical Sediment Removal – No Lake Draining	Removal by land-based equipment on floating barges.	Sediment loaded first into barges and from barges into trucks outfitted to prevent water leakage. Wet sediment placed into a dewatering area to further drain. Afterwards sediment is spread on final placement area
Alternative 6 - Hydraulic Dredging	Removal by floating hydraulic cutter head dredge	Pumping to an off site dewatering area. Dewatering will be accomplished in **geotubes.**** Dewatered sediment then removed from the dewatering area, loaded into trucks and spread on final placement area
Alternative 7* - Drain/Hydraulic Dredge Combination	Requires partial draining of lake. Land-based equipment to remove sediment in drained shallow portion of lakes. Floating hydraulic dredge to remove sediment in deeper portions of lakes.	Combination of both Alternatives 2 and 4 above.

*Alternative 7 was eliminated from further consideration due to potential instability of non-dredged material that may slip or flow into deeper previously dredged areas. ** Dewatering basins could not be used due to the lack of sufficient space (80 acres minimum) to construct them.

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4.0 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE PLANS

4.1 General Discussion

The following discussion examines as objectively as possible the potential impacts of each of the alternatives presented in Section 3.0 of this report. This section presents impacts of the alternatives on the present aquatic and riparian habitat within and around the lake, downstream along Pine Creek, the terrestrial habitat at all of the sediment placement sites and staging areas, and the effect that each alternative will have on recreation use of the park during and after construction. To make comparing the impacts of the alternative dredging plans easier for the reader, a table at the end of this section (TABLE 5) has been developed which summarizes each environmental parameter and the impacts (positive and negative) that each alternative is expected to produce.

4.2 Environmental Effects Common to All Alternatives

There are several ecosystem parameters that would not be impacted by any of the implemented alternatives. To avoid needless repetition in the discussion of the four alternatives as presented below in Sections 4.4 through 4.8, these parameters are discussed within this section as a group.

4.2.1 Threatened and Endangered Species

None of the alternatives considered in this report would cause any impacts to Federally listed, threatened or endangered species or their habitat or state listed species of concern. Letters from the U.S. Fish and Wildlife Service and the Pennsylvania Department of Conservation and Natural Resources, regarding Federally listed and State listed species, respectively, are contained in APPENDIX 1.

4.2.2 Prime Farmland

Although there are prime farmland soils located at the Bull Pen and Latodami sediment placement sites, these sites would not be used for future crop production and their modification by sediment placement would, therefore, not result in any significant adverse prime farmland soil impacts.

4.2.3 Hazardous, Toxic, Radiological Waste

As discussed in Section 2.7 and APPENDIX 5, the sediment to be removed from the lake does not contain any hazardous materials and has been determined to meet state

requirements as clean fill. Therefore, its removal and/or placement would not generate hazardous, toxic, or radiological waste within the lake or downstream in Pine Creek or at any of the proposed dewatering or sediment placement sites. Because the material is clean, drain-water runoff from the sediment at the placement sites would not contaminate surface streams or groundwater.

APPENDIX 5 also contains the findings of the environmental site assessment in regards to the sediment placement areas. The findings revealed that there were no major sources of potential contamination.

4.2.4.Environmental Justice

A proposal must have potential for disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, and Indian tribes in order to have Environmental Justice impacts. The project area is not used by any such groups of subsistence fishing or hunting, and the proposed project would not involve the release of hazardous, toxic, or radioactive materials to which minority or low-income populations could be exposed. In addition the project would not require the construction of any new water treatment facilities or the relocation of roads, utilities, businesses, or residences. Moreover, the minority and low income populations make up a very small percentage of the population that could be affected by the proposed project. Based upon the above, this project will not have any disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, or Indian tribes. The project would benefit low-income and minority residents the same as all other segments of the population by increasing the aquatic productivity and lifespan of the lake.

4.2.5 Population and Employment

Because of the nature of the proposed project, it would have no effects on the population of northern Allegheny County in regards to census figures, nor will it significantly impact employment. The project will not require the relocation of any residential, commercial or industrial structures or businesses. Employment opportunities may, in the short term, be provided during construction if the selected construction firm hires personnel to complete the North Park Lake project. The project, once completed, will not increase employment opportunities within the local area.

4.2.6 Cultural Resources

As discussed in Section 2.8 of this report, all of the placement and staging areas except the Deer Pen and Latodami sites were considered to have been surveyed in 1979 and have no significant archaeological resources. However, five archaeological sites were recorded within the Deer Pen and Latodami sediment placement areas. To use these two areas for sediment placement would require the Corps to conduct expensive Phase I and II studies to relocate and analyze the archaeological sites identified in 1979. If any of the re-located cultural resource sites were found to be National Register eligible, the District would then have to conduct time consuming and expensive Phase III (data recovery)

investigations. If either the Deer Pen or Latodami site was used for sediment placement, cultural resource studies would be required regardless of the alternative selected as the recommended plan.

Late in this investigation, the Local Sponsor indicated a willingness to negotiate with the owner of the Wildwood site to acquire all or part of it for sediment placement and eventual park expansion. As a result, the Wildwood site became the favored area for sediment placement. Preliminary meetings between the owner of the Wildwood site and the Local Sponsor have been positive.

To reduce project costs, the District decided to take the following actions: 1. Eliminate the Deer Pen site due to its small size and limited capacity for fill and, 2. Delay the initiation of any cultural resource studies at Latodami field until such time that the Local Sponsor can assure the District that it can formally acquire the Wildwood site for sediment placement. If the Local Sponsor can successfully acquire the Wildwood site, the Latodami field will be eliminated from consideration.

Should the Wildwood site become unavailable, there would be no economically viable alternative sediment placement site to use other than Latodami field. Under these circumstances, rather than abandon the project, the District would then conduct all necessary cultural resource studies, including Phase III data recovery, if determined necessary, to meet the Corps' responsibilities under Section 106 of the National Historic Preservation Act and allow the use of this area for the project.

4.3 Impacts of the Formulated Alternatives

The primary goal of the project is to restore open water habitat within North Park Lake. To accomplish this goal, various alternatives were considered. Only the dredging options (alternatives 4, 5 and 6) and alternative 1 ("No Action") have been carried forward in the formulation process. Alternatives 2 and 3 that considered the construction of sedimentation basins were eliminated due to engineering impracticability. Also Alternative 7 , which considered a combination of dredging techniques was eliminated due to engineering infeasibility. The environmental consequences of implementing alternatives 1, 4, 5, and 6 are described in the following sections below:

4.4 Alternative 1 - No Action

4.4.1 Aquatic Habitat

4.4.1.1 North Park Lake

As previously mentioned in Sections 3.3 (Future Without Conditions) and 3.4.1 (Alternative 1 – No Action), No Action will result in the loss of the lake and most of the open water habitat except for a very small, shallow pool which will likely remain near the face of Pine Creek Dam caused by Pine Creek wending its way downstream and being

blocked by the dam. If this alternative is pursued the very popular put and take trout fishery will be permanently lost along with the warm water bass fishery.

4.4.1.2 Pine Creek Downstream of the Dam

Under the No Action alternative, Pine Creek downstream of North Park Lake will largely remain unaffected.

4.4.2 Wetlands

In the place of open water, wetland vegetation will flourish. Eventually all lentic habitat will grow so shallow that emergent wetlands will develop in the lake area. These wetlands will provide excellent habitat for a large variety of insects, birds, amphibians and other wildlife. Over time the emergent wetlands will be replaced by scrub/shrub bottomland hardwood wetlands through the process of uninhibited, natural vegetative succession.

4.4.3 Riparian/Terrestrial Habitat – Lake Area

Under No Action, riparian/terrestrial habitat will expand as wetlands in the lake gradually turn into scrub/shrub wetlands and then into bottomland hardwood

4.4.4 Terrestrial Habitat – Sediment Placement Areas

This alternative will not create a need for sediment placement areas.

4.4.5 Air Quality/Nuisance Odor Problems

Under No Action, these parameters will remain, as they currently exist.

4.4.6 Traffic/Public Safety

Traffic and public safety will be unaffected by No Action.

4.4.7 Noise

Noise levels will be unaffected.

4.4.8 Aesthetics

The aesthetic character of North Park around the lake would be dramatically and permanently altered with the loss of the lake. Open water will largely disappear and be replaced by wetland vegetation. Under this scenario, the park will lose its focal point for those who appreciate open water habitat.

4.4.9 Recreation

The park would permanently lose one of its primary recreational assets, which would significantly reduce recreational opportunities for the residents of Allegheny County. All lake-based recreation, such as boating and fishing would be permanently eliminated as the lake disappears. Those who enjoy lakeside picnic groves, and walkers/runners and others who value the scenic vista supplied by the lake would permanently lose this recreational resource.

4.4.10 Cultural Resources

Cultural resources would not be affected by this alternative

4.5 Alternative 4 - Mechanical Sediment Removal, Drain the Lake

4.5.1 Aquatic Habitat

4.5.1.1 North Park Lake

Draining the lake and removing accumulated bottom sediment would temporarily eliminate all lake aquatic habitat. All existing fish, aquatic macroinvertebrates and aquatic vegetation would be lost. To minimize fish losses, the District in cooperation with the PA Fish and Boat Commission, will take steps as the pool is lowered to net as many fish as possible to transfer them downstream into Pine Creek. These losses, however, are only temporary. Because of the excessive vegetation now growing in the lake, its removal will actually be beneficial. Vegetation will naturally repopulate after the lake is refilled, and wetland vegetation will be planted in coir logs in strategic locations around the shoreline. As stated in Section 2.2.3, the lake contains a stunted panfish population. After the lake refills, the PA Fish and Game Commission will be able to stock the lake with more desirable species to create a more balanced aquatic community. Macroinvertebrates will naturally repopulate from upstream sources. After the lake is refilled and after fish attracting structures are placed and vegetation planted, the lake's aquatic habitat will radically improve over present conditions. Except for the short-term loss of the lake, no permanent, significant adverse aquatic impacts are expected should this alternative be selected.

4.5.1.2 Pine Creek Downstream of the Dam

After the lake is drawn down, Pine Creek and the North Fork of Pine Creek will still wend their way along the lake bottom towards the lake's outlet valve located near the face of the dam. As lake bottom sediments are exposed and disturbed by construction, there is a likelihood of sediment entering the stream channel within the lakebed and exiting into Pine Creek downstream of the dam via the outlet valve. Excess sediment, if allowed to enter Pine Creek would adversely impact the stream, which is a valuable natural resource because of the fishery it supports. To minimize impacts to Pine Creek downstream of North Park Lake during construction, the District will construct a rock filter downstream of the dam to trap sediment. Normal average flows entering the

reservoir will be discharged through the gate. For higher than average flows, discharges will be made through the gate, and pumps will discharge flows over the spillway up to near bank-full capacity downstream. For even higher flows, such as during extreme flood events, water will be stored behind the dam and released through the gate in a controlled manner. During all of these events, the rock filter will help minimize downstream sedimentation. (See typical APPENDIX 5, (PLATE 5-2). The filter will be cleaned out and removed after construction is complete. During the preparation of Plans and Specifications, the District will conduct additional studies to more accurately define how excess flows will be handled during construction. The District will coordinate this information with the State to help ensure that discharges are controlled to minimize the chances for downstream flooding.

4.5.2 Wetlands

This alternative will create approximately 7,000 linear feet of additional wetland area around the perimeter of the lake through the selective placement of coir logs in various locations. See Section 3.9 for more detail. The diverse wetlands that have developed at the upper end of the lake's Pine Creek arm would be protected by the construction of a rock dike across the entire width of the lake. Section 6.1.6 explains why this dike is necessary and how it will benefit these existing wetlands.

A small poor quality wetland has developed within a swale located at the County sediment placement site. This wetland is detached and composed primarily of invasive exotic species. It's quality and habitat value is poor. The loss of this small wetland would not constitute a significant impact and would not require any form of mitigation.

4.5.3 Riparian/Terrestrial Habitat – Lake Area

Draining the lake and mechanically removing the sediment will require several staging and access areas to be established at the lake's edge. The staging areas identified (Goldstar and Mars Picnic areas as well as the Point, Rose Barn and Pearce Mill Road access sites) would be affected by construction activity. Several maturing red pine trees located at the Goldstar site may have to be removed to facilitate heavy equipment access to the lake. Mown lawn is present and predominates at all the sites except the Pearce Mill Road access site. This site supports brush and small trees. Temporary roadways designed to support heavy equipment would be constructed from the staging/access areas to the lake. The construction and use of the roadbeds will eliminate vegetation and compact the underlying soils. This temporary loss of terrestrial habitat is insignificant. After the work is completed, the roadbeds would be removed above elevation 960, and the areas would be re-graded and planted with a grass mixture. Below elevation 960, the roadbeds constructed of rock will be left to provide aquatic habitat. Another option would be to remove the rock and use it for the construction of rock piles (discussed in Section 3.10) to increase aquatic habitat within the lake area.

4.5.4 Terrestrial Habitat – Sediment Placement Areas

The primary sediment placement areas that are being considered include the Bull Pen Site, County Site and Wildwood Site. The Latodami site would only be used if the Local Sponsor cannot acquire the Wildwood Site. As described in Section 2.2 and APPENDICES 9 and 10, the terrestrial habitat at all of these sites has been disturbed and all support a high percentage of exotic (non-native) vegetation, which is believed to have significant negative effects on small mammal and breeding bird populations. The Bull Pen Site has been largely paved with asphalt, the County site is an un-reclaimed sediment placement area and the Wildwood site is a reclaimed gob pile. The Latodami site is a former agricultural field that also supports a high percentage of exotic (non-native) vegetation, which negatively impacts local wildlife. The exception to this is a 4-acre strip of land on a steep slope that lies between the reclaimed Wildwood gob pile and the Round Top picnic grove. This area contains maturing hardwoods with a low percentage of exotic species. Results of the PAMHEP study indicate that initially all of the sites will lose habitat value. This is to be expected since all vegetation will eventually be stripped from the placement areas through required site preparation activities. However, the PAMHEP study concluded that with some easily implemented site preparation and after project management practices, the habitat at all of the placement sites, except for the Deer Pen site would be expected to improve over existing conditions. Consequently, since the Deer Pen site has been dropped due to its smaller size and its potential for containing cultural resources, the use of any of the remaining sediment placement areas, including Latodami field would not cause any significant long term, adverse impacts. (See APPENDIX 9 for more details). *NOTE:* Negotiations between the County and the owner of the Wildwood sediment placement area are continuing. It is anticipated that the County will acquire sufficient acreage for sediment placement that will eliminate the need to clear the steep wooded hillside below the Round Top picnic grove. During construction, the wooded area would, therefore, be left intact except for minimal clearing needed to construct an access road.

4.5.5 Air Quality/Nuisance Odor Problems

Draining the lake will potentially cause some odor problems as enriched lake sediments begin to dry out. The odor problem will be most noticeable to those who are directly adjacent to the lake, i.e. walkers, bikers, and those who may still use picnic groves on the banks of the drained lake. To a lesser extent, odor problems may also occur near the sediment placement areas as sediments initially dry. To help reduce impacts, the initial lake drainage could be done during cooler weather when less recreation occurs.

Fugitive dust could become a problem during construction largely from truck tires picking up sediment from the lakebed and tracking mud onto the roadways used for sediment transport. As the mud dries on the pavement, cars and trucks and wind would tend to pick up the dried sediment and disperse it as dust. To minimize the tracking of mud on local roads, all sediment carrying trucks may be required to go through a wheel wash after each loading to remove accumulated mud. Some dust may be generated later in the project as lake sediments are excavated at lower levels in the lake. As the excavation gets deeper, the bottom soils layers will tend to dry faster than the upper

layers of loose, wet sediment. The amount of dust generated will depend upon climactic conditions, i.e. temperature and rainfall and wind speeds during the periods when this material is exposed. The window for this nuisance impact to occur will be relatively short and would be expected for a few months at the end of the project as the last amount of material is excavated from the lakebed prior to refilling.

4.5.6 Traffic/Public Safety

North Park is a very popular, highly used suburban recreational facility, which will unavoidably be affected by the trucking of sediment from the lake to the sediment placement areas. To move nearly 400,000 cubic yards of sediment from the lake will require about 50,000 truck trips (assuming each truck can carry 8 cubic yards of sediment). This translates to approximately 12 trucks per hour for 10 hours per day for 415 days. Because of these massive transport requirements, maintaining traffic/public safety on park and local roads is of supreme and overriding importance and concern both to the Corps of Engineer and the Local Sponsor.

During the construction phase of this project, a steady stream of trucks will be entering and exiting the lake area from the staging and access sites located around the lake's perimeter. Trucks will have to travel on park roads as well as local roads outside the park to reach the various sediment placement sites. It is estimated that a truck will enter or exit the lake every 5 minutes during a 10 to 12-hour workday. Because of the required heavy truck traffic, every practicable traffic control feature will be employed during construction to help ensure the safety of pedestrian and vehicular traffic. Some of the procedures that may be employed include the posting of flagmen with two way radios, putting up temporary traffic signals at key intersections, installing flashing warning lights at access areas, separating trucks from pedestrian and public vehicular traffic by using Jersey barriers, changing traffic patterns to reduce truck travel on park roads and even closing park roads or portions of park roads where necessary during construction. All of the plans for traffic control, to be developed during the next phase of the project (Plans and Specifications), will be closely coordinated with park officials, state, county and local police and PennDot to help maintain public safety during project construction. The public will also be notified of proposed traffic pattern changes through preliminary placement of signs and local media including newspapers and radio and television news broadcasts. Every effort will be made to alert park users, local residents and commuters of the traffic pattern changes well in advance of construction.

The following table shows in matrix format all of the truck routes to and from each staging and access area to each sediment placement site. The truck routes were selected to minimize traffic disruptions on Ingomar and Wildwood Roads, which form a heavily used east west corridor in the North Hills.

The following abbreviations are used in the table to reduce space:
LSD - Lake Shore Drive
PMR - Pearce Mill Road
ReyR – Reynolds Road

BrnR – Brown Road
BAB – Babcock Boulevard
HemDr – Hemlock Drive
SRR – South Ridge Road
WR – Walter Road
UAR – Unnamed Access Road

To locate the routes in relation to the sediment placement areas, access and staging areas please refer to PLATES 4a and 4b and 4c

TABLE 5
Truck Routes from Staging and Access Areas to Sediment Placement Sites

Staging and Access Areas	**Sediment Placement Areas**			
	County Site	**Bull Pen Site**	**Latodami Site**	**Wildwood Site**
Mars Staging and Access	1. LSD north to PMR 2. PMR south to BAB Reverse direction to return to lake	1. LSD north to WR 2. WR east to UAR Reverse direction to return to lake	1. LSD north to PMR 2. PMR north to to BrnR 3. BrnR north to ReyR Reverse direction to return to lake	1. LSD north to PMR 2. PMR south to BAB 3. BAB east to HemDr 4. HemDr east to SRR Reverse direction to return to lake
Goldstar Staging and Access	1. LSD north to PMR 2. PMR south to BAB Reverse direction to return to lake	1. LSD north to WR 2. WR east to UAR ***or*** 1. LSD west to WR 2. WR east to UAR Reverse direction to return to lake	1. LSD north to PMR 2. PMR north to BrnR 3. BrnR north to ReyR Reverse direction to return to lake	1. LSD north to PMR 2. PMR south to BAB 3. BAB east to HemDr 4. HemDr east to SRR Reverse direction to return to lake
Point Access	Not used to travel to the County Site	1. Across LSD up the slope using an improved logging road (one way) Return Trip: 1. UAR west to WR 2. WR north to LSD 3. LSD south to Point access	Not used to travel to the Latodami Site	Not used to travel to the Wildwood Site
Rose Barn Access	1.PMR south to BAB Reverse direction to return to lake	1. PMR north to WR 2. WR east to UAR Reverse direction to return to lake	1. PMR north to BrnR 2. BrnR north to ReyR Reverse direction to return to lake	1. PMR south to BAB 2. BAB south to HemDr 3. HemDr east to SRR Reverse direction to return to lake
Pearce Mill Road Access	1. PMR south to BAB Reverse direction to return to lake	Not used to Access the Bull Pen Site	1. PMR north to BrnR 2. BrnR north to ReyR Reverse direction to return to lake	1. PMR south to BAB 2. BAB east to HemDR 3. Hem east to SRR Reverse direction to return to lake

TABLE 5a
Truck Route Mileage from Staging and Access Areas to Sediment Placement Sites

Staging and Access Areas	**Sediment Placement Areas**			
	County Site	**Bull Pen Site**	**Latodami Site**	**Wildwood Site**
Mars Staging and Access	1.9	1.3	3.1	4.3
Goldstar Staging and Access	2.0	2.0	3.5	3.9
Point Access	Not used to travel to the County Site	0.5 Return Trip: 2.2	Not used to travel to the Latodami Site	Not used to travel to the Wildwood Site
Rose Barn Access	0.7	1.1	2.5	3.2
Pearce Mill Road Access	0.1	Not used to Access the Bull Pen Site	3.1	2.6

4.5.7 Noise

Trucks traveling on all of the roads identified above and especially along the heavily used Lake Shore Drive, Pearce Mill Road, and Babcock Boulevard around the lake, as well as on South Ridge Road in the southern section of the park, will generate noise during construction. The constant movement of trucks plus the noise generated by the excavators removing sediment from the lake will certainly detract from the recreational experience that the park currently provides. Elevated noise levels will be disturbing, however, they are, unavoidable and must be tolerated by the public during the period of construction. The noise from construction is only a temporary inconvenience and will cease entirely upon completion of the project. As the time for construction nears, the County's use of the media will help prepare the general public to accept the inevitable increase in local noise levels. Except for requiring that all engine exhaust mufflers are in good working order, nothing can practicably be done to reduce noise impacts at the park.

4.5.8 Aesthetics

Draining the lake will degrade the aesthetic character of parkland around the lake's perimeter. Looking at a large, mud-bottomed lakebed with trucks and excavators moving and working in it will be very interesting to watch but will be neither quiet nor aesthetically pleasing. However, once the lake is refilled the aesthetics will rapidly and dramatically improve. Over time as the planted wetland vegetation becomes established and matures, the aesthetic character of the lake area will further improve.

4.5.9 Recreation

Similar to aesthetics, recreation usage of the park near the lake will be noticeably reduced for the period of construction. Fishing and boating in North Park Lake will obviously be

suspended until the lake is refilled. Although this impact is temporary it is an important consideration with regard to selecting a recommended plan, especially considering that there is no other lake within Allegheny County that could act as a replacement for North Park Lake. Discussions with the PA Fish and Boat Commission revealed that North Park Lake is the most heavily used trout fishing lake in the entire Commonwealth of Pennsylvania. This is due to its location within densely populated Allegheny County, and ease of access around most of the shoreline.

Based upon a survey completed by the Commission at North Park Lake in 2000 and 2001, the lake receives approximately 22,000 trout angler days per year.
At an estimated cost of $40 per angler day, this would translate into a recreational economic loss of over $1.7 million over a two-year construction period if this plan were selected. This impact is considerable but temporary. With the restoration of the lake, the fishing would dramatically improve over existing conditions for many decades into the future. Without lake restoration, the loss of the recreational trout fishery would be certain and permanent. Using the above figures, over a minimum 50-year project life, lake restoration (without considering inflation) would provide over $44 million in recreational benefits.

If this alternative were selected, preliminary discussions with the Commission indicate that they may stock trout in Marshall Lake to help minimize the temporary loss of the fishery while North Park Lake is drained.

The quality of the walking, biking and picnicking experience along the shoreline will be poor due to the presence of the drained lake and the constant drone of engines, the odor of diesel exhaust and movement of trucks carrying sediment. These recreation impacts are unavoidable but temporary and will cease immediately as construction is completed. After dredging, the lake will be refilled and recreation will resume. The restored, deeper lake will provide a more aesthetically pleasing experience especially within the upper lake areas that are currently shallow. Fishing will eventually improve as fish re-enter either artificially through stocking or through repopulation from natural stock upstream. Fish populations and the fishing experience will be much improved over present conditions due to the restoration of lake depth, placement of fish attracting cover within the lake and the planting of wetland vegetation around the shoreline.

4.5.10 Cultural Resources

The removal of the sediments from within the lake will impact neither prehistoric nor historic cultural resources. Except for the Deer Pen site and Latodami sites, none of the other sediment placement areas contain significant cultural resources. The Deer Pen site has been eliminated from future consideration. The Latodami site would only be used if the County cannot successfully negotiate the sale of land at the Wildwood sediment placement area. Should it be necessary to use the Latodami site for sediment placement, all necessary cultural resource investigations required by Section 106 of the National Historic Preservation Act will be completed and coordinated with the Pennsylvania State Historic Preservation Officer prior to the initiation of any construction activity.

4.6 Alternative 5 - Mechanical Sediment Removal, No Lake Draining

4.6.1 Aquatic Habitat

4.6.1.1 North Park Lake

Under this alternative, the lake would remain filled during the entire construction period. Impacts would be limited to disturbances caused by the mechanical excavators mounted on floating platforms. Due to mobility, the fish presently in the lake would remain largely unaffected by dredging. Fish will naturally move away from the operating dredging equipment. The excessive aquatic vegetation now present would be removed along with the bottom sediment. This alternative would inherently create more turbidity during the life of the project. To keep turbidity localized, the contractor would be required to operate within a silt curtain that would encircle the area being excavated.

4.6.1.2 Pine Creek Downstream of the Dam

The type of sediment removal proposed under this alternative would inherently re-suspend fine sediment particles in the water column of the lake in the vicinity of the excavation equipment. Without proper safeguards to keep re-suspended sediment from moving downstream during construction, the aquatic habitat of Pine Creek could be adversely affected. Such sediment would affect not only sight feeding fish but also benthic organisms. As described previously in this report, sedimentation reduces visibility, smothers eggs and benthic organisms, clogs gills and reduces light penetration that adversely affects vegetation. To minimize the potential for these impacts to occur downstream, a rock filter will be constructed within Pine Creek downstream of the dam. The filter would be cleaned out and removed after excavation is completed.

4.6.2 Wetlands

The impacts to wetlands would be similar to Alternative 4. Coir logs will be placed in strategic locations around the lake to increase available wetland habitat. Similarly, the diverse wetlands that have developed at the upper end of the lake's Pine Creek arm would be protected by the construction of a rock dike across the entire width of the lake. As in Alternative 2, new wetlands would be created and the existing high quality wetlands in the upper Pine Creek portion of the lake would be protected.

4.6.3 Riparian/Terrestrial Habitat – Lake Area

This alternative would employ the same staging areas as Alternative 4, and the impacts would be similar. See Section 4.5.3

4.6.4 Terrestrial Habitat – Sediment Placement Areas

Although the sediment placement areas would be the same as described for draining the lake, the treatment of the areas would be handled differently to accommodate extremely wet materials. The sediment placement areas would have to be designed to catch runoff

water and allow sediment particles to settle out of the water column before the runoff can be released either downstream or back into the lake. Regardless of the sediment dewatering method used, the final treatment of the sediment placement sites would be the same as for Alternative 4. Temporary losses of habitat will occur as the vegetation is removed to make the site ready for sediment placement. After project completion as vegetation re-establishes and as the sites are managed, the habitat quality will improve over existing conditions.

4.6.5 Air Quality/Nuisance Odor Problems

Because the lake will not be drained, there would be no odor problems associated with an exposed lakebed as in Alternative 4. Because trucks will not be driving on a muddy lake bottom as in Alternative 4, there will be less of a problem with mud on local roads. The trucks will enter the staging areas and be loaded from the shoreline. Gravel roads will be constructed in the staging areas to support truck traffic. The potential for the generation of fugitive dust would be lessened since the lakebed will not be exposed during sediment removal. Because the material to be loaded into trucks would be saturated with water, the trucks used to haul sediment to the placement areas will have to have tailgate seals installed to keep water from running out of the truck beds and onto local roads. There may be some odor problems at the sediment placement sites during the initial drying of the excavated materials.

4.6.6 Traffic/Public Safety

The concerns and potential for impacts would be identical to Alternative 4.

4.6.7 Noise

Noise levels from operating excavating equipment and trucks transporting sediment would be similar to Alternative 4.

4.6.8 Aesthetics

Unlike Alternative 4, the aesthetic impact of this method of alternative would be lessened principally because the lake will not be drained. Noise levels that will disturb park users as well as a constant stream of truck traffic will still reduce the aesthetic quality of the lake area, but the visual impact will be far less. During times when the contractor is not operating, the aesthetic qualities that now exist would remain essentially the same, except for the staging areas, which will exhibit temporary roads and be filled with parked machinery and an assortment of construction equipment.

4.6.9 Recreation

The impacts to in-lake recreation would be far less than Alternative 4 principally because the lake will not be drained. For safety reasons public access to the lake for boating may

be restricted or totally curtailed during this two-year construction alternative. Shoreline fishing should not pose a safety problem as long as the public is kept a safe distance from the dredging equipment and staging and access areas. The recreation experience will, however still be compromised by the constant din of operating machinery and truck engines. If the Contractor does not work weekends, recreation activity at the park during these periods would not be significantly affected. Overall, the impacts to recreation caused by this alternative will be less than Alternative 4.

4.7 Alternative 6 - Hydraulic Dredging

4.7.1 Aquatic Habitat

4.7.1.1 North Park Lake

The short-term impacts to the aquatic habitat will be similar to those generated by Alternative 5. The lake will not be drained but will remain intact throughout the life of the project. Fish will largely remain unaffected; they will naturally move away from the operating cutter head dredge. Due to the powerful vacuuming action of the dredge some smaller fish may be removed during the process. This potential loss would not be significant and it would not adversely affect existing fish populations within the lake. All aquatic vegetation and existing benthic habitat within the lake will be removed as bottom sediment is vacuumed away. These impacts are short term and inconsequential. The placement of rock piles and porcupine cribs at strategic locations within the lake will more than offset the temporary loss of poor quality fish habitat caused by the project.

4.7.1.2 Pine Creek Downstream of the Dam

The dredging operations would generate much less in-lake turbidity than using land-based excavators simply because the hydraulic dredges are designed to remove, by vacuum, the material loosened by the cutter head. The potential for downstream impacts is therefore much less than Alternatives 4 and 5. Because of the much larger amounts of water that will be removed from the lake, and the comparatively large land area that would be needed to dewater the material in a system of sedimentation ponds (about 80 acres), the District will instead use Geotubes for dewatering. Tests have shown that the drain water from these tubes would be very clean and could be returned directly to the lake or downstream without impact.

4.7.2 Wetlands

The impacts to wetlands would be similar to Alternatives 4 and 5. About 7,000 linear feet of coir logs will be placed in strategic locations around the lake's perimeter at the water/shoreline interface to increase available wetland habitat. Similarly, the diverse wetlands that have developed at the upper end of the lake's Pine Creek arm would be protected by the construction of a rock dike across the entire width of the lake. As in

Alternatives 4 and 5, new wetlands would be created and the existing high quality wetlands in the upper Pine Creek portion of the lake would be protected.

4.7.3 Riparian/Terrestrial Habitat – Lake Area

This alternative would employ the same staging areas as Alternatives 4 and 5, and the impacts would be similar. See Section 4.5.3

4.7.4 Terrestrial Habitat – Sediment Placement Areas

The effects of this alternative on terrestrial habitat in the sediment placement areas would be identical to the effects described for Alternative 4. Site plan design and preparation would be nearly identical since the material to be placed from either drained geotubes or the drained lake would not be as wet as compared to sediment removed by mechanical means from floating barges (Alternative 5).

4.7.5 Air Quality/Nuisance Odor Problems

As in Alternative 5, the lake would not be drained. Therefore, there would be no odors created by exposure of the lake bottom as in Alternative 4 (drain the lake). Also, the potential dust problem associated with Alternative 4 would not occur in the vicinity of the lake. The only potential for trucks to track mud on the highways would be from the loading zone where the geotubes would be cut opened after drainage. In this area, a front-end loader or similar heavy equipment will scoop the drained sediment from the opened geotubes and load it into waiting dump trucks. Because the sediment will be well drained, tracking mud from these loading areas onto local roads is not expected to be an issue. There may be some odor problems near the geotubes and at the sediment placement sites during the initial drying of the excavated materials.

4.7.6 Traffic/Public Safety

Whenever construction vehicles are on the highway, there is always the concern about public safety. The movement of sediment from the geotube dewatering areas to the sediment placement areas involves the same roads as those discussed in Alternative 4. Consequently, the temporary impacts to traffic patterns and public safety would be similar. This alternative would add another safety concern. The lines that carry the pumped water/sediment mix to the location of the geotubes for dewatering will be under high pressure. These lines will have to be placed so that they will not impact traffic or be a hazard to pedestrians.

4.7.7 Noise

Noise levels from heavy equipment, such as the dredging equipment, trucks and equipment used to load the drained sediment from the geotubes into trucks would be similar to Alternatives 4 and 5.

4.7.8 Aesthetics

Temporary aesthetic impacts would be similar to Alternative 5.

4.7.9 Recreation

Recreation impacts would be similar to those described for Alternative 5

TABLE 6 below was developed to permit reviewers to easily compare summarized impacts of the “No Action” Alternative and Alternatives 4, 5, and 6.

TABLE 6
Summary Comparison of Environmental Impacts of Alternative Dredging Plans
[Negative Impacts are underlined]

Environmental Parameters	**Alternative 1 No Action**	**Alternative 4 Mechanical Sediment Removal - Drain the Lake**	**Alternative 5 Mechanical Sediment Removal – No Lake Draining**	**Alternative 6 Hydraulic Dredging (Using Geotubes to Dewater Sediment)**
Open Water Habitat	Unabated reduction of open water habitat until the entire lake is lost to ongoing sedimentation.	Temporary loss of entire pool. Enhancement and restoration of 63 surface acres of open water habitat after project completion	Enhancement and restoration of 63 surface acres of open water habitat	Enhancement and restoration of 63 surface acres of open water habitat
Fish/Fish Habitat	Fish habitat will continue to degrade as the lake fills with sediment. The lake will grow increasingly shallow and warmer and, less suitable for fish. Desirable fish populations will continuously decline	Temporary loss of all fish and benthos in the lake. Fish habitat will be restored. Adding depth and structure will increase habitat diversity and optimize habitat suitability for various aquatic species.	Fish habitat will be restored. Adding depth and structure will increase habitat diversity and optimize habitat suitability for various aquatic species.	Fish habitat will be restored. Adding depth and structure will increase habitat diversity and optimize habitat suitability for various aquatic species.
Water Quality	Continual degradation due to sedimentation and associated enrichment. Dissolved oxygen will become depleted and water temperatures will increase making the lake less able to	At project completion, water quality will improve. Added depth will provide cooler temperatures during warm summer months making the lake more suitable for cool water fish, especially stocked trout. Dissolved oxygen levels will	Minor localized increases in turbidity at dredging site. Turbidity to be contained by good engineering practices At project completion, water quality will improve. Added depth will provide cooler temperatures	Minor localized increases in turbidity at dredging site. Turbidity to be contained by good engineering practices At project completion, water quality will improve. Added depth will provide cooler

Environmental Parameters	Alternative 1 No Action	Alternative 4 Mechanical Sediment Removal - Drain the Lake	Alternative 5 Mechanical Sediment Removal – No Lake Draining	Alternative 6 Hydraulic Dredging (Using Geotubes to Dewater Sediment)
	sustain fish and benthic macroinvertebrates.	increase. Elevated nutrient levels will decrease. A sediment trap will be constructed to help maintain downstream water quality.	during warm summer months making the lake more suitable for cool water fish, especially stocked trout. Dissolved oxygen levels will increase. Elevated nutrient levels will decrease. A sediment trap will be constructed to help maintain downstream water quality.	temperatures during warm summer months making the lake more suitable for cool water, especially stocked trout. Dissolved oxygen levels will increase. Elevated nutrient levels will decrease. Hydraulic dredging will not adversely impact the water quality of Pine Creek downstream of the dam.
Aquatic Vegetation	Aquatic vegetation will become denser due to sedimentation, enrichment and warmer temperatures. Algal blooms, which are detrimental to fish, will steadily increase in extent.	Aquatic vegetation will be temporarily removed. At project completion, conditions for algal blooms will be minimized. Desirable native aquatic vegetation will establish that will enhance the aquatic ecosystem.	Aquatic vegetation will be temporarily removed. At project completion, conditions for algal blooms will be minimized. Desirable native aquatic vegetation will establish that will enhance the aquatic ecosystem.	Aquatic vegetation will be temporarily removed. At project completion, conditions for algal blooms will be minimized. Desirable native aquatic vegetation will establish that will enhance the aquatic ecosystem.
Terrestrial/Riparian Habitat				
Lake Area	No Impacts	Temporary loss of three acres for staging and lake access	Temporary loss of three acres for staging and lake access	Temporary loss of three acres for staging and lake access
Dredged Material Placement Areas	No Impacts	Temporary loss of habitat ranging from bare asphalt to mown lawn to early old-field vegetation with a	Temporary loss of habitat ranging from bare asphalt to mown lawn to early old-field vegetation with a predominance of non-	Temporary loss habitat ranging from bare asphalt to mown lawn to early old field vegetation with a

Environmental Parameters	Alternative 1 No Action	Alternative 4 Mechanical Sediment Removal - Drain the Lake	Alternative 5 Mechanical Sediment Removal – No Lake Draining	Alternative 6 Hydraulic Dredging (Using Geotubes to Dewater Sediment)
		predominance of non-native, invasive species. The loss of habitat would be temporary. Placement areas will be reestablished with native vegetation of the sponsor's choosing.	native, invasive species. The loss of habitat would be temporary. Placement areas will be reestablished with native vegetation of the sponsor's choosing.	predominance of non-native, invasive species . The loss of habitat would be temporary. Placement areas will be reestablished with native vegetation of the sponsor's choosing.
Bull Pen	No Impacts	Temporary loss of 6.5 acres of mostly paved asphalt	Temporary loss of 6.5 acres of mostly paved asphalt	Temporary loss of 6.5 acres of mostly paved asphalt
Deer Pen	No Impacts	Temporary loss of 4 acres of mostly grass	Temporary loss of 4 acres of mostly grass	Temporary loss of 4 acres of mostly grass
County Site	No Impacts	Temporary loss of 6.5 acres of mostly early old field vegetation composed of primarily non-native exotics and some wetland vegetation located in a swale at the site	Temporary loss of 6.5 acres of mostly early old field vegetation composed of primarily non-native exotics and some wetland vegetation located in a swale at the site	Temporary loss of 6.5 acres of mostly early old field vegetation composed of primarily non-native exotics and some wetland vegetation located in a swale at the site
Latodami Site	No Impacts	Temporary loss of 29.6 acres of primarily early old field vegetation composed primarily of exotic non-native species	Temporary loss of 29.6 acres of primarily early old field vegetation composed primarily of exotic non-native species	Temporary loss of 29.6 acres of primarily early old field vegetation composed primarily of exotic non-native species
Wildwood Site	No Impacts	Temporary loss of 57 acres of poor quality habitat, mostly grass	Temporary loss of 57 acres of poor quality habitat, mostly grass	Temporary loss of 57 acres of poor quality habitat, mostly grass
Wetlands	Existing wetlands will continue to expand due to ongoing	Existing wetlands in lake area would remain untouched. Installation of " COIR" logs will	Existing wetlands in lake area would remain untouched. Installation of " COIR" logs will enhance	Existing wetlands in lake area would remain untouched. Installation of " COIR" logs will

Environmental Parameters	**Alternative 1 No Action**	**Alternative 4 Mechanical Sediment Removal - Drain the Lake**	**Alternative 5 Mechanical Sediment Removal – No Lake Draining**	**Alternative 6 Hydraulic Dredging (Using Geotubes to Dewater Sediment)**
	sedimentation	enhance wetland development around lakeshore in desirable locations. Stoppage of mowing along the North Fork of Pine Creek's left descending bank will allow degraded wetlands to reestablish. Loss of a small, isolated, wetland of variable quality (depending upon rainfall) located in a swale within the County site.	wetland development around lakeshore in desirable locations. Stoppage of mowing along the North Fork of Pine Creek's left descending bank will allow degraded wetlands to reestablish. Loss of a small, isolated, wetland of variable quality (depending upon rainfall) located in a swale within the County site	enhance wetland development around lakeshore in desirable locations. Stoppage of mowing along the North Fork of Pine Creek's left descending bank will allow degraded wetlands to reestablish. Loss of a small, isolated, wetland of variable quality (depending upon rainfall) located in a swale within the County site
Threatened and Endangered Species	No Impact	No Impact	No Impact	No Impact
HTRW	No Impact	No Impact	No Impact	No Impact
Air Quality	No Impact	Temporary air quality reduction due to engine exhaust and odors from drained lake. Potential impacts from dust as lake dries out and from trucks tracking mud on local roads	Temporary air quality reduction due to engine exhaust, and dust from trucks tracking mud on local roads during construction	Temporary air quality reduction due to engine exhaust, and dust from trucks tracking mud on local roads during construction
Prime Farmlands	No Impact			
Latodami Site		Minor impact	Minor impact	Minor impact
Bull Pen Site		Minor impact	Minor impact	Minor impact
Socio Economic Effects				
Noise	No Impact	Noise will be generated	Noise will be generated	Noise will be generated

Environmental Parameters	Alternative 1 No Action	Alternative 4 Mechanical Sediment Removal - Drain the Lake	Alternative 5 Mechanical Sediment Removal – No Lake Draining	Alternative 6 Hydraulic Dredging (Using Geotubes to Dewater Sediment)
		by land-based excavators removing sediment from lake and by trucks hauling sediment and by land based equipment spreading the sediment on the sediment placement area.	by land-based excavators removing sediment from lake and by trucks hauling sediment and by land based equipment spreading the sediment on the sediment placement area.	by hydraulic dredge and booster pumps running 12 hours/day. Noise generated by land based equipment transporting, re-grading the drying sediment.
Public Safety	No Impact	Extensive truck traffic hauling sediment will be a hazard to park users and to traffic on local roads. Drained lake will be a safety hazard to persons trying to walk near or in the muddy lake bottom. Dewatering/sediment placement areas pose a safety hazard if not secured by gated or fence. Flagmen and other traffic controls will be posted at intersections to direct traffic and protect public safety	Extensive truck traffic hauling sediment will be a hazard to park users and to traffic on local roads. Dewatering/sediment placement areas pose a hazard if not secured by gate or fence Flagmen and other traffic controls will be posted at intersections to direct traffic and protect public safety	Extensive truck traffic hauling sediment will be a hazard to park users and to traffic on local roads. Dewatering/sediment placement areas pose a hazard if not secured by gate or fence. Pipeline carrying sediment could pose a tripping hazard or safety hazard if pipe bursts during pumping. Flagmen and other traffic controls will be posted at intersections to direct traffic and protect public safety
Nuisance Odor Problems	No Impact	Drained lake will generate strong odors due to sediment enriched with organic matter. Similar problem with sediment placement areas	Sediment placement areas could generate strong odors due to exposed sediment enriched with organic matter	Sediment placement areas could generate strong odors due to exposed sediment enriched with organic matter

Environmental Parameters	Alternative 1 No Action	Alternative 4 Mechanical Sediment Removal - Drain the Lake	Alternative 5 Mechanical Sediment Removal – No Lake Draining	Alternative 6 Hydraulic Dredging (Using Geotubes to Dewater Sediment)
Aesthetics	Lake aesthetics will continue to degrade as the lake slowly fills with sediment	The drained lakebed will be extremely unattractive until the project is completed. Afterwards aesthetics will greatly improve as the lake is refilled.	Aesthetics will be improved by eliminating extremely shallow water due to sedimentation.	Aesthetics will be improved by eliminating extremely shallow water due to sedimentation.
Recreation	Permanent loss of both cool water and warm water fishery and loss of boating opportunities as the lake fills will sediment.	Temporary loss of fishing and boating opportunities and temporary disturbances caused by truck traffic. Temporary odor problems around lake and sediment placement areas where sediments are initially exposed Permanent improvement to lake based recreation. once project is completed	Loss of lake-based recreation in areas where equipment is working. Disturbances caused by truck traffic. Temporary odor problems in sediment placement areas as sediments are initially exposed. Permanent improvement to lake based recreation.	Temporary disturbances caused by noise from dredging equipment and booster pumps. Temporary odor problems around placement areas as sediments are initially exposed. Permanent improvement to lake based recreation.
Cultural Resources	None	Potential impacts to extant cultural resources at Deer Pen and Latodami sediment placement areas.	Potential impacts to extant cultural resources at Deer Pen and Latodami sediment placement areas.	Potential impacts to extant cultural resources at Deer Pen and Latodami sediment placement areas.

4.8 Cumulative Impacts of Alternative Plans

The Council on Environmental Quality's (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) define cumulative effects as, "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions (40 CFR §1508.7)". Cumulative effects assessments focus upon the beneficial and adverse impacts that past present and potential future actions could have on the ecosystem and human community being affected by an action.

In simple terms, a cumulative effects analysis considers the impacts of a proposed action in relation to what else is occurring, has occurred, or potentially may occur in a given project area. To keep a cumulative effect analysis meaningful, bounds must be set to establish a reasonable time frame and impact area. For this project, the impact area considered is North Park Lake and Pine Creek downstream of the lake. A rough time frame for future actions would be 25 years after construction

4.8.1 Past and Present and Future Actions

For the North Park project, past actions relate to the original construction of the park and dam in the late 1930's and the development within the basin that caused the siltation within the lake up until the present time. This report has described how accumulated sediment from past development within the Pine Creek basin has adversely affected the lake's aquatic ecosystem. Present actions relate to the effects of project construction which were described above and summarized in TABLE 6. Reasonably foreseeable future actions refer to those actions that could occur within the park or upstream within the Pine Creek basin. The cumulative impacts described below would be the combined effect of the past present and reasonably foreseeable future actions and how they would affect North Park Lake. This discussion is necessarily qualitative since future actions are based upon a mixture of professional judgment and common sense rather than on specific quantifiable impacts, such as acres of habitat lost or gained.

4.8.3 Cumulative Effects of Proposed Action

Each construction alternative described within this report achieves the project objective, which is an improved aquatic ecosystem within North Park Lake. Because the positive and negative impacts of the construction alternatives are fairly similar, the effect of the present action when analyzing cumulative impacts is the effect of a completed project. Consequently, separate discussions of cumulative impacts for each alternative would be nearly identical and therefore unnecessary. The description of the effect of past, present and reasonably foreseeable future actions upon the environmental parameters evaluated in Sections 4.5 through 4.7 is presented below in TABLE 6a in a tabular format to facilitate ease of reading.

TABLE 6a – Cumulative Effects Assessment

Resource	Past Actions +	Present Actions +	Future Actions =	Cumulative Effects
Fish and Benthos	Past development within the Pine Creek basin upstream of Pine Creek Dam has severely degraded North Park Lake's fishery through sedimentation. **Impact – Negative**	Project will remove accumulated sediment, and place fish attracting structures on the lake bottom **Impact - Positive**	Assuming stricter watershed management practices will be enforced, a diverse fishery could be sustainable for longer than the estimated life of the project. **Impact - Positive**	Habitat for fish and benthos would be improved. **Cumulative impact - Positive**
Water Quality	North Park Lake is a eutrophic lake suffering from past discharges of high levels of nutrients and minerals from excess runoff **Impact - Negative**	Removing nutrient-laden sediment and will help improve water quality. **Impact – Positive**	Enforcement of future watershed management controls will help slow the eutrophication process in the lake and maintain good water quality. **Impact - Positive**	Water quality should not degrade as quickly over time as in the past. **Cumulative impact - Positive**.
Wetlands	High quality wetlands are present in the upper Pine Creek arm of the lake that developed due to ongoing sedimentation. **Impact – Positive from a wetland resource perspective but negative from an open water habitat perspective.**	The project will protect high quality wetlands developing in the Pine Creek arm of the lake and will create other near-shore emergent wetlands. **Impact - Positive**	To reach the shoreline, anglers may trample on and adversely impact created near shore emergent wetlands in specific locations. This adverse impact can be ameliorated through public education, signage, and enforcement by park personnel. **Impact - Minimal**	Recreation induced wetland loss would be minor and localized near access points. The amount and quality of wetland acreage will increase over past and present conditions. **Cumulative Impact- Positive**
Riparian/ Terrestrial Habitat	When first constructed there was minimal riparian habitat around the lake. Since creation of the park riparian habitat quality has improved although is still somewhat limited due to regular mowing. **Impact - Positive**	Project construction will not cause any significant long term losses of riparian or terrestrial vegetation. **Impact - None**	Careful management of park land by the County should minimize any impacts to riparian or terrestrial habitat. **Impact - None**	**Cumulative Impact - None**
Noise	The area was formerly agricultural and rural.	Local noise levels generated by operating	Future population growth will place higher demand	**Cumulative Impact - Negative**

Resource	Past Actions +	Present Actions +	Future Actions =	Cumulative Effects
	Since completion of the park and areas upstream of the dam noise levels have increased due to increased population, traffic and associated development. **Impact - Negative**	equipment will temporarily increase, but will cease completely after project is completed. **Impact – Short Term Negative Impacts**	upon North Park. Noise from traffic and day use activities would likely increase. **Impact - Negative**	
Roads and Traffic	Traffic increased as the population grew. Attendant road construction also expanded with the increase in population to meet traffic demands. I**mpact - None**	Temporary increases in local traffic caused by a steady stream of trucks leaving an entering the park to haul dredged sediment to disposal areas. **Impact – Short Term Negative Impacts**	As population grows, traffic would be expected to increase commensurately within North Park. It is expected that the existing roads will be able to handle increased traffic loads. Increased traffic would require increased road maintenance, and could, if not managed, decrease safety for pedestrians as well as for wildlife. **Impact - Negative**	**Cumulative Impact – Negative**
Air Quality	Past development and growth of commercial and residential areas may have negatively affected air quality within the park since it resides in Allegheny County which is classified as a moderate non-attainment area for the U.S. Environmental Protection Agency's 1-hour ozone standard. **Impact – Minimal**	Exhaust from heavy equipment and increased truck traffic during construction would be temporary and minor. **Impact - Minimal**	Expected increases in local traffic would also result in increased vehicle emissions. Considering that future vehicles will be more efficient and cleaner burning air quality should not decrease. **Impact - None**	**Cumulative Impact - None**
Recreation	Recreational use of the Park has been a focal point for residents since its creation. **Impact - Positive**	Recreation would greatly benefit from a restored lake. Boating, fishing, sightseeing, etc. will be improved. **Impact - Positive**	The restored lake will continue to provide an excellent recreational resource for residents of Allegheny County. At specific times, such as opening day of trout season, the lake may	**Cumulative Impact - Positive**

Resource	Past Actions +	Present Actions +	Future Actions =	Cumulative Effects
			experience temporary overcrowding. **Impact - Positive**	
Aesthetics	Creation of the Park provides a place of refuge from suburban development. **Impact - Positive**	Aesthetics of a restored lake would be greatly improved. **Impact - Positive**	As planted lake wetlands mature the aesthetic character of the lake would increase. **Impact - None**	**Cumulative Impact – Positive**

As can be seen in the summary table above, most of the cumulative impacts identified were either positive or were not significant. Noise and traffic, which would be expected to increase over time, could adversely affect park users, pedestrians and wildlife if not managed carefully. Speed restrictions, increased police patrols and the installation of traffic lights at specific intersections may be needed to control future traffic volumes and minimize potential impacts.

4.9 Risk and Uncertainty Analysis

Uncertainty and variability are inherent in water resource planning. Situations of risk are conventionally defined as those in which the potential outcomes can be described in reasonably well-known probability distributions, such as the knowledge that a waterway will on average flood to a specific elevation on regular basis. Uncertainty exists where one cannot describe an outcome on the basis of known probability distributions.

For the North Park Lake project, there is little or no risk that the project upon completion will fail to meets its objectives. Restoration of open water habitat will be successful no matter what alternative is selected. The difference between the alternatives is primarily related to efficiency in completing the dredging and how dredging and sediment placement options could impact park users and local traffic patterns and not with regard to achieving the restoration objectives. From an aquatic habitat perspective, the outcome of each alternative would be similar and the risk of not achieving its objectives is extremely low.

The primary uncertainty is how long the improved habitat within the lake will remain at optimum levels after project completion. This report has described how sedimentation has severely degraded the open water habitat of the lake. Sedimentation within the Pine Creek Basin and North Park Lake will continue to occur after the project is constructed. The specific rate of future sedimentation is unknown since it is dependent upon numerous factors many of which cannot be predicted with certainty, such as future demographics and economic growth and development within the Pine Creek basin, and the potential implementation and strict enforcement, at some future date, of storm water management regulations by local municipalities.

Given the historical levels of sedimentation, the life expectancy of the North Park project is projected to be 105 years if the sediment is removed to original contours and the lake is regularly maintained by the Local Sponsor. Based upon this estimate of project life under current conditions, it is the opinion of the Corps and local sponsor that the expenditure of funds to construct the project is justifiable in the face of the uncertainty of future sedimentation versus the certainty of eventually losing the lake if no action is taken.

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5.0 COST EFFECTIVENESS AND INCREMENTAL COST ANALYSES

5.1 - Introduction

The Corps of Engineers Planning Regulations (ER 1105-2-100) require that all water resource development projects be evaluated in terms of acceptability, completeness, effectiveness and efficiency. In addition, ecosystem restoration projects require evaluation on the basis of cost effectiveness and incremental cost analyses of the possible alternatives and the significance of ecosystem outputs (environmental benefits). Specifically, cost effectiveness analysis is concerned with evaluating the efficiency of alternative means of producing outputs (environmental benefits); incremental cost analysis is concerned with identifying and displaying variations in cost for the production of different benefit levels. These analyses help decision makers to determine the "best buy" alternative plan. These comparative numerical analyses do not in and of themselves dictate which plan is ultimately the best for the local sponsor. Other considerations must also be included in the decision-making processes.

For the North Park Lake project, dredging to restore open water habitat is by far the key and most costly ecosystem restoration feature of the entire project. Without dredging, the construction of other ecosystem restoration features, such as the placement of various types of fish habitat, and planting of wetland vegetation, would be pointless simply because the lake is degraded by too much accumulated sediment. These other features achieve importance only after the dredging is complete. After dredging, the lake would have no structure to provide cover for fish or benthic organisms. The placement of fish structure and the planting of wetland vegetation, therefore, become critical to the restoration of the lake after open water habitat is restored. Because the costs associated with these attendant environmental features are relatively minor in comparison to the dredging costs, they will be included equally in each alternative regardless of the selected dredging option. Therefore, for the Cost Effective and Incremental Cost Analyses performed in the following sections, the primary ecosystem restoration feature evaluated is open water habitat restored through dredging.

5.2 Cost Effectiveness and Incremental Cost Analysis

In cost effective analysis, the goal is to filter out plans that produce the same output level as another plan, but cost more; or cost either the same amount or more than another plan, but produces less output. This analysis establishes the least cost method of sediment removal for producing the same level of environmental output (open water habitat). Through the formulation of alternatives, three dredging plans were considered feasible. The table below compares the *construction* costs of each of these plans all of which will restore the lake to original contours. Although the costs shown below in TABLE 7 are only screening level (preliminary) estimates, they are of sufficient accuracy to compare each alternative plan.

TABLE 7 - COST EFFECTIVENESS ANALYSIS
Cost Comparison to Dredge North Park Lake to Original Contours
October 2004 Cost Level

Alternative Plan	Construction Cost
1. No Action	$0
4 Mechanical Sediment Removal – Drain the Lake	$8,642,000
5. Mechanical Sediment Removal - No Lake Drainage	$12,792,000
6. Hydraulic Dredging	$10,960,000

Based upon TABLE 7 above, Alternative 4, drain the lake and remove the sediment mechanically, is clearly the most cost effective dredging plan. To produce the same level of environmental output, Alternative 4 is approximately 2.3 million dollars less than the next expensive plan, hydraulic dredging at 10.96 million dollars. However, Alternative 4 is not the plan that will cause the least disruption to the users of North Park as described in TABLE 6.

The above costs in TABLE 7 are construction costs only. The total project cost for all of the construction alternatives would be higher. For Alternative 4, TABLE 8 and the following paragraph provides **preliminary** estimates of the major cost items including construction, and lays out the Local Sponsor's cost share.

TABLE 8
Preliminary Total Project Costs for Alternative 4
October 2004 Cost Level*

Sunk Costs: Work completed prior to initiation of the DPR and development of draft and final DPR	$1,050,000
Planning Engineering and Design	$865,000
Construction Management	$648,000
Real Estate	$341,000
Construction	$8,642,000
Estimated Total Project Cost	$11,546,000

*Includes contingencies

By regulation, the Federal share of any Section 206 project cannot exceed $5,000,000. The Federal cost share of all Section 206 projects is 65%. Therefore, the maximum cost of any Section 206 project is $7,692,307.60. ($5,000,000 / 65% = $7,692,307.60). For a project of this magnitude, the local share (35%) would be $2,692,307.

If the cost of a Section 206 project exceeds 7.69 million dollars, local sponsors are required to pay for 100% of the costs that exceed the statutory limit of the Federal project share. For the North Park project, the preliminary estimated total project cost (based upon October 2004 cost levels) shown in TABLE 8 is $11,546,000. Therefore, the preliminary total local share of the cost of this project (based upon October 2004 cost levels) would be $6,546,000.

$11,546,000 (total project cost)
- $ 5,000,000 (maximum Federal Share)
$ 6,546,000 (local share)

To help reduce project costs, project features would have to be eliminated. Because most of the environmental features described in this report are relatively inexpensive, other than open water habitat restoration, the most effective way to reduce costs and maintain habitat diversity would be to reduce the amount of sediment removed from the lake.

TABLE 8a below shows an example of what the **preliminary** total cost would be to remove 75% of the existing sediment:

TABLE 8a
Preliminary Total Project Costs for Alternative 4 Modified to Remove 25% Less Sediment
October 2004Cost Level

Sunk Costs: Work completed prior to initiation of the DPR and development of draft and final DPR	$1,050,000
Planning Engineering and Design	$707,000
Construction Management	$530,000
Real Estate	$341,000
Construction	$7,063,000
Estimated Total Project Cost	$9,691,000

This dredging option reduces costs by approximately $1.9 million. Determining whether removing less sediment is worth the effort from an ecosystem point of view is dealt with in the sections that follow.

The removal of lesser amounts of sediment will still allow all of the environmental features to be placed. The primary difference in removing differing sediment amounts is project life expectancy and cost per cubic yard to remove it. Normally, as the volume of sediment removed from the lake increases, the cost of dredging per cubic yard decreases. The District calculated what the cost per cubic yard would be to incrementally remove increasing amounts of sediment. All of these costs were based upon draining the lake and removing sediment mechanically since the analysis in TABLE 7 above showed that this was the most cost effective method to remove sediment. The following table, TABLE 9, displays the ***construction costs*** to remove varying amounts of sediment from North Park Lake:

TABLE 9
INCREMENTAL CONSTRUCTION COSTS TO REMOVE VARYING AMOUNTS OF SEDIMENT UNDER ALTERNATIVE 4
October 2004 Cost Level

NUMBER OF CUBIC YARDS OF SEDIMENT REMOVED FROM LAKE AMOUNT (PERCENT)	COST PER CUBIC YARD	TOTAL CONSTRUCTION COST
101,250 CY (25%) change numbers!!!	$33.25	$3,367,000
202,500 CY (50%)	$27.46	$5,560,000
303,750 CY (75%)	$23.25	$7,063,000
405,000 CY* (100%)	$21.34	$8,642,000

**100% dredging means removing all of the accumulated sediment except for the wetland area upstream of the wetland protection dike.*

As can be clearly seen in TABLE 9, the amount of material removed is inversely proportional to the cost, i.e. as sediment volume removed increases, the cost decreases. The table shows that the costs per cubic yard changes dramatically as the volume of sediment removed decreases. TABLE 10 below expresses this cost increase in a dollar value and a percentage of the maximum amount of sediment to be dredged.

TABLE 10
PERCENTAGE INCREASE IN COSTS TO REMOVE LESSER AMOUNTS OF SEDIMENT UNDER ALTERNTIVE 4
April 2006 Cost Level

NUMBER OF CUBIC YARDS OF SEDIMENT REMOVED FROM LAKE AMOUNT (PERCENT)	COST PER CUBIC YARD	COST INCREASE PER CUBIC YARD	PERCENTAGE COST INCREASE PER CUBIC YARD
405,000 CY (100%)	$21.34	$0	0
303,750 CY (75%)	$23.25	$1.91	8.95%
202,500 CY (50%)	$27.46	$6.12	28.68%
101,250 CY (25%)	$33.25	$11.91	55.81%

Based upon the values presented in TABLE 10, it is obviously less expensive to remove 100% of the sediment. Removing 75% may be reasonable, since the cost increase is about 9% or roughly two dollars per cubic yard greater. Removing less than 75% becomes quite costly on a per cubic yard basis. As shown the cost increase goes from $27.46 to $33.25 per cubic yard (28.68% to 55.81%, respectively) as the amount of sediment removed is reduced from 202,500 CY to 101,250 CY.

5.2.1 Standardized Output Measurement Process

The Great Lakes and Ohio River Division has developed an environmental investment strategy to allow documentation of the value added by a particular ecosystem restoration project. This tool, which standardizes project outputs, allows a numerical comparison of the ecosystem value of project alternatives. This standardized output process has been applied to the North Park project and is presented below.

5.2.1.1 Project Outputs

The outputs, as proposed in the Division's guidance, recommends using acres of habitat as standard habitat measure. The existing 63 **surface** acres of North Park Lake will not be affected by any alternative dredging method or alternative dredging depth because dredging will not expand the surface area of the lake. What will dramatically change immediately after project construction is the lake depth. Hence, the use of surface acres as a habitat parameter to compare the effectiveness of dredging alternatives would be meaningless because the surface area of the lake will remain virtually the same after project completion as before.

To allow a meaningful comparison of dredging alternatives, the unit of measure or ecosystem output used in this report will be an acre-foot of open water habitat. An acre-foot is a volume measurement that can be thought of as a horizontal "slice" of a lake one acre in surface area, one foot deep. This unit of measure will allow comparison of the open water habitat generated by various dredging options and will be utilized to compare projected habitat changes over time as well as the ecosystem outputs and their costs. To determine which level of dredging is the "best buy" plan (the plan that provides the most benefits for the least cost), dredging options are compared and contrasted in the following sections.

5.2.1.1 Standardized Index (SI)

A standardized index is a number that gages habitat quality and is assigned to each dredging option. This index is based upon best professional judgment and uses a scale of zero to ten where zero represents complete habitat degradation (essentially sterile habitat) and ten represents optimal habitat (completely undisturbed, "natural" conditions). This number will change over time as the newly dredged lake matures.

5.2.1.2 Significance Factor (SF)

Significance considers habitat attributes such as relative abundance or rareness, natural, undisturbed habitat, status of how habitat changes over time, connectivity to other habitat corridors, fragmentation, or barriers that limit habitat, and biodiversity.

Levels of significance range from a low of one to a high of five.

TABLE 11
DEFINITION OF SIGNIFICANCE FACTORS

Significance Factor	***Significance Factor Rating***
National/International	**5**
Regional	**4**
State/Tribal	**3**
Local	**2**
Common	**1**

Normally, the significance factor does not change, and once assigned it remains constant throughout the analysis.

5.2.1.3 Standardized Output Units

The Standardized Output Unit (SOU) is obtained by multiplying the amount of habitat (acre-feet of aquatic habitat) times the Standardized Index times the Significance Factor.

Acre-feet of a habitat ***x*** SI ***x*** SF = SOU

The Future without Project Condition (Fw/oPC) and the Future with Project Condition (Fw/PC) will be based on projected shifts in each habitat's area and quality through the life of the project. For the North Park project, an SOU is produced for the base or current year, one at 25 years and one at 50 years for both the Fw/PC and the Fw/oPC. Although the projection of ecosystem succession is not an exact science, projections can nevertheless be made. The alternative with the greatest net increase of SOUs over the life of the project relative to the Fw/oPC and that best meets the project and sponsor's goals is the recommended alternative. The following tables and paragraphs compare future without and future with project conditions and their associated Standardized Output Units.

5.3 SOU - Future Without Project Conditions

TABLE 12
CURRENT BASELINE CONDITION*

Habitat Type	Acre-Feet of Aquatic Habitat*	SI (Scale of 1-10)	SF (Scale of 1-5)	SOU
Open Water Aquatic Habitat	297 acre feet	4	3	3,564 Units

*Lake capacity was measured in 2001

A Standardized Index (SI) of 4 was selected for the current baseline condition. Although the lake is degraded from excessive siltation and sedimentation and is eutrophic, suffering from an over abundance of nutrients and vegetation, it still supports a fish population and is still stocked by the Pennsylvania Fish Commission with "put and take" trout. A Significance Factor (SF) of 3 out of 5 was used for North Park Lake. This number was based upon the fact that this lake is the most heavily utilized "put and take" trout fishery in the state of Pennsylvania. It therefore merits statewide significance. Using a Standardized Index of 4 and a Significance Factor of 3 yields a Standardized Output Unit of 3,564 units for the baseline condition.

The "future without project condition" in 25 years shown below in TABLE 13 anticipates continued sedimentation with a commensurate loss of open water habitat and degradation of the remaining aquatic habitat.

TABLE 13
ESTIMATED FUTURE WITHOUT PROJECT CONDITION IN 25 YEARS (YEAR 2026)

Habitat Type	Acre Feet of Aquatic Habitat	SI Scale of 1-10	SF Scale of 1-5	SOU
Open Water Aquatic Habitat	192 acre-feet	2	3	1,152

When originally constructed in 1936 the lake had a capacity of 568 acre-feet. In 2001 the capacity was 52% of the original volume at 297 acre-feet. This represents an average loss of open water habitat over 65 years (1936 to 2001) of approximately 4.2 acre feet per year. Projecting the loss of capacity 25 years into the future (assuming for this exercise that the sedimentation rate remains constant) will reduce open water habitat by another 105 acre-feet yielding a capacity of 192 acre-feet in the year 2026. This represents a loss of about one third of the current capacity. Because the lake's habitat quantity and quality will continue to degrade over time, the Standardized Index was reduced to 2. Therefore, the SOU for the estimated future without project condition is 1,152 units. This represents a loss of 2,412 Standardized Output Units (3564 units [baseline condition] –1152 units] =

2412 unit loss). In other words the lake will lose approximately 68 percent of its present value in 25 years.

TABLE 14 below represents what future without project condition of the lake would be in 50 years if nothing were done to restore the aquatic habitat.

TABLE 14
ESTIMATED FUTURE WITHOUT PROJECT CONDITION IN 50 YEARS (YEAR 2051)

Habitat Type	Acre Feet of Aquatic Habitat	SI Scale of 1-10	SF Scale of 1-5	SOU
Open Water Aquatic Habitat	87 acre-feet	1	3	261

Under this scenario, assuming sedimentation will continue at the same rate (i.e. 4.2 acre-feet per year) there would be a loss of 210 acre-feet of open water habitat from the baseline condition leaving approximately 87 acre feet of water. This represents an approximate 70% reduction in open water habitat from baseline conditions in 2001.

In 2051, the lake would essentially be a small turbid pond that would have lost most of its value as a fishery resource. Trout stocking would have been stopped, the warm water fishery would be extremely degraded and recreational boating would be stopped due to extremely shallow conditions, a large loss of surface area due to sediment deposition and the presence of extremely dense beds of aquatic and emergent vegetation. Because of these projected conditions, the Standardized Index value was reduced to 1. At this point in the lake's life, its SOU would be 261 units. This represents a loss of 3,303 output units or about 93 percent of its value from baseline conditions. Under this scenario, much of the open water that presently exists would have been converted to wetland through sedimentation and natural vegetative succession.

5.4 SOU – Future With Project Conditions – Without Maintenance

TABLE 15 below shows the estimated project life and expected ecosystem outputs of North Park Lake based upon removing varying amounts of sediment. When removing lesser amounts of sediment than 100% of what has accumulated, the expected project life as well as the expected project generated ecosystem outputs would be reduced. This table assumes a constant rate of sedimentation of 4.2 acre-feet per year with no maintenance.

TABLE 15
ESTIMATED LAKE LIFE EXPECTANCY AND ACRE FEET OF HABITAT GENERATED BY REMOVING VARYING AMOUNTS OF SEDIMENT – NO MAINTENANCE

Number Of Cubic Yards Of Sediment Removed From Lake Amount (Percent)	**Ecosystem Outputs - Acre Feet Of Open Water Habitat Created***	**Estimated Lake Life Expectancy In Years**
101,250 CY (25%)	325 acre feet**	7 years
202,500 CY (50%)	392 acre feet**	23 years
303,750 CY (75%)	460 acre feet**	40 years
405,000 CY (100%)***	528 acre feet**	57 years

** The initial capacity of the lake in 1936 was 568 acre-feet. 40 acre feet of capacity has been permanently lost to high quality wetland that has developed in formerly open water in the upper end of the Pine Creek arm of the lake. These wetlands will be protected and maintained by a stone dike. See Section 6.1.6.3 for more detail*
***These numbers represent initial total capacity immediately after project completion. Lake capacity will begin to reduce due to ongoing sedimentation.*
**** As previously mentioned in a footnote to TABLE 9, 100% dredging means removing all of the accumulated sediment except for the wetland area upstream of the wetland protection dike.*

As shown in the above table, as dredging amounts increase by 25%, ecosystem outputs also logically increase linearly. Each 25% increase in dredging from the least amount of sediment removal to the next higher level results in an approximately 67 to 68 acre-foot gain. For each 25% increase in dredging, life expectancy of the lake similarly increases linearly by about 17 years. These numbers assume a constant rate of sedimentation of about 4.2 acre-feet per year.

The same analysis used for the "future without project condition" (FW/OPC) is used to determine the SOU for the "future with project condition" (FWPC) to show the degree of improvement with the project in place over baseline conditions and over time. The same time frames will be used for the "with project conditions", i.e. 25 and 50 years. TABLE 16 shows what the SOU would be in 25 years after the project is constructed. The table is expanded to include different levels of dredging to show the variation in SOUs. These tables assume that the past rate of sedimentation would be constant (4.2 acre feet per year) in the future and that the local sponsor would perform little if any maintenance dredging.

TABLE 16
FUTURE WITH PROJECT CONDITION IN 25 YEARS (YEAR 2026)
NO MAINTENANCE

Habitat Type	Acre Feet of Aquatic Habitat*	SI Scale of 1-10	SF Scale of 1-5	SOU
Open Water Habitat 25% Dredging	(325 ac ft – 105 ac ft) = 220 ac ft	2	3	1,320
Open Water Habitat 50% Dredging	392 ac-ft – 105 ac ft = 287 ac ft	4	3	3,444
Open Water Habitat 75% Dredging	460 ac-ft – 105 ac ft = 355	5	3	5,325
Open Water Habitat 100% Dredging (Original Contour)	528 ac-ft – 105 ac ft = 423 ac ft	7	3	8,883

* These numbers represent what the capacity of the lake would be in 25 years assuming a sedimentation rate of 4.2 acre-feet per year after initial dredging.

As seen in the table above, in 25 years there will be a loss of 105 acre feet of open water aquatic habitat due to ongoing sedimentation. The condition of the lake after 25 years with only 25% removal will not be much better than conditions without a project. The without project condition yields an SOU of 1152 units in 2026. Removing 25% of the sediment will provide 1320 units of open water habitat in 2026. This alternative is clearly not feasible. An SI score of 2 was used because at the end of 25 years the lake will essentially be no better than the future without project condition.

Removing 50% of the existing sediment will, in 25 years, provide a lake with habitat conditions and capacity similar to baseline conditions in 2001. Consequently, the same SI score of 4 was used that provided an SOU of 3444, a score similar to present conditions (3,564 units).

Removing 75% of the sediment will produce conditions in 25 years that are better than that which currently exists. The lake will have 355 acre-feet of open water habitat or approximately 67% of the maximum amount that the lake could ever contain (528 acre feet). Since conditions would be improved, an SI index of 5 was utilized yielding an SOU of 5,325 units, which is an increase of 1,761 habitat units over baseline conditions.

100% sediment removal provides 423 acre-feet of open water habitat in 25 years or roughly 80 percent of the habitat that was available immediately after dredging. Under this scenario, habitat conditions in the lake would be good; an SI score of 7 was utilized that provided an SOU of 8, 883 units.

Table 17 below depicts the habitat conditions of the lake in 50 years with a project that is not maintained.

TABLE 17
FUTURE WITH PROJECT CONDITION IN 50 YEARS (YEAR 2051)
NO MAINTENANCE

Habitat Type	Acre Feet of Aquatic Habitat*	SI Scale of 1-10	SF Scale of 1-5	SOU
Open Water Habitat 25% Dredging	(325 ac ft – 210 ac ft) = 115 ac ft	1	3	345
Open Water Habitat 50% Dredging	392 ac-ft – 210 ac ft = 182 ac ft	2	3	1092
Open Water Habitat 75% Dredging	460 ac-ft – 210 ac ft = 250	3	3	2250
Open Water Habitat 100% Dredging (Original Contour)	528 ac-ft – 210 ac ft = 318 ac ft	4	3	3816

As can be readily seen in this table, the effect of ongoing sedimentation is devastating to North Park Lake. At 25% sediment removal, the lake in 2051 will be nearly as degraded as if there were not project at all. The without project condition in 50 years yielded an SOU of 261 units, which is only slightly worse than the 345 units shown above. At 50% sediment removal, the final SOU score in the year 2051 would be 1092 units, which is less than half the SOU that presently exists and is similar to projected conditions in 25 years without a project (1152 units) shown in TABLE 13. Because of the poor conditions that will result from ongoing sedimentation SI scores of 1 and 2, respectively, were assigned to the 25% and 50% dredging levels. Similarly, for dredging levels 75% and 100% SI scores were low due to the effects of ongoing sedimentation. Even at 100% dredging, the amount of open water habitat that would exist in 50 years after a project is completed and that is not maintained would only be 21 acre feet more than what now presently exists. The SOU in 50 years (3816 units) is similar to the present SOU of 3564.

TABLE 18 below summarizes the project changes over time for the various dredging options with no lake maintenance.

TABLE 18
SUMMARY COMPARISON OF SOU'S FOR VARIOUS DREDGING OPTIONS AND OVER DIFFERENT PROJECT LIFE STAGES WITH AND WITHOUT A PROJECT – NO MAINTENANCE

CONDITIONS	**TOTAL SOU**	**CHANGE IN SOU OVER BASELINE**	**PROJECT BENEFITS** (Difference between with and without project condition)
Current Baseline	3,564		
FW/OPC 25 Yrs	1,152	2,412 SOU decrease	
FW/PC 25 Yrs			
25% Dredging	1,320	2,244 SOU decrease	168 SOU
50% Dredging	3,444	120 SOU decrease	2,292 SOU
75% Dredging	5,325	1,761 SOU increase	4,173 SOU
100% Dredging	8,883	5,319 SOU increase	7,731 SOU
FW/OPC 50 Yrs	261 SOU	3,303 SOU decrease	
FW/PC 50 Yrs			
25% Dredging	345	3,219 SOU decrease	84 SOU
50% Dredging	1092	2,472 SOU decrease	831 SOU
75% Dredging	2250	1,314 SOU decrease	1,989 SOU
100% Dredging	3816	252 SOU increase	3,555 SOU

The summary table above clearly shows that if all of the sediment were removed without regular maintenance that ongoing sedimentation would return the lake to its near baseline condition within 50 years. There would only be a 252 SOU increase over baseline after 50 years if all of the sediment were removed. Without maintenance, the lake will improve for the first years of its life then decline quickly as the lake ages. Project benefits after 50 years range from a low of 84 to a high of 3,555 SOU. Removing lesser amounts of sediment would still provide project benefits over the future without project condition as shown in the project benefits column.

5.5 SOU – Future With Project Conditions – With Maintenance

As shown in the tables below, maintenance performed at the lake by the local sponsor to remove incoming sediment on a routine basis will greatly extend the viability of the lake and make the sponsor's and Federal Government's initial investment of funds worthwhile.

Table 19 demonstrates the efficacy of regular maintenance and how important it is to lake longevity.

TABLE 19
ESTIMATED LIFE EXPECTANCY AND ACRE FEET OF HABITAT GENERATED BASED UPON REMOVING VARYING AMOUNTS OF SEDIMENT – WITH ANNUAL MAINTENANCE

Number Of Cubic Yards Of Sediment Removed From Lake Amount (Percent)	**Ecosystem Outputs - Acre Feet Of Open Water Habitat Created***	**Estimated Life Expectancy In Years***
101,250 CY (25%)	325 acre feet	13
202,500 CY (50%)	392 acre feet	43
303,750 CY (75%)	460 acre feet	74
405,000 CY (100%)	528 acre feet	104

*Based upon studies conducted by the District, approximately 2.0 acre feet (3225 CY) of sediment per year could realistically be removed from the lake by the local sponsor leaving an annual accumulation of 2.2 acre feet.

TABLE 19 displays the lake's life expectancy before it slowly degrades to baseline conditions if it were regularly maintained. Sedimentation is a natural process that cannot be completely controlled. It occurs in all manmade lakes to some degree. The severity of accumulation depends upon conditions in the watershed. Even though sedimentation cannot be totally eliminated, it can be managed. At North Park Lake, management at least as far as the Lake is concerned, must center on regular sediment removal. If this were routinely accomplished, as shown above, the lifespan of the lake would be nearly doubled for each option. Regular maintenance will help maintain the viability of the lake as well as its habitat diversity and productivity and greatly increase the value of the investment.

TABLE 20 below shows the calculation of SOU's for a future with project condition in 25 years with the assumption that the lake will be regularly maintained by the removal of 2 acre-feet of accumulated sediment per year.

TABLE 20
FUTURE WITH PROJECT CONDITION IN 25 YEARS (YEAR 2026)
WITH ANNUAL MAINTENANCE

Habitat Type	Acre Feet of Aquatic Habitat*	SI Scale of 1-10	SF Scale of 1-5	SOU
Open Water Habitat 25% Dredging	(325 ac ft – 55 ac ft) = 270 ac ft	3	3	2,430
Open Water Habitat 50% Dredging	392 ac-ft – 55 ac ft = 337 ac ft	5	3	5,055
Open Water Habitat 75% Dredging	460 ac-ft – 55 ac ft = 405	7	3	8,505
Open Water Habitat 100% Dredging (Original Contour)	528 ac-ft – 55 ac ft = 473 ac ft	10	3	14,190

* These numbers represent what the capacity of the lake would be in 25 years assuming a sedimentation rate of 2.2 acre-feet per year after initial dredging.

Removing 25 % of the sediment under this scenario provides an SOU of 2,430 units, which is somewhat less than present baseline conditions, meaning that the lake would be more degraded in 25 years than it is now. Therefore the SI value assigned to this scenario was a 3. At 50% dredging, the habitat at 25 years with maintenance would generate 337 acre-feet of habitat, which is similar to the amount of habitat that would be generated by 75% dredging with no maintenance. For this output level, an SI of 5 was assigned. A similar relationship is found when you compare 100% dredging with no maintenance and the 75% dredging with maintenance option. They both generate about the same SOU. The primary difference is the 100% dredging option with maintenance shown above. At this level of dredging almost 90% of the original open water habitat created still exists at year 25. At this phase in the life of the lake, it would still be at optimal conditions of productivity, with another 80 years of life left. Hence, the SI value assigned to this option was 10, which yields an SOU of 14,190 units.

TABLE 21 below shows depicts the changes in SOU 50 years from baseline.

TABLE 21
FUTURE WITH PROJECT CONDITION IN 50 YEARS (YEAR 2051)
WITH ANNUAL MAINTENANCE

Habitat Type	Acre Feet of Aquatic Habitat*	SI Scale of 1-10	SF Scale of 1-5	SOU
Open Water Habitat 25% Dredging	(325 ac ft – 110 ac ft) = 215 ac ft	2	3	1,290
Open Water Habitat 50% Dredging	392 ac-ft – 110 ac ft = 282 ac ft	4	3	3,384
Open Water Habitat 75% Dredging	460 ac-ft – 110 ac ft = 350	5	3	5,250
Open Water Habitat 100% Dredging (Original Contour)	528 ac-ft – 110 ac ft = 418 ac ft	7	3	8778

* These numbers represent what the capacity of the lake would be in 50 years assuming a sedimentation rate of 2.2 acre-feet per year after initial dredging.

As shown on this table the SOU values after 50 years are reduced but still good. This is to be expected since sedimentation is unavoidable. With maintenance however, at 50 years the amount of open water habitat is 350 and 418 acre-feet respectively for the 75% and 100% dredging options. The SOU values for these options are 1.5 to 2.5 times greater that existing conditions and immensely better than the without project condition. With no action, the lake would, in effect be lost having only 261 SOU (TABLE 14). At 50 years the SOU's for either the 75% and 100% dredging levels are 5250 and 8778 respectively, which gives you a viable lake with a good fishery that still has years of life left in it before another major dredging project must be accomplished.

TABLE 22 below summarizes the project changes over time for the various dredging options with lake maintenance.

TABLE 22
SUMMARY COMPARISON OF SOU'S FOR VARIOUS DREDGING OPTIONS AND OVER DIFFERENT PROJECT LIFE STAGES WITH AND WITHOUT A PROJECT – WITH MAINTENANCE

CONDITIONS	**TOTAL SOU**	**CHANGE IN SOU OVER BASELINE**	**PROJECT BENEFITS** (Difference between with and without project condition)
Current Baseline	3,564		
FW/OPC 25 Yrs	1,152	2,412 SOU decrease	
FWPC 25 Yrs			
25% Dredging	2,430	1,134 SOU decrease	1,278 SOU
50% Dredging	5,055	1,491 SOU increase	3,903 SOU
75% Dredging	8,505	4,941 SOU increase	7,353 SOU
100% Dredging	14,190	10,626 SOU increase	13,038 SOU
FW/OPC 50 Yrs	261 SOU	3,303 SOU decrease	
FWPC 50 Yrs			
25% Dredging	1,290	2,274 SOU decrease	1,029 SOU
50% Dredging	3,384	180 SOU decrease	3,123 SOU
75% Dredging	5,250	1,686 SOU increase	4,989 SOU
100% Dredging	8,778	5,214 SOU increase	8,517 SOU

The summary table above clearly shows that if either 75% or 100% all of the sediment were removed with regular maintenance that the lake would still be a productive fishery in 50 years. With 75% removal, the project would generate a 1,686 SOU increase over current baseline conditions and would still have another 24 years of life left before major dredging would have to be performed. At 75% sediment removal, the project would generate benefits of 4,989 SOU's compared to the FW/OPC of 261 SOU. Better still is the 100% removal option. 25% of additional dredging produces an almost 50% increase in additional benefits (4989 SOU @75% dredging versus 8517 SOU @ 100% dredging)

5.6 Incremental Cost Analysis

TABLE 22 below shows the incremental cost, incremental output and the incremental cost per unit of output for successive levels of dredging. The costs were based upon the costs generated in TABLE 9 and the outputs were based upon the project benefits (SOU's generated) at 50 years from TABLE 22. It is assumed that because of the obvious project benefits the local sponsor will regularly maintain the lake.

TABLE 23
INCREMENTAL COST, INCREMENTAL OUTPUT, AND INCREMENTAL COST PER UNIT OF INCREASING OUTPUT TO THE NEXT SUCCESSIVE LEVEL
April 2006 Cost Level

PLAN:	CONSTRUCTION COST: (See Table 9)	OUTPUT (Benefits at 50 years)	INCREMENTAL COST	INCREMENTAL OUTPUT	INCREMENTAL COST PER INCREMENTAL UNIT OF OUTPUT
No Action	$0	0	$0	0	$0
25% Sediment Removal	$3,367,000	1,029 SOU	$3,367,000	1,029 SOU	$3,272
50% Sediment Removal	$5,560,000	3,123 SOU	$2,193,000	2,094 SOU	$1,047
75% Sediment Removal	$7,063,000	4,989 SOU	$1,503,000	1,866 SOU	$805
100 % Sediment Removal	$8,642,000	8,517 SOU	$1,579,000	3,528 SOU	$448

The table above shows that the most cost effective plan is removing 100% of the sediment. This plan gives the highest incremental benefits (incremental output of SOU) for the least incremental cost (3,528 SOU @ $448/SOU). It also provides the longest project life at 105 years, which decreases the annual costs. The next best plan is the removal of 75% of the sediment. The incremental cost per unit of output is $805/SOU. This is $242/SOU less than the 50% dredging option but $357/SOU more than the 100% dredging option. The removal of 75% of the lake sediments would give a project life of 74 years, which is also acceptable.

5.7 Average Annual Costs

Average annual costs (based upon the construction costs only) for the 75% and 100% dredging options have been determined below. The costs were based using a discount rate of 5.125%. Costs were annualized using a project life of 50 years. Operation and maintenance costs of $48,800 annually were calculated based upon removing 2 acre feet (about 3,200 CY) of sediment per year at $15 per cubic yard and replacing vegetation that fails to establish.

To remove 100% of the sediment, the average annual cost is $556,083. Based upon the benefits of generating 8,517 SOU at year 50 the average annual cost per SOU is approximately $65.

To remove 75% of the sediment, the average annual cost is $463,396. Based upon the benefits of generating 4,989 SOU at year 50, the average annual cost per SOU is approximately $93.

5.8 Other Issues Affecting Decision Making

5.8.1 Sediment Placement Area Selection

As mentioned earlier in Sections 3.5 and 3.8 some private citizens expressed concerns regarding use of Latodami field for sediment placement. Some representative e-mails received by the District on this facet of the project are shown in the correspondence APPENDIX 1. The perception of the Latodami Site's biological attributes by a vocal minority of local residents (Friends of Latodami) is that it is a high quality upland habitat that should remain totally undisturbed. Scientific, biological investigations conducted by the District in concert with the Local Sponsor and several interested individuals from the "Friends of Latodami" group determined that this site is simply a former agricultural field, that because of past disturbance, contains a high percentage of non-native, exotic vegetation that not only does not provide high quality wildlife habitat, but is actually detrimental to wildlife and avian populations.

Part of the perception problem by local citizens stems from the large number of artificial nesting boxes that have been placed in the field for bluebirds and other cavity nesters, which are, in fact, used by these species. It has been shown in this report that if this site were utilized for sediment placement, it could be improved over existing conditions, and that if the nesting boxes were replaced, the bluebirds and other cavity nesters would return.

Subsequent investigations of the reclaimed gob pile known as the Wildwood Sediment Placement Site, revealed that it was potentially available to the County and feasible to use for sediment placement. Assuming that the County's current efforts to acquire this property will be successful, the sediment will be placed there instead of at the Latodami site. The selection of this site will increase the total cost of the ecosystem restoration project because the County will have to acquire this additional property. If negotiations fail, the Latodami site would be used for sediment placement (after appropriate Section 106 studies at the site are completed) or else the project would have to be completely abandoned simply because the District has determined that there is no other economically feasible place to put the dredged sediment.

5.8.2 Other Consequences of the No Action Alternative

If the local sponsor elects the no action alternative, it will eventually lose the lake as previously stated. Moreover, if the no action alternative is ultimately followed, sediment will continue to accumulate in the lake and behind the dam to dangerous levels that, in the long term, could threaten the dam's structural integrity. Should the dam fail in the

future, an uncontrolled flow of tons of sediment would move downstream into Pine Creek. This would devastate the Pine Creek fishery; cause downstream flooding problems; and threaten the health and safety of residents whose houses and businesses are near the creek. To avoid this safety issue, the dam would eventually have to be breached or the lake dredged. If breaching is selected, a large portion of the sediment load will still have to be removed to avoid downstream sedimentation. Reservoirs created by dams require routine maintenance. Therefore, the County has no choice but to maintain this dam. They can choose to maintain it now in partnership with the Corps under Section 206 or some time in the future with no guarantee of Corps participation utilizing some other Federal, State or local funding vehicle. Regardless of the path it takes, the County cannot ignore the sedimentation problem at North Park Lake; it must eventually take action to maintain the dam and manage the sediment behind it.

5.9 Final Comparison of Alternative Plans and Identification of the National Ecosystem Restoration Plan

The decision to proceed with a project is ultimately up to the local sponsor. This report has presented various dredging options, explained the impacts of alternative plans, presented costs of alternatives, and analyzed the outputs incrementally. It is the opinion of this District that either of two options would be a "best buy" plan. These plans would be removing either 75% or 100% of the sediment by draining the lake and removing it mechanically. The table below offers a side by side comparison of these two dredging options.

TABLE 24
FINAL COMPARISON OF BEST BUY PLANS
Based Upon Total Preliminary Cost Estimates from Tables 8 & 8a

Alt 4 - 100% Sediment Removal	**Alt 5 – 75% Sediment Removal**
Generates 8517 SOU @ year 50	Generates 4989 SOU @ year 50
Cost $21.34 per cubic yard to remove sediment	Cost $23.25 per cubic yard to remove sediment
Total Preliminary Cost is $11,546,000	Total Preliminary Cost is $9,691,000
Local Share $6,546,000	Local Share $4,691,000
105 year project life	74 year project life
Average annual cost per SOU = $65	Average annual cost per SOU= $93

Of the two plans, 100% sediment removal (Alternative 4) is the most cost effective, since it provides the greatest return for the investment. This plan would be considered the National Ecosystem Restoration (NER) Plan. The Local Sponsor has also expressed that removing 100% of the sediment would be their locally preferred plan and will provide funding to cover all costs over the statutory Federal limit of $5,000,000. The construction features of the NER plan are discussed below.

Ω

6.0 DESCRIPTION OF ALTERNATIVE 4 – THE NER AND LOCALLY PREFERRED PLAN

6.1 Plan Description

The information presented below supplements the data on Alternative 4, the 100% sediment removal alternative that has been presented in this report.

6.1.1 Mechanical Sediment Removal, Placement, and Heavy Equipment

The lake will be completely drained using the outlet valve near the spillway. Once the lake is drained, access roads will be constructed to the lake to allow machinery to enter and exit the lake at some or all of the access areas previously described in this report. The decision to use the access areas identified will be up to the individual contractor who ultimately bids successfully on the job. It is anticipated that low-pressure, crawler (track mounted) hydraulic excavators similar to the one pictured to the left, will be used to remove the sediment from the lake bottom.

The contractor will probably start from the shallow ends of the lake and move in a downstream direction to permit the deeper areas of the lake to dry while the more shallow areas are excavated. The excavators will directly load tri-axel dump trucks with sediment. Track mounted dozers similar to the one pictured at the right would then be used to rough grade the lake bottom after the excavators remove the sediment.

Under the NER/Locally Preferred plan, 100% of the sediment will be removed from the lake, which totals approximately 405,000 cubic yards. Under this scenario where 100 percent of the sediment will be removed, the County, Bull Pen, and Wildwood sites would likely be utilized for sediment placement. Sediment will be trucked to these sites via the routes described previously in this report (Section 4.5.6 and TABLE 5). The sediment will be placed on

these sites and worked with a bulldozer to dry it and spread it evenly in 6 to 12 inch lifts. Each lift or layer would then be compacted by the use of a sheep's foot roller similar to the one shown in the photo to the left. These could be either self propelled or static (pulled by a tractor) as shown in the photograph.

6.1.2 Sediment Placement

The Contractor will have discretion regarding the usage of the identified sediment placement areas. Initially, sediment that is removed from the lake will be quite wet. It is probable that the Contractor will truck this sediment to the Bull Pen site where it can be spread and dried, compacted and possibly left in place. As work progresses and as drier sediment is encountered, it can be distributed among the three sites (Bull Pen, County and Wildwood) in the most efficient manner. Before the placement begins erosion and sediment control measures will have been put in place to preclude sediment from entering Pine Creek or the North Park Lake.

6.1.3 Road Modifications and Safety Precautions

To reduce truck travel time and maintain public safety during construction, traffic flow within the park will be modified in conjunction with the posting of signage, placement of temporary stop lights and deployment of flagmen at key intersections and truck access points.

Because of the frequency of truck traffic anticipated during active construction (one truck leaving/entering the lake every 3 to 5 minutes) flagmen or self activating traffic signals will be placed at each access points along Lake Shore Drive, and Pierce Mill Road. Traffic control will be located at the Gold Star, Mars, Point, Rosebarn, and Pierce Mill Road equipment laydown and access areas around the lake as well as along South Ridge Road at the southern boundary of the park near the Round Top Picnic Grove adjacent to the Wildwood sediment placement area. In addition some roads or portions of roads may be blocked entirely to public access or may allow limited access depending upon safety concerns. Concrete Jersey barriers may also be installed on highly traveled roads to keep truck traffic separate. Traffic patterns and direction of traffic flow in the park may also be modified temporarily during construction. Specific traffic planning details will be developed during the Plans and Specifications phase of the project in coordination with the County and PennDOT .

6.1.4 Daily Operating Schedule

To run machinery in a cost effective manner means that heavy equipment will run at least 10 hours per day. It is anticipated that the contractor will run his equipment from 7:00 AM till at least 5 PM or longer each work day or as long as lighting conditions permit.

6.1.5 Public Safety Precautions

Where there is defined access such as at piers and walkways and construction access, measures, such as erecting orange safety fencing, placing warning signs and putting up construction taping, will be implemented to restrict public access to help avoid encountering unsafe conditions.

6.1.6 Wetlands Creation/Enhancement and Protection

6.1.6.1 Wetlands Creation/Enhancement

The proposed plan would enhance existing wetlands and create additional wetland acreage within North Park. The Corps has suggested to the local sponsor that the regularly mowed, low-lying lands bordering the left descending bank of the North Fork of Pine Creek should be allowed to revegetate naturally. The diversity and productivity of these degraded wetlands would dramatically increase by allowing the growth of a more diverse wetland plant community. APPENDIX 10 contains more specific detail on the creation of these wetlands.

6.1.6.2 COIR Logs

Coir logs will be installed along approximately 7,000 feet of shoreline of the lake to reduce shoreline erosion and restore wetland vegetation where currently there is bare or nearly bare shoreline. PLATE 20 of APPENDIX 5 shows the location of coir logs that will be placed at the shoreline. The coir logs will be placed on the lake bottom in very shallow water. The coir log is about 12 inches in diameter, and half of it will extend above the water line. The logs will be held in place using wooden stakes pounded into the lakebed on both sides of the log. Then a natural rope, such as sisal, is then tied between the wooden stakes to stabilize the log. Wetland plants are then planted within the coir log. Over time the wetland plants will establish and the coir log will deteriorate so that only wetland plants will remain. A simple diagram of a staked coir log placed at the toe of a bank is shown in FIGURE 6 at the left.

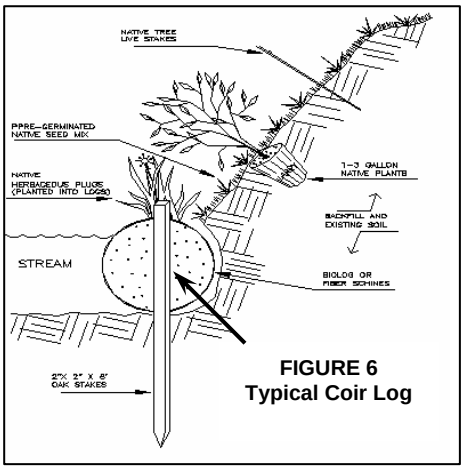


FIGURE 6
Typical Coir Log

APPENDIX 10 also contains more detail on wetland enhancement through placing and planting coir logs. (Note the APPENDIX uses 5,000 feet of coir logs. Since this APPENDIX was created, the proposed length of coir logs has been increased to 7,000 feet.)

6.1.6.3 Protection of Existing Wetlands

Within North Park Lake, the proposed project would help protect the existing wetlands that have developed in the upper section of the Pine Creek arm of the lake. To maintain the integrity of these wetlands during and after sediment removal, a barrier constructed of rock will be placed across the width of the lake at the downstream leading edge of these wetlands to prevent head cutting. If this were not accomplished, the wetland soils would naturally move downstream into the deepened dredged areas of the lake until the soil slope interface between the dredged area and the higher elevation of the wetland soils becomes stable. The simple line sketches contained in the Figures below illustrate why this is necessary.

Figure 7 - Plan View – Wetland Protection Barrier
Pine Creek Arm of North Park Lake
(not to scale)

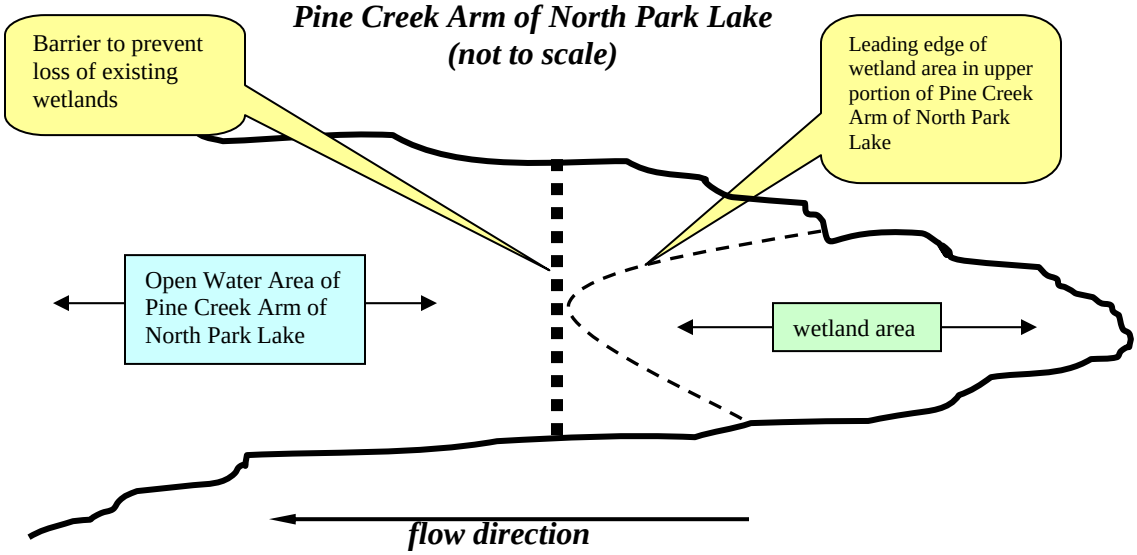


Figure 8 – Cross Section - *Wetland Protection Barrier*
Pine Creek Arm of North Park Lake
(Exaggerated for clarification - not to scale)

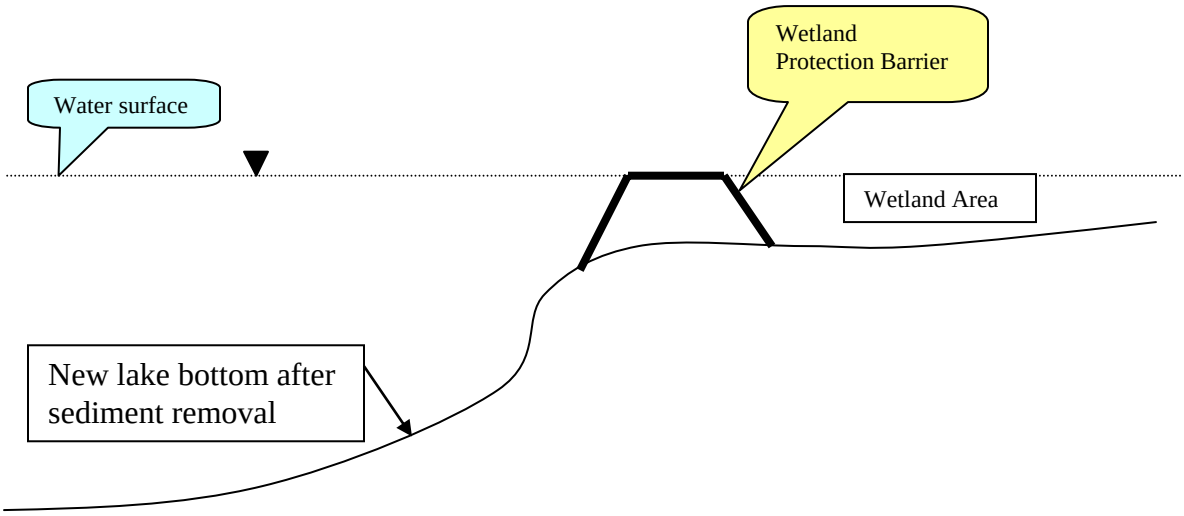
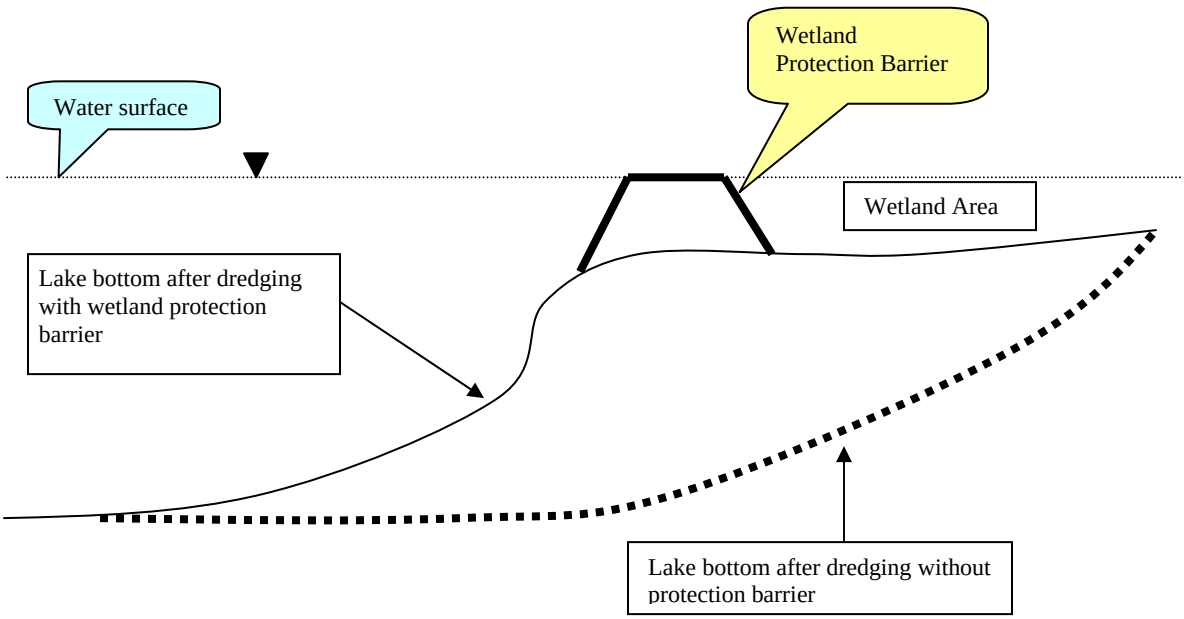


Figure 9 – Cross Section Wetland Protection Barrier
Lake Bottom With and Without Wetland Protection Barrier
Pine Creek Arm of North Park Lake
(Exaggerated for clarification - not to scale)



The wetland barrier would consist of a 10-foot high rock dike 12 feet wide at the top with 1 on 3 side slopes. The top of the rock material will be at elevation 960 NGVD.

Approximately 3,450 cubic yards of rock will be needed to construct the barrier. Drawings depicting the construction of this barrier is contained in APPENDIX 5, PLATES 5-7 through 5-9.

6.1.7 Creation of Fish and Benthic Habitat

PLATE 21 of APPENDIX 5 shows schematically, in plan view, the placement of individual mixed stone rock piles, rock humps, and porcupine cribs on the lake bottom that will create usable fish habitat after the lake is dredged. The PLATE shows the arrangement of these structures along the various contours of the lake.

6.1.7.1 Mixed Stone Rock Piles and Rock Humps

The mixed stone rock piles will consist of nine, 20-ton piles placed in deep water near the dam. Rock humps will be consist of 1 to 2 tons of rock spaced at 20 ft intervals at the four and seven-foot lake bottom contours. Approximately 930 rock piles will be placed on the lake bottom. As shown on PLATE 21 these will be placed throughout the lake and together will provide excellent aquatic habitat for both fish and benthic macrovinertebrates. Both of these structures will last indefinitely as long as they don't silt in. They will be placed in the dry by dump truck after the lake is dredged.

6.1.7.2 Porcupine Cribs

Porcupine cribs and porcupine crib juniors will be placed at the eight to ten-foot deep lake bottom contour in groups of 5-6 in the form of open circles as recommended by the Pennsylvania Fish and Boat Commission.. These will be placed in conjunction with the base of the dam breast, drop-offs, benches, points, islands, overhanging trees, rubble humps etc. For accurate placement, these fish habitat structures will be constructed in the dry while the lake is still down and after the sediment has been removed. The cribs could also be placed in the wet, however the accuracy of placement is comprised. Several photographs of porcupine cribs being placed in a reservoir in the dry and by boat are shown in APPENDIX 3. Approximately 160 porcupine cribs and 450 porcupine crib juniors will be placed in the lake.

6.1.8 Miscellaneous Habitat Creation

As noted in Section 3.12 two osprey nesting platforms will be constructed, one on each arm of North Park Lake. For construction details see Section 3.12.

In addition to the aquatic habitat features described above in Section 6.1.7, the District will be placing gravel in several locations primarily as part of the access ramp construction activities. The gravel from these access ramps located beneath the surface of the lake could be left to provide additional habitat for fish and benthic macroinvertebrates. This will help reduce construction costs and at the same time increase bottom habitat value.

6.1.9 Sediment Placement Area Construction and Management

The final treatment of the sediment placement areas will consist of final grading and surface modifications to improve its value for the establishment of vegetation and for wildlife. Native vegetation will be selected and planted in cooperation with the local sponsor. APPENDIX 9 contains recommended sediment treatment options to increase the habitat value of the placement areas.

6.2 Plan Implementation

Upon approval of this report by higher authority, the next phase of study, Plans and Specifications, will be initiated. Once this phase of work is completed and all required state permits are obtained, a contact bid package will be advertised. Once a contactor's bid is selected, the contract will be awarded. Actual construction would then commence within 90 days after contract award. See TABLE 26 for estimated schedule.

6.3 Monitoring

Monitoring will have to be done by the local sponsor after project construction is completed. Most of this monitoring will involve inspecting the sediment placement and wetland areas to observe whether planted vegetation survives. As time progresses, and vegetation establishes, the need for monitoring will diminish.

6.4 Real Estate

6.4.1 Work Area Access and Easements

Access to the lake will be accomplished on existing park/public roads. The Local Sponsor, Allegheny County owns all of the land needed for access to the lake and for work in the lake. The only properties required for this project that are not currently owned by the County is related to the Wildwood sediment placement site. To gain access to the site, and use it, easements from three separate property owners will be required. This may change if the County successfully acquires the Wildwood sediment placement site prior to construction. For details regarding acreage and the type of easements required to implement the project see the Real Estate Plan, APPENDIX 6.

The total acreage required to construct the project is 210.58 acres, which includes 7.98 acres for temporary road easements, 137.29 acres for temporary work area easements, 0.55 acres for utility easements and 64.76 acres in fee (the Wildwood Site). For more information see the Real Estate Plan, APPENDIX 6. The Local Sponsor recently indicated that they are in the process of negotiating for the acquisition of the Wildwood site.

6.5 Total Project Cost

TABLE 25 provides a brief summary breakdown of the total project cost to implement the NER (100% sediment removal) Plan. The total cost is the cost to construct the project as of April 2006 and includes updated real estate costs for the County's acquisition of the Wildwood sediment placement area. The fully funded cost is based upon adjustments for inflation over the length of the entire design and construction effort.

TABLE 25
Summary Costs of Entire Project
Fully Funded Cost Breakdown
April 2006

Account No. and Description	**April 2006 Total Project Cost (Includes Contingencies)**	**Fully Funded Cost Level**
01- Lands and Damages	$784,000	$803,000
12 – Dredging (100%)	$8,761,000	$9,237,000
22 – DPR Sunk Costs	$1,050,000	$1,050,000
30 - Planning, Engineering and Design	$876,000	$897,000
31 - Construction Management	$657,000	$693,000
Total*	**$12,128,000**	**$12,680,000**

*The maximum Federal cost for any Section 206 project is $5,000,000. The local 35% share of a project at this limit is $2,692,307.60. Because the Local Sponsor has agreed to pay for 100 percent of the cost over the $5,000,000 Federal cost sharing limit, their total cost based upon the fully funded estimate will be $7,680,000**.**

The construction cost estimate shown above, including appropriate contingencies, has been developed using the MCACES software and is in conformance with the Civil Works Breakdown Structure (CWBS). The unit prices for the construction features have been calculated by estimating the equipment, labor, material, and production rates suitable for the project being developed. A more detailed breakdown is contained in APPENDIX 4 (Project Cost Estimate). The project cost estimate includes costs for code of accounts 01 Lands and Damages; 12 Dredging; 22 DPR sunk costs (costs to date for the DPR); 30 Planning, Engineering and Design; and 31 Construction Management. The actual construction costs are based on April 2006 prices for plant, labor, materials and supplies. The other costs associated with the project are based upon cost information furnished by the appropriate functional areas.

6.6 Operation and Maintenance Requirements

6.6.1 Sediment Management

As required under the Section 206 program, the operation and maintenance of the project will be a responsibility of the local sponsor. Allegheny County will be responsible for 100 percent of this cost for the life of the project. To maintain the lake after it is restored, the local sponsor will have to regularly remove sediment as it accumulates behind the wetlands protection dike and possibly in back of the small weir in the upper end of the North Fork arm of Pine Creek. The District estimates that 2.0 acre-feet of sediment per year should be removed to maximize the project life. One acre-foot translates in volume to 1613 cubic yards. Therefore 3,226 cubic yards of material must be removed per year from the lake. This translates to approximately 400 truckloads of sediment (3226 CY @ 8 CY per truck load). At a cost of approximately $15 per cubic yard, the cost to the County to remove this amount of sediment on an annual basis would be about $48,400.

To reduce this yearly maintenance responsibility would require that the control of sedimentation be made at its source. To achieve meaningful reductions in the amount of sediment entering the lake from Pine Creek and the North Fork of Pine Creek, the County and local authorities would have to implement and strictly enforce a watershed management program that effectively manages residential and commercial development to reduce uncontrolled runoff, soil erosion, and its resultant nutrient loading of Pine Creek and its tributaries within the Pine Creek Basin. Reductions in sedimentation within the basin will effectively increase the life expectancy of the ecosystem restoration project and reduce the yearly expenditure of funds needed to keep sedimentation under control.

6.6.2 Wetland and Sediment Placement Area Management

The Local Sponsor will have to monitor the wetland vegetation planted within the COIR logs, riparian areas and sediment placement areas and to replace that vegetation which may not establish. It is estimated that there will be an annual failure of 10% of the vegetation planted for at least two years. This vegetation will have to be replaced until it establishes. It is estimated that it would cost the local sponsor approximately $4,000 the first year and $3,000 the second to replace wetland vegetation that fails to establish after project completion. Annualized over 50 years this cost works out to be approximately $400 per year.

Based upon the above, the estimated total annual cost for the operation and maintenance over of this project to replant vegetation and remove sediment is $48,800 per year. Only sediment control will be a permanent maintenance activity.

6.7 Preliminary Schedule of Future Efforts to Reach Construction

Table 26 below provides a preliminary schedule of the major milestones that need to be accomplished to complete the project.

TABLE 26
NORTH PARK LAKE ECOSYSTEM RESTORATION
PROJECT MILESTONES
Plans & Specifications and Construction Phases

Milestone	Duration	Begin	End
DPR Approval	3 Months	Sep 2006	Nov 2006
Plans & Specs	12 Months *	Jan 2007	Dec 2007
PCA drafting & execution	5 Months	Oct 2007	Feb 2008
RE Acquisition**	18 Months	May 2006	Oct 2007
Issue P&S and Advertise Contract	3 Months	Feb 2008	Apr 2008
Award Contract	1 Month	May 2008	May 2008
Construction	24 Months	Jun 2008	May 2010

*Includes review time
**Local Sponsor expressed a desire to acquire Real Estate ahead of PCA execution.

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7.0 STATUS OF ENVIRONMENTAL COMPLIANCE WITH ENVIRONMENTAL PROTECTION STATUTES

Table 27 below lists the Federal Statutes with which the Corps of Engineers must comply.

TABLE 27 – COMPLIANCE WITH 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 Act (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	FC**
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
Environmental Justice in Minority Populations and Low-Income Populations (E.O.12898)	FC	FC
Analysis of Impacts on Prime and Unique Farmland	FC	FC
State And Local Policies	FC	FC

FC - full compliance; NA - not applicable
***Full compliance achieved when the District receives Section 401 Water Quality Certification from the Commonwealth of PA**
****Full compliance achieved after the District Engineer signs the FONSI.**

To meet the requirements of Section 404 of the Clean Water Act, the District has prepared a Section 404(b)(1) evaluation which considers the effects of the discharge of fill materials, i.e. the stone for the wetland protection dike, wood used to construct porcupine cribs, and the movement of sediment on the lake bottom during excavation. See APPENDIX 11. The requirements of the Fish and Wildlife Coordination Act and Section 7 of the Endangered Species Act have been met through District communications with the US Fish and Wildlife Service Field office located in State College, PA. The Service elected to not participate in the project stating that it would benefit the environment without causing adverse environmental effects.(SEE APPENDIX 1 Memo of a telephone conversation with the field office. The Service also stated in a letter dated

June 6, 2006 that the project would not impact any Federally listed endangered or threatened species or their habitat. See APPENDIX 1. The requirements of Section 106 of the National Historic Preservation Act has been fulfilled by the Districts coordination with the Pennsylvania State Historic Preservation Officer and the consideration of the effects of the project on extant cultural resources.

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8.0 LIST OF PREPARERS

The following Corps of Engineers team members participated in the development of this Section 206 ecosystem restoration project:

Larry Moskovitz – Planning and Environmental Branch
Carmen Rozzi – Planning and Environmental Branch
Mike Fowles – Operations Division - Wildlife Specialist
Rose Reilly – Technical Services Division – Water Quality
Jim Kelly – Technical Services Division - Real Estate
Jeff Horneman – Technical Services Division - Real Estate
Jim Kosky – Technical Services Division -Hydraulics and Hydrology
Paula Boren – Technical Services Division – Cost Engineering
Robert Waigand – Technical Services Division – Cost Engineering

Gary Cooper (Former District Employee)
Craig Carney – (Former District Employee)
Kirk Piehler – (Former District Employee)
Paul Donahue – (Former District Employee)
Gerald Barczyk –(Former District Employee)
Dilip Kothari – (Former District Employee)

In addition, representatives of the local sponsor, Allegheny County, provided invaluable input to the genesis and final development of the proposed project:

Tom Donatelli, P.E. – Allegheny County, Director of Public Works
Andrew Baechle – Allegheny County, Director of Parks and Recreation
Gene Vaskov, P.E. – Allegheny County, Manager, Geotechnical Division
Rich Nagel – Allegheny County, Parks and Recreation

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9.0 Independent Technical Review

According to the Pittsburgh District's Quality Management Plan, an independent technical review of all District products is required. Accordingly, an independent technical review (ITR) team headed by a Regional Technical Specialist (RTS) from another District to avoid bias was assembled to review the report and provide comments

and corrections where required. Comments on the report were made using "Dr. Checks" software. Copies of the comments and how they were satisfactorily addressed are on file in the Pittsburgh District office.

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10.0 Public Involvement

The District has coordinated extensively with its local sponsor in the development of this project. During preparation of this DPR and Environmental Assessment, the District coordinated with the U.S. Fish and Wildlife Service, The U.S. Natural Resources Conservation Service, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Environmental Protection, Pennsylvania Game Commission, Pennsylvania Fish and Boat Commission, and the Pennsylvania State Historic Preservation Office. In addition an evening public meeting was held in February 2003 at North Park to brief the public about the project.

As part of the review process, the interested Federal, state and local government agencies listed below as well as interested citizens and citizens groups were given copies of this draft report and environmental assessment in computer disc (CD) format for a 30-day review period:

U. S. Fish and Wildlife Service
U. S. Environmental Protection Agency
U.S Department of Agriculture, Natural Resources Conservation Service
Pennsylvania Department of Environmental Protection
Pennsylvania Fish and Boat Commission
Pennsylvania State Historic Preservation Office
Pennsylvania Game Commission
Pennsylvania Department of Transportation
Pennsylvania Department of Conservation and Natural Resources
Allegheny County
Allegheny County Sanitary Authority
Libraries
    Carnegie Library of Pittsburgh – Main Branch – Oakland
    Northland Public Library – 300 Cumberland Road, North Hills
Interested citizens who submitted comments to the District as the report was being developed

After the 30 day review period, the District will address all comments received on the draft report period and will revise the report as necessary. The final report will contain a listing of all of the comments made as well as the District's responses in a separate APPENDIX. The report will be finalized with all necessary revisions and will be sent to those who received a draft report as well as to those who made comments. As noted in the list above, copies of the report will also be placed in local libraries for public review.

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11.0 Conclusions

This ecosystem restoration report and its attendant appendices have presented an in-depth analysis of existing conditions at North Park Lake. To restore the habitat that has been severely degraded by decades of sedimentation stemming from extensive suburban development will require radical ecosystem treatment. The treatment options carefully considered in this report, if implemented, will restore open water aquatic habitat, and improve the overall ecological, recreational, and aesthetic characteristics of the lake.

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12.0 Recommendations

Alternative 4, NER plan, which is also the locally preferred plan, as presented in this report is the most cost effective alternative that produces maximum benefits for the least cost. The cost of the NER plan exceeds the statutory Federal cost sharing limits. However, the Local Sponsor has agreed to pay for 100% of the cost that exceeds the Federal share. Having considered the biological deficiencies of North Park Lake, the District recommends approval of this Feasibility Study and Integrated EA in order to allow the NER plan described herein to move into the next phases, Plans and Specifications and Construction.

Note: The recommendations contained herein reflect the information available at this time and current Departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to the Congress as proposals for authorization and implementation funding. However, prior to transmittal to Congress, the sponsor, the States, interested Federal agencies, and other parties will be advised of any modifications and will be afforded an opportunity to comment further.

_____ _____

Date

Steven L. Hill
Colonel, Corps of Engineers
District Engineer

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Finding of No Significant Impact

Detailed Project Report and Integrated Environmental Assessment
North Park Lake
Section 206
Aquatic Ecosystem Restoration Project

The Pittsburgh District is proposing to restore the open water habitat of North Park Lake that has been severely degraded by sedimentation. This ecosystem restoration project is being conducted under the authority of Section 206 of the Water Resources Development Act of 1996 (WRDA '96), Public Law 104-303.

Since the lake was constructed in the late 1930's it has lost over half its depth due to sedimentation resulting from uncontrolled development that occurred in the Pine Creek basin from the 1940's through the 1990's. Sedimentation has effectively eliminated 12 acres of open water habitat and degraded the remaining lentic habitat within the lake.

Under the National Environmental Policy Act, the Pittsburgh District prepared an Environmental Assessment of the Proposed Action, which has been integrated within a Detailed Project Report. Consultations were undertaken with the U.S. Fish and Wildlife Service pursuant to Section 7 of the Endangered Species Act. The District also coordinated with the Pennsylvania Department of Conservation and Natural Resources to determine potential impacts to state listed species of concern. To fulfill its obligations under Section 106 of the National Historic Preservation Act, this project was coordinated with Pennsylvania Bureau for Historic Preservation, State Historic Preservation Officer, to determine potential impacts to extant cultural resources.

The Detailed Project Report and integrated Environmental Assessment (DPR & EA) presents various alternatives to restore the open water habitat within North Park Lake as well as the no action alternative. Potential impacts were assessed with respect to: public safety, transportation, terrestrial and aquatic habitat, water quality, soils, erosion, air quality, protected species and habitat, demographics, socioeconomics, land use, recreation, cultural resources, environmental justice, aesthetics, and hazardous, toxic, and radioactive contaminants.

Alternative sediment placement areas were examined and analyzed utilizing a Pennsylvania Modified Habitat Evaluation Procedure (PAMHEP) to determine short and long and short-term ecosystem impacts. The sites recommended for sediment placement include a partially asphalt-paved field, (Bull Pen site), a former sediment placement area (County site) and a reclaimed coalmine waste (gob) pile. The PAM HEP study determined that the use of these sites would in the long term be beneficial and would ultimately increase their habitat value after vegetation is re-established.

To minimize impacts to Pine Creek downstream of North Park Lake during construction, the District will construct a rock filter downstream of the dam to trap sediment. Normal average flows entering the reservoir will be discharged through the gate. For higher than average flows, discharges will be made through the gate, and pumps will discharge flows over the spillway up to near bank-full capacity downstream. For even higher flows, such as during extreme flood events, water will be stored behind the dam and released through the gate in a controlled manner. During all of these events, the rock filter will help minimize downstream sedimentation. During the preparation of Plans and Specifications, additional studies will be made to more accurately define how excess flows will be handled during construction. The District will coordinate this information with the State to help ensure that discharges are controlled to minimize the chances for downstream flooding.

The primary concern identified in the report is public safety and traffic disruption in and around the park during construction. It will take about 50,000 thousand truck trips to move the approximate 400,000 cubic yards of sediment from the lake to the sediment placement areas under the recommended plan. This translates to about 12 trucks leaving the park per hour for 10 hours each day for 415 days. Trucks will have to travel through the park and on local roads to reach the sediment placement areas. To minimize the danger to pedestrian and vehicular traffic, actions will be taken to close portions of local roads to through traffic, separate trucks from public traffic, place traffic lights and signage and or post flagmen where necessary at dangerous intersections.

The recommended plan includes the following primary features:

1. Draining the lake and mechanically removing approximately 400,000 CY of sediment
2. Trucking the sediment to three placement sites, the County Site, Bull Pen site and Wildwood Road Site.
3. Establishing near-shore emergent wetlands in strategic places using COIR logs
4. Placing habitat on the lake bottom in the form of porcupine cribs, and rock rubble piles to increase cover for benthic organisms and fish.
5. Constructing two osprey nesting platforms, one on each arm of North Park Lake.
6. Constructing a wetland protection dike in the upper Pine Creek arm of the lake to protect valuable wetlands from head cutting after dredging is completed.

Placement of the physical habitat within the lake and construction of the wetlands protection dike is a fill activity that falls under the Clean Water Act. A Section 404(b)(1) evaluation prepared for this work determined that the proposed disposal site for discharge of fill material complies with the Section 404(b)(1) guidelines.

Copies of the draft report on CD have been circulated to various interested federal, state and local agencies and organizations, as well as to interested private citizens. Those who received a copy of the draft report will also receive copies of the final report in CD format. In addition, CD's containing the final report will be made available to local

libraries in the North Hills in the vicinity of North Park as well as the main branch of the Carnegie Library of Pittsburgh.

After having carefully evaluated and balanced all beneficial and detrimental aspects of the action proposed in this environmental assessment, including all regulatory agency input, I have reasonably concluded that the proposed project would not constitute a major Federal action significantly affecting the quality of the human environment because, in accordance with 40 C.F.R. § 1508.13 (1) there will be only limited cumulative impacts that will not be significant; (2) the aquatic habitat of North Park Lake would be dramatically improved by eliminating sediment buildup, providing additional cover for fish and benthos, and planting near shore emergent wetands, (3) there will be no significant impacts to ground-water resources, prime farmland, geology, soils, wetland resources, noise and air quality, and riparian habitat; and (4) impact on transportation and traffic near the park will only be temporary. Consequently, the preparation of an environmental impact statement under NEPA is not warranted. The public interest will be best served by the implementation of the proposed action. Further, the proposed work is in compliance with all applicable Federal, State, and local laws and regulations. This Finding of No Significant Impact precedes the Corps of Engineers final decision on the proposed action.

_____ _____

Date

Stephen L. Hill
Colonel, Corps of Engineers
District Engineer