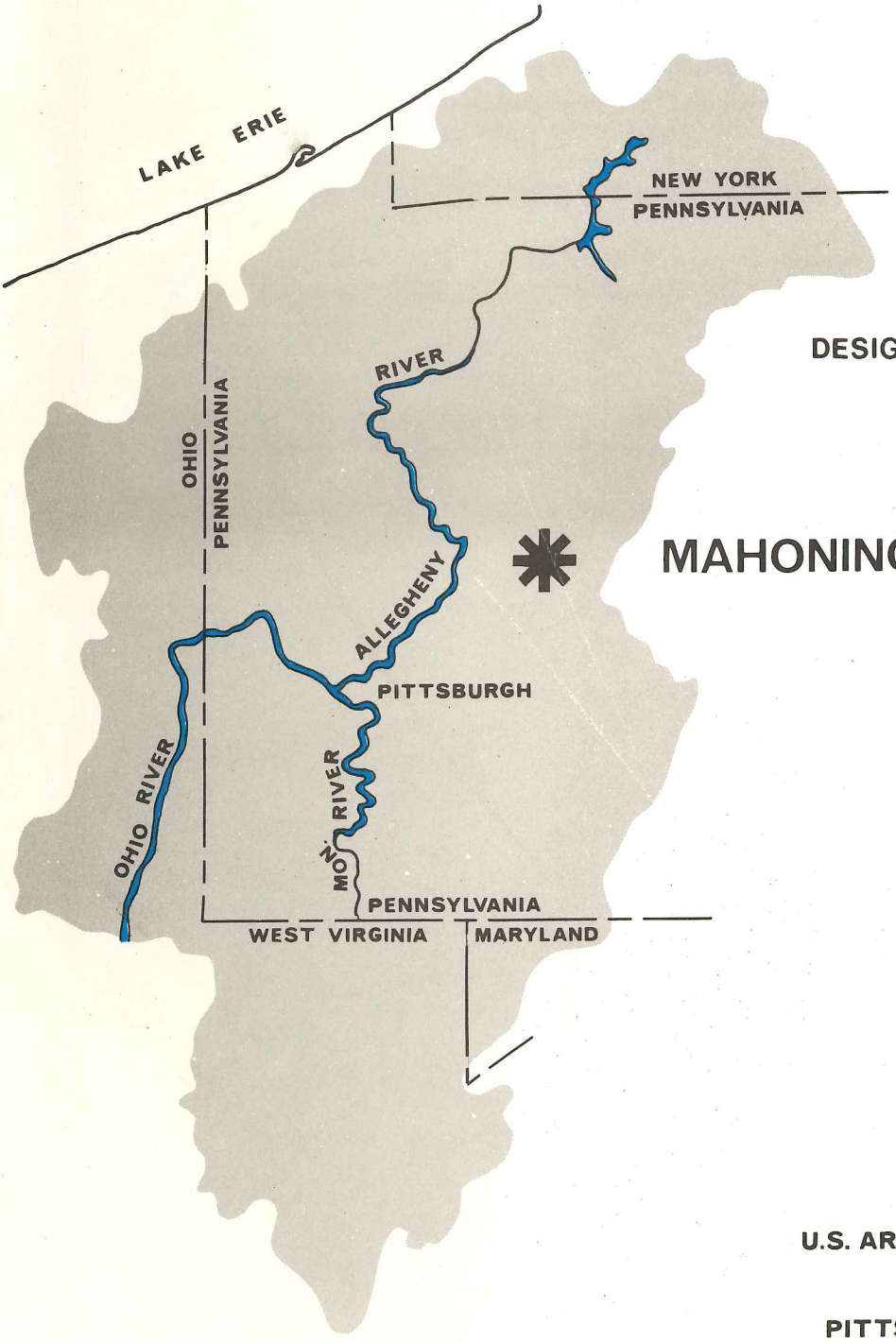
MAHONING CREEK LAKE

ALLEGHENY RIVER BASIN, PENNSYLVANIA



MASTER PLAN
DESIGN MEMORANDUM NO.1
OCTOBER 1976

MAHONING CREEK LAKE

U.S. ARMY ENGINEER DISTRICT
PITTSBURGH
CORPS OF ENGINEERS
PITTSBURGH, PENNSYLVANIA

DEPARTMENT OF THE ARMY
PITTSBURGH DISTRICT, CORPS OF ENGINEERS
FEDERAL BUILDING, 1000 LIBERTY AVENUE
PITTSBURGH, PENNSYLVANIA 15222

ORPED-PL

20 October 1976

SUBJECT: Updated Master Plan, Mahoning Creek Lake, Allegheny River Basin, Pennsylvania

Division Engineer, Ohio River
ATTN: ORDPD-R

1. References:

a. Letter, ORPED-PL to ORDPD, dated 18 August 1975 with one indorsement, subject: Special Report, Post-Authorization Change and Draft Environmental Impact Statement for Mahoning Creek Lake, Allegheny River Basin, Pennsylvania.

b. Letter, ORDPD-R to ORPED-PL, dated 14 January 1976, subject: Special Report, Post-Authorization Change and Draft Environmental Impact Statement for Mahoning Creek Lake, Allegheny River Basin, Pennsylvania.

2. Seven (7) copies of the subject updated Master Plan are submitted for review and approval. The basic plan of development presented in the attached Master Plan was orginially submitted by reference 1a as a Special Report for a Post-Authorization Change. In response to the guidance contained in the 1st Indorsement to reference 1a, the subject updated Master Plan has been prepared which includes a recommendation for an operational change to achieve a higher summer pool level and outlines a plan for the cost-shared development and non-Federal management of additional recreation and fishing and hunting access facilities on existing Federal land.

3. The revised Draft Environmental Impact Statement reflecting the additions and revisions requested by paragraph 5 of the 1st Indorsement to reference 1a is scheduled for filing and distribution by the third quarter, FY 1977.

4. Also included in this submittal are three (3) copies each of the draft cost-sharing contracts covering general recreation development, fishing and boating development and wildlife development and three (3) copies of a supplement covering contract deviations from the prescribed contract format as contained in ECI A-311 with justification for each deviation. The corrections and revisions to the cost-sharing contracts noted in reference 1b have been made and requested additional justifications for contract changes have been provided. The referenced letter also requested the justification for entering into separate contracts with two State agencies rather than a single contract covering full State interest in the project. In this regard, it should be noted that the Pennsylvania

ORPED-PL 20 October 1976

Subject: Updated Master Plan, Mahoning Creek Lake, Allegheny River Basin, Pennsylvania

Fish Commission and the Pennsylvania Game Commission are independent commissions separate from each other and separate and distinct from the Pennsylvania Department of Environmental Resources. Each commission has its own set of commissioners and own executive director and each has its own budget and source of funding. Funding for the Fish Commission comes largely from the sale of fishing licenses while the Game Commission is funded mainly through the sale of hunting licenses. For these reasons, separate contracts are definitely required.

5. With respect to the attached draft cost-sharing contracts, to date, the Pennsylvania Fish Commission and the Pennsylvania Game Commission have provided letters of intent with respect to cost-sharing. Armstrong County has withheld any commitment on the contract pending receipt of assurances of financial assistance from the Commonwealth of Pennsylvania. The Fish Commission's cost-sharing commitment is conditioned on reaching a separate agreement with Armstrong County to provide local maintenance of the proposed boat-launching area at the Milton Loop. Upon approval of the Master Plan, we will continue our coordination with the three parties to attempt to work out the final details of the proposed program. Funds for the cost-shared fishing access development with the Fish Commission and the hunting access development with the Game Commission are included in the FY 1978 Code 710 budget.

MAX R. JANAIRO, JR.
Colonel, Corps of Engineers
District Engineer

4 Incl
1. Updated Master Plan (7 copies)
2. 3 Draft Cost-Sharing Contracts (trip)
3. Supplement-Contract Deviations & Justification (trip)
4. Letter - Pa. Game Commission

MASTER PLAN

Design Memorandum No. 1

MAHONING CREEK LAKE
ALLEGHENY RIVER BASIN, PENNSYLVANIA

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LIST OF EXHIBITS

Letter	Description
A.	United States Department of the Interior Bureau of Outdoor Recreation letter dated 6 September 1974.
B.	United States Department of the Interior Fish and Wildlife Service letter dated 7 October 1974.

Letter	Description
C.	United States Department of the Interior Fish and Wildlife Service letter dated 14 January 1975.
D.	Pennsylvania Department of Environmental Resources letter dated 5 October 1973.
E.	Pennsylvania Fish Commission letter dated 28 November 1973.
F.	Pennsylvania Game Commission letter dated 13 September 1974.
G.	Tri-County Park Authority letter dated 21 September 1973.
H.	County of Armstrong, Pennsylvania letter dated 20 November 1974.
I.	County of Indiana, Pennsylvania letter dated 28 February 1974.
J.	County of Jefferson, Pennsylvania letter dated 13 March 1974.

LIST OF APPENDICES

Letter	Title
A.	Project Resource Management Plan *
B.	Forest Management Plan *
C.	Fire Protection Plan *
D.	Fish and Wildlife Management Plan *
E.	Project Safety Plan *
F.	Lakeshore Management Plan *
G.	Hydrologic Review

* To be prepared cooperatively with the appropriate agency(ies) subsequent to the preparation of this master plan.

MASTER PLAN
Design Memorandum No. 1

MAHONING CREEK LAKE
ALLEGHENY RIVER BASIN, PENNSYLVANIA

SECTION 1.0 - INTRODUCTION

1.1 AUTHORIZATION

1.1.1 General

Mahoning Creek Reservoir was authorized by the Flood Control Acts (Public Laws No. 738, 74th Congress and No. 761, 75th Congress), approved 22 June 1936 and 28 June 1938 respectively. Project construction was completed in 1941. During its 35-year existence it has been operated solely for flood control as a part of the flood control system for the Allegheny River Basin.

The project designation was changed from Mahoning Creek Reservoir to Mahoning Creek Lake by authority of EC 1130-2-75 and supplement thereto, EC 1130-2-1, dated 27 January 1971.

1.1.2 Specific Authorization

The authority for inclusion of recreation development at Mahoning Creek Lake is contained in Section 4 of the Flood Control Act of 1944 as amended by Section 207 of the Flood Control Act of 1962 which grants the Secretary of the Army general permissive authority to construct recreational developments at all water resource projects under his control. The construction of additional recreation facilities at the project will be in accordance with the policy for implementing the provisions of the Federal Water Project Recreation Act of 9 July 1965 in previously authorized projects. In accordance with this policy, all additional recreational facilities will be developed under a cost-sharing agreement with non-Federal interests.

1.2 PURPOSE

The purpose of this updated master plan is to provide a comprehensive review of the existing resources of Mahoning Creek Lake and to provide a long-range guide for the future development, management and use of these resources for optimum public benefit throughout the project life. It provides specific guidelines for the enhancement of the recreation and fish and wildlife opportunities of the project through a plan of revised project operation and plans for development and management of additional recreation facilities. This updated master plan supersedes and replaces the existing project Master Land Use Plan, dated 1950.

1.3 SCOPE OF THE STUDY

1.3.1 Study Areas

The collection and analysis of data used in the development of the master plan is limited to three distinct zones of influence.

The "Market Area" extends from the U. S. Government boundary to a hypothetical line generally described as an hour and a half driving time from the project.

The "Vicinity" consists of the area surrounding the project and extending approximately two miles from the U. S. Government boundary.

The "Existing Site" consists of the area within the confines of the existing U. S. Government boundary line.

1.3.2 Inventory

An inventory of significant project resources was conducted at a level of detail adequate for the development of sound plans for the future development and management of the project.

1.3.3 Establishment of Demands

Several reports, including the Outdoor Recreation Resources Review Commission Study, the Pennsylvania Statewide Comprehensive Outdoor Recreation Plan, and the Ohio River Basin Comprehensive Survey have established the concept and needs for recreation in Pennsylvania. These reports have been examined for information which relates directly to Mahoning Creek Lake.

Initial project recreation relative to the market area was then determined by examining similar Corps projects in accordance with Technical Report Number Two dated October 1969 and by comparing similar facilities existing in Pennsylvania within or close to the market area for Mahoning Creek Lake.

The estimated visitations were translated into activities and the activities turned into design load and initial and ultimate facility requirements.

The final step compared facility requirements with the limitations of the land and water resources. Facilities were adjusted as necessary.

1.3.4 Problems

A thorough analysis of all problems related to the development of the project area was conducted and an evaluation made to determine the impact of the study upon these problems.

1.3.5 Summer Conservation Pool

The feasibility of maintaining a higher summer conservation pool to enhance the recreation and fish and wildlife use of the project was investigated. This investigation included hydrologic feasibility, loss of flood control benefits, ecological disruptions and/or benefits and operational or management considerations.

1.3.6 Plan of Development

Based on a careful analysis of the project resources and an examination of the public demand on these resources, a plan of recreation facility development has been prepared including site plans, design criteria, and cost estimates.

1.3.7 Coordination

The study has been coordinated with a wide range of interested Federal, state, county and local agencies. In addition, the input of private interest groups and the general public has been actively solicited and included in the master plan.

1.3.8 Management

Management guidelines and policy have been developed for all project land and water resources. Project lands and waters have been designated for management by appropriate non-Federal agencies and governing bodies according to their capability to undertake the type of management required and their interest in cost-shared facility development to provide for public use of these resources.

1.4 PRIOR STUDIES AND REPORTS

1.4.1 General

As previously mentioned, the construction of Mahoning Creek Reservoir was authorized by the Flood Control Acts of 22 June 1936 and 28 June 1938 solely to provide flood control. It has been operated primarily for that purpose since its construction in 1941. The only exceptions were the incidental uses of recreation, fishing and agriculture, none of which conflicted with the primary purpose of flood control. Several studies were conducted during this period which explored the potential recreational development and future operation and management of the project.

1.4.2 Participating Agencies or Organizations

From 1945 to 1950, several studies were conducted by the National Park Service, the Department of Forests and Waters of the Commonwealth of Pennsylvania (now the Department of Environmental Resources), the Pennsylvania Fish Commission, the Pennsylvania Game Commission and the U. S. Fish and Wildlife Service. In addition, the U. S. Public Health Service conducted a "Malaria Control Survey Report". These reports led to the development of the "Master Land Use Plan", dated 1950.

1.4.3 Master Land Use Plan

The 1950 Master Plan report recognized the limitations of difficult access and recommended the development of facilities within the operational area by the Corps of Engineers and the development of a recreation area and two organized camp sites by others. It further recommended the continued practice of agricultural leasing and the management of steep wooded hillsides as public hunting grounds.

Supplemental reports to the Master Land Use Plan include "Conservation Recommendations" compiled by the U. S. Soil Conservation Service. Generally this report concluded that existing wooded areas should remain in forest cover and all forestry management practices and timber harvesting programs should be carefully followed. In addition, the report suggests that all project lands suitable for cultivation should be utilized to their full capability for agricultural purposes consistent with sound soil conservation practices.

Also included in the Master Plan is a "Memorandum of Understanding" developed between the Pennsylvania Department of Forests and Waters (now part of the Department of Environmental Resources), and the Corps of Engineers. This memorandum is basically an agreement that the Department of Forests and Waters will provide fire protection facilities and fight fires on Federal lands in the same manner as it does for all forest fires in Pennsylvania.

1.4.4 Armstrong County Planning and Zoning Commission

The Armstrong County Planning and Zoning Commission in conjunction with the Mahoning Creek Lake Development Committee prepared a report entitled, "A Proposal for the Mahoning Creek Reservoir". This report recommended the development of a summer conservation pool at elevation 1098 and the development of boat launching, day use and camping facilities at the Milton Loop near the Route 839 highway bridge.

1.4.5 Foundation Report

In this report, Mahoning Creek Dam stability was re-evaluated using present-day criteria for the first periodic inspection report, November 1968, and reviewed for the second periodic inspection report, December 1972. Further foundation testing and evaluation was performed in 1974 using conventional analysis. The stability computations indicate that the monoliths investigated meet present-day criteria for sliding (shear-friction) and foundation pressures, but not for the overturning condition for which the resultant of all forces is outside the kern of the base in all conditions of loading. The results were based on assumed uplift values which are conservative when compared

to actual recorded values. Using maximum recorded uplift pressures, the spillway and abutment monoliths were found to have adequate stability and to meet present-day criteria. A review of the uplift measurements taken at drain holes in the inspection gallery shows that the uplift pressures upstream of the grout curtain follow the rise and fall in the pool, while those downstream of the grout curtain do not change significantly for reservoir levels between elevations 1075 and 1160. The highest pool of record reached elevation 1161.3 on 11 March 1964 but no uplift pressures for that date are available. In view of the results of the stability investigations and the fact that the dam has been loaded to within 8 inches of the original design pool elevation 1162 on 11 March 1964 with no adverse effects, it is concluded that the dam would be stable for a conservation pool at elevation 1098 and for all contemplated loading conditions. It is speculated that establishment of the proposed conservation pool at elevation 1098 could result in an increase in uplift pressures under the structure due to the longer exposure to higher hydrostatic pressures induced by the conservation pool. A drastic change in uplift pressures could adversely affect the stability investigation results and conclusions stated above, and would require a reappraisal of the dam stability. For these reasons, close monitoring of uplift pressure readings will be implemented to detect at an early stage any significant changes in the response of uplift pressures to the conservation pool.

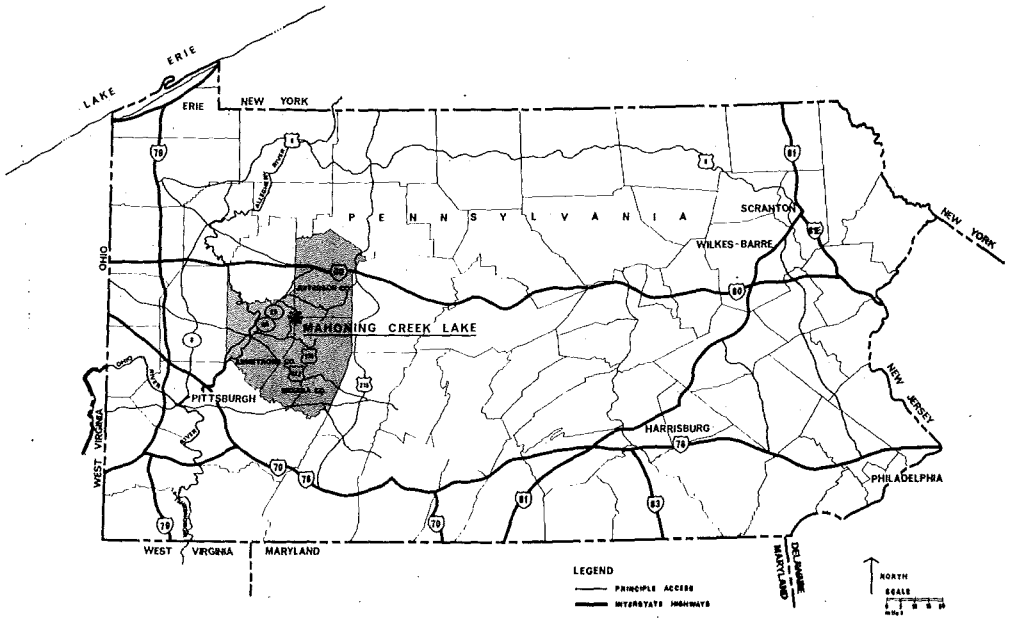
SECTION 2.0 - PROJECT DESCRIPTION

2.1 PROJECT LOCATION

Mahoning Creek Lake is situated in Western Pennsylvania approximately 70 miles northeast of Pittsburgh. Project lands and waters extend over portions of Armstrong, Indiana and Jefferson Counties as shown on the Location Map Figure 2-1.

FIGURE 2-1

LOCATION MAP



PROJECT LOCATION MAP

2.2 RESOURCES OF THE MARKET AREA

2.2.1 General

The market area has been established as that area bounded by a 90 minute driving time from the center of the project (Milton Loop). See Plate 1.

All or parts of the Pennsylvania Counties of Allegheny, Armstrong, Butler, Cambria, Clarion, Clearfield, Indiana, Jefferson, Venango and Westmoreland fall within the 90 minute driving contour; however, not all of these counties have the same degree of significance to the project area and its related environs. Allegheny, Westmoreland and Butler Counties orient basically to the economic influences of the Greater Pittsburgh Region while Venango and Clarion relate to one another as well as to Pittsburgh market areas more than with the immediate project vicinity. Cambria County focuses directly on the Johnstown Standard Metropolitan Area to the south.

Armstrong, Indiana and Jefferson Counties will be most directly influenced by activities involving the further development of Mahoning Creek Lake. In terms of economy, population and related influences these three political subdivisions have much in common. Therefore, with the exception of the market area resources, which includes an inventory of all significant resources within the 90-minute driving contour, the discussions of (1) human resources, (2) economic influences and (3) development potential will be focused on these three counties as an entity.

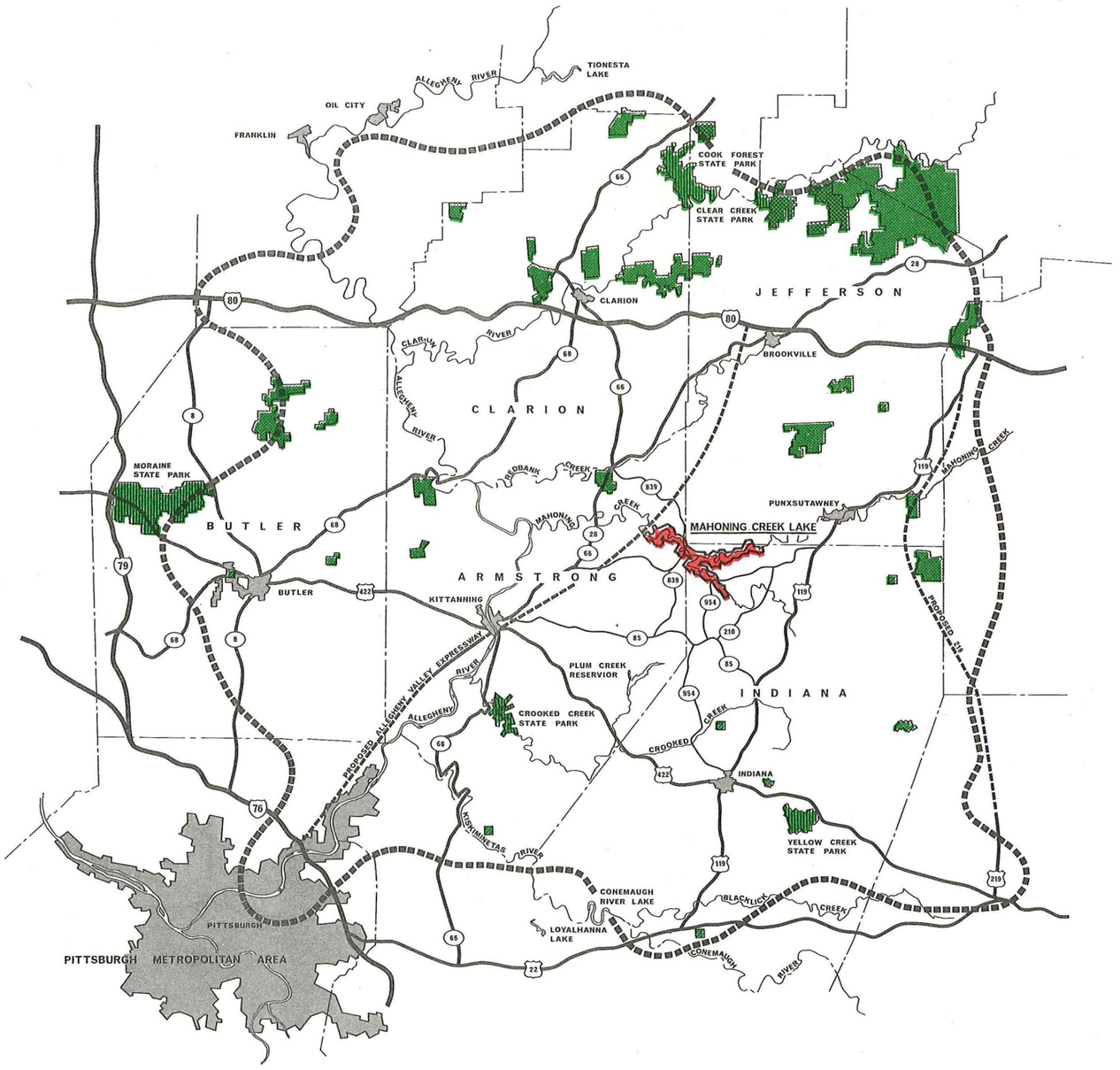
The major population centers which influence the project are the cities of Butler, Clarion, Indiana, Kittanning and Punxsutawney with some influence from the Pittsburgh Metropolitan Area.

2.2.2 Highways

The principal highways providing access through the market area and as such having an influence upon circulation to and from Mahoning Creek Lake are Interstate 79, Interstate 80 and Interstate 76. U. S. Routes 119, 422 and State Routes 28, 66 and 68 also play an important role in providing access. The future extension of the Allegheny Expressway (Route 28) will have a major impact upon the movement of people to and from the project.

2.2.3 Geology

This area of Western Pennsylvania is characterized as "rolling country" and is a transition from the flat farmland in the west to the Appalachian Mountains in the east. The land forms are generally related to the geologic periods when layers of sedimentary rock were deposited and later "buckled" by changes in the earth's surface.



NORTH

LEGEND

- MAHONING CREEK LAKE PROJECT AREA
- STATE PARKS
- STATE FORESTS
- STATE GAME LANDS
- COUNTY PARKS
- POPULATION CENTERS
- MARKET AREA (90 MINUTE DRIVING TIME)
- INTERSTATE HIGHWAYS
- PRINCIPAL ACCESS ROUTES
- LOCAL ACCESS ROUTES

MARKET AREA MAP

MAHONING CREEK LAKE

ALLEGHENY RIVER BASIN, PENNSYLVANIA

MASTER PLAN

SCALE IN MILES

4 0 4 8

U.S. ARMY ENGINEER DISTRICT, PITTSBURGH, CORPS OF ENGINEERS
OFFICE OF THE DISTRICT ENGINEER, PITTSBURGH, PA. 19 MAY 1975

SUBMITTED: CHIEF PLANNING BRANCH
APPROVAL RECOMMENDED: CHIEF ENGINEERING DIVISION
APPROVED: COLONEL CORPS OF ENGINEERS, DISTRICT ENGINEER
CHECKED BY:

At a still later date the runoff from the retreating glaciers sliced deep valleys through the soft sedimentary rock leaving a series of steep valley walls and rolling hills in between. This combination provides scenic viewing for visitors moving through the open farmland and wooded hillsides.

2.2.4 Watershed

The market area, consisting of approximately 4,200 square miles, is located primarily in the Allegheny River Basin and includes about 36 percent of the total watershed. The Allegheny River generally divides the area from the north to the south with the main tributaries located on the eastern side of the watershed. They include the Clarion River, Redbank Creek, Mahoning Creek, Crooked Creek, Blacklick Creek, the Conemaugh River and the Kiskiminetas River.

Several Corps of Engineers flood control projects exist within the market area watershed. They are Mahoning Creek Lake, Crooked Creek Lake and the Conemaugh River Lake. The area also includes Piney Reservoir and Plum Creek Reservoir which were built by local power companies and in addition to their primary purposes are currently under license to the Pennsylvania Fish Commission.

2.2.5 Dominant Land Uses

The dominant land uses of the market area are related to agriculture and forestry through crop production, open field grazing, or wooded knobs and hillsides not suitable for agriculture.

2.2.6 Other Recreation

Within the market area there are other similar recreation facilities (see Plate 1). Similar, in this case, means a similarity of size and type of activities offered when compared to the potential of the Mahoning Creek Lake project area. Because of this test of similarity, the facilities listed are large scale projects mainly operated by the Corps of Engineers, the Bureau of State Parks, the Bureau of Forestry, the Pennsylvania Game Commission independently or in combination with each other. County parks having a significant impact have also been indicated.

The following chart indicates the names of these recreation areas and lists the types of activities offered.

	Boating	Camping	Fishing	Hiking	Hunting	Nature Interpretation	Picnicking	Swimming
Clear Creek State Park		●	●	●	●	●	●	●
Conemaugh River Lake	●			●	●		●	
Cook Forest State Park	●	●	●	●	●	●	●	●
Crooked Creek State Park	●	●	●	●	●		●	●
Moraine State Park	●		●	●	●		●	●
Plum Creek Lake	●		●					

2.2.7 Climate

The nearest available weather data are recorded by the National Weather Service Forecast Office at Pittsburgh, Pennsylvania. The regional climate, which includes all of the market area, is classified as humid micro-thermal, characterized by warm summers and moderately cold winters.

During the normal summer recreation season, extending from June through August, the average afternoon temperature is 81.3° F with the temperature ranging annually from an average high of 68° F to an average low of 25° F. During this same period, 66 percent of the days will be sunny and only an average of 8 days per month will have rainfall of .1 inch or more. The average amount of rain per month will be 3.9 inches while the total annual precipitation, which is evenly distributed throughout the year, will average 43 inches.

These statistics indicate that the climate of the area is favorable to the development of a summertime outdoor recreation program. For additional weather information on this area refer to the Hydrologic Review, Appendix G.

2.3 RESOURCES OF THE VICINITY

2.3.1 General

The next level of investigation of the area resources is that area referred to as the "Vicinity". It is an area consisting of approximately 68 square miles or 2 percent of the Market Area and extends from the U. S. Government boundary for a distance of about 2 miles. This area is located in Armstrong, Indiana and Jefferson counties and consists of 4 percent of Armstrong County, 4 percent of Indiana County and 2 percent of Jefferson County. Within this area the resources having significant influence on project development were investigated. These resources have been recorded on the "Vicinity Map", Plate 2.

2.3.2 Population Centers

The principal center of the vicinity is Dayton, population 715, in the 1970 census. It is situated in Armstrong County and is located approximately 6 miles from the dam. It is located on State Route 839 which is the main access route to the project from the north and the south.

Smicksburg is the second largest community and it has a population of 70, 1970 census. It is located in Indiana County on Little Mahoning Creek about 4 miles east of Dayton. State Route 954 penetrates the community from the south and east.

Several small unincorporated communities are also located within the vicinity. They are strictly residential areas and range in population from several to a dozen families. They are McCrea Furnace, McGregor and Milton in Armstrong County, North Point in Indiana County and Hamilton in Jefferson County.

2.3.3 Roads

The major feeder roads of the vicinity which provide convenient access to the project are State Routes 839, 954, 210 and 85. They are two-lane bituminous roads providing the connection from the project to the principal market area highways.

2.3.4 Recreation

Recreation in the vicinity is generally limited to informal activities because of the lack of developed recreational facilities. The exceptions to this are the Creek Bend Campground and North Point Park picnic area. Picnic facilities at the Corps Operational Area, the Dayton Area Sportsmen's boat launch and the Smicksburg Picnic Area are located on Government land and will be discussed under a following section on Existing Project Resources.

The Creek Bend Campground consists of approximately 23 acres of open land and is located on the bluff overlooking the right bank below the dam. Access is from Township Route 382 near the entrance to the dam. This facility is privately owned and contains approximately 60 camping sites. There is a community shelter, flush toilets and a shower room, a dump station and some playground equipment. Vending machines and refreshments are available at the shelter. Every Saturday evening during the summer months there is a band and a square dance at the shelter. The shelter is also available to rent for community activities. Camping is offered from May through September at a charge of $2.50 per day plus $.50 for an electrical hookup.

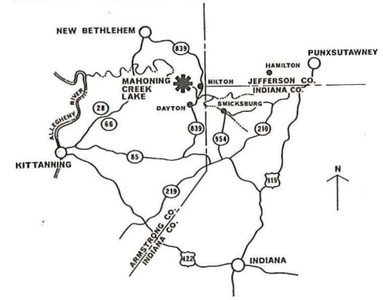
The facility is relatively new and in good condition. It is the only developed campground facility within the vicinity and, as such, plays an important role in the existing recreation picture. The photograph below presents a view of the facility.

CORPS OF ENGINEERS

U. S. ARMY

NORTH

PROJECT LOCATION MAP



LEGEND

- U. S. GOVERNMENT BOUNDARY LINE
- CREEK CHANNEL
- DIRECTION OF FLOW
- TREE COVER
- OPEN AREAS (CROPLAND, GRAZING, FIELDS)
- INACTIVE STRIP MINES (EXCEPT AS NOTED)
- EXISTING STRUCTURE
- GAS WELL
- GRAVEL PIT
- CEMETERY

VICINITY MAP

MAHONING CREEK LAKE

ALLEGHENY RIVER BASIN, PENNSYLVANIA

MASTER PLAN

SCALE 1" = 2000'

2000 0 2000 4000

U.S. ARMY ENGINEER DISTRICT, PITTSBURGH, CORPS OF ENGINEERS
OFFICE OF THE DISTRICT ENGINEER, PITTSBURGH, PA. 19 MAY 1975

SUBMITTED: CHIEF PLANNING BRANCH

APPROVAL RECOMMENDED: CHIEF ENGINEERING DIVISION

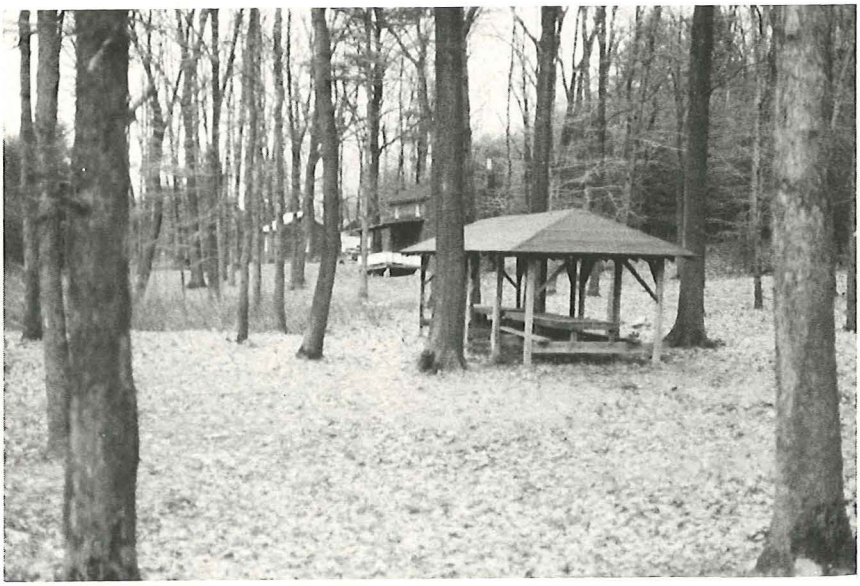
APPROVED: COLONEL CORPS OF ENGINEERS, DISTRICT ENGINEER

CHECKED BY: E.C.A.

PLATE 2

North Point Park is a privately owned picnic area consisting of about 25 acres. It is located on the left bank of Mahoning Creek across from the community of North Point and is situated on land for which the U. S. Government has acquired a flowage easement. It consists of several picnic shelters and scattered picnic tables which are available from the owner, for a fee, who lives on the property. There are no developed parking facilities and sanitary facilities consist of pit toilets. Fishing and waterplay are available in Mahoning Creek.

The facilities are old, in a state of disrepair, and lack the necessary amenities, but they are sited in a beautiful stand of oak trees and, it is assumed, provide group picnic facilities for the surrounding communities. See photograph below for a view of the facility.



2.3.5 Institutions

The majority of the institutional facilities located within the vicinity are in Dayton. They consist of the following:

2.3.5.1 Public Schools

The school district servicing this area encompasses all of Bogs, Pine and Wayne Townships in Armstrong County and West Mahoning Township in Indiana County. The school facilities, consisting of an elementary school and a high school, are located in Dayton and have a combined attendance of approximately 770 children. Field observation of these facilities indicates that they are in good physical condition.

2.3.5.2 Fire Protection

Fire protection for the vicinity, including Smicksburg, is provided by the Dayton Volunteer Fire Company with assistance, when needed, by the fire companies from Plumville and Punxsutawney. The company consists of 25 active members and two pumper trucks and two water tank trucks.

2.3.5.3 Police Protection

Generally police protection for the vicinity is provided by the state police or the various county sheriff offices. Dayton does have a part-time police chief and two constables, but their police powers are limited.

2.3.5.4 Medical Protection

There is one doctor and emergency ambulance service in Dayton, with additional medical assistance available in New Bethlehem, located approximately 11 miles northwest of the project. The nearest hospital facilities are located in either Punxsutawney in Jefferson County or Kittanning in Armstrong County.

2.3.6 Commercial

Most of the commercial and industrial activities of the vicinity occur in Dayton or the surrounding area. These consist of two gas stations, a bank, a post office, a department store, two grocery stores, a variety store, a restaurant, two feed mills, a saw mill and a fertilizer mixing plant. With the exception of a farm equipment supply store located in Smicksburg, the remainder of the vicinity contains little or no commercial activity of any significance.

2.3.7 Land Use

The vicinity is generally rural in nature with the predominant land uses being agricultural, either grazing or cropland. The remainder of the land is generally unsuitable for agriculture and as such has been left in tree cover.

Strip mining has had a significant impact on the area in the past, but most of the sites are currently inactive and are in various stages of reclamation. The exceptions have been indicated on Plate 2 as active strip mines.

2.3.8 Public Utilities

Electrical power for the vicinity is furnished by the West Penn Power Company and telephone service is provided by the Brookville Telephone Company and Bell Telephone of Pennsylvania. Electrical and telephone service is available to all residences within the vicinity.

There is a 66,000 volt cross-country transmission line which traverses the project near North Point and a 22,000 volt electrical line extending from the north, crossing Mahoning Creek near the confluence of the two creeks and terminating in an electrical sub-station at L.R. 32111.

There is also a cross-country underground gas pipeline which crosses the southwest corner of the project near Smicksburg.

Many natural gas wells are located in the vicinity and most of them are inter-connected by collector lines which criss-cross the entire area.

The following companies represent the major gas interests involved in this activity:

1. Apollo Gas Company
2. Consolidated Gas Company
3. Peoples Natural Gas Company
4. T. W. Phillips Gas and Oil Company

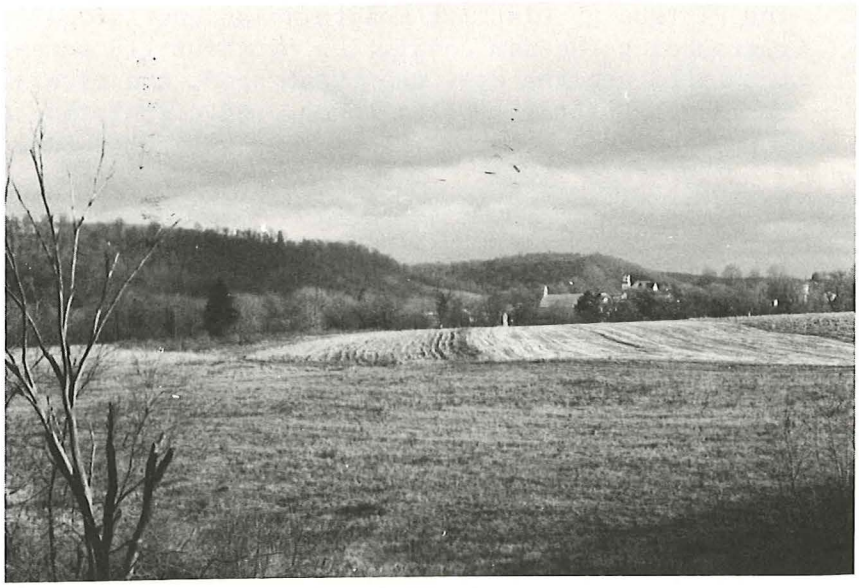
The Baltimore and Ohio Railroad maintains a single track line which runs from Butler to Punxsutawney and enters the vicinity near Dayton and generally follows Mahoning Creek to Hamilton. There is no passenger service available, but approximately five freight trains a day, a total of ten trips, run between these two communities.

2.3.9 Scenic Qualities

The countryside is very scenic, consisting mainly of rolling farmland and steep, wooded hillsides. This contrast between open fields and wooded areas is very pleasant to view as one travels the winding local roads.

2.3.10 Long Distance Vistas

In addition to the wooded hillsides and open fields, many long distance vistas are visible creating a variety of visual experiences which make the area a favorite of sightseers. This is especially true in the fall when the mixed hardwoods of Penn's Woods come "alive" with color.



2.4 RESOURCES OF THE EXISTING PROJECT

2.4.1 General

This level of investigation is limited to the lands and water within the U. S. Government boundary line and the adjacent lands as required by the study. This area occupies portions of Armstrong, Indiana and Jefferson Counties and consists of approximately 30 square miles. These resources are recorded on the "Project Area Map", included as Plate 3.

2.4.2 Project Boundaries

Government ownership consists of 2,533 acres of land contained within the Government boundary line shown on Plate 3. In addition, there is a total of 84 acres of flowage easements which abut the Government boundary line and within these easements the Government has acquired the right to periodically flood the land. The combination of Government ownership and flowage easements generally represents the full pool elevation of 1162 with minor variations as required by normal real estate practices.

The Pittsburgh District maintains an operational area surrounding the dam consisting of about 118 acres. Within this area are the dam, the trash boom, the caretakers' residences, the necessary access and circulation roads and a small picnic area.

2.4.3 Existing Leases or Agreements

With the exception of the operational area, all other lands and waters are currently under license to the Pennsylvania Fish Commission for management purposes. This license expires in 1979.

In addition, some of the land under license to the Pennsylvania Fish Commission is also under lease or agreement for various other purposes. This includes 864.5 acres of land under agricultural share crop agreements. Plate 3 shows the location of the share crop agreements, all of which are due to expire on 31 May 1978.

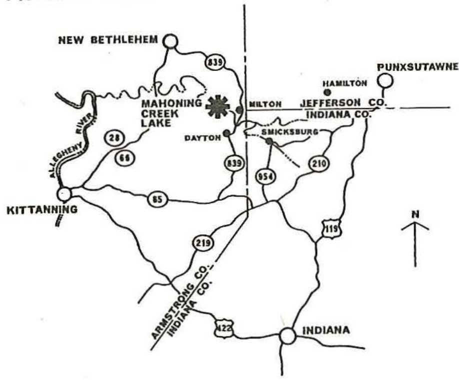
2.4.4 Roads

Access to the project area is severely restricted in many areas by the steep terrain and as a result the number of possible roads are limited.

Access to the dam and the Creek Bend Campground is limited to Route T-382 which is a two-lane gravel or oiled-gravel road. In many areas of steep gradient, the road has eroded and created a "washboard" surface which is difficult to drive upon. This is the only access by the general public to the summer pool, but it does not provide access by car or boat trailer to the water.

NORTH

PROJECT LOCATION MAP



LEGEND

- U.S. GOVERNMENT BOUNDARY LINE
- CREEK CHANNEL
- DIRECTION OF FLOW
- TREE COVER
- OPEN AREAS (CROPLAND, GRAZING, FIELDS)
- INACTIVE STRIP MINES (EXCEPT AS NOTED)
- CORPS OPERATIONAL AREA
- SHARE CROP AGREEMENTS
- MISCELLANEOUS USES
- FLOWAGE EASEMENTS
- EXISTING SUMMER POOL (ELEVATION 1075)
- UTILITIES
- EXISTING STRUCTURE
- GAS WELL
- GRAVEL PIT
- CEMETERY

PROJECT AREA MAP

MAHONING CREEK LAKE

ALLEGHENY RIVER BASIN, PENNSYLVANIA

MASTER PLAN

SCALE 1" = 2000'

2000 0 2000 4000

U.S. ARMY ENGINEER DISTRICT, PITTSBURGH, CORPS OF ENGINEERS
OFFICE OF THE DISTRICT ENGINEER, PITTSBURGH, PA. 19 MAY 1975

SUBMITTED: CHIEF PLANNING BRANCH
APPROVAL RECOMMENDED: CHIEF ENGINEERING DIVISION
APPROVED: COLONEL CORPS OF ENGINEERS DISTRICT ENGINEER

CHECKED BY: E.C.Z.

The next point of access to the water occurs where State Route 839 crosses Mahoning Creek at Milton. This is the main route of travel between Dayton and New Bethlehem and it is a two-lane bituminous road. Just outside of Dayton where the road crosses the railroad there is a one-lane, humpback, wood-deck bridge which is somewhat hazardous to those unfamiliar with the road.

There is almost continuous access to Mahoning Creek on the right bank from Milton to Hamilton except where the road moves away from the creek to avoid steep terrain. The road is identified by various route numbers, both township and legislative. Between Milton and the confluence of the two creeks it is a two-lane gravel road while the portion between the confluence and Hamilton is a narrow two-lane paved road. At four places, the road crosses the railroad at on-grade, unguarded crossings creating hazardous conditions. Along this route there are many narrow two-lane gravel or dirt township roads.

Access to the left bank of Mahoning Creek is more difficult because of the steep hillsides, but along the upper reaches, the valley widens and access is provided from Hamilton by Township Routes T-522 and T-512 which are narrow two-lane gravel roads.

Mahoning Creek can be crossed at three places within the U. S. Government boundary line. These are via State Route 839 which is a two-lane concrete bridge at the confluence with Little Mahoning Creek via L.R. 32111 on a one-lane steel frame bridge, and again on L.R. 32111 at North Point over a new two-lane concrete bridge.

Access to Little Mahoning Creek is generally limited to the right bank between Smicksburg and McCormick because of the steep terrain. This route consists of a narrow, two-lane paved road with crossings at Smicksburg via State Route 954 over an old steel-frame bridge, at T-398 which is currently scheduled for abandonment, and just downstream from McCormick on a new two-lane concrete bridge.

2.4.5 Trails

Because of the low traffic volume and rural quality of many of the existing roads, some are currently used for hiking.

Other than a short segment of trail at the dam, the only existing developed trail is the Baker Trail which extends from north of Pittsburgh to Cook Forest. The trail enters the project area on the left bank of Little Mahoning Creek downstream from Smicksburg and follows an old roadbed paralleling the creek to the confluence with Mahoning Creek where it then cuts across farmland to the bridge at Milton. There it crosses Mahoning Creek and follows the right bank to a point just upstream from the dam where it turns north and leaves the project area. In this area between Milton and the dam, the trail is along township roads except where it cuts cross-country to touch the creek at Furnace Run and at the point where it leaves the project area where a short branch trail leads to a lean-to shelter overlooking the lake above the dam.

2.4.6 Railroad

The Baltimore and Ohio Railroad meanders in and out of the project area crossing Mahoning Creek twice and Little Mahoning Creek once while roughly paralleling Mahoning Creek between the confluence with Little Mahoning Creek and Hamilton. Along most of the route there is adequate vegetation to visually screen the railroad from the creeks and with the limited amount of daily traffic currently using this route, noise should not be a serious problem.

2.4.7 Structures

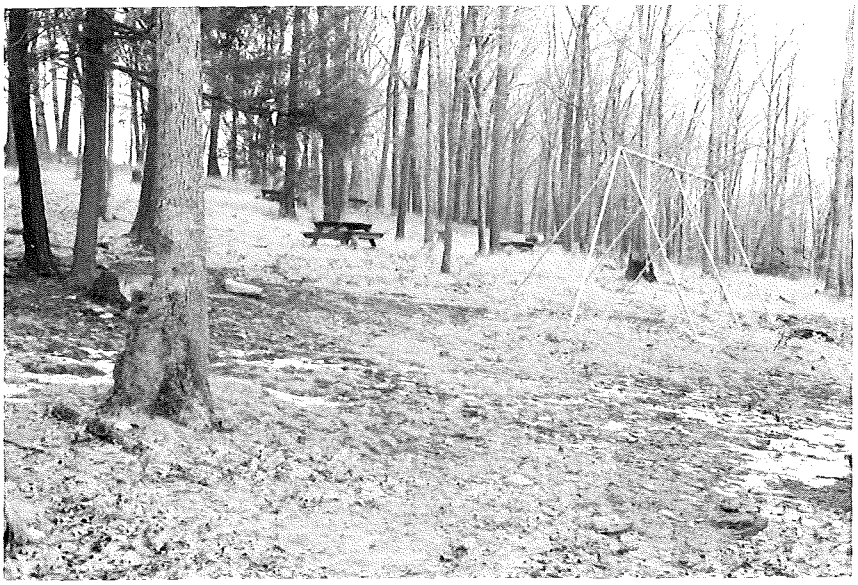
The only structures within the U. S. Government boundary line are the two damtenders' residences and a small maintenance building located above the dam on the right bank.

2.4.8 Recreation Facilities

There are very few existing developed recreation facilities within the project area mainly because of the lack of access to the existing summer pool. The facilities that do exist are:

2.4.8.1 Operational Area

Within the operational area at the dam, the Corps of Engineers have developed a small picnic area which is located on the right bank above the dam and consists of approximately 20 picnic tables, scattered fire rings, a pit toilet and several swing and slide sets for the children to play on. This area is shown in the following photograph. Included as part of this area is a short trail that leads from the picnic area to a shelter and overlook located on the hillside above the dam.



On the right bank, starting at the dam and extending upstream for approximately one-half mile to a gently sloping point of land adjacent to the lake is an existing hiking trail, as shown in the photograph below.

Located approximately 950 feet downstream from the dam is a stilling weir which backs up a shallow pool that has become a favorite fishing spot. Access to this area is via a one-lane gravel service road to a small gravel parking area along the right bank as indicated in the following photograph. The Corps has installed five picnic tables and some playground equipment in this area to serve the families of the fishermen.

2.4.8.2 Existing Boat Launching Facilities

A boat launching ramp and a primitive camping area are located on the left bank approximately 2 miles above the dam at a point where an old road crossed the creek prior to construction of the dam. The process of launching a boat at this facility is extremely difficult and dangerous because of the one-lane access road which is very steep and unpaved. Guardrails were recently constructed on the access road which somewhat reduces the hazard. The launching ramp itself is long, narrow, unpaved, lacking in safety devices and requires several backing movements to turn the boat at the head of the ramp to place it in a launching position. The primitive camping area contains no improvements or facilities with campers merely pitching their tents among the rocks along the edge of the pool. See the photograph below for a picture of the lower reaches of the access road and the launching ramp.

2.4.8.3 Smicksburg Picnic Area

The Borough of Smicksburg operates a small picnic area of approximately 3 acres along the left bank of Little Mahoning Creek at Smicksburg. The area consists of a small meadow area, approximately one acre in size, enclosed on three sides by scrub tree cover and fronting on a dead-end gravel road. The Borough has installed two pit toilets and placed several picnic tables and fire rings in the woods at the edge of the meadow and there is a short dirt path which forms a loop from the gravel road to the creek and back again. There are no permanent improvements and users are required to park along the gravel road. Prior to the construction of the dam the area was the site of an old church and the photograph below shows the picnic area and the meadow with the remaining front steps of the old church.

2.4.9 Hydrology

The existing dam and lake are part of a comprehensive system of storage reservoirs for flood control for the Allegheny and Ohio River Basins. The drainage area for Mahoning Creek Lake is 340 square miles and covers parts of Armstrong, Clearfield, Indiana and Jefferson Counties. The dam is located on Mahoning Creek in Armstrong County and is 21.6 miles upstream from the creek's junction with the Allegheny River. Little Mahoning Creek is a major tributary to Mahoning Creek and joins it about 7 miles upstream from the dam.

The lake is presently operated between a permanent pool elevation of 1075 and a full pool elevation of 1162. During periods of low flow, the lake level normally fluctuates between elevations 1075 and 1080. When excess runoff occurs, it is temporarily stored in the lake to be released at a rate sufficient to draw the lake level down to the normal range within 5 to 10 days without causing recurrent downstream flooding.

Under present operating procedures, the reservoir is drawn down after the spring rains to an elevation of 1075 and maintained there through the summer and winter months except for normal fluctuations. At this elevation, the pool covers an area of approximately 170 acres, has a storage capacity of 4,500 acre-feet, and is about 4 miles in length. The stream gradient within this pool averages 17.6 feet of fall per mile. A gaging station is located at the McCrea Furnace bridge about one mile downstream from the dam. All records to date from this station and supplemental testing in the pool and creeks above the dam indicate good water quality suitable for a warm water fishery.

The following table is a summary of pertinent data related to the dam and lake.

Dam

Type - concrete gravity	
Maximum height (abutment sections above streambed)	162 feet
Top length	962 feet
Base width (spillway section)	154 feet

Spillway

Controlled concrete ogee section, with five 29-foot high by 30-foot long crest gates. Net length of gated section is 150 feet. The crest is at elevation 1135.

Outlet Works

Three main conduits, each controlled by two (service and emergency) 5'-8" by 10'-0" hydraulically operated gates, invert elevation 1015. Two low discharge conduits each regulated by one 24" service gate and controlled by one 36" emergency gate, invert elevations 1021 and 1025, respectively. Conduit inlets are protected by trash racks. The gates are operated from within the structure.

Maximum flood of record at damsite - 24,100 c.f.s., 18 March 1936.

Other Structures

Stilling weir located 950 feet downstream from the axis of the dam. Overflow section is 180 feet long. Crest is at elevation 1019.5.

Hydraulic Design

Spillway capacity - 120,000 c.f.s. at maximum water surface elevation of 1172.

Reservoir

Pool	Elevation of Pool	Capacity (Ac-Ft)	Capacity (In.)*	Acre (acres)	Backwater main stream length in mi.
Minimum	1075.0	4,500	0.25	170	4.0
Flood Control	(net)	69,700	3.84	N/A	N/A
Total Storage	1162.0	74,200	4.09	2,370	19.5

*Inches of Runoff

Miscellaneous Data

	1950	1960	1970	1973	1975
Annual Visitation	23,088	16,298	16,880	53,305	59,900

Total Construction Costs - $6,421,000.
Capital Improvements for Recreation (through F.Y. 72) - $68,700.
Average Annual Operation and Maintenance Costs (1957-1973) - $80,030.
Total Estimated Flood Control Benefits (1941-June 1973) - $122,362,000.

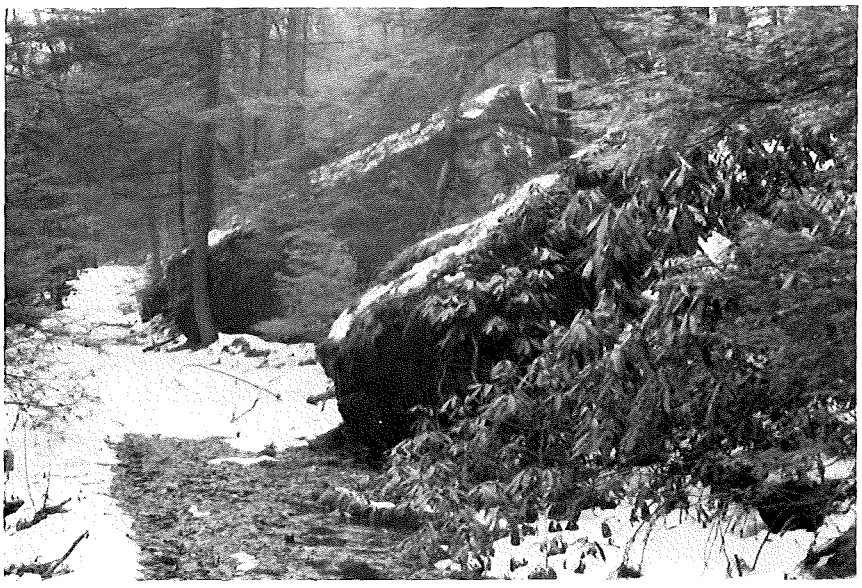
2.4.10 Vegetation

The steep hillsides surrounding the lake and some areas along the creeks are heavily wooded and consist of second and third growth timber. They are predominantly part of the oak-hickory association consisting of northern red oak, white oak, chestnut oak, American beech, sugar maple, red maple, tulip poplar, yellow birch, basswood, black cherry, hemlock, white pine and pitch pine.

On the left bank just upstream from the dam is a small stream which forms a picturesque waterfall as it cascades over the rocks and very steep terrain in its plunge to the lake. Whether viewed from the lake or the hillside above, the 100-foot drop of this waterfall is impressive.

The upper reaches of the project area consist of the Mahoning and Little Mahoning Creek flood plains. For the most part the creeks meander through relatively flat land consisting of fields and cropland. The edges of the creeks in this area are covered by dense shrubs and tree cover normally associated with streams in this part of the country. They are predominantly alder, red maple and river birch.

Dense stands of rhododendron and scattered stands of hemlock are found along the edges of the lake above full pool and along the tributaries and steep hillsides as indicated in the next photograph. Stands of mountain laurel are found along the ridges of the edge of the woods and large sandstone boulders are found throughout the area.



2.4.11 Dense Vegetation Along the Creeks

While most of the hilltops and level areas surrounding the project are treeless, the dense growth along the edge of the creeks gives one the feeling of being in the middle of an extensive forest when using the creeks such as the scene depicted in the following photograph.

2.4.12 Topography

There are dramatic changes in topography as the creeks flow through the flat farmland, merge and flow into the pool area. In the upper reaches, the valley floor averages 1,100 feet in width and the difference in elevation from the streambed to the surrounding hills is approximately 340 feet.

In the area of the existing conservation pool (elevation 1075) the water surface is approximately 600 feet wide. The steep hillsides in this area rise from a streambed elevation at the dam of 1008 to an elevation of 1500.

2.4.13 Soils

Due to the topographic charasteristics of the project area the majority of the soil groups are identified as those occurring on steep hillsides, generally the area flanking the sides of the proposed conservation pool; or the flood plains, the areas adjacent to Mahoning and Little Mahoning Creeks. There is some minor influence from the transition soils, those soils occurring on the gently sloping areas between the steep hillsides and the flood plains.

The soils related to the steep hillsides consist mainly of the DeKalb Series. They are moderately deep, well drained soils formed in material weathered from acid gray sandstone and siltstone on the uplands. Bedrock occurs at depths of 1-1/2 to 3-1/2 feet and most use problems are related to the depth of bedrock and steep slopes which severely restrict their recreational value other than as a visual amenity or hiking activities.

The flood plains, occurring almost exclusively in the upper reaches of the project area along the two creeks, consist mainly of soils grouped into the Monongahela-Allegheny-Pope association. The Monongahela soils are the predominant soils of this association and are characterized as deep, moderately well drained terrace soils formed in sediments washed from shale and siltstone uplands. This series is generally well suited to the development of recreational activities with most use problems related to seasonal wetness, flooding and moderate permeability.

The transition soils, which occupy a relatively small amount of project land, consist of many different soil series, but generally they are silt loam soils that are deep and moderately well drained. Most use problems occur because of wetness and moderate permeability.

2.4.14 Utilities

A field check of the utilities within the project area indicated that electrical power and telephone service are available along most of the local roads and that these services are available to all residences located within the area.

All utilities which cross the water channels are shown on Plate 3. There do not appear to be any general areas of conflict between use of the water and these utilities, but two locations which require specific identification are the underground telephone line which crosses Mahoning Creek at the Big Loop and the underground gas line which crosses Mahoning Creek below the Milton Loop. The gas line was destroyed during Hurricane Agnes and has since been rebuilt and anchored to the bottom of the creek. Any future development or use of these areas would require necessary precautions to preclude any damage to these utilities.

2.4.15 Fish and Wildlife

Fishing and hunting have long been popular attractions within the project area. Both have remained good over the years primarily due to the low annual recreational visitation and good wildlife habitat.

The most common game fish species found in the lake and Mahoning Creek are northern pike, largemouth bass and sunfishes. Little Mahoning Creek is a mixed fisheries stream with most common warm water fishes being northern pike, large and smallmouth bass, and various sunfish species. Some trout have been stocked by the Pennsylvania Fish Commission in both the upper and lower sections of Little Mahoning Creek.

TABLE 2-1

FISH SPECIES INVENTORY

Mahoning Creek and Lake

Northern Pike	Golden Redhorse Sucker
Largemouth Bass	Yellow Bullhead
Black Crappie	Pumpkinseed
Bluegill	Golden Shiner
Rock Bass	White Sucker

Little Mahoning Creek

Northern Pike	Green-sided Darter
Largemouth Bass	Rainbow Darter
Smallmouth Bass	Fantail Darter
Bluegill	Blacksided Darter
Rock Bass	Silver Shiner
Golden Redhorse Sucker	Sand Darter
River Chub	Banded Darter
Stoneroller	Common Shiner
Log Perch	Stone Catfish
Bluntnose Minnor	Brown Trout
Johnny Darter	

Note: Fresh Water Clams were also found in Mahoning Creek during field investigations.

Source: Pennsylvania Fish Commission

The most common game species present within the project area are the white-tailed deer, the cottontail rabbit, the gray squirrel, and the ruffed grouse. Ring-necked pheasant are present in limited numbers throughout the area. The utilization of the area by waterfowl and doves is of little to moderate importance with populations varying depending on the time and pattern of migration.

The following Table 2-2 is an inventory of Game Species which occur within the project area.

TABLE 2-2

GAME SPECIES INVENTORY

Species	Relative Abundance	Management Potential
White-tail Deer	High	Good
Cottontail Rabbit	Moderate	Good
Gray Squirrel	Low to Moderate	Limited - subject to forest growth
Ruffed Grouse	Low to Moderate	Limited - species cyclic
Dove	Moderate	- - - -
Ring-necked Pheasant	Low	Limited due to climate - stocking could provide moderate hunting potential
Waterfowl	Low to Moderate	Limited due to steep gradient of impoundment and shoreline.

Source: Pennsylvania Game Commission

A check of the listing of rare and endangered species common to the vicinity indicates that no species of these categories are common to this area.

2.4.16 Micro-climate

This investigation is limited to general micro-climate considerations which should be used only as a guide to modify or adjust the weather data gathered for the market area.

As you travel from the relatively open stretches of the upper creek valleys of the project into the tight confines of the normal pool there is a decided change in the relative comfort index. This change, brought about by changes in the micro-climate, provides a cooling effect as you travel downstream. This is caused by a prevailing northwesterly breeze which is funneled upstream. This effect is increased by the narrow steepsided valley walls which contain and channel the breezes. This natural phenomenon occurs even during the warmest weather.

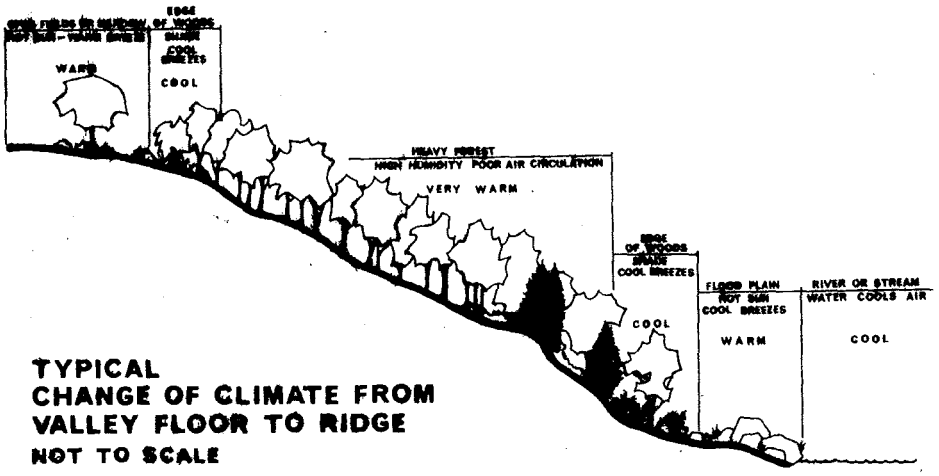
The normal variations in micro-climate are shown in Figure 2-2. Generally the coolest zone is at the edges of the wooded areas where there is the advantage of the shade and the cooling breezes from the surrounding open land. As you move deeper into the heavily wooded areas, the breezes decrease and the humidity increases making the areas very uncomfortable during the summer months. The exposed ridges are cooled by the prevailing winds blowing from ridge to ridge and depending upon the amount of wind, may become very cool in the shade.

In the evening, the higher elevations cool first and the heavier cool air descends the hillsides to the stream valleys providing pleasant breezes.

As a general rule an increase in elevation reflects an increase in temperature within the framework of this study.

FIGURE 2-2

VARIATIONS IN MICRO-CLIMATE



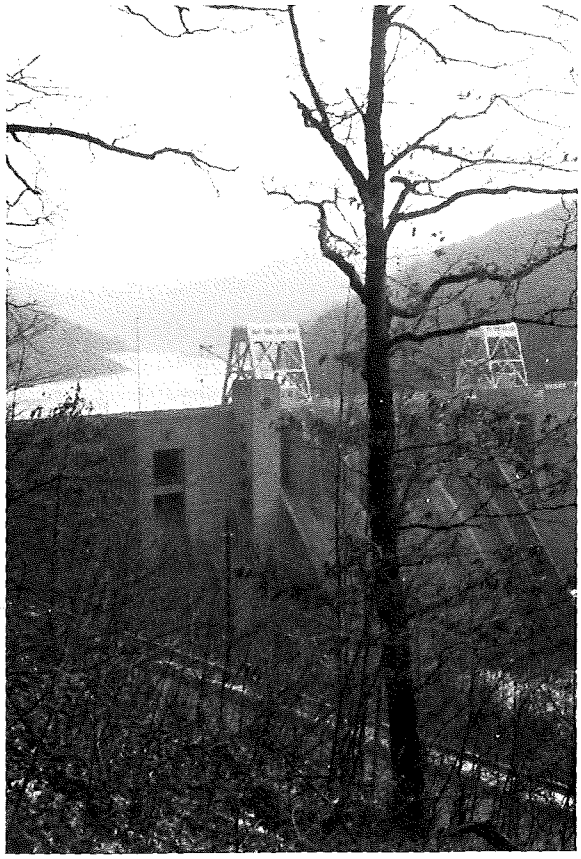
2.4.17 Scenic

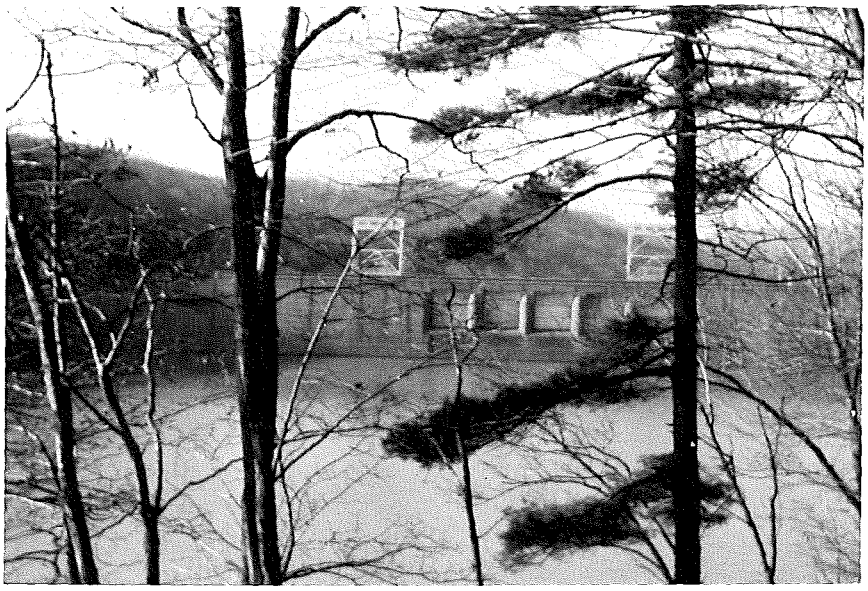
The rural setting with the predominant landscape characteristics of farming and steep, wooded hillsides provides a passive, low-key setting for the project area. Add to this setting the charm of traveling slow-speed rural roads with a great variety of topographic change and the result is a beautiful natural experience as you move through the area.

This experience varies from sweeping views of the creeks and valleys from adjacent ridges and hilltops to the pleasant views of the creeks as the roads in many places parallel the creek edges. Many of the roads move in and out of the farmland and the wooded areas offering an interesting variety of visual experiences.

2.4.18 Dramatic Views of the Dam

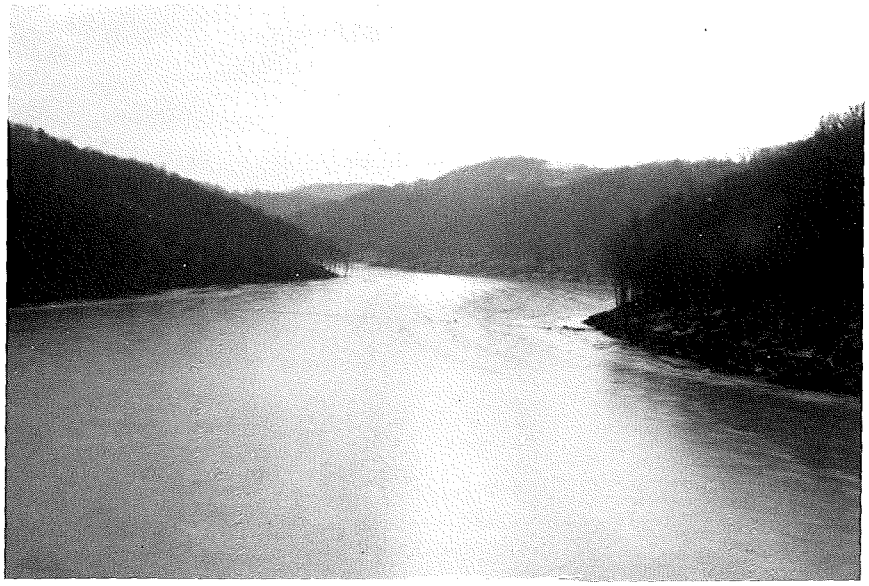
The existing trails and overlooks on the right bank within the Corps Operational Area offer many exciting views of the dam as indicated by the following photographs.





2.4.19 Scenic Vistas of the Lake

Scenic vistas of the surrounding countryside are visible from any of the ridges and hilltops. At one area on the left bank above the dam, a short walk leads to a dramatic view of the dam and lake as shown below.



Within the wooded areas there are many rock outcroppings and large sandstone boulders interspersed with lush stands of rhododendron, mountain laurel and hemlock. In many of these areas small streams cascade over the rocks and descend to the pool or creeks below. Whether viewed by foot, boat or merely passing in a car these sights are striking and this variety of natural scenic beauty has made the project area a favorite spot of sightseers for decades.

2.4.20 Historical and Archeological Sites

A check of all available data has indicated that there are no historical or archeological sites of any significance located within the project area.

SECTION 3.0 - RECREATION NEEDS AND PROBLEMS

3.1 RECREATION MARKET AREA

The Recreation Market Area primarily including all or parts of the counties of Allegheny, Armstrong, Butler, Clarion, Indiana and Jefferson, is bounded by a 90 minute driving contour which represents the maximum amount of time a majority of the general public is willing to spend getting to and from a day-use facility. This 90 minute limit is currently being used by the Pennsylvania Department of Environmental Resources, Bureau of State Parks in the computation of recreation demand for state park facilities and it has also been used at other similar Corps projects around the country.

However, as previously discussed under the section on "Resources of the Market Area", not all of these counties have the same degree of significance to the project area, and consequently the discussion of the demographic information of this section will deal primarily with the three counties directly influenced by further development of Mahoning Creek Lake: Armstrong, Indiana and Jefferson.

3.2 POPULATION CHARACTERISTICS OF THE MARKET AREA

3.2.1 General

An indication of future population levels is important in order to plan for future needs. Important as a basis for forecasting future growth is the awareness of general population characteristics and trends within the area under study. Population levels, age groups, income levels, education and special ethnic groups are all important in terms of community structure and development potential.

3.2.2 Population

Total population in the three-county area consisting of Armstrong, Indiana and Jefferson was reported at 198,736 by the 1970 Federal census. Table 3-1 lists population by individual county over the past two decades together with the percentage of population change which has occurred.

TABLE 3-1

COUNTY POPULATION WITH PERCENT OF CHANGE

County	1950	1960	% Change 1950-1960	1970	% Change 1960-1970
Armstrong	80,842	79,524	-1.6	75,590	-4.5
Indiana	77,106	75,366	-2.3	79,451	+5.4
Jefferson	49,146	46,792	-4.8	43,695	-6.6
Totals	207,095	201,682	-2.6	198,736	-1.5

As indicated, a consistent pattern of population loss has occurred in this three-county area over the past twenty years, with the exception of a gain of over five percent in Indiana County from 1960 to 1970. This increase has been limited primarily to the central area of Indiana County where new industry (Shelocta Power Generating Station) and the expansion of educational facilities (Indiana University of Pennsylvania) has created new housing. Armstrong and Jefferson Counties have each recorded larger percentages of loss over the last decade than were recorded during the preceding ten-year period.

The centroid of population in each county is located at the site of major cities or towns with the balance of population scattered in low density patterns along the secondary and local road systems. No major concentrations of dwelling units are found such as in subdivision developments except contiguous to the established cities and towns. In Armstrong County, the center of population is the Kittanning vicinity; in Indiana County it is in the vicinity of Indiana; and in Jefferson, it is near the center of the county as a result of the Brookville-Punxsutawney concentrations.

3.2.3 Age Groups, Income Levels and Education

The study of existing age group patterns, income levels and education profiles provides a key to the immediate potential for growth in a given regional area. For instance, a weighting of upper age group levels is indicative of a decline in growth while higher levels in the young and middle age groups ordinarily signifies a continuing growth trend for the future. A comparison of the three-county area and the Commonwealth of Pennsylvania is provided in Table 3-2 on the following page.

TABLE 3-2

MEDIAN AGE AND AGE GROUP PERCENTAGES - 1970

	Median Age	% Under 5 years	% 18 yrs. and over	% 65 yrs. and over
Commonwealth (Pa.)	31.0	7.9	67.3	10.8
Armstrong	32.4	7.7	66.8	11.8
Indiana	26.3	8.0	68.1	10.4
Jefferson	33.6	7.3	67.2	14.0

An analysis of the age group breakdowns for the area reveals parallels with the previously cited population trends which have been recorded over the past two decades. Pennsylvania, which has recorded only minor growth on a state level in recent years, has a median age of 31.0. With the exception of Indiana County this area has a relatively higher median age than the state. Accordingly the percentage of the population in the younger age groups (under five years) is low and the percentage of older persons (over 65 years) is high in comparison to the state and specific areas where population has increased. Locally these trends are significant since an older median age indicates less business expansion, fewer opportunities for employment and a general population decline.

Income levels throughout the area are low in comparison to the state levels. Median income for the three counties in 1970 was generally low as shown below:

Armstrong	$7,708
Indiana	7,952
Jefferson	7,520

In comparison, the state-wide median income was $9,730. Also, the percentage of the families below low income levels established by the Federal Government in 1970 was significantly higher than the state percentage as shown below:

Armstrong	11.1%
Indiana	11.8%
Jefferson	11.7%
State	7.9%

Low income levels will continue in the area unless business expansion occurs to provide improved job opportunities. The present status of income levels is indicative of areas experiencing population decline.

Federal census data provide a guide to educational levels. The state level for median school years completed in 1970 was 12.0 school years. In this area, only Indiana County was equal to the state level. Both Armstrong and Jefferson Counties recorded lower median levels with 11.0 and 11.5 school years, respectively. This pattern follows the median age levels and income data listed previously.

Age group statistics as well as income and educational levels for this area have been consistent in reflecting the patterns of population decline experienced during the past two decades. If only one or two of these statistical components reflect conditions adverse to a growth climate a specific cause can usually be isolated. For example, the loss of major employment centers will be reflected in lower income levels and in some instances lower education levels. However, in this instance the combination of all these negative indicators confirms a general long-term decline in population characterized by the out-migration of younger age groups over a period of years. These statistics show a continuing condition which has persisted for some time and one which will require the introduction of new activities and programs to reverse.

3.2.4 Ethnic or Special Groups

The population is predominantly Caucasian. The only organized ethnic group of special note within the area is the Amish. A community of about 200 Amish are in the immediate vicinity. They live primarily in Wayne Township, Armstrong County and in West Mahoning Township, Indiana County.

By choice, the Amish reside effectively removed from contemporary life in independent communities. As a rule they do not involve themselves in civic activities outside of their immediate group and follow a simple agrarian existence. This religious oriented community desires little contact with their non-Amish neighbors. Some of the group work within the community while others farm. Some send their children to public schools but most attend their privately established schools.

3.2.5 Trends and Projections

A series of population projections have been prepared which are applicable to the market area which includes the counties of Allegheny, Armstrong, Indiana, Jefferson, Butler and Clarion. These include projections developed by state agencies, the individual county planning agencies and the OBERS projections which are compiled by the Office of Business Economics (now Bureau of Economic Analysis) of the Department of Commerce, and Economic Research Service of the Department of Agriculture with assistance from the Forest Service.

In the investigation of available projections it was concluded that striking a mid-point between the highs and the lows provided a realistic outlook. The high projection appears to be overly optimistic in view of overall population trends in central and northern Pennsylvania during recent decades. While patterns of decline are expected to be reversed they will not be as dramatic as the high projection indicates. On the other hand the low projection is not realistic when considered in the light of recent activities and programs which are influencing this area. Some of these include the potential for coal and oil field revitalization as a result of the national emphasis on development of energy resources, the growing use of public recreation areas for which this area is well suited and local and county programs for increased emphasis on recreational and industrial facility growth.

Although any projection is subject to many factors, both foreseen and unforeseen, the mid-point approach will provide a reasonable projection path for estimating future population levels. The analysis of conditions does not indicate major growth potential, however, indications are that previous population declines will be converted to gains in future years. A mid-point approach tempers high and low extremes which are unrealistic.

TABLE 3-3

POPULATION PROJECTION - ALLEGHENY COUNTY

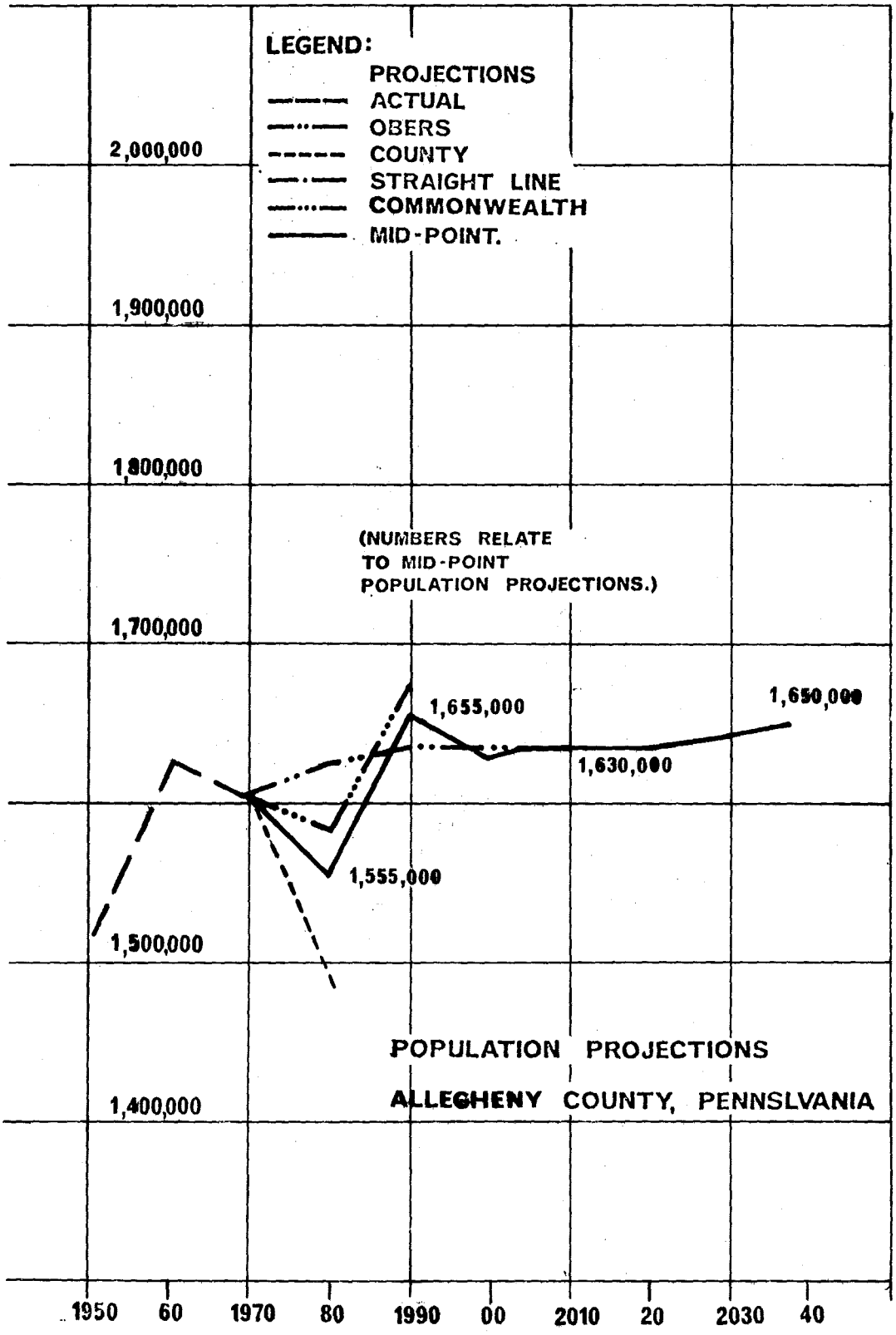


TABLE 3-4

POPULATION PROJECTION - ARMSTRONG COUNTY

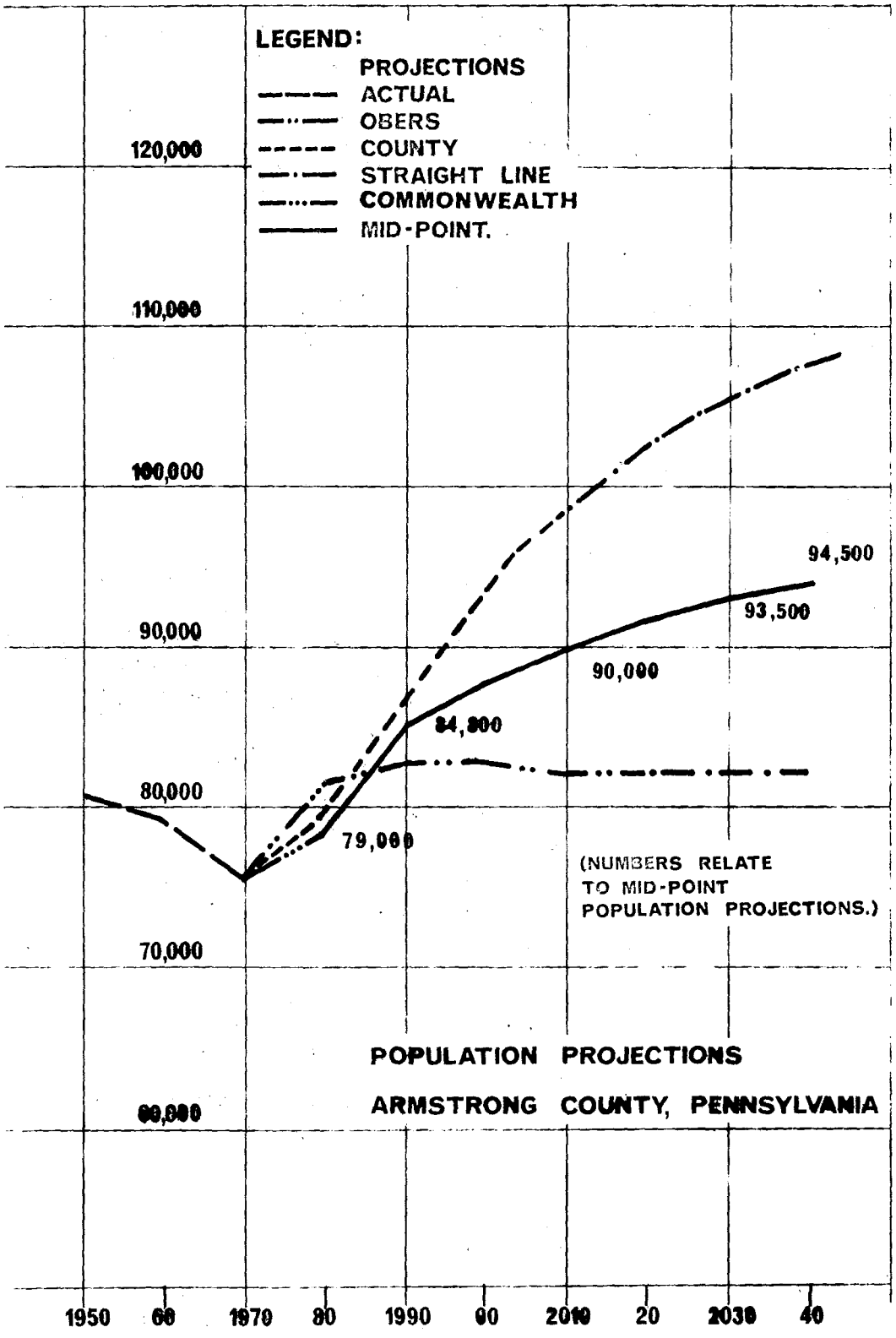


TABLE 3-5

POPULATION PROJECTION - BUTLER COUNTY

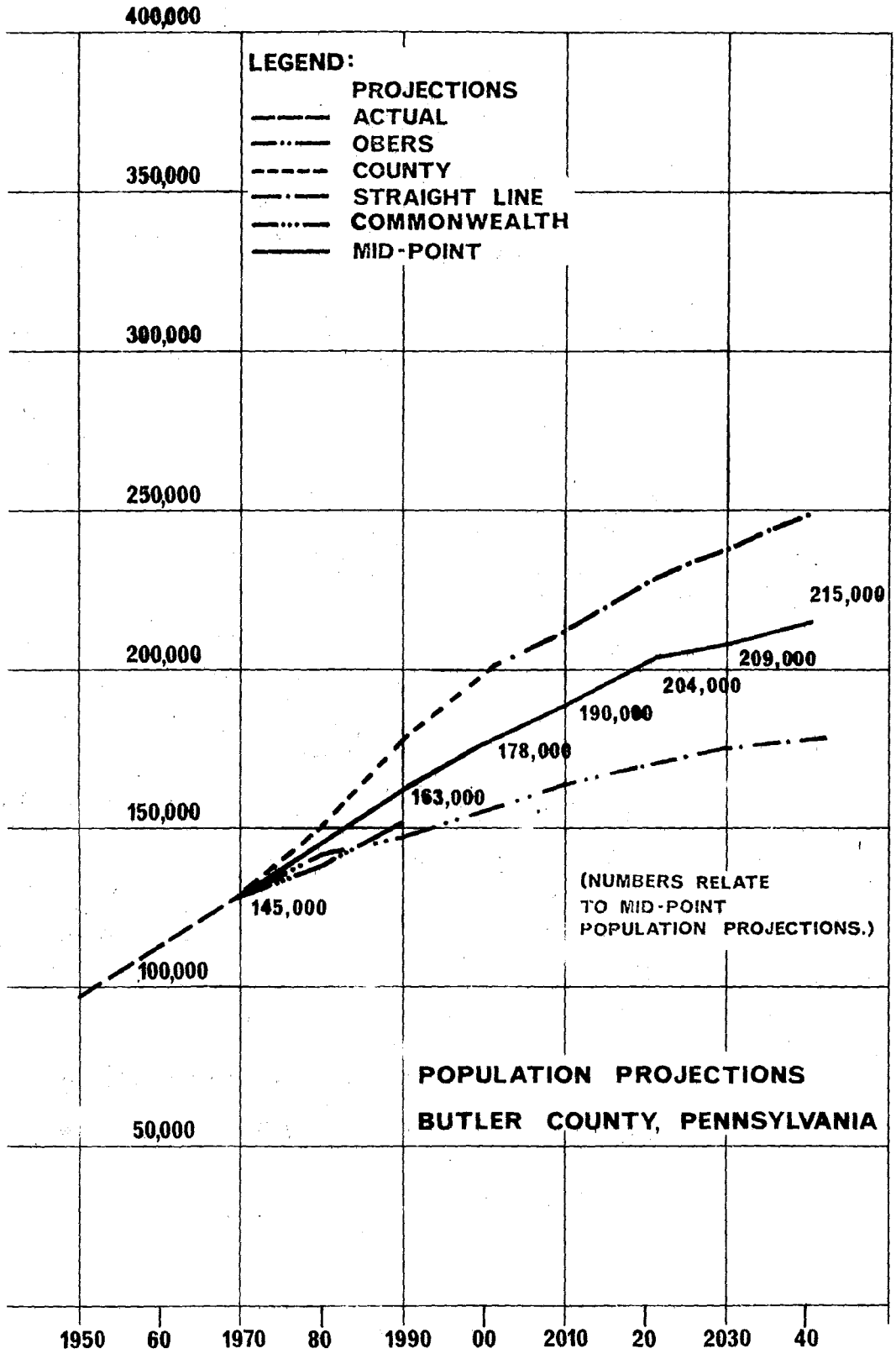


TABLE 3-6

POPULATION PROJECTION - CLARION COUNTY

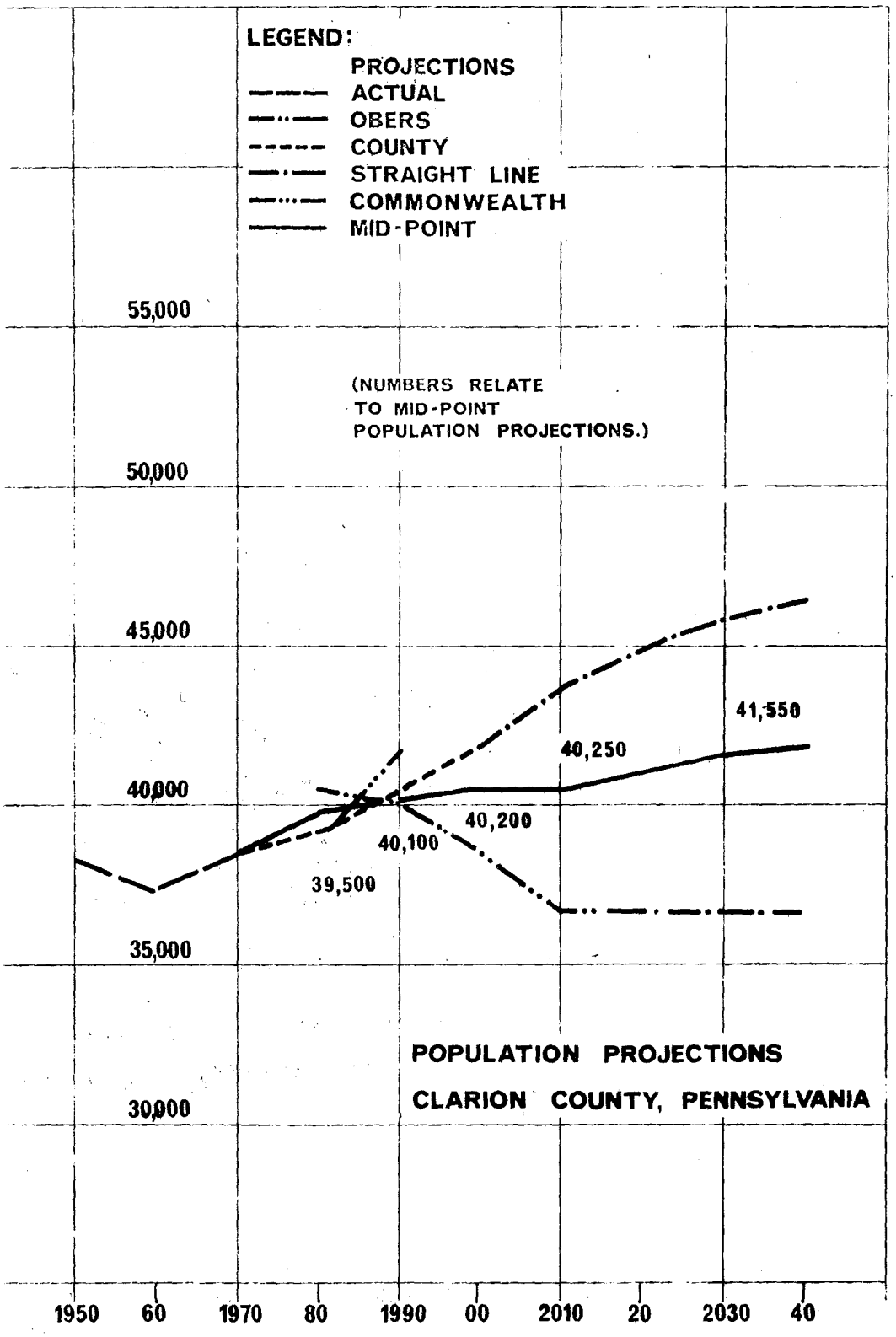


TABLE 3-7

POPULATION PROJECTION - INDIANA COUNTY

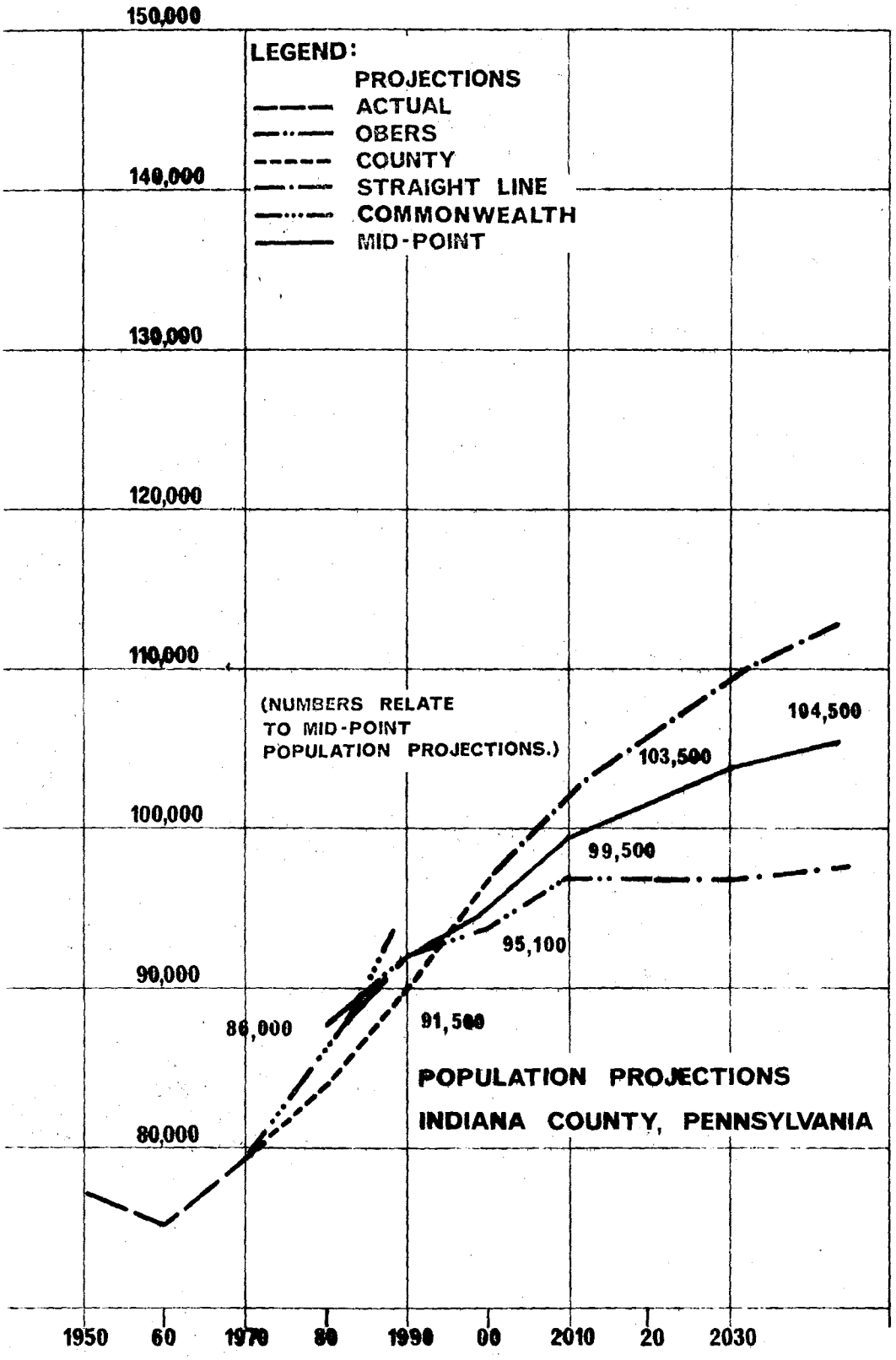
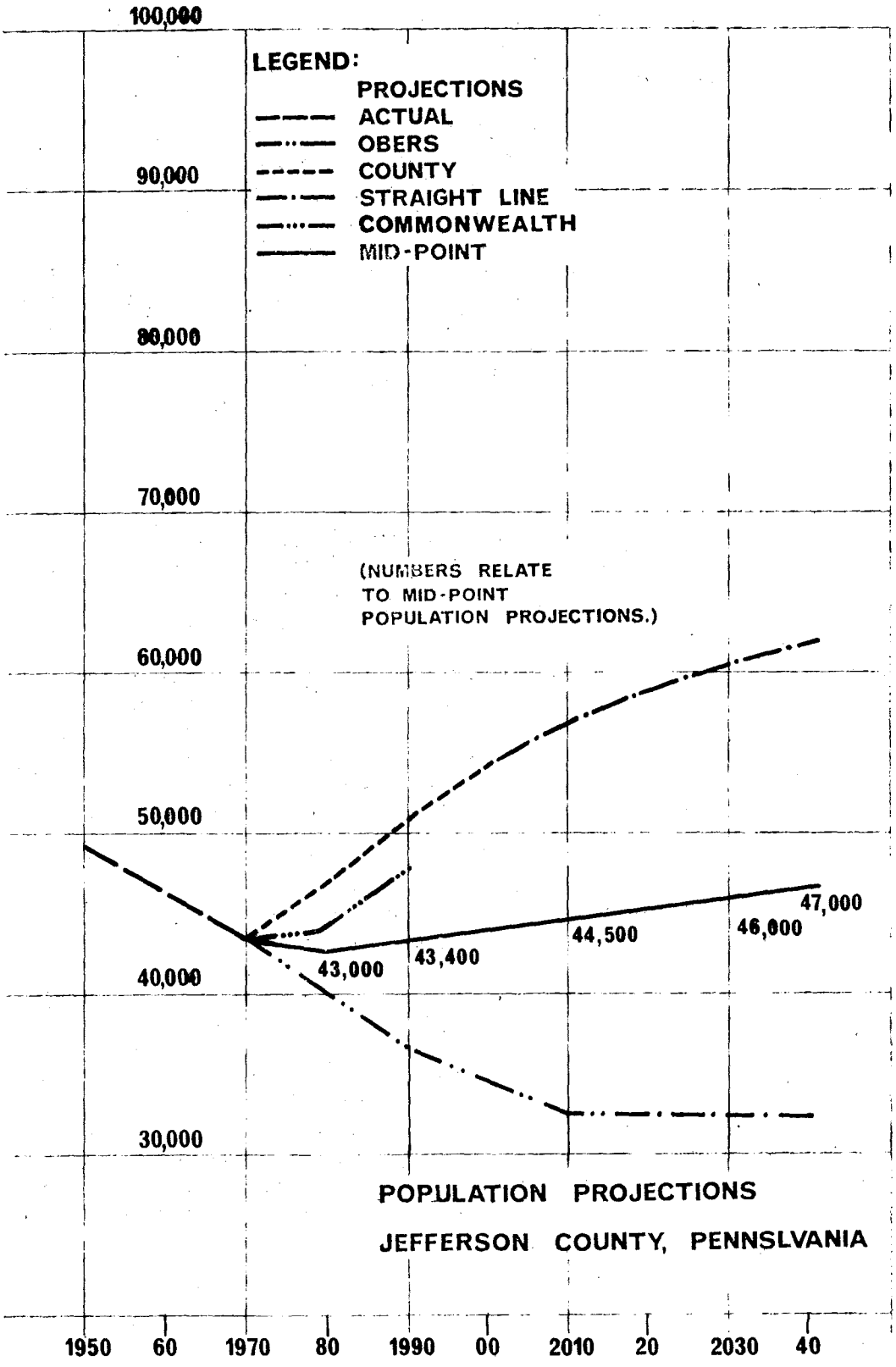


TABLE 3-8

POPULATION PROJECTION - JEFFERSON COUNTY



3.3 ECONOMY OF THE MARKET AREA

3.3.1 Economic Base

The market area of Mahoning Creek Lake relates to two distinct economic sectors of influence in Pennsylvania. These include the petroleum areas of northwestern Pennsylvania and the bituminous areas of northcentral Pennsylvania. The economic base of these two sectors has and will continue to determine the business and industrial potential of the project vicinity. Since the economic base of a community consists of those activities which provide the basic employment and income on which the rest of the local economy depends, it is important that major economic activities be identified.

3.3.1.1 Industry

Two industries are concentrated in this area, both of which relate to our national energy resources. The bulk of Pennsylvania's oil and refining industry, as well as some of the state's best and most productive coal fields, are found in this vicinity.

Although the local petroleum industry was among the earliest in the nation it is still productive. The peak of petroleum production in the late nineteenth century was responsible for the settling of many local communities. Today the production of oil per well is low, requiring special methods of handling which results in more employment per barrels of product produced than in many of the huge western petroleum fields. Pennsylvania oils are prized for use as the base of lubricants and are even more important today due to the energy crisis.

Although the oil industry nurtured much of the growth in this economic region, coal production has been an important source of employment. While shifts in economic dependence have taken place over the years, coal was the basis upon which many local communities depended following the oil boom of the 1890's. In recent years manufacturing has lessened the impact of mining on the local economy to some extent.

Manufacturing in the area was originally tied primarily to the mining and petroleum industries. Today a variety of manufactured products are made including glass, steel products of many types, paper products, chemicals, electronic items, furniture, drilling equipment, mining and oil industry products, auto parts and many other items. Manufacturing in the small cities scattered throughout the area has become a major economic support element.

3.3.1.2 Commerce

Most of the cities are important as farm shipping centers or processing centers. In addition, these cities in many instances have become important as district rail centers. As a result of such economic attractions the cities have also become shopping centers for the peripheral mining and agricultural communities. In most instances these centers of economic activity are also the seats of county government and related cultural and civic functions.

3.3.1.3 Farming

Agriculture in this area is dominated by dairy farms. Much of the land within the agriculture areas is not farmed and remains wooded because of its rough and hilly character. Of the land that is farmed about one-half is used to grow crops of hay, corn, oats and wheat and the balance is in pasture. In the more easterly portions of this area the land is more rugged and the percentage of the land area in farming yields to hilly wooded areas. Corn, wheat, oats and potatoes are raised in addition to hay crops in these areas.

Throughout the area about one-half of the farms are commercial and the balance are part time farms or primarily residential sites. Economic surveys have indicated that over three-fourths of farm income is from livestock and livestock products. The level of living for farmers is moderate in this vicinity when compared to that found in eastern and northwestern portions of the state.

3.3.1.4 Tourism

Tourism is being promoted with some degree of success at the county level throughout this general vicinity. For many years this section of the state was virtually isolated due to the lack of major interstate access and rough semi-mountainous terrain. Although a series of secondary highways laced the small communities together, only indirect access was available to urban centers such as Pittsburgh, Erie, Johnstown and the east. The introduction of the Keystone Shortway (Interstate 80) and partial development of major projected north-south routes is providing improved access which will support tourism.

3.3.2 Development Trends and Projections

A 1967 report prepared by the Pennsylvania Department of Community Affairs has projected manpower levels by county to the year 1980. The report preface suggests that these projections are not to be construed as forecasts since they do not take into account changes in economic or social conditions in a particular county. However, in the report, the projected employment by industry for the three counties of Armstrong, Indiana and Jefferson through 1980 shows consistent declines in agriculture and mining. Food and dairy products are shown in decline for Armstrong and Indiana with no change indicated for Jefferson County while a rise in manufacturing employment is shown only for Indiana County. Service and wholesale employment activities are the only categories which indicate significant increases for all three counties although the total projected employment by industry for all categories indicates a gain for only Indiana County.

The outlook presented in the 1967 report is bleak and does in fact reflect general trends which have taken place in the economic region. However, there are brighter prospects for economic growth which are based upon changes that are taking place in and around the region, changes in public policy, the emergence of new industry and the revitalization of existing economic activities and a revision of local, state and natural economic priorities.

The recent national emphasis on energy considerations may be expected to reverse some of the decline in the oil and coal industries which were at one time basic local industries. Although major expansions will probably not occur, a stabilization of present activity levels is anticipated and gains are probable. This activity will influence related support industries such as equipment supply and transportation. In general manufacturing and subsidiary functions in the region should have a brighter outlook.

Another major influence on local economic growth potential is the development of new highway systems. Interstate 80 in the northern tier of the region offers direct access to the concentrated population centers of the east and midwest. Improvements to existing routes such as U. S. 422 provide additional east-west access. Even more significant to local access will be the improvement and development of north-south routes such as the proposed Allegheny Valley Expressway (Route 28) and relocated U. S. 219. The Expressway will direct traffic through the heart of the region and should have a major favorable impact on the local economy.

A major benefactor of improved access to this region will be the tourism and recreation industries. Public programs for the establishment of recreation sites together with the natural amenities which are available in abundance will most likely attract additional tourists to this area.

In general, losses which have been experienced in basic industries such as mining and petroleum production should stabilize. Other established industries in the region can be expected to show moderate growth. Agriculture will continue to record moderate declines although dairying and cattle raising will remain a significant element in the local economy. The greatest area of economic growth potential is in the fields of recreation related tourism and subsidiary service and entertainment activities.

3.4 RECREATION NEEDS AS ESTABLISHED BY EXISTING REPORTS

3.4.1 General

Several reports by other agencies have established the concept and need for recreation in Pennsylvania. It is helpful to examine these reports for information which relates directly to Mahoning Creek Lake and its five county market area.

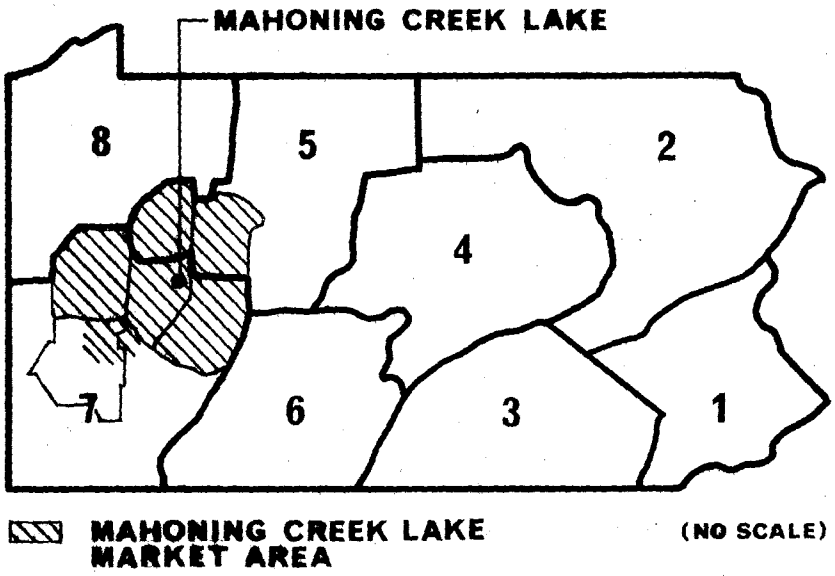
3.4.2 Pennsylvania State-wide Comprehensive Outdoor Recreation Plan

"Outdoor Recreation Horizons" is the Department of Forests and Waters (now the Department of Environmental Resources) section of Pennsylvania's State-wide Comprehensive Outdoor Recreation Plan. This report which was published in 1970 establishes the Mahoning area as part of an outer urban zone which would serve recreationists from the highly populated Pittsburgh region. State parks planned for this zone will be spacious and less intensively developed than those planned closer to the population centers. They will be resource oriented parks that take full advantage of the natural qualities of the site.

Pennsylvania has been divided into eight areas for state park planning purposes. The five county area surrounding Mahoning Creek Lake falls into two of the areas, Number Five and Number Seven as shown in Figure 3-1 below.

FIGURE 3-1

PENNSYLVANIA STATE PARK PLANNING AREAS



Planning Area Number Five includes the following counties: Clarion, Jefferson, Clearfield, Elk, Cameron, McKean and Potter. Of these counties Clarion and Jefferson are within the market area for Mahoning Creek Lake.

Planning Area Number Seven includes Butler, Armstrong, Indiana, Allegheny, Beaver, Westmoreland, Washington, Fayette and Greene Counties. From this group Butler, Armstrong, Indiana and Allegheny Counties fall within the Mahoning Creek Lake Market Area.

The report has inventoried and shown on maps all the large existing parks falling within the various counties making up the planning areas. A summary of the information given for each county within the market area is shown below.

	State Parks	State Fish Comm. Access Areas	State Game Comm. Areas	Corps of Engineers Resources	State Forests	County Parks
Butler	1	1	4	-	-	-
Clarion	1	1	6	-	-	-
Armstrong	1	1	3	1	-	-
Jefferson	1	2	5	-	2	-
Indiana	1	-	3	1	-	-
Allegheny	1	-	1	-	-	11

The Outdoor Recreation Horizons Report predicts an inflow of people into Planning Area Number Five from Pittsburgh, Pa., Ohio and New York. Their destination will be namely the High Mountain Area which is located in the northern half of this planning area. The influx of tourists and out-of-state visitors to this area will pass through the market area but otherwise not strongly affect Mahoning Creek Lake except for some sightseeing and overnight camping.

Existing State Parks and any new ones proposed will be planned as destination types and include day-use activities such as picnicking, swimming and family overnight camping. All facilities for these parks will be oriented to reflect the specific resources available. The State will be providing, for the planning area, similar facilities to those planned at Mahoning.

A total demand in activity days for various recreation activities proposed for Planning Area Number Five was developed on page 170 of the study. The chart below lists the demand figures for the activities proposed at Mahoning and shows the responsibility that the State will assume for provision of these activities. The deficit between the demand and the State's responsibility will have to be made up by the existing parks shown above for each affected county and future county parks planned by the many different Government Agencies and private groups. Mahoning Creek Lake by providing the planned facilities will fill an essential portion of the demand.

Planned Mahoning Creek Lake Activities	Total Demand in Planning Area 5 in Activity Days	State Park Responsibility in Activity Days	Deficit in Planning Area 5 in Activity Days
Picnicking	889,585	355,834	533,751
Camping	11,123	55,562	55,561
Swimming	2,636,435	316,372	2,320,063
Boating-Canoing	365,214	18,261	346,953
Sightseeing	1,046,542	52,327	994,215
Boat Fishing-Bank Fishing	400,657	20,033	380,624
Hunting	480,485	-	480,485
Hiking	2,238,844	447,769	1,791,075

Source: Outdoor Recreation Horizons, Pennsylvania Department of Forests and Waters, Area and Facility Requirements, 1980, State Planning Area Number 5, Page 168.

Allegheny County, which includes the large metropolitan area of Pittsburgh, has 11 large regional parks which can satisfy a major portion of the area's need for day-use outdoor recreation facilities. In addition, the State Planning Area Number 7 has several existing State Parks available including Point Park, Raccoon Park, Linn Run Park and Keystone Park. New State parks are contemplated including the recently acquired Hillman Park and Yellow Creek Park and a proposed park in eastern Washington County.

While Pittsburgh's and Allegheny County's recreation deficiency has been greatly relieved by these parks, there is still an unfilled demand for water-based recreation as evidenced by the turn-away crowds at Morraine State Park north of Pittsburgh. Mahoning Creek Lake is within day-use range of the northern half of Allegheny County and it is anticipated that, with improvement of the Allegheny Expressway north, many citizens of Allegheny County will want to use the facilities planned at Mahoning.

State Parks planned in the outer urban zone away from Pittsburgh and its metropolitan region will provide low density recreation activities such as hiking and camping. Emphasis will be on quality and not quantity of recreation and the resource will dictate the specific activity. Destination camping and day-use group activities are anticipated.

The demand for recreation activities developed for Area Number Seven are related to the activities proposed for Mahoning and shown on the chart below. The balance of the demand after the State has fulfilled its responsibility must be met by other Government agencies and private organizations both in the parks that currently exist and those planned for the future. The development of planned facilities for Mahoning Creek Lake will fill an important portion of the need.

Planned Mahoning Creek Lake Activities	Total Demand in Planning Area 7 in Activity Days	State Park Responsibility in Activity Days	Deficit in Planning Area 7 in Activity Days
Picnicking	10,540,234	3,478,277	7,061,957
Camping	1,307,681	653,841	653,840
Swimming	30,503,497	3,660,420	26,843,077
Boating-Canoeing	4,333,156	216,658	4,116,498
Sightseeing	12,411,701	620,585	11,791,116
Boat Fishing-Bank Fishing	2,336,538	116,827	2,219,711
Hunting	2,645,329	-	2,645,329
Hiking	26,578,237	5,315,647	21,262,590

Source: Outdoor Recreation Horizons, Pennsylvania Department of Forests and Waters, Area and Facility Requirements. 1980, State Planning Area Number 7, Page 170.

3.4.3 The Ohio River Basin Comprehensive Survey

The day-use market area for Mahoning Creek Lake is included as a small portion of the Allegheny River Basin subarea. The subarea has been evaluated in terms of recreation need in the "Ohio River Basin Comprehensive Survey" prepared by the Bureau of Outdoor Recreation in 1960. This Study is briefly reviewed below for the purpose of determining recreation need in the Mahoning market area.

Coal mining until recent years was the main economic activity in the Allegheny Basin. Now the area is experiencing an economic change and it will be in transition for several decades. Because of the rugged underdeveloped terrain and its prime location, the area may serve the growing tourist-recreation industry. Lack of access by major roads has been a barrier, however, to the area becoming a recreation mecca. (The situation has improved somewhat since the report date by the construction of the north-south Interstate 79 and the east-west Interstate 80.)

The demand for water-oriented outdoor recreation according to the survey was 11.2 million recreation days in 1960 and is projected to grow to 26.8 million in 1980 and 48.8 million by the year 2000. The following activities were used to determine the total number of recreation days.

1. Swimming
2. Boating
3. Water skiing
4. Picnicking
5. Camping
6. Sightseeing
7. Nature walks
8. Hiking

Recreation supply in the Allegheny Basin was inventoried in 1960 and visitation was calculated as 9.0 million recreation days. The demand of 11.2 million compared with the supply of 9.0 million leaves a 2.2 million net need for outdoor recreation development in the base year of 1960. The survey projected the needs to 17.8 million recreation days in 1980 and to 39.8 million in the year 2000.

3.4.4 Fish and Wildlife Service

The Federal Fish and Wildlife Service estimated in 1974 that there are 165,500 fishermen in the eleven county area surrounding Mahoning Creek Lake. These counties include:

1. Armstrong
2. Indiana
3. Jefferson
4. Allegheny
5. Butler
6. Cambria
7. Clarion
8. Clearfield
9. Elk
10. Forest
11. Westmoreland

The 165,500 fishemen will demand approximately 1.3 million fisherman days. In total, these eleven counties provide, in the existing streams and reservoirs including Mahoning Creek, 919,000 fisherman days leaving an unsatisfied demand of 375,000 days.

At the same time the Service estimates that there are 246,000 hunters in the same eleven county area listed above. They create a total demand for 2,840,600 hunter days which can be broken down further to 2,026,400 days for small game hunting and 814,200 days for white-tailed deer hunting.

The wildlife habitat in the eleven counties will support 1,744,800 days of small game hunting and 476,200 days of big game hunting leaving an unsatisfied demand of 619,600 hunter days.

3.4.5 Existing and Planned Recreation Opportunity

A study of the factors affecting recreation (population, age levels, income, recreation and mobility) indicates that the demand for recreation in this area would be slightly less than the demand created for recreation state and nationwide. However, the entire area with its natural resources of coal and oil could experience a quick economic turn-around if coal is used to meet the country's energy needs. This would develop favorable factors and increase the demand for recreation to normal or even slightly above.

While the perimeter of the market area and beyond offers a supply of recreation land similar to the type available at Mahoning Creek Lake, the core area offers only a few parks. This void in recreation lands can be partially met by the proposed development.

Facilities and activities provided in the existing parks are of the same general type as proposed for Mahoning. The reports which have analyzed the need for recreation in Western Pennsylvania have all shown significant need for additional facilities in each category both now and in the future. These reports cover a much larger area than the one affecting Mahoning and the factors there controlling recreation demand are more favorable. Mahoning should help to fill a portion of the general need because of its location and its potential for water-based recreation.

The lake and related lands would provide recreation close to home that can be reached in a short period of time. For many people it would offer the extra opportunity to fish or hunt after work. For school children during the school day, it would provide a place for nature education or the special education that only a reservoir can offer. For family groups it would offer the chance of a midweek, after work picnic. For private organizations and clubs the lake would provide a closeby place for evening meetings.

3.5 OUTDOOR RECREATION TRENDS

3.5.1 General

To develop the need for recreation at Mahoning Creek Lake, it is essential to examine the trends of those factors which influence the demand for recreation. National trends are an indicator that can be used to help predict the future of recreation within the local area.

3.5.2 Outdoor Recreation Resources Review Commission (O.R.R.R.C.) Study

The O.R.R.R.C. Study published in January 1962 is the most complete source of information on the subject of national trends. Their findings on demand influences are briefly reviewed as follows:

3.5.2.1 Population

The number of people involved is the most basic of all factors. As population increases so does the demand. The United States population is projected to rise from 179 million in 1960 to 213 million in 1975 and to range from 245 to 287 million by the year 2000.

Population distribution is important, for as the study points out, the demand for outdoor recreation by urban dwellers is likely to grow faster than a similar demand by rural dwellers. The reason given is that most Americans live in urban areas today and this imbalance is growing.

The report states, "that by the year 1976, 17 percent of the population will be in the 15 to 24 age bracket." Young people are generally more active than their elders requiring more facilities to meet the increased demand.

3.5.2.2 Income

The O.R.R.R.C. Study has demonstrated that participation in recreation rises as income increases. In the United States incomes have risen steadily and the report predicted that by 1976, 23 percent of the wage earners will have incomes between 10,000 and 15,000 dollars. This will cause a 14% increase by 1976 in the rate of participation in outdoor recreation.

3.5.2.3 Leisure Time

As a result of increased productivity, the number of hours worked per week is slowly declining. The average number of hours in 1960 was 39. This has been projected to 36 hours by the year 2000. Much of this extra time will be expended in recreation pursuits.

3.5.2.4 Mobility

The ability of people to move from their homes to recreation areas has a decided effect on demand for recreation. Passenger motor vehicle registrations in Pennsylvania have risen steadily since the end of World War II. Improvement to highways during the same period has made highway travel decidedly easier.

3.5.2.5 Education and Occupation

These two factors, according to the O.R.R.R.C. Study, have a direct bearing on demand. As education increases so does participation in certain recreation activities. Professional and technical workers participate more often in recreational activities than do service or farm workers.

3.5.2.6 Preferred Activities

The O.R.R.R.C. Study determined that the following outdoor recreation activities were the ones that Americans participated in the most. In the order of preference they are:

1. Driving for pleasure
2. Walking for pleasure
3. Playing outdoor games or sports
4. Swimming
5. Sightseeing
6. Bicycling
7. Fishing
8. Attending outdoor sports events
9. Picnicking
10. Nature walks
11. Boating (other than sailing or canoeing)
12. Hunting
13. Horseback riding
14. Camping
15. Ice skating
16. Sledding or tobogganing
17. Hiking
18. Water skiing
19. Attending outdoor concerts, drama, etc.
20. Canoeing
21. Sailing
22. Mountain climbing
23. Snow skiing

3.5.3 Effects of the Energy Crisis on Recreation

One of the factors which influences demand, namely mobility, may be seriously affected by the shortage of gasoline for private cars and the resultant rise in the per gallon prices. Even though the shortage has been eased, many experts believe that gas may not be as plentiful as it has been since 1945 nor will it be sold as cheaply.

The availability of gas and other fuels could affect the recreation habits of the American people and in turn affect the development of future park programs and facilities. The changes which can logically be predicted for Mahoning Lake should be considered in this planning stage.

To conserve energy, people will want to travel the shortest distance possible to reach a park that will satisfy their recreation needs. At Mahoning Lake this may mean an increase in visitation by the people who live within its day-use market area and a decrease in visitation by those living outside of the 90 minute travel time. Increased visitation would require more facilities and possibly additional acquisition of land.

There may also be a demand for public transportation to the park on a scheduled basis. Special tour buses or chartered buses may become popular. Mass transportation to the park would undoubtedly increase the visitation (one-half of the present population - youth, elderly and infirm - cannot drive a car) and would require special facilities to handle the types selected. In addition, users without the hauling capacity of their cars would need to rent camping equipment at the park and other equipment such as bikes, horses and canoes.

Without the automobile to move from place to place within the park, visitors would be inclined to make greater use of all the trail facilities. The increased use may lead to a greater variety and more miles of trail than are planned for under normal conditions.

3.5.4 Local Outdoor Recreation Trends

The discussion under Population Characteristics of the Market Area, Section 3.0, has examined the market area surrounding Mahoning Creek Lake. Briefly, it revealed that the population in the area has declined with the exception of Indiana County; the medium and over 65 age groups have more people than the state average while the younger age groups have less people than the average; the educational level is generally lower than average; the income levels are lower than the state average.

The above factors will strongly influence the development of recreation within the market area. Since only a moderate rise in population is predicted to the year 2040 the numbers of people requiring recreation will increase only moderately. Recreation provided should be close to home to reduce the amount of travel required. Activities which favor the older generation are in order as are those which will provide fish and game.

SECTION 4.0 - PLANNING CONSIDERATIONS

4.1 RESERVOIR OPERATION

4.1.1 Current Operations

Mahoning Creek Lake is presently operated for flood control only. During periods of low flow, the lake level normally fluctuates between elevations 1075 and 1080. When excess runoff occurs in the reservoir's basin, it is temporarily stored in the reservoir, to be released afterward at a rate sufficient to draw the lake level down to the normal range within 5 to 10 days without causing recurrent downstream flooding. This procedure is followed throughout the year.

4.1.2 Hydrologic Review

For many years, local residents have expressed the desire for additional recreational development at the project. Early in 1967, local interests represented by the Mahoning Reservoir Development Committee in cooperation with the Armstrong County Planning and Zoning Commission suggested that the pool be raised to elevation 1098 feet m.s.l. Subsequent hydrologic studies have indicated that a 280-acre summer conservation pool at elevation 1098 feet m.s.l. could be maintained without seriously impairing the flood control capacity of the project. These studies are summarized in The Hydrologic Review (Appendix G).

4.1.3 Basis of Pool Selection

The basis of pool selection was contingent upon many different evaluation criteria, all of which were considered in the selection of a summer conservation pool elevation which would provide optimum recreation and fish and wildlife enhancement without any significant infringement upon the primary purpose of flood control or the related environment.

Several different pool elevations were considered, but the elevation which most successfully met the criteria established in previous discussion was elevation 1098. To raise the pool above this level would inundate a large portion of the land proposed for recreation, namely the Milton Loop, and would require considerable clearing of trees and brush to make the pool safe for boating.

At elevation 1098 the summer conservation pool will extend to the Milton Loop and provide sufficient depth, approximately 5 feet, to safely launch boats. This is significant because an investigation of the land upstream from the dam revealed that nowhere else between the dam and the Milton Loop is there sufficient land or suitable access to develop a boat launching facility. The Milton Loop is large enough (42 acres) and close enough to good access (Route 839) to provide a complete range of recreational facilities.

Raising the pool to elevation 1098 will require clearing only on the upper reaches of the pool and even this would be minimal because of the steep terrain containing the pool.

Any effect on the environment or the wildlife habitat should be insignificant because the water level in the pool regularly exceeds elevation 1098 during periods of high run-off. This, in combination with the fact that most of the pool was cleared and the habitat removed above this elevation during the original construction, suggests that the establishment of a summer conservation pool at this elevation would not seriously affect the environment. Discussions with the Pennsylvania Game Commission support this conclusion.

The Fish and Wildlife Service and the Pennsylvania Fish Commission have also reviewed the proposal to raise the pool and have indicated that they sense no detrimental effects to the environment would occur from raising the pool to elevation 1098.

Establishment of a summer conservation pool would require raising the conservation pool (elevation 1075) 23 feet to an elevation of 1098. This would result in an increase from 170 surface acres of water to 280 surface acres of water. The hydrologic review further indicated that by selecting a pool elevation of 1098, the actual pool level would fluctuate between 1098 and 1101 with an average elevation of 1100 occurring approximately 60 percent of the time. This fluctuation would not affect the development of facilities along the pool because the change in elevation would be within the existing creek banks.

4.2 PROBLEMS

4.2.1 General

A thorough analysis of potential problems related to the existing project has been made and those problems which would have a significant impact upon the development of facilities are discussed herein.

4.2.2 Steep Topography

The major problem related to the existing project is the lack of safe access to the current conservation pool. This is caused by very steep valley walls, 25-70 percent slope, which contain the existing pool and the lower reaches of Mahoning Creek. In the few places where old roads did penetrate the steep slopes and cross the creek prior to the construction of the reservoir they are too hazardous for heavy safe use. These roads are narrow, unpaved farm lanes with no storm drainage and very steep gradients. The steep gradient and the existence of bedrock close to the surface makes the cost of improving these roads prohibitive.

The tight confines of the steep valley result in a narrow elongated pool. The existing conservation pool averages 500 feet in width and is 4 miles long. Steep wooded hillsides surround the pool and range to 500 feet above the water surface providing seclusion but creating the illusion of an even narrower pool. This combination, plus the passive character of the natural setting, demands that existing standards for determining capacity of use be tempered to reflect the unique character of the lake.

4.2.3 Lack of Facilities

Directly related to the difficult access problems is the lack of existing facilities to serve the public. With the exception of a small picnicking and parking area located at the dam, the only other facilities consist of the hazardous launch site operated by the Dayton Area Sportsmen's Club and the two small picnic areas at North Point and Smicksburg. All of these areas lack appropriate facilities.

At the public meeting held in Dayton on 20 April 1972 the people in attendance favoring further development indicated that the lack of existing facilities severely limited the use of the reservoir and related areas.

4.2.4 Water Quality

Water quality testing has been performed below the dam over the past 20 years and generally the quality has been good. However testing above the dam and in the creeks was just begun during July and October of 1973. These tests also indicated that the water quality is good but additional testing will be required to evaluate the quality over an entire recreation season. None of the testing to date has included tests for total or fecal coliform counts. These will be necessary to determine the safety of the water for stream wading or swimming.

Several areas of discolored water discharge were identified during field investigations and they have been marked for further observation to see if they become a problem during the recreation season.

4.2.5 Debris

There exists within the pool an accumulation of floating debris consisting mainly of fallen trees. This debris floats back and forth in the pool as the wind direction changes. The elimination of this problem will be undertaken prior to and independently of the development of additional facilities.

4.2.6 Pool Fluctuation

Although the proposed summer pool would fluctuate between elevations 1098 and 1101, the 5-year flood is calculated at elevation 1147. This means that theoretically, on an average of once every 5 years, the pool will flood to elevation 1147. This results in Mahoning Creek flooding its banks to an area above North Point, and Little Mahoning Creek flooding its banks to a point midway between Smicksburg and McCormick. When this occurs almost all stream-side activities are covered by water. Consequently, special considerations are necessary to prevent flood damage to facilities located in these areas.

4.2.7 Public Access

Public access to the project area is over local roads, many of which are narrow, unpaved and without sufficient safety barriers. In many areas there is not adequate horizontal and vertical site alignment to permit safe travel. Several bridges and culvert structures are limited to one lane circulation.

Local highway officials should be informed of the anticipated increased visitation due to proposed development and urged to upgrade those local roads which are important to the vehicular circulation within the project area.

Hazardous conditions and excessive costs to improve the existing boat launch would indicate that this area should be closed to public launching during the summer season and maintained only as a bank fishing access point and to provide boating access to the winter pool.

4.2.8 Lack of Support Facilities

Support facilities such as police and fire protection, emergency service and necessary consumer services are essential to the successful development of the project. Most of these services are available in Dayton, but they may require expansion to accommodate the expected visitation to the project.

4.2.9 Protective Buffer Lands

The original purchase of land related to flood control only and consequently the U. S. Government boundary line closely follows the full pool elevation of 1162 with the result that in many areas of steep terrain the boundary line is located very close to the water's edge. All of these areas are heavily wooded and provide the scenic background for the pool and creeks. If this background is disrupted by logging, strip mining or other incompatible uses the very essence of the project, the beautiful natural setting, will be destroyed and much of the charm of the project lost.

4.2.10 Current Leases

Implementation of the Recommended Plan would necessitate certain changes to land use agreements within the U.S. Government ownership. The current license to the Pennsylvania Fish Commission would be terminated upon the execution of a new cost-sharing type lease. In addition, as outlined in Section 9.0, certain areas within the present Fish Commission license would be leased to Armstrong County for recreational purposes while others would be leased to the Pennsylvania Game Commission for wildlife development purposes. Existing share crop agreements within the wildlife development area would be terminated although it is anticipated that the Game Commission would again share-crop some of these areas as part of their management program. The current letter permit to the Borough of Smicksburg covering the Smicksburg Picnic Area would be terminated and coordination would be initiated to formally lease the picnic area to the Borough. The letter permit to Indiana University to conduct outdoor biological research on several tracts within the proposed Game Commission lease area would be continued since the permit does not convey any right in Government owned land or limit public use of the area.

4.3 VISITATION PROJECTIONS

4.3.1 Method

Recreation use for Mahoning Creek Lake has been determined in accordance with Technical Report Number Two dated October 1969 and entitled "Estimating Initial Reservoir Recreation Use".

4.3.2 Selection of a Similar Reservoir

Englebright Reservoir in the Sacramento District was chosen as a similar reservoir from the group presented because it most nearly compared with Mahoning Creek Lake in an initial and detailed investigation.

4.3.3 Comparison of Physical Characteristics

The physical characteristics for Englebright Reservoir and Mahoning Creek Lake are compared below in Table 4-1.

TABLE 4-1

COMPARISON OF THE PHYSICAL CHARACTERISTICS OF MAHONING CREEK LAKE AND ENGLEBRIGHT RESERVOIR

Item	Proposed Mahoning Development	Englebright
Surface acres of water	280	750
Shoreline miles	12	10
Major access	U. S. 422	State 20
Total land and water acres	2,900	1,800
Access to project	(1) 2 lane	(1) 2 lane
Normal annual rainfall	43"	20"
Winter low temperature	-18° F	-
Summer high temperature	98° F	97° F
Fishery	good	-
Overnight facilities	Campground	none
Miles to overnight facilities	.5	-
Water quality	good	good
Nearest population (miles)	21	20
Lake slopes	steep	steep
Competing areas (number)	12	12
Purpose of project	flood recreation	flood recreation
Launching ramps	3	2

The two projects are nearly equal in all of their physical characteristics. Englebright has more surface acres of water but fewer shoreline miles and fewer total land and water acres. No adjustment is considered necessary for this slight difference.

4.3.4 Comparison of Competing Recreation Areas

The nearby competing recreation areas for each project were compared and are shown in Tables 4-2 and 4-3 below.

TABLE 4-2

COMPETING WATER-ORIENTED RECREATION AREAS
MAHONING CREEK LAKE

Name	Distance Miles	Size 1/	Recreation Facilities Pub.	Pri.	Estimated Annual Attendance
Moraine	50	15,900 Ac	Yes	No	1,484,900
Lake Oneada	70	-	Yes	No	Not available
Glade Mill	48	-	Yes	No	Not available
Cook Forest State Park	45	7,820 Ac	Yes	No	546,200
Piney Dam	35	-	Yes	-	Not available
Clear Creek State Park	45	1,120 Ac	Yes	No	318,300
Crooked Creek State Park	30	2,500 Ac	Yes	No	621,900
Keystone Dam	20	1,200 Ac	Yes	-	Not available
Kyle Lake	45	-	Yes	-	Not available
Conemaugh Lake	50	-	Yes	No	159,400
Yellow Creek State Park	35	7,820 Ac	Yes	-	Not available
Allegheny River	15	80 Mi	Yes	Yes	Not available

Source: "Outdoor Recreation Horizons", Pennsylvania Statewide Comprehensive Outdoor Recreation Plan, 1970.

1/ Data shown for reservoirs represent surface area (acres) of average recreation pool -- data for rivers denote miles of river within designated distance zone (0-25, 25-50)

TABLE 4-3

COMPETING WATER-ORIENTED RECREATION AREAS
ENGLEBRIGHT RESERVOIR

Name	Distance Zone (miles)	Size or Length 1/ 0-25	25-50	Recreation Facilities Pub.	Pri.	Estimated Annual Attendance
Bullards Bar	0-25	515		Yes	Yes	INA*
Camp Far West	0-25	2,680		Yes	No	INA
Feather River	25-50		25	Yes	Yes	INA
Folsom Lake	25-50		11,450	Yes	Yes	3,946,310 (1967)
French Meadows	25-50		1,418	No	Yes	INA
Lake Combie	25-50		360	Yes	No	INA
Lake Spaulding	25-50		674	Yes	Yes	INA
Lake Valley Reservoir	25-50		312	No	Yes	INA
Merle Collins Reservoir	0-25	975		Yes	No	INA
Rollins Reservoir	0-25	825		No	Yes	INA
Sacramento River	25-50		40	Yes	Yes	INA
Sly Creek Reservoir	25-50		562	No	Yes	INA

1/ Data shown for reservoirs represent surface area (acres) of average recreation pool -- data for rivers denote miles of river within designated distance zone (0-25, 25-50)

* Information Not Available

Each project has a similar number of both large and small competing recreation areas within their market area ranges of 50 miles or 90 minutes driving time. Each will also receive competition from a nearby river.

Attendance Figures

The two projects are considered approximately equal in terms of competing areas.

4.3.5 Comparison of the Socio-economic Indicators

The social and economic indicators for the Mahoning Creek Lake and the Englebright Reservoir were examined through 1970 data available for each county related to the projects. All indicators including the following were examined and found to be nearly equal with the exception of unemployment.

1. Total population
2. Population per square mile
3. Urban percentage
4. Net migration
5. Age
6. Education
7. Income
8. Unemployment

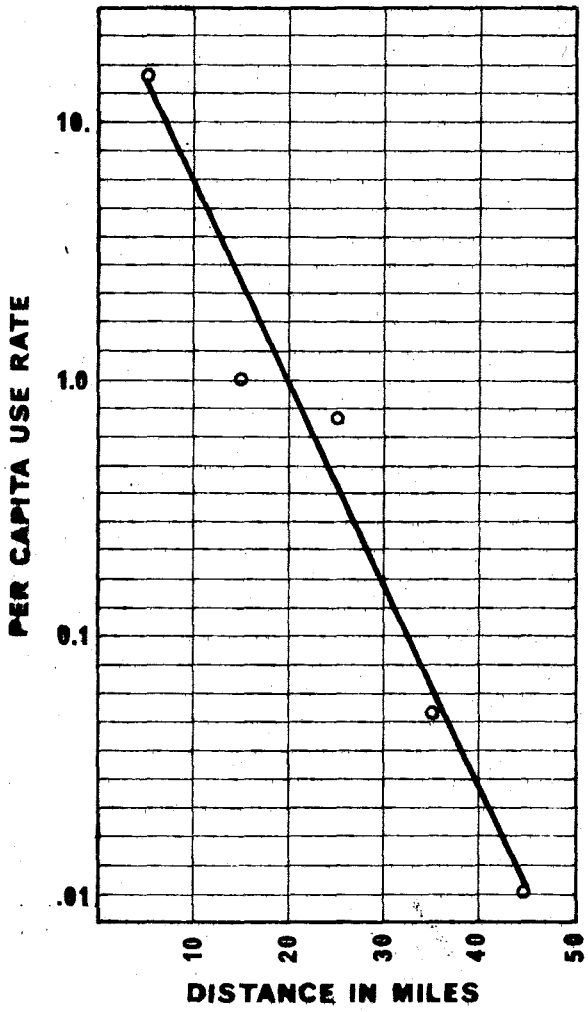
The rate of unemployment is higher in the related California counties than in the comparable counties in Pennsylvania. Since unemployment varies each year the difference between the areas is considered insignificant.

4.3.6 Adjustment of the Day-Use Per-capita Rate Curve

Based on all information available there are no substantial differences between the two projects which necessitate an adjustment to the use curve developed for the Englebright Reservoir. The curve is shown in Figure 4-1 on the following page.

FIGURE 4-1

PER-CAPITA USE RATES - ENGLEBRIGHT RESERVOIR
SACRAMENTO DISTRICT



4.3.7 Potential Initial Day-Use Attendance

To develop the potential initial day-use attendance for the project, it is necessary to determine the most populated city within each county represented in the market area and the distance of each from the project. This information is presented in Table 4-4 on the following page.

TABLE 4-4

COUNTY POPULATION CENTERS WITHIN MARKET AREA

County	Most Populated City	Population 1970	Distance from Project
Allegheny	Pittsburgh	520,167	48
Armstrong	Kittanning	6,231	21
Butler	Butler City	18,691	43
Clarion	Clarion Boro	6,095	27
Indiana	Indiana Boro	16,100	29
Jefferson	Punxsutawney	7,792	22

From this information and from selection of a day-use rate for each county based upon the distance of its most populated city from the project, a total potential initial day-use for Mahoning can be calculated as shown below. Since Allegheny County is located on the edge of the market area only one-half of the population was used in calculating the day-use for the project.

TABLE 4-5

POTENTIAL DAY-USE ATTENDANCE

County	Estimated Population	Distance of Largest Town From Project (Miles)	Per-Capita Day-Use Rate 1.	Attendance at Project (Rec. Days Annually) 2.
Armstrong	79,900	21	.85	67,150
Indiana	86,000	29	.20	17,200
Jefferson	43,000	22	.70	30,100
Butler	145,000	43	.016	2,320
Clarion	39,500	27	.30	11,850
Allegheny (1/2)	777,000	48	.009	6,990
Potential initial day-use (rounded).				136,000

1. See Day-Use Per-capita Rate Curve
2. Estimated 1980 Population Times Per-capita Day-use Rate. Refer to Population Projection Curves Mid-Point Curve pages 3-6 thru 3-11.

4.3.8 Adjustment of Potential Initial Day-use

The market area serving the project will contribute approximately 90 percent of its total day-use. The other 10 percent will come from outside. This additional 10 percent would amount to approximately 15,000, or a combined total of 151,000 for initial day-use.

4.3.9 Overnight - Use of the Project

The overnight-use of the project has been determined by examining the percents of activity use for 1971 of the Englebright Reservoir and two existing reservoirs, Crooked Creek and Tionesta, which are within the project market area. The results are given below in Table 4-6.

TABLE 4-6

OVERNIGHT-USE PERCENTAGE

Existing Reservoir	Percentage
Englebright (CA)	3
Crooked Creek (PA)	3
Tionesta (PA)	12

Table 4-6 is based on 1971 data obtained from "Recreation Statistics", April 1973, Department of the Army, Corps of Engineers, Civil Works Directorate.

The average of the above percentages is 6 percent but because many local campers will use the facilities, this percentage has been adjusted to 10 percent. This additional 10 percent gives a total use of about 170,000 recreation days and the difference equals the overnight use of 19,000 recreation days.

4.3.10 Total Ultimate Use of the Project

The base year is considered to be the third year of project operation, or, in this case, 1980 will be used in determining initial facility development requirements.

In 1980 the project will be 40 years old and have another 60 years of anticipated life remaining. Ultimate use of the project therefore has been calculated to the year 2040.

Based on anticipated population increase, a modest increase in per capita use rates brought about by more leisure time, the energy crisis and the inclusion of people not now served by parks, the total ultimate use of the project would be 235,000 recreation days annually.

4.4 FACILITIES REQUIRED

4.4.1 Local Desires

The people within the Mahoning Creek Lake market area have expressed their desires through a public meeting and invitation response card. While a number of people favor no action at the reservoir, the large majority of the people favor raising the summer pool to provide additional water surface for recreation. At the same time the people for the most part favored limited horsepower for power boating on the lake.

Results of Public Meeting Number One written and verbal statements asked for the inclusion of the following facilities in the plans.

1. Camping
2. Hiking
3. Fishing
4. Boating
5. Swimming
6. Picnicking
7. Nature trails
8. Bridle trails
9. Biking
10. Canoeing

Response Cards Summary:

The results of the response cards have been tabulated and are given below in Table 4-7.

TABLE 4-7

RESPONSE CARD RESULTS*

Activity In Order of Preference	Percent Wishing to Participate	Average Number of Occasions Desired Per Yr.
1. Picnicking (family)	84	7.7
2. Fishing	67	13.2
3. Swimming	66	10.2
4. Sightseeing	66	9.1
5. Hunting	62	10.6
6. Hiking	58	7.1
7. Picnicking (group)	55	2.4
8. Nature walks	44	5.6
9. Trailer Camping	39	10.1
10. Boating	33	4.7
11. Canoeing	25	6.4
12. Outdoor games	23	4.4
13. Tent Camping	21	2.3
14. Bicycling	21	5.4
15. Riding	17	1.9
16. Water Skiing	15	2.0
17. Wading	14	1.0
18. Bird Watching	14	1.4
19. Trail biking	13	7.0
20. Sailing	8	0.8

*Based on 181 responses out of a potential 300.

4.4.2 Activities at Similar Corps Projects

Activities and percentages of activity use at similar Corps projects, Englebright in the Sacramento District, Crooked Creek and Tionesta in Pennsylvania are given in Table 4-8 below.

TABLE 4-8

ACTIVITIES AND PERCENTAGES OF ACTIVITY USE AT SIMILAR PROJECTS IN 1971

Activity	Englebright (Calif.)	Crooked Creek (Pa.)	Tionesta (Pa.)	Adjusted Percentage
Picnicking	40	25	11	25
Camping	5	4	12	15
Swimming	14	27	6	10
Boating	17	7	3	25
Sightseeing	22	55	44	40
Fishing	28	3	25	10
Hunting				3
Hiking				15

Percentages of activity use were obtained from: Recreation Statistics Department of the Army, Corps of Engineers, Civil Works Directorate, April 1973.

4.4.3 Adjustment of Percentages of Activity Use

4.4.3.1 Camping

The camping percentages have been adjusted to reflect the uniqueness of the Mahoning Creek Lake and its market area. The outstanding camping environment coupled with the fact that metropolitan Pittsburgh is within overnight range suggests that the camping percentage should be raised above that for Tionesta. It has therefore been adjusted upward to 15 percent.

4.4.3.2 Swimming

The percentage of activity use for swimming has been adjusted downward to 10 percent. The lake does not lend itself to swimming development but there is an opportunity to enjoy water play in the creeks. Water play would include wading and splashing but not formal swimming.

4.4.3.3 Boating

Boating has been adjusted upward to 25 percent to reflect the local public interest in increased boating. This is caused in part by the lack of suitable boating facilities in this part of the state and in the desire of a large segment of the population to participate in boating activities.

This lack of facilities, in combination with the increase in access and the desirability of this area for canoeing suggests justification for this increase.

4.4.3.4 Sightseeing

The percentage for sightseeing has been adjusted downward to 40 percent. This reflects the gradual change in percentage as other activities are made available and become popular.

4.4.3.5 Fishing

Information available from the Fish and Wildlife Service gives an estimate of approximately 14,000 annual angler days depending upon the alternative considered. This figure compared to an annual general recreation use of 160,500 indicates that the percent of activity use for fishing should be reduced to 10 percent and that there would be no increase in fisherman days from the initial design load to the future design load.

4.4.3.6 Hunting

A percentage of use for hunting was based on an estimate of annual hunter days made by the Fish and Wildlife Service. This figure is 3 percent of the annual general recreation use expected by 1980.

4.4.3.7 Hiking

Presence of the Baker Trail across project lands at Mahoning Creek Lake plus the ideal hiking environment indicates that hiking will be popular. The O.R.R.R.C. report shows that when modest hiking facilities are made available 19 percent of the adult population will make use of them at least once a year. This percentage is reduced to 15 percent to recognize that the percentage among the total population, both adult and children, will be somewhat lower.

TABLE 4-9

INITIAL AND FUTURE DESIGN LOAD

Activity	Percent of Day Load	Initial Design Day Load (2934)	Ultimate Design Day Load (4060)	Turnover Rate	Initial Design Load	Ultimate Design Load
Picnicking	25	730	1,020	1.8	410	570
Camping	15	440	610	1	440	610
Swimming	10	290	410	1.5	190	270
Boating	25	730	1,020	1	730	1,020
Sightseeing	40	1,170	1,620	5	230	320
Fishing	10	290	-	1	290	-
Hunting	3	90	120	1	90	120
Hiking	15	560	770	2	280	390
Totals	143%	4,300	5,570	-	2,660	3,300

4.4.5 Initial and Future Facilities

Primary facilities required to accommodate the initial and future design loads were determined from criteria set forth in EM 1110-2-400 as well as past experience at District lakes and from criteria developed by the Pennsylvania Bureau of State Parks. The facilities and the applicable criteria for each are given below:

Picnicking

4 persons per table
4 tables per picnic unit or 16 persons per standard picnic unit
1.8 turnover rate
1 car parking space per table
10 tables per acre density
1 acre of support facilities to support 1 acre of tables includes parking, meadow area, toilets and trails
1 acre for each acre of tables and each acre of support facilities to provide alternative picnic sites (one picnic unit requires 1.6 acres of land)

4.4.4 Design Load and Facility Requirement

To determine facility requirements to accommodate the initial attendance the day load use was calculated by the following formula.

$$DL = \frac{AA \times \% PM \times \% WE}{8}, \text{ where}$$

DL = day load at maximum practical use

AA = annual attendance (170,000 initially and 235,000 by the year 2040)

% PM = percent of annual use expected during the peak month of recreation use. A study of available data for Crooked Creek, Tionesta and Mahoning Creek Lake in Pennsylvania for the years 1970 and 1973 indicates that this figure would be 22.5%.

% WE = percent of peak month use expected on weekends. Data available for Crooked Creek and Mahoning Creek Lake for the year 1971 indicates that this figure would be 61.4%.

8 = the number of weekend days per month.

The computation of initial day load is:

$$DL = \frac{170{,}000 \times .225 \times .614}{8} = 2936$$

The computation of the ultimate day load is:

$$DL = \frac{235{,}000 \times .225 \times .614}{8} = 4060$$

These day loads would be distributed among the activities listed in Table 4-8 according to the adjusted percentages of activity use. Table 4-9 gives the resulting initial and future day loads and design loads by activities.

Camping

4 persons per camping unit
4 units per acre
1 turnover rate
1 acre for support facilities for each acre of camping units
1 car parking space per unit (Included under support facilities)

Swimming (water play)

Swimming would take the form of water play at Mahoning Creek Lake. Formal swimming is not possible but splashing at the water's edge and playing and wading in the streams are possible.
100 S.F. of water surface per person, 40 percent of people in water at one time.
100 S.F. of bank space per person, 60 percent of people out of water at one time.
1 car parking space per 4 persons

Boating

80 percent motor boats (limited horse-power)
4 persons per boat
1 turnover rate
1 launching lane per 40 boats
17 car/trailer parking spaces per lane
8 car parking spaces per lane
1,000 S.F. bank space per lane
1 boat per 1 acre of lake surface
20 percent canoes
4 persons per canoe
1 car parking space per 4 persons
5 canoes per 1 mile of canoeable stream
1 canoe per 1 acre of lake surface
2.3 acres of support land per canoe

Sightseeing

30 percent of sightseers require formal facilities
70 percent of sightseers distributed throughout project and on roads related to the site
1 car parking space per 4 persons for sightseers requires formal facilities
5 sightseeing cars per mile of road

Fishing

50 percent of fishermen will use boat
1 boat per 3 fishermen
1 turnover rate
1 launching lane per 40 boats
17 car/trailer parking spaces per lane
8 car parking spaces per lane
1 acre of water surface per boat
50 percent of fishermen will bank fish
1 car parking space per 3 persons
1 fisherman per 50 LF of usable stream bank or shoreline (25' width)

Hunting

22 percent of total hunters hunt big game
78 percent of total hunters hunt small game
1 turnover rate
64 acres per 1 big game hunter
8 acres per small game hunter
1 car parking space per 2 persons

Hiking

10 hikers per mile of trail
1 car parking space per 3 persons
12 acres per mile to support trail

4.4.6 Facilities and Space Requirements to Support Initial and Future Design Loads

Tables 4-10 and 4-11 give the facilities and space required to meet initial and future design loads based upon the criteria given below:

TABLE 4-10

INITIAL FACILITY AND SPACE REQUIREMENTS

Activity	Facility	Space
Picnicking	25 units	40 acres
	100 car parking	
Camping	110 units	55 acres
	110 car parking	
Swimming	50 car parking	
(water play)	water	.2 acre (water)
	beach	.3 acre (beach)
Boating, Motor	4 launch lane	.1 acre
(146 boats)	17 car/trailer	1.5 acres
	8 car parking	.6 acre
	water surface	146 acres (water)
Boating, Canoe	37 car parking	.6 acre
(37 boats)	water surface	.8 mile canoeable stream
Sightseeing	18 car parking	.2 acre
	roads	.8 mile of road
Fishing, from Boat	1 launching lane	.02 acre
(26 boats)	17 car/trailer parking	.4 acre
	8 car parking	.1 acre
	water	30 acres
Fishing, from Bank	25 car parking	.5 acre
	bank	1 mile usable bank or shore
Hunting, Big Game	10 car parking	-
	game land	1280 acres
Hunting, Small Game	35 car parking	
	game land	560 acres
Hiking	95 car parking	.9 acre
	trail	28 miles
	support	336 acres

TABLE 4-11

ULTIMATE FACILITY AND SPACE REQUIREMENTS

Activity	Facility	Space
Picnicking	35 units	56 acres
	140 car parking	
Camping	150 units	75 acres
	150 car parking	
Swimming	70 car parking	.6 acre
(water play)	water	.3 acre (water)
	beach	.4 acre (beach)
Boating		
Motor	5 launch lane	.1 acre
(204 boats)	85 car/trailer	2 acres
	40 car parking	.7 acre
	water surface	204 acres
Canoe	51 car parking	1 acre
(51 boats)	water surface	10 miles canoeable stream
Sightseeing	25 car parking	.2 acre
	roads	11 miles of road
Fishing		
From boat	1 launching lane	.02 acre
(26 boats)	17 car/trailer	.4 acre
	8 car parking	.1 acre
	water	30 acres
From bank	25 car parking	.5 acre
	bank	1 mile usable bank or shore
Hunting		
Big game	15 car parking	-
	game land	1600 acres
Small game	50 car parking	-
	game land	760 acres
Hiking	130 car parking	1.2 acres
	trail	40 miles
	support	480 acres

4.5 DEVELOPMENT CONCEPTS

4.5.1 General

A new development concept for Mahoning Creek Lake was established through an analysis of information gathered from a public meeting with people who will use the lake, and existing State and Corps projects in Western Pennsylvania. The intensity of recreation use was examined for all of the projects within the Pittsburgh District and this information was then applied to a conservation-recreation intensity scale.

The scale is divided into five categories of intensity. They are:

1. Recreation Intensive

   This includes projects that have 90 to 100 percent of their resources devoted to public use and 0-10 percent devoted to conservation.

   (Conservation includes lands which are maintained in their natural state but are open to passive uses such as hunting, hiking and fishing access.)

2. Recreation Weighted

   Included in this category are projects which have 60 to 80 percent of the available lands for recreation development and devote 20 to 40 percent to conservation.

3. Conservation/Recreation Mix

   This mid-point category recognizes projects that maintain a balanced use - 40 percent recreation and 60 percent conservation.

4. Conservation Weighted

   Conservation becomes the primary theme using 70 to 90 percent of the resources. 10 to 30 percent of the land is devoted to active public recreational use.

5. Conservation Intensive

   The final category recognizes full conservation use. 90 to 100 percent of the resource is used for conservation purposes while 0 to 10 percent is devoted to active recreation activities.

Of all the projects in the Pittsburgh District, Mahoning is the only one which can at the present time be classified as Conservation Intensive. East Branch falls within the Conservation Weighted category and the rest of the projects are grouped as follows:

Recreation Intensive	3
Recreation Weighted	5
Recreation/Conservation	5

4.5.2 A New Concept for Mahoning Creek Lake

During the analysis of existing data for the purpose of establishing a development philosophy several considerations emerged as strong guidelines and have been listed below:

1. Recent mandates by the Corps of Engineers and increased public pressure on all levels of Government to provide additional recreational facilities indicate a need to move in this direction with all Corps projects designed originally for only flood control. This is especially true at Mahoning Creek Lake because of the natural potential of the resource to sustain development of recreational activities.

2. This concept is further strengthened by the realization that no additional land acquisition would be required to accommodate the development of suitable recreation and fish and wildlife enhancement activities.

3. Public response to the suggestion that Mahoning Creek Lake be developed more intensively for recreation purposes has been most favorable. This has been apparent in the two public meetings which have been held concerning this issue and by the amount of favorable mail received. However, in addition to their support of additional recreational activities, most people also stated that they did not want to see the project compromised or destroyed by the suggested recreational development.

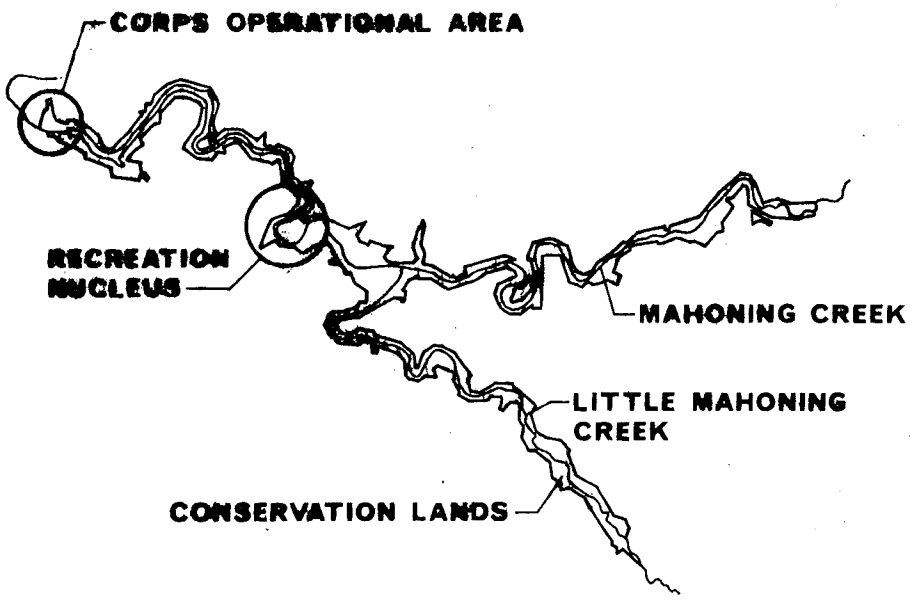
With this information in hand, it is apparent that the best way to respond to the pressure for increased recreational activities and additional fish and wildlife enhancement at Mahoning Creek Lake is to move the project ahead one step on the Conservation/Recreation Intensity Scale to the classification of "Conservation Weighted".

4.5.3 A Development Concept for Mahoning Creek Lake

Based upon the Conservation Weighted concept as the development philosophy of all further development of the project area, a basic plan was developed as indicated in the following diagram and outline.

FIGURE 4-2

PROPOSED DEVELOPMENT DIAGRAM



1. The Corps operational area surrounding the dam would continue to be used for sightseeing, picnicking, fishing and hiking.

2. Located near the center of the project, near the area known as the Milton Loop, would be the nucleus of most of the active recreational activities. This centralization of activities would preserve the natural quality of most of the project while providing easy access to other areas and activities.

3. The remaining project lands which include portions of Mahoning Creek, Little Mahoning Creek and the proposed summer conservation pool would be classified as conservation areas and generally limited to the development of fish and wildlife enhancement activities.

SECTION 5.0 - PLAN OF DEVELOPMENT

5.1 PLANNING CONCEPTS

The overall plan (see Plate 4) consists of the establishment of a summer conservation pool at elevation 1098 and the development of recreation, and fish and wildlife enhancement under the guidelines of the Conservation Weighted Theme. Plate 4 shows the areas selected for public use, the type of use to which they should be put, the relative size of each area and the type and total cost of activities to be developed. This plan was formulated recognizing the physical constraints and natural amenities of the project area. Areas of steep terrain and areas required as safety buffers around proposed development or existing residential areas have been designed for conservation use and development of these areas limited to occasional trails. Areas with productive wildlife habitat and terrain conducive to good hunting have been planned for wildlife enhancement, while fishing access has been planned in areas of known quality fishing potential. Recreational areas were designed to reflect the natural resources and to embrace the principles of advanced environmental park planning while responding to the previously stated desires of the general public.

The planning for proposed development of all of the areas and their related activities incorporates the desires of, was thoroughly coordinated with, and has been approved by, the cost-sharing partners (see List of Exhibits).

5.2 RECREATION USE

Recreation uses planned for this alternative are mainly passive in nature and are consistent with the selected Conservation Weighted Theme. They are primarily boating, canoeing, picnicking, camping, hiking, water play, fishing, hunting, nature interpretation and sightseeing. Land required for recreational facility development consists of only 11 percent of the total amount of land available for use which is within the Conservation Weighted classification on the Conservation Recreation Intensity Scale. (See page 4-22)

5.3 AVAILABLE LAND

5.3.1 Existing Project Lands

Within the existing U. S. Government boundary line (see Plate 3) the Federal Government owns in fee 2,533 acres of land. Of these lands, approximately 118 acres of land at the dam site are managed by the Corps as the flood control project operational area, while the remaining 2,415 acres are under license to the Pennsylvania Fish Commission for management purposes. This license is due to expire in 1979.

5.3.2 Flowage Easements

There are currently 84 acres in perpetual flowage easements, but because of their location and their relationship to proposed development, none are proposed for acquisition at this time.

5.3.3 Additional Lands

Additional land acquisition proposed under this plan is limited to 19 acres on the left bank below the dam extending from the weir dam to the McCrea Furnace bridge. This area would be acquired by the Pennsylvania Fish Commission and developed for fishing access as described in paragraph 5.7.1.2.

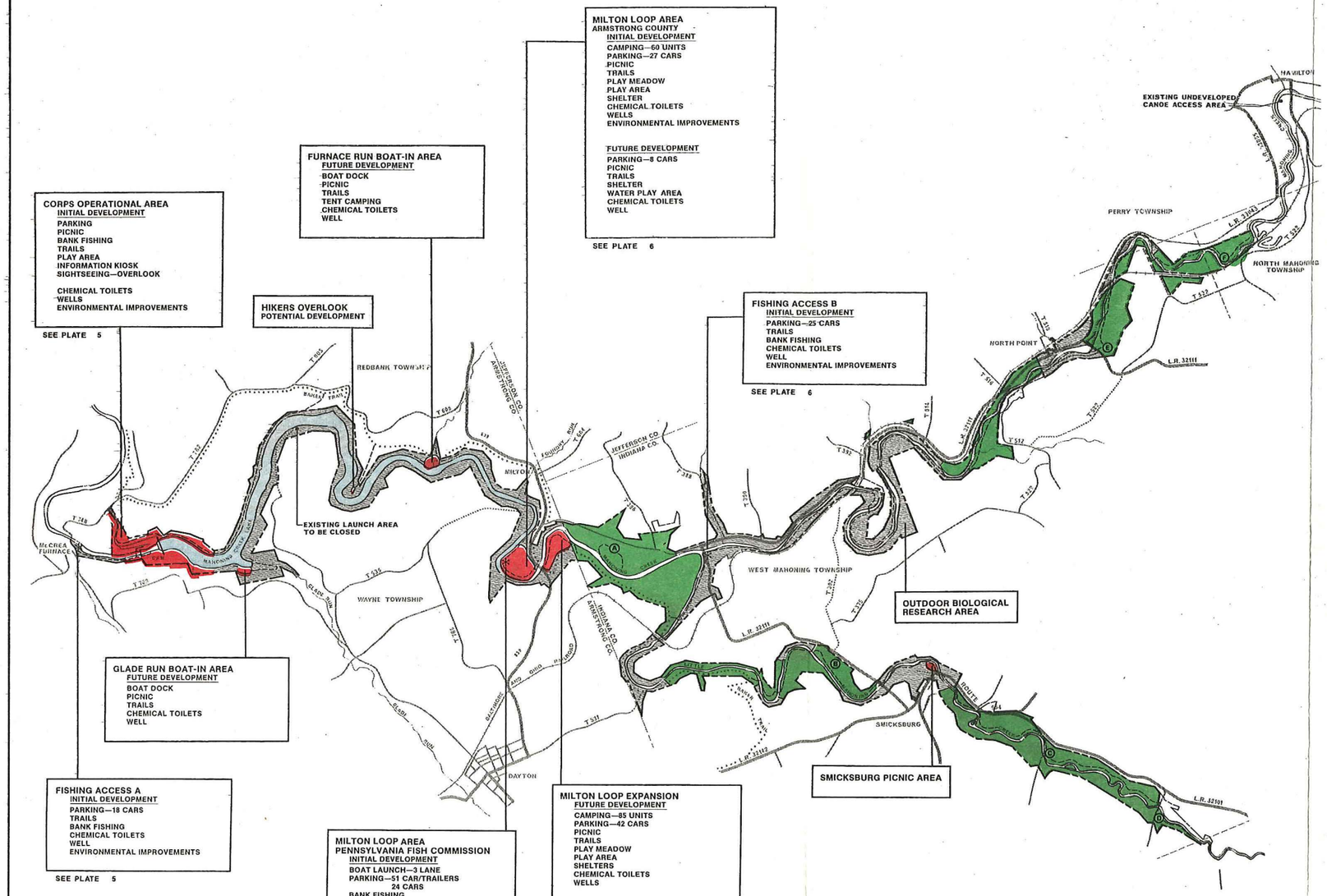
5.4 LAND USE

All of the land uses proposed for the Recommended Plan fall within the following general categories: recreation, conservation, and fish and wildlife development. These categories are broken down into the following acreages:

Recreation	207 acres
Conservation	713 acres
Fish and Wildlife Development	1,352 acres
Total	2,272 acres

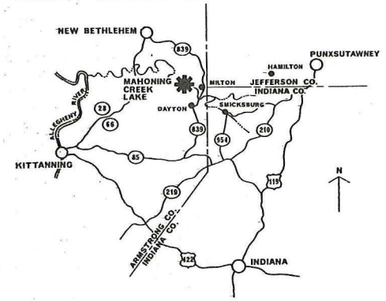
NOTE: The total acreage includes the potential 19 acre acquisition by the Pennsylvania Fish Commission but excludes the 280 acre summer pool.

Land too steep for hunting, safety buffers around proposed development and residential areas, areas devoted to nature interpretation and outdoor biological research have been categorized as conservation land.



NORTH

PROJECT LOCATION MAP



LEGEND

- CONSERVATION
- RECREATION
- WILDLIFE ENHANCEMENT
- SUMMER CONSERVATION POOL (ELEVATION 1098)
- U.S. GOVERNMENT BOUNDARY LINE
- CREEK CHANNEL
- FLOWAGE EASEMENTS
- PROPOSED TRAIL DEVELOPMENT
- * FISHING ACCESS
- Ⓐ HUNTING ACCESS
- ← DIRECTION OF FLOW

NOTE: RECOMMENDED PLAN CONSISTS OF:
- SUMMER CONSERVATION POOL-EL. 1098
- ACQUISITION OF LAND
- DEVELOPMENT OF RECREATION, FISH AND WILDLIFE ENHANCEMENT

RECOMMENDED PLAN
LAND USE DEVELOPMENT

MAHONING CREEK LAKE
ALLEGHENY RIVER BASIN, PENNSYLVANIA

MASTER PLAN

SCALE 1" = 2000'
2000 0 2000 4000

U.S. ARMY ENGINEER DISTRICT, PITTSBURGH, CORPS OF ENGINEERS
OFFICE OF THE DISTRICT ENGINEER, PITTSBURGH, PA. 19 MAY 1975

SUBMITTED: CHIEF PLANNING BRANCH
APPROVAL RECOMMENDED: CHIEF ENGINEERING DIVISION
APPROVED: COLONEL CORPS OF ENGINEERS DISTRICT ENGINEER
CHECKED BY: [illegible]

5.5 VISITATION

The visitation attributable to the Recommended Plan has been based upon the capacity of the recreation areas to provide activities. The initial and future visitation projected for the project has been reduced proportionally to the reduction in design load necessitated by constraints imposed by the topography and the lack of areas that could be developed. In addition, facility development has been planned at a level to retain the Conservation Weighted Theme. Table 5-1 below shows the facilities required to accommodate the originally projected visitation and the facilities to be provided under the Recommended Plan. The resulting annual visitation is 105,000 recreation days, increasing to an ultimate level of 135,000 recreation days.

TABLE 5-1

RECREATION NEED ADJUSTED TO CAPACITY OF RECOMMENDED PLAN

Activity	Required Facility		Recommended Plan	
	Initial	Future	Initial	Future
Picnic				
Units	25	10	10	14
Parking	100	40	27	40
Camping				
Units	110	40	60	95
Parking	110	40	60	95
Water Play Parking	50	20	-	8
Boating				
Car/Trailer	68	17	34	-
Parking	32	8	16	-
Launching	4	1	2	-
Canoe Parking	37	14	30	-
Sightseeing Parking	18	7	18	-
Boat Fishing				
Launch	1	-	1	-
Car/Trailer Parking	17	-	17	-
Parking	8	-	8	-
Bank Fishing Parking	50	-	50	-
Hunting Parking	45	20	42	-
Hiking Parking	95	35	35	-

5.6 RECREATION FACILITIES

5.6.1 General

The development of recreation facilities would be a combination of a joint effort of cost-sharing under the provisions of Public Law 89-72 between Armstrong County and the Corps of Engineers (the Milton Loop).

5.6.2 Initial Development

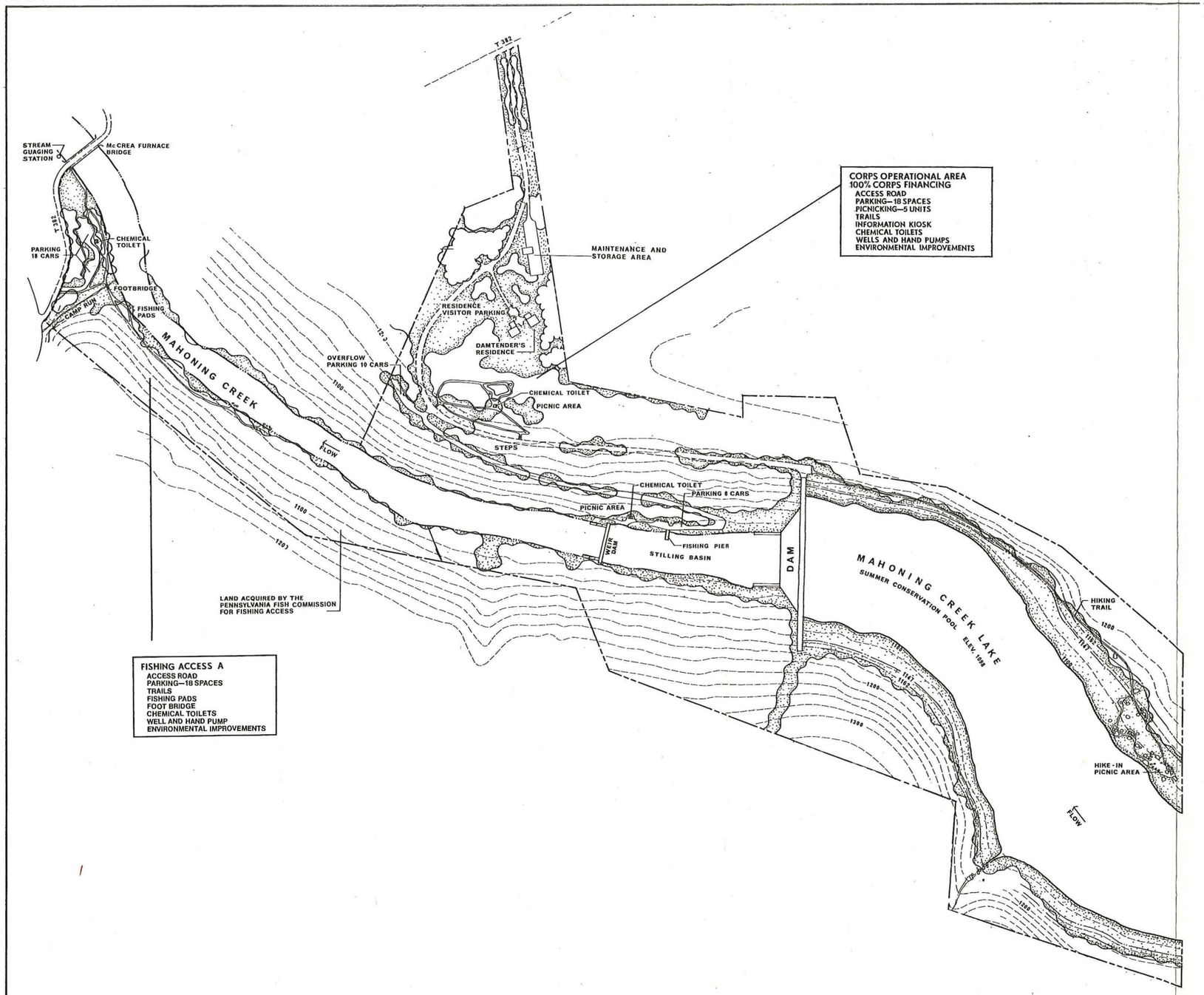
The initial development of recreation facilities has been planned to support the anticipated level of use during the third year of project operation. Facilities planned are itemized in the cost tables (see Tables 6-1 through 6-6) and are discussed below.

5.6.2.1 Corps Operational Area

This area includes the right bank in the vicinity of the dam and has been developed 100 percent by the Corps of Engineers. As shown on Plate 5, the operational area consists of 118 acres of land and 36 acres of the summer conservation pool in the immediate vicinity of the dam. An additional 19 acres of land on the left bank between the U. S. Government boundary line and the McCrea Furnace bridge would be purchased by the Pennsylvania Fish Commission. Since this area would be developed by the Pennsylvania Fish Commission to provide fishing access, it is not included in this discussion.

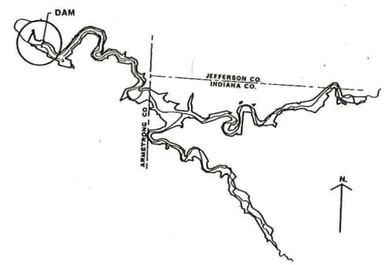
Development of the Corps Operational Area would be limited to improvements of existing facilities to provide for continued public health and safety. These improvements would be accomplished as operations and maintenance funds are available. The existing picnic area above the dam on the right bank would be improved and the picnic units replaced as necessary. The existing pit toilets would be removed and a new chemical toilet constructed.

Starting at the dam and continuing upstream on the right bank for approximately one-half mile, the existing trail would be extended to the bend in the land looking back at the dam. This work could be accomplished in stages with hired labor.



NORTH

DEVELOPMENT LOCATION MAP



LEGEND

- U. S. GOVERNMENT BOUNDARY LINE
- SUMMER CONSERVATION POOL ELEV. 1098
- 5 YR. FLOOD FREQUENCY POOL ELEV. 1147
- FULL POOL ELEV. 1162
- EXISTING ROADS
- EXISTING TREE COVER
- EXISTING STRUCTURES
- PROPOSED ROADS AND PARKING AREA
- PROPOSED STRUCTURES

ENVIRONMENTAL IMPROVEMENTS

- TREE PLANTING

NOTE: ALL AREAS DISTURBED DURING CONSTRUCTION WILL BE GRADED AND SEEDED.

RECOMMENDED PLAN
DEVELOPMENT PLANS

MAHONING CREEK LAKE

ALLEGHENY RIVER BASIN, PENNSYLVANIA

MASTER PLAN

SCALE IN FEET
200 0 200 400

U.S. ARMY ENGINEER DISTRICT, PITTSBURGH, CORPS OF ENGINEERS
OFFICE OF THE DISTRICT ENGINEER, PITTSBURGH, PA. 19 MAY 1975

SUBMITTED: CHIEF PLANNING BRANCH
APPROVAL RECOMMENDED: CHIEF ENGINEERING DIVISION
APPROVED: COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER
CHECKED BY:

This area, unique because of the large sandstone boulders scattered under the trees, would be developed as a "hike-in" picnic area. Development would be limited to the construction of trails and the installation of trash receptacles. The boulders would serve as picnic tables and benches.

At the intersection of the service roads to the top and base of the dam, an unpaved overflow parking area for approximately 10 cars would be developed to provide overflow parking for public use activities below the dam. The service road to the base of the dam would be widened and paved and parking for 8 more cars provided along the right bank beside the stilling basin. This area would be primarily developed for fishing, but the few existing picnic and playground facilities for family use would be retained and a new chemical toilet installed. The development of these facilities would utilize practically all of the usable land in this area.

Present maintenance and storage facilities are inadequate for existing project needs and would be further overtaxed with the increased visitation projected with addition of a larger summer conservation pool. Therefore, a new maintenance and storage area is proposed as shown on Plate 5. This area would include a garage and office building with a fenced in maintenance yard. An existing parking lot would be incorporated within this area. The maintenance building would be faced with brick to conform with existing structures in the area and screening with native vegetation would be accomplished for aesthetic purposes.

The increased visitation to the dam and the modified operational procedures with the larger summer pool point out the need for a revised and expanded informational program at the operational area. The information plaque in place on the right bank below the dam would be replaced and additional information about the dam and project area provided. Directional signs as needed would be placed at each road and trail juncture to direct the flow of traffic.

5.6.2.2 The Milton Loop

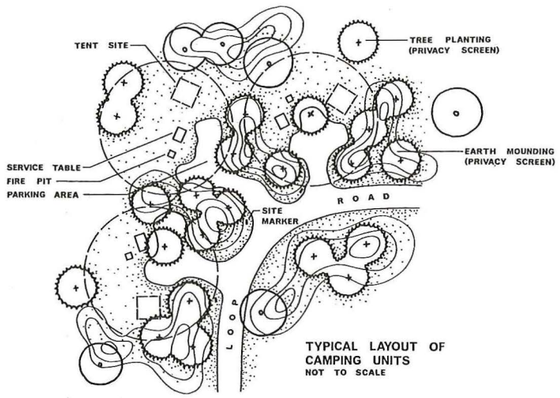
The Milton Loop, located in Armstrong County on Mahoning Creek at the Route 839 bridge, is shown on Plate 6. Because this area provides the only access to the proposed summer conservation pool it becomes the focal point of the project. To this end, it is planned as a multi-use area providing day-use, camping, and boating/fishing activities. However, because of the cost-sharing arrangements, only the recreation facilities are presented in the following.

This site consists of approximately 36 acres of usable land of less than a 10 percent slope. It is peninsula shaped, bordered by Mahoning Creek and currently it is partly under an agricultural lease, and with the exception of the creek banks, where a band of mature trees occurs, the area is void of tree cover. The terrain rises abruptly from the creek to a height of 3 to 4 feet then levels off in a band approximately 100 feet wide. It then rises to a second plateau where it continues to rise gently to the neck of the peninsula. This split level effect provides a natural separation of activities. The upper level also commands a good view of the valley and surrounding hillside.

The development of the day-use and camping facilities would be cost-shared with Armstrong County. The camping activities would be operated as a revenue producing activity to help cover the operation and maintenance costs for the County.

Access to the site would be by a constructed park road from Route 839 which would be developed and cost-shared with the Pennsylvania Fish Commission. A secondary road would lead from the access road to the camping area and would be assigned to the costs for the development of the camping facilities.

The camping area is located on the gently sloping land of the upper peninsula. The area contains approximately 30 acres of usable land and although void of tree cover is screened from the creek by



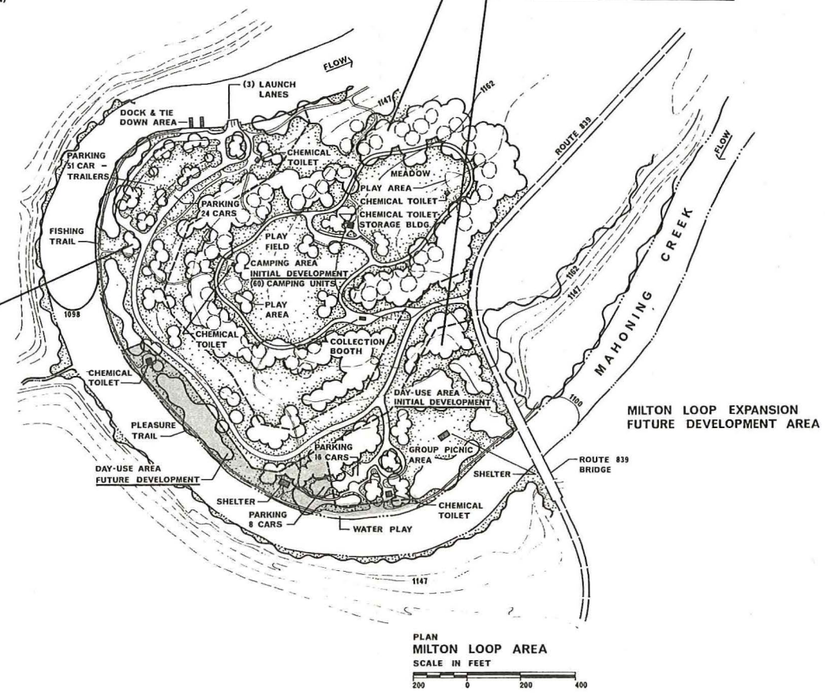
TYPICAL LAYOUT OF CAMPING UNITS
NOT TO SCALE

MILTON LOOP AREA
COST SHARING
ARMSTRONG COUNTY

- ACCESS ROAD
- LOOP ROAD
- PARKING—27 SPACES
- CAMPING—60 UNITS
- COLLECTION BOOTH
- DUMP STATION
- CHEMICAL TOILETS
- WELLS AND HAND PUMPS
- PLAY FIELD
- PLAY AREAS
- STREAM PATH
- PICNICKING—4 UNITS
- SHELTER
- ENVIRONMENTAL IMPROVEMENTS

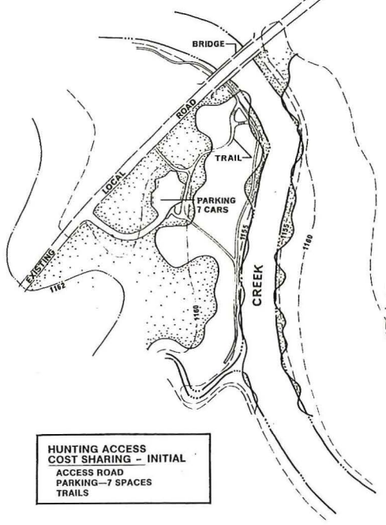
MILTON LOOP AREA
COST SHARING
PENNSYLVANIA FISH COMMISSION

- ACCESS ROAD
- PARKING—51 CAR/TLR. 24 CARS
- TRAILS
- BOAT LAUNCH
- FLOATING DOCKS
- CHEMICAL TOILETS
- WELL AND HAND PUMP
- ENVIRONMENTAL IMPROVEMENTS



MILTON LOOP EXPANSION
FUTURE DEVELOPMENT AREA

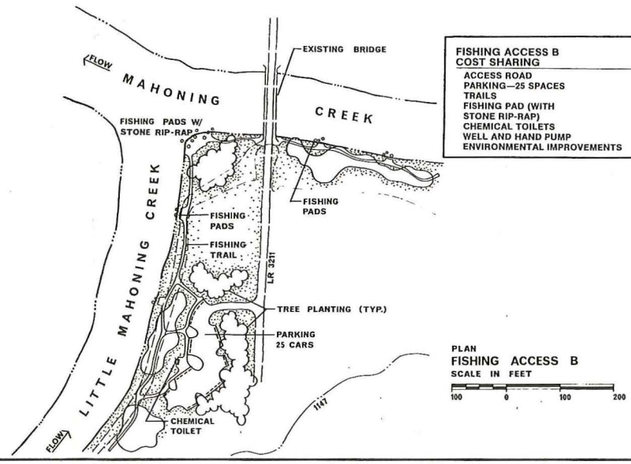
PLAN
MILTON LOOP AREA
SCALE IN FEET
200 0 200 400



PLAN
TYPICAL HUNTING ACCESS
SCALE IN FEET
100 0 100 200

HUNTING ACCESS
COST SHARING – INITIAL

- ACCESS ROAD
- PARKING—7 SPACES
- TRAILS



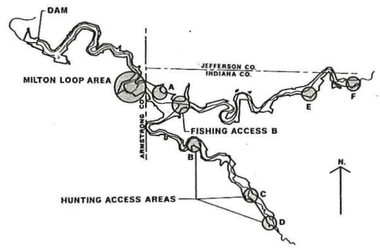
FISHING ACCESS B
COST SHARING

- ACCESS ROAD
- PARKING—25 SPACES
- TRAILS
- FISHING PAD (WITH STONE RIP-RAP)
- CHEMICAL TOILETS
- WELL AND HAND PUMP
- ENVIRONMENTAL IMPROVEMENTS

PLAN
FISHING ACCESS B
SCALE IN FEET
100 0 100 200

NORTH

PROJECT AREA MAP



LEGEND

- SUMMER CONSERVATION POOL ELEV. 1098
- 5 YR. FLOOD FREQUENCY POOL ELEV. 1147
- FULL POOL ELEV. 1162
- EXISTING ROADS
- EXISTING TREE COVER
- PROPOSED ROADS AND PARKING AREA
- PROPOSED STRUCTURES

ENVIRONMENTAL IMPROVEMENTS

- TREE PLANTING

NOTE: ALL AREA DISTURBED DURING CONSTRUCTION WILL BE GRADED AND SEEDED

RECOMMENDED PLAN
DEVELOPMENT PLANS

MAHONING CREEK LAKE
ALLEGHENY RIVER BASIN, PENNSYLVANIA
MASTER PLAN

U.S. ARMY ENGINEER DISTRICT, PITTSBURGH, CORPS OF ENGINEERS
OFFICE OF THE DISTRICT ENGINEER, PITTSBURGH, PA. 19 MAY 1975

SUBMITTED: CHIEF PLANNING BRANCH
APPROVAL RECOMMENDED: CHIEF ENGINEERING DIVISION
APPROVED: COLONEL CORPS OF ENGINEERS DISTRICT ENGINEER
CHECKED BY: C.E.K.

the change in topography. There would be 60 camping units arranged in a loop with the units located on the outside of the loop and on the inside would be located a large play meadow. Each unit would consist of approximately 6,000 square feet of area and would include a paved parking area, a soft surface area for a tent and a picnic table and fire pit. See the typical sketch plan on Plate 6. The units would be arranged in a random pattern and would be grouped in some areas for small groups of campers and separated in other areas for individuals. The units would be unique in design in that the parking areas would be irregular in shape to better fit the terrain and to allow the camper to place his vehicle within the area the way he desires. To provide privacy between the units and to develop a better environmental setting for the facilities, mounding of earth and new tree planting would be included. Additional facilities would include a collection booth, a combination chemical toilet-equipment storage building, a sanitary dump station, hand-pump wells, trails and creative play areas.

The day-use facilities located along the creek on the upper half of the peninsula would be free to the public. They would consist of a short secondary access road, parking for 16 cars, a group picnic shelter, a chemical toilet, picnic tables, a hand-pump well and a trail along the creek bank. All of these facilities would be below the 5-year flood level at elevation 1147 and would be designed for ease of maintenance and periodic flooding.

5.6.3 Future Development

5.6.3.1 Milton Loop

Future development of the Milton Loop facilities would consist of an expansion of the day-use area. This would include parking for 8 more cars, additional picnic tables, an expansion of the trail system, a water play area along the creek, a combination change facility-chemical toilet and another shelter.

5.6.3.2 Milton Loop Expansion

The area known as the Milton Loop Expansion is located upstream from Milton Loop on the left bank. (See Plate 4). It contains approximately 46 acres of land which is currently under agricultural lease and it is located within Armstrong County. The area is void of tree cover except along the creek bank and the upper extremities and the terrain gently slopes from the creek upward toward the U. S. Government boundary line and the wooded hillside.

The recreation facilities planned for this area would be similar to the Milton Loop in size, number and design. They would include a paved access road from Route 839, a camping area with 85 camping units, and a day-use area along the creek with parking space for 42 cars. There would also be picnicking, hiking trails, play meadows and creative play equipment, shelters, chemical toilets and hand-pump wells.

5.6.3.3 Furnace Run Boat-In Area

This area consists of approximately 6 acres of gently sloping, wooded land situated at the confluence of Furnace Run and the summer conservation pool. (See Plate 4). This beautiful area with mixed hardwoods and pine trees is completely surrounded by steep wooded hillsides and is isolated from the rest of the project. Access would only be by boat and the Baker Trail.

The facilities planned for this area would consist of a place to beach and tie up boats, picnic tables, several tent camping sites, a chemical toilet, a hand-pump well, and hiking trails. Tent camping would be available at this site for hikers using the Baker Trail.

5.6.3.4 Glade Run Boat-In Area

This area is on the left bank approximately 3/4 of a mile above the dam where Glade Run enters the pool. The raised pool in this area forms a small inlet which leads back into the area to be developed. (See Plate 4). This is a small wooded glen along the banks of the stream and the facilities planned for this area would include boat tie-up, picnic tables, hiking trail, chemical toilet, and a hand-pump well.

5.6.4 Baker Trail

The Baker Trail, as shown on Plate 4, enters the project from the south and travels through or adjacent to the project area for a distance of approximately 11 miles before leaving the area north of the dam.

The variety of visual experiences, the charm of the rural setting and the availability of existing Government lands have long made this area a favorite spot of hikers. To expand upon this natural feature and to accommodate all hikers, i.e., the back-packer, the walker and the naturalist, a proposed trail system (see Plate 1) has been planned. This system, known as the "Mahoning Loop", would be a cooperative effort among the Corps of Engineers, the Pennsylvania Game Commission and the local chapter of the American Youth Hostels. The American Youth Hostels is a non-profit, volunteer group whose interest includes the promoting of hiking and backpacking opportunities. The Baker Trail and the proposed extensions would be available to the general public without restrictions.

The Mahoning Loop would consist of the extension of the Baker Trail from a point south of the project area near the town of Denton to Little Mahoning Creek; the Granny Coon Trail, which would be the connecting link between Little Mahoning Creek and Mahoning Creek; and the North Point Trail and the Smicksburg Trail which would connect the northern and southern ends of the Granny Coon Trail to the confluence of the two creeks, thus completing the loop. The American Youth Hostels would construct the Baker Trail Extension and the Granny Coon Trail on their own and have agreed to complete the development within two years after the implementation of the Recommended Plan. Overnight tent camping opportunities would be provided and maintained by them on private lands.

The North Point Trail and the Smicksburg Trail would also be constructed at the same time as a cooperative effort among the Corps of Engineers, The Pennsylvania Game Commission, and the American Youth Hostels. They would be constructed entirely on Government owned land and would generally consist of nothing more than a cleared earth path.

The existing Baker Trail, where feasible, would be relocated to Government property along the northern edge of the summer conservation pool with this relocation occurring as a joint effort between the Corps of Engineers and the American Youth Hostels. Tent camping opportunities would be available along this trail at the Milton Loop and at the Furnace Run Boat-In Area.

This total system of trails would allow a hiker to traverse the entire project area or to select the trail combination and length that best suits his desires, interests and capabilities. In addition to hikers, these trails would also be available for use by hunters and fishermen with parking available at the various recreation areas and hunting and fishing access sites along the trail system.

In addition to hiking this area also offers canoeing on Mahoning Creek and, during periods of high water, on Little Mahoning Creek. Many natural launching sites with nearby parking are available along both creeks and they have been identified on Plate 7. There is a beautiful area on the Big Loop that is accessible only by water and has been designated as a canoe rest area. This area is completely surrounded by steep wooded hillsides and would provide a delightful setting for a picnic or a rest break.

This combination of hiking and canoeing opportunities, in addition to the other opportunities offered as part of the Recommended Plan, make Mahoning Creek Lake unique in the variety of experiences offered to the outdoorsman.

5.7 FISH AND WILDLIFE DEVELOPMENT

5.7.1 Fishing Access Initial Development

5.7.1.1 Milton Loop

The primary fishing access and a major feature of the project is the boat access on the Milton Loop. (See Plate 6). This area is located on the lower portion of the peninsula and, as mentioned before, is the only area with sufficient water depth and reasonable access to provide safe launching facilities to the summer conservation pool.

Facilities planned for this area would include a park-like access road from Route 839 that would be designed to fit the land in a natural manner and the surface would receive a double seal coat of gravel to further blend into the natural setting. This road would provide access to, and be similar in design and materials, to the secondary roads leading to the previously mentioned camping and day-use areas.

TENT CAMPING OPPORTUNITIES FOR HIKERS AT THE FURNACE RUN BOAT-IN AREA.

BAKER TRAIL WOULD BE RELOCATED TO THIS SUGGESTED CORRIDOR. THE TRAIL WOULD BE DEVELOPED BY THE AMERICAN YOUTH HOSTELS WITHIN TWO YEARS AFTER IMPLEMENTATION OF THE RECOMMENDED PLAN.

THE NORTH POINT TRAILWOULD BE DEVELOPED AS A COOPERATIVE EFFORT BETWEEN THE CORPS OF ENGINEERS, THE PA. GAME COMMISSION AND THE AMERICAN YOUTH HOSTELS.

THE GRANNY COON TRAIL WOULD BE DEVELOPED AS THE MAHONING LOOP CONNECTING TRAIL WITHIN THIS SUGGESTED CORRIDOR. THE TRAIL WOULD BE DEVELOPED WITHIN TWO YEARS AFTER IMPLEMENTATION OF THE RECOMMENDED PLAN BY THE AMERICAN YOUTH HOSTELS, OVERNIGHT CAMPING OPPORTUNITIES WOULD BE PROVIDED BY THE A.Y.H. ON PRIVATE LAND.

CANOE REST AREA

POTENTIAL OVERLOOK WOULD BE DEVELOPED BY THE AMERICAN YOUTH HOSTELS.

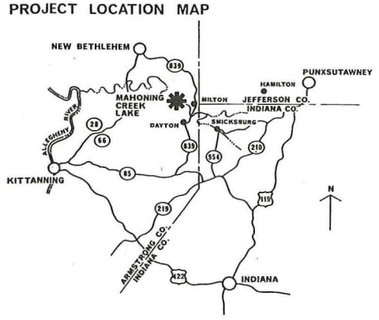
TENT CAMPING OPPORTUNITIES FOR HIKERS AT THE MILTON LOOP CAMPING AREA.

THE SMICKSBURG TRAILWOULD BE DEVELOPED AS A COOPERATIVE EFFORT BETWEEN THE CORPS OF ENGINEERS, THE PA. GAME COMMISSION AND THE AMERICAN YOUTH HOSTELS.

BAKER TRAIL WOULD BE EXTENDED TO THIS SUGGESTED CORRIDOR. THE TRAIL WOULD BE DEVELOPED BY THE AMERICAN YOUTH HOSTELS WITHIN TWO YEARS AFTER IMPLEMENTATION OF THE RECOMMENDED PLAN.

NORTH

PROJECT LOCATION MAP



LEGEND

- EXISTING BAKER TRAIL
- PROPOSED TRAIL DEVELOPMENT
- SUGGESTED CORRIDOR FOR MAHONING LOOP TRAIL DEVELOPMENT
- POTENTIAL CANOE ACCESS SITES (NOTE - CANOEING ON LITTLE MAHONING CREEK IS LIMITED TO PERIODS OF HIGH WATER)
- U.S. GOVERNMENT BOUNDARY LINE
- CREEK CHANNEL
- DIRECTION OF FLOW

MAHONING LOOP TRAIL SYSTEM

MAHONING CREEK LAKE

ALLEGHENY RIVER BASIN, PENNSYLVANIA

MASTER PLAN

SCALE 1" = 2000'

2000 0 2000 4000

U.S. ARMY ENGINEER DISTRICT, PITTSBURGH, CORPS OF ENGINEERS
OFFICE OF THE DISTRICT ENGINEER, PITTSBURGH, PA. 19 MAY 1975

SUBMITTED: CHIEF PLANNING BRANCH

APPROVAL RECOMMENDED: CHIEF ENGINEERING DIVISION

APPROVED: COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER

CHECKED BY: E.C.K.

Included in this area would be a 3-lane launch ramp, a boat tie-down and canoe launching platform, 51 car-trailer parking area, and an additional parking area for 24 cars. The car-trailer parking would be treated in a special way to reduce the impact on the natural setting. It would be constructed of a gravel base, shot with a water-bound liquid asphalt emulsion, choked with a mixture of finer gravel and topsoil, and seeded. The parking spaces will be identified by railroad tie stop bars. This would provide a stable parking area which would not be an intrusion on the landscape. Additional facilities would include trails for bank fishing, a chemical toilet and a hand-pump well.

5.7.1.2 Fishing Access A

This area is located on the left bank of Mahoning Creek below the dam. It extends from just below the weir dam to the McCrea Furnace bridge. (See Plate 5). It is a narrow band of land paralleling the creek with dense tree cover, large sandstone boulders, and lush stands of rhododendron scattered throughout. There is an existing trail located about 100 feet uphill from the creek and extends the length of this area. In addition, secondary trails connecting the main trail to the creek bank would be constructed. At the McCrea Furnace bridge area there would be parking for 18 cars, a trail for bank fishing, chemical toilets, and a well with hand-pump. The parking facility would consist of a gravel base with a double seal coat.

The implementation of the development of the area is dependent on the acquisition of the necessary land by the Pennsylvania Fish Commission.

5.7.1.3 Fishing Access B

This area, located at the confluence of Mahoning and Little Mahoning Creeks, has long been a favorite fishing spot. (See Plate 6). The facility is planned to provide an area where fishermen can park and gain access to the creek banks for fishing.

The facility would include a parking area for 25 cars constructed of a gravel base with a double seal coat, an access trail, a chemical toilet and a hand-pump well. It would be located to blend into the landscape as naturally as possible.

Development of Fishing Access B would be cost-shared with the Pennsylvania Fish Commission.

5.7.1.4 Existing Boat Launching Area

An analysis of the existing boat launching area indicates that its limited size and steep topography coupled with the long and difficult access into the area would make any major expansion or improvement of the site infeasible and uneconomical. Therefore, after construction of the Milton Loop launching ramp, the area would be closed to launching during the summer season. However, since the area provides the only access to the winter pool, it would be opened again for boat access after the Milton Loop launch is no longer usable due to the drawdown to winter pool. Since the level of "off-season" boating use is expected to be very low, the area could be maintained for this purpose with only minimum expenditure.

5.7.2 Hunting Access

Because of the lack of manageable huntable land along the summer conservation pool with less than a 20 percent slope, all of the land established specifically for hunting occurs along the two creeks in Indiana and Jefferson Counties. See Wildlife Enhancement, Plate 4. Access to these lands, which are widely scattered and inter-mixed with conservation-safety zones, requires construction of several hunting access areas. There would be six of these areas and they would all be similar in design and construction as indicated on Plate 6. The facilities would be limited to small, 7-car parking areas and in some cases access trails. The primary purpose of these facilities would be to provide areas where the hunters could park off the local roads.

The parking areas and short access roads would be designed to fit the natural landscape as unobtrusively as possible and would be constructed of a gravel base, choked with a mixture of finer gravel and topsoil and seeded. Railroad ties would be used to provide safety barriers where required. Trails would primarily be cleared paths with no surfacing or drainage improvements and health and sanitary facilities would be available only at the recreational areas or in the surrounding communities. Development of these facilities would be cost-shared with the Pennsylvania Game Commission and no future facilities are planned.

5.8 ENVIRONMENTAL IMPROVEMENTS

5.8.1 General

The environmental improvements have been planned in accordance with the intent of Public Law 91-190 and the policies of ER 1165-2-2 and EM 1110-2-38, "Beautification Aspects of Engineering Design for Civil Works Projects". The general intent of this program would be to preserve the existing natural setting as much as possible. As mentioned previously, the charm of the project is the great variety of visual experiences offered, and to this end, the open fields as well as the wooded areas would be preserved and protected in their existing state as much as possible. The environmental improvements that are planned would occur at the following areas: The Milton Loop, the Corps Operational Area, and Fishing Access Areas A and B. They are indicated on the enlarged scale plates of each of these areas.

5.8.2 Milton Loop

The environmental improvement program for this area would provide for the preservation of existing vegetation where possible, restoration of areas disturbed during construction, meadow seeding, and landscaping which would consist mainly of tree planting. The tree planting would be with indigenous species that would harmonize with the existing natural vegetation of the project area.

Extensive tree planting is designated for the camping area to provide screening and privacy for the camping units. These trees would be both evergreen and deciduous and would be sized to produce an immediate screening effect.

Earth mounding would also be included with the tree planting to supplement the screening effect. Additional tree planting and seeding would be added to the day-use and boat access facilities to provide screening and to reinforce the design of the area.

5.8.3 Fishing Access A and B

These areas would require only a minimum of environmental improvements consisting mainly of reseeding of disturbed land and selected tree planting to screen these facilities from the local access roads.

5.8.4 Debris Clearance

As previously mentioned under Section 4, Problems, there is an accumulation of debris existing in the pool and along the shoreline. Most of the debris consists of fallen tree trunks and brush and will be removed by others under a separate effort by the District Operations Division.

5.9 ENVIRONMENTAL IMPACTS

There should not be many significant environmental impacts related to the development of proposed facilities. Consistent with the Conservation Weighted Theme, development of facilities would occupy only a small portion, 11 percent, of the land available. The remainder of the land would be devoted to conservation and fish and wildlife development. The facilities and activities that would be developed have been carefully planned to harmonize with the rural character of the natural landscape.

Approximately 110 acres of land would be flooded during the period of the raised summer pool, but for the most part, the land affected is the steep banks that contain little tree or shrub cover because of the normal periodic flooding of this area during periods of high runoff and the clearing of this area that occurred during the original construction of the reservoir.

The most significant environmental impact most probably would result from the expected increase in visitation to the project area. This increase should result in a slight increase in noise levels because of increases in boating, vehicular traffic, and recreational activities. However, this anticipated increase in noise levels has been minimized through careful planning so the activities with a high noise potential have been segregated and buffered from the rest of the project area by the use of existing hillsides and tree cover. In addition, the Operational Area and

the Milton Loop, the only areas proposed for concentrated use, are currently affected by high noise levels from the dam and Route 839, so the introduction of proposed facilities at these areas should not significantly increase the noise levels.

There will be some noise generated during construction, but this should not be significant because the types of facilities planned do not require unusually heavy or large numbers of construction equipment. In addition, the existing residences in this rural area are generally somewhat removed from the proposed construction areas and should not be seriously affected by the construction activities.

The existing air quality of the project is quite good and is due mainly to the rural nature of the area and lack of industrial activity. The anticipated increase in visitation to this area is not expected to create any significant detrimental effect on air quality.

The existing water quality in the pool and the creeks is good, see Appendix G, and neither the raising of the pool nor the increase in water related activities is expected to significantly alter this quality. In addition, carefully planned management and maintenance programs and the use of chemical toilets at all recreational areas, which in fact, should be a significant improvement over existing conditions where only limited sanitary facilities are available, are proposed to help maintain the water quality.

Increased visitation should not produce any serious detrimental effects on the natural resources of the area because, in all cases, the number of activities and the size of the individual facilities have been carefully planned so as not to overtax the resource base. In addition, the physical monitoring of activities in the Operational Area, the Milton Loop, and on the lake by supervisory personnel, and the limited number of parking areas and access points available in the remote areas, should provide a satisfactory measure of control on visitation and use.

Overall, any negative environmental impact caused by the proposed development should be minor and, in many cases, may be reduced because of the management programs which would be associated with the Recommended Plan.

SECTION 6.0 - DESIGN CRITERIA

6.1 GENERAL

The preceding section of this Master Plan presented the proposed plan of development for the project including a land use allocation for all project lands and the location of proposed recreation and fish and wildlife facilities. This section presents the specific planning and design considerations for the proposed facility development. These considerations are generally in conformance with those outlined in EM 1110-2-400 except where special circumstances dictate a deviation from prescribed criteria. In these cases the reasons for the variations from the criteria are explained.

6.2 SITE SELECTION

As presented in Section 5.0, topography and access were the two major considerations which dictated the locations of the proposed recreation and fishing and hunting access areas. Because of the extreme limits imposed by the steep topography and the limited number of developable sites, certain deviations from established criteria were necessary in locating facilities within the areas. General planning criteria dictate that roads and parking areas be located above the five-year flood pool and that structures be located above full pool. However, both at the Milton Loop Area and at Fishing Access B, certain deviations from these guidelines were required. The Milton Loop Area is divided into two distinct levels with camping development proposed to be developed on a plateau overlooking the pool and boat launching and day-use facilities on a second level along the pool. While the camping area, including all circulation roads, campsites and parking is above the five-year pool, the boat launching and day-use areas are within the five-year pool, including two chemical toilets. These units would be designed to allow for sealing of all waste storage vaults and would be designed to withstand periodic inundation. Of the three chemical toilets located within the camping area, two would be above full pool elevation and the third would be at about the ten-year flood pool. At Fishing Access B all roads and parking and the chemical toilet would be located within the five-year flood pool. The toilet would be designed similar to those subject to flooding at the Milton Loop. While the disadvantage of this proposed location of facilities is recognized, it is the only real option available if additional facilities are to be provided at Mahoning Creek Lake since the majority of developable land lies below the full pool elevation.

6.3 SANITARY SYSTEM

6.3.1 General

Several factors were considered in planning a sewage system for Mahoning Creek Lake. The severe topographic features would economically preclude any centralized system for the entire project. The second consideration was the low density use of the project which would be divided between widely separated access areas. The largest concentration of use would be at the Milton Loop Area but even in that area use would be less than 50,000 annual recreation days. A third consideration was the cost of any potential system which had to be carefully weighed against the relatively low use levels and the limited scale of development. The final consideration was the location of the recreation area below the full pool elevation and in some cases below the five-year flood pool. This potential for frequent flooding would not be conducive to treatment by septic tanks and tile fields. The above factors would favor the use of vault or chemical toilets. However, recognizing the odor problems associated with standard vault toilets, two chemical toilet systems were selected as the most feasible alternatives. These systems incorporate a flushing feature which largely eliminates those problems associated with a standard vault.

In the area of projected high use, the Corps Operational Area and Milton Loop Area, a sewerless, flushing, sanitary system that looks and operates like a conventional toilet would be used. This system utilizes a clear, odorless, non-reactive fluid for flushing. The fluid looks exactly like water; but, unlike water, it is continually recycled within the system to carry wastes to a sealed tank where the wastes are separated from the flush fluid and stored for periodic pickup and disposal. Electric service would be required for a pump which is incorporated into the system.

In other more remote areas, where the projected use would be lower, a system would be utilized where a chemical fluid from a reservoir tank flushes the wastes into a holding tank in the bottom of the unit. The system is manually operated, and when the flush pump is activated, fluid from the holding tank is combined with a measured amount of chemical from a reservoir. Treated waste accumulates in the holding tank until pump-out. Odors are controlled by chemicals released into the holding tank.

6.3.2 Corps Operational Area

The area around the dam is and would continue to be one of the more concentrated use areas on the Mahoning project. The area would accommodate about 100 people at any one time on a summer weekend day. However, since the primary uses of the area are sightseeing and picnicking, the turnover rate is high and the annual attendance at the site would approach 22,000 annual recreation days. Standard criteria would dictate that a single (one male and one female fixture) chemical toilet would meet sanitary requirements. However, since use of the area is divided between a hillside picnicking area and a fishing and picnicking area on a lower level at the outflow, it is proposed that a single recycling chemical toilet be provided in each area. These chemical units would utilize a 500-gallon tank at each unit and each tank could accommodate 7,500 uses. Based on the projected annual attendance and an average of one use per visitor, the tank would have to be pumped out about three times during any two-year period.

6.3.3 The Milton Loop

The Milton Loop is the focal point of the proposed recreation development and contains three areas requiring utility service, consisting of a boat launching area, a day-use area and a camping area.

The boat launching area would be served by one double recycling chemical toilet (two male and two female fixtures) in accordance with the criteria presented in EM 1110-2-400. The projected use of the boat launching area would be about 25,000 annual recreation days. The double chemical toilet would utilize two 500-gallon tanks, each having a capacity of 7,500 uses. At one use per recreation day the tanks would have to be pumped out and recharged less than two times per year.

The initial development in the day-use area would consist of a single recycling chemical toilet. The annual use of the day-use area would be less than 7,000 annual recreation days and the toilet would only require pump-out and recharge once a year.

The camping area would consist of 60 campsites. In accordance with the criteria in EM 1110-2-400 which dictate eight fixtures each (male and female) for every 50 campsites, it is proposed to provide three recycling chemical toilets within the camping area. Two would be double units and the third would be a large unit including four male and four female fixtures. No showers would be included in any of the units. The projected annual attendance for the camping area is about 15,000 recreation days and each camper would utilize the toilets on an average of three times per day. There would be a total of eight 500-gallon storage tanks between the three structures and each tank could accommodate 7,500 uses. Therefore, less than one pump-out per year would be required for the three units.

Future sanitary facilities for the Milton Loop Area and Milton Loop Expansion would consist of three recycling chemical toilets within the camping area and two additional recycling chemical toilets in the day-use areas. These facilities would be sized in accordance with the criteria previously described for the initial development.

6.3.4 Fishing Access A and B

Fishing Access A and B are low density areas primarily designed to provide parking for fishermen. The use of each area would be less than 5,000 annual recreation days. Therefore, each fishing area would be serviced by a single (one male and one female fixture) manually operated chemical toilet. Each fixture would accommodate 850 uses without pump-out and recharge. At one use per fisherman, it is anticipated that the units would require pump-out and recharge a maximum of three times per year.

6.3.5 Boat-In Areas

Two Boat-In Areas are proposed as part of the future development (Glade Run and Furnace Run). Both areas would be very limited in scale, with the Glade Run Area limited to several picnic tables and a boat tie-down area, and the Furnace Run Area, including a picnic area and ten primitive campsites for boaters. The Glade Run Area would accommodate about 3,000 recreation days and the use of the Furnace Run Area would approach 6,000 recreation days. These low use levels would dictate single manually operated chemical units for each area. These units would require pump-out and recharge a maximum of three times per year. Each area would be accessible by trail and pump-out could be accomplished by a four-wheel drive vehicle and small trailer pump-out unit.

6.4 WATER SUPPLY SYSTEM

6.4.1 General

The factors of topography, widely scattered low density use and cost which influenced the type of sanitary system that would be provided at Mahoning also played a large part in dictating the proposed water system. These factors, coupled with the use of the flush chemical toilet systems that don't require water service, favored the use of wells and hand pumps in the recreation areas.

6.4.2 Corps Operational Area

The water supply requirements for the Operational Area would be met through the provision of one well and hand pump in the hillside picnicking area, and one at the outflow fishing and picnicking area. Based on criteria of two gallons of water per user per day for picnickers and fishermen, and one gallon per user per day for sightseers, it is estimated that about 400 gallons of water would be required on a summer weekend day.

6.4.3 The Milton Loop

The Milton Loop Area would initially be served by seven wells with hand pumps which would be divided between the boat launching area, the day-use area and the camping area. Given criteria of two gallons per day per user for the boat launching area, it is estimated that approximately 960 gallons of water would be required on an average summer weekend day. This requirement could be met through the provision of one well and hand pump. The day-use area would accommodate about 130 users on a weekend day and would require the provision of about 260 gallons of water. One well and hand pump would be provided to meet this requirement. The remaining five initial wells and hand pumps would be located within the camping area and would be located at a maximum distance of 300 feet from the farthest space. At five gallons per user per day a total of 1,200 gallons of water per day would be required for the camping area.

A total of five additional wells and hand pumps would be provided in the future as the Milton Loop Expansion is developed.

6.4.4 Fishing Access A and B and Boat-In Areas

Water requirements at the two fishing access areas and two future boat-in areas would be minimal and generally average less than 200 gallons per day. These requirements would be met through provision of one well and hand pump at each of the four areas.

6.5 DESIGN STANDARDS

6.5.1 Roads and Parking Areas

6.5.1.1 Standards

The following standards would be utilized for roadway design throughout the Mahoning Creek Lake project area.

Road Type	Road Width (ft.)	Maximum Grade (%)	Design Speed (mph)	Shoulder Width (ft.)	Minimum Radius (ft.)
Major Access	20	12	30	3	270
Minor Access or Circulation	18	12	25	3	150
Camping	12	12	20	3	150

6.5.1.2 Materials

Two types of roads and three types of parking areas are planned for the Mahoning project. Within the Corps Operational Area, where there is a relatively high use level and traffic volume due to the high turnover sightseeing use, the existing parking areas and access road to the outflow area are proposed to be bituminous surfaced. The access road and parking areas would consist of ten inches of crushed aggregate and 1-1/4 inches of bituminous intermediate course and 1-1/4 inches of bituminous surface course. At the Milton Loop Area, Fishing Access Areas A and B and the Hunting Access Areas access, circulation and camp roads would consist of an 8-inch crushed stone base choked with a double seal coat of crushed aggregate or approved bank run gravel. Small low visual impact parking

areas within Fishing Access A and B, the Milton Loop Camping Area would consist of a 6-inch crushed stone base choked with a double seal coat of crushed aggregate or approved base run gravel. The large car-trailer parking area at the Milton Loop Boat Launching Area and the six small hunting access parking areas would consist of six inches of crushed stone or gravel base, shot with a water-bound liquid asphalt emulsion, choked with a mixture of finer gravel and topsoil, and seeded. This would provide a stable parking area while minimizing its visual impact.

6.5.2 Picnic Areas

6.5.2.1 Picnic Units

Picnicking facilities would be provided at the Corps Operational Area, the Milton Loop Area, the Milton Loop Expansion and the Glade Run and Furnace Run Boat-In Areas. Each picnic unit would consist of four picnic tables, two trash receptacles and two charcoal grills. It is anticipated that each table would accommodate an average of four picnickers at any one time with a turnover rate of 1.8. The maximum number of tables would be 12, or three units per acre, and the minimum spacing between tables would be 50 feet.

6.5.2.2 Area Development

The maximum cross-slope in the picnic areas would be 20 percent. Picnic areas within the Milton Loop and Milton Loop Expansion would have a picnic shelter provided with each shelter accommodating eight tables.

6.5.2.3 Toilets

A chemical toilet would be situated in each picnic area and would be located within 500 feet of 90 percent of the picnic tables, but not closer than 100 feet. The sizing of these facilities was previously discussed.

6.5.2.4 Parking

A convenient parking area would be provided for each picnic complex except for the boat-in areas. The parking areas would be located within 500 feet of 90 percent of the picnic tables. Parking would be provided at the rate of a parking space for each picnic table.

6.5.3 Camping Facilities

6.5.3.1 Campsites

Tent and trailer campsites would consist of approximately 6,000 square feet of area including buffer. Each site would include a crushed stone parking area of approximately 600 square feet, a 15' x 15' turfed area for a tent, one picnic table and one fire pit or fire ring. Each campsite would be unique in design with an irregular shape to fit within the terrain and to allow the camper to place his vehicle within the area the way he desires. One trash can would be provided for every two campsites. Each site would be designed to accommodate a party of four.

6.5.3.2 Area Development

Tent and trailer campsites would be located on the outside of a loop road with the interior of the loop devoted to a large play meadow which would feature creative play areas. Campsites would be located between 75 and 100 feet apart and would be separated by earth mounding and tree planting. The average density of the camping area would be about two campsites per acre when the play area, access road and circulation roads are considered. A sanitary disposal station and collection booth would be provided at each camping area. The sanitary and water requirements have been defined in paragraphs 6.3.3 and 6.4.3.

6.5.3.3 Boat-In Camping

Ten boat-in campsites would be developed in the Furnace Run Boat-In Area. These sites would be designed for tent camping and would include a 15' x 15' turfed area, one picnic table and one fire pit or fire ring.

6.5.4 Boat Launching Ramp

6.5.4.1 Size

The launching ramp at the Milton Loop Area would be sized to accommodate the anticipated boating and fishing design load within the constraints imposed by the site. The three-lane launching ramp would accommodate the launching and withdrawal of 120 boats per day. The adjacent platform would accommodate the launching of an additional 40 canoes or small boats.

6.5.4.2 Design

The boat launching ramp would consist of poured concrete with a maximum grade of 16 percent and a one-lane width of 12 feet. A floating courtesy dock would be provided for the ramp.

6.5.5 Water Play Area

6.5.5.1 Size

The water play area at the Milton Loop would be designed to provide a wading area along Mahoning Creek. It would not be intended as a swimming beach as such. The area would be designed to accommodate a design load of about 100 people. At any one time, it is assumed that 60 percent of the users would be on shore, 30 percent would be in the water and 10 percent would be elsewhere. Based on a criterion of 100 square feet of beach and water area per user, 6,000 square feet of swimming area and 4,000 square feet of water area would be provided.

6.5.5.2 Materials

The underwater beach would be constructed of sand, varying in depth from approximately two and one-half feet along the shoreline to a minimum depth of 12 inches. The underwater sand portion of the wading area would be bordered by a concrete retaining curb generally directly above the water's edge. The sunning area would be a graded and turfed area gently sloping to the sand beach.

6.5.6 Trails

The major trail development would consist of an extension of the Baker Trail and spur trails to the proposed hunting access parking areas. The trail development would be primitive in character and mainly consist of clearing brush and marking of a three-foot wide walking trail. Minimum drainage features and some minor grading would be accomplished as required. Additional trail development would consist of fishermen trails at Fishing Access Areas A and B, a streamside trail at the Milton Loop and extension of the right bank trail at the dam. At the Milton Loop and the dam where use levels would be higher a crushed stone or wood chip base would be provided.

6.5.7 Signs and Markers

The general character of the signs and markers would be similar and compatible with those already existing at Mahoning. Initially entrance signs would be placed at the Milton Loop Area and Fishing Access A & B. Identification signs for the hunting access areas would be low key and generally directional in nature. An interpretive sign would be located at the dam to generally identify the project resources.

6.6 ARCHITECTURAL CHARACTER

The character and design of future project buildings would be in conformance with the following general architectural criteria:

1. All buildings would be designed and sited to sensitively blend with their natural setting. The character of the Mahoning Creek Lake project is natural, undeveloped and rural and the buildings would be designed to be harmonious with this setting.

2. To the degree that is economically feasible, local materials with natural or "natural looking" finishes would be selected.

3. The architectural details, design and materials would be standardized throughout the various recreation areas of the project. The only exception would be the dam area where the existing structures have set an architectural character which would be continued in that area.

4. To the extent possible all buildings would be designed to withstand public usage, vandalism and, where applicable, flooding.

5. The design of all buildings would consider use by the handicapped.

SECTION 7.0 - COORDINATION

7.1 STUDY PARTICIPANTS

7.1.1 General

From the outset every effort has been made to involve all interested parties in project planning. The end result is a cooperative venture embracing the principles of interdisciplinary planning and multiple use spanning Federal, state, county and local agencies or governing bodies, and including the input of private interest groups and the general public.

7.1.2 List of Participants

Table 7-1 lists the participants in the planning process and indicates the general categories of participation for each.

7.2 FEDERAL

Many Federal agencies were contacted during the preparation of this study to gather information pertinent to the study and to solicit their comments and suggestions.

The Bureau of Outdoor Recreation (BOR) has reviewed the draft of the study and has found the plans for recreational opportunities to be in conformance with the Pennsylvania Statewide Comprehensive Outdoor Recreation Plan. The Bureau has also indicated that it is favorably impressed by the diversity of recreational experiences proposed, but strongly recommends that horsepower limitations be placed on all pleasure boating on Mahoning Creek Lake. (See Exhibit A.) As noted in their letter, the plan of development reviewed by BOR was originally included as part of a Special Report, Post Authorization Change which was discontinued. However, the development plan presented in this updated Master Plan is essentially the same as contained in the Special Report, except for the deletion of some land acquisition and facility development around the dam. Therefore, BOR's comments are still considered applicable to the Master Plan.

The Fish and Wildlife Service also played an important role, working with the Pennsylvania Fish and Game Commissions, in the development of the fishery and wildlife resources and benefits for the study. In their review of the Recommended Plan, they have suggested the addition of a fishing access site and boat launching facility closer to the dam, and elimination of high speed boating from the reservoir. (See Exhibits B and C.)

These comments have been answered by the Pennsylvania Fish Commission. (See Exhibit C.) The Fish and Wildlife Service also originally reviewed the development plan as part of the discontinued Special Report. Since the plan has not significantly changed, their comments are still considered applicable to the Master Plan.

7.3 COMMONWEALTH

Again, many state agencies were instrumental in providing information and suggestions valuable to the development of the study.

Both the Pennsylvania Fish and Game Commissions have indicated a desire to participate in the development of the Recommended Plan and were involved in the planning from the inception of the study. (See Exhibits E and F.)

The Pennsylvania Department of Environmental Resources was also asked to participate. Secretary Goddard replied that a lack of available funds for this type of project would prevent the State from participating. He further stated that the development of Mahoning Creek Lake would not be in conflict with the Statewide Comprehensive Outdoor Recreation Plan. (See Exhibit D.) He emphasized the fact that because Mahoning Creek had been in operation since 1941 with minimum development of public use facilities and the fact that Public Law 89-72 generally covers projects after 1965, he felt that any additional recreational facilities at Mahoning Creek Lake should be provided for and operated by the Corps of Engineers.

7.4 LOCAL

7.4.1 General

The motivation to begin a reappraisal of the recreation potential of the Mahoning project was an active card and letter campaign by interested public groups and individuals within the market area. The late John P. Saylor, U. S. Congressman from the 22nd Congressional District, was a strong supporter of a larger summer pool and increased recreation opportunity at Mahoning Creek Lake. As far back as 1967 1,200 signatures on a petition supporting the development of a summer conservation pool were received by the Armstrong County Planning Commission and passed on to the Corps of Engineers.

PARTICIPATING AGENCIES AND ORGANIZATIONS

STUDY RESPONSIBILITY

U. S. ARMY CORPS OF ENGINEERS	EXISTING PROJECT CONDITIONS - HYDROLOGY - WATER QUALITY PROGRAM - PROPOSED DEVELOPMENT

CONTRIBUTIONS

FEDERAL

BUREAU OF SPORT FISHERIES AND WILDLIFE	WILDLIFE SPECIES - PROGRAM - PLANNING AID REPORT
U. S. SOIL CONSERVATION SERVICE	SOILS INFORMATION - GEOLOGY
U. S. DEPARTMENT OF COMMERCE	CENSUS INFORMATION - NATIONAL WEATHER RECORD CENTER
U. S. DEPARTMENT OF AGRICULTURE	ECONOMIC RESEARCH
BUREAU OF OUTDOOR RECREATION	RECREATION SURVEY INFORMATION
ENVIRONMENTAL PROTECTION AGENCY	POLLUTION ABATEMENT

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF ENVIRONMENTAL RESOURCES	
BUREAU OF WATER QUALITY	WATER QUALITY
BUREAU OF ENVIRONMENTAL STUDIES	WATER QUALITY
BUREAU OF PLANNING AND DEVELOPMENT RESEARCH	
DIVISION OF MINE AREA RESTORATION	WATER QUALITY - MINE RESTORATION
BUREAU OF FORESTRY	VEGETATION
DEPARTMENT OF COMMUNITY AFFAIRS	POPULATION STATISTICS
PENNSYLVANIA FISH COMMISSION	FISHERY - PROGRAM - PROPOSED DEVELOPMENT
PENNSYLVANIA GAME COMMISSION	WILDLIFE SPECIES - PROGRAM - PROPOSED DEVELOPMENT
PENNSYLVANIA DEPARTMENT OF TRANSPORTATION	EXISTING ROADS - NEW DEVELOPMENTS

COUNTY

ARMSTRONG	
COUNTY COMMISSIONERS	PROGRAM - PROPOSED DEVELOPMENT
PLANNING COMMISSION	PROGRAM - POPULATION CHARACTERISTICS - ECONOMY - LAND USE
TOURIST PROMOTION OFFICE	RECREATION DEVELOPMENT - HISTORICAL
HISTORICAL SOCIETY	HISTORICAL
INDIANA	
COUNTY COMMISSIONERS	PROGRAM
PLANNING COMMISSION	PROGRAM - CHARACTERISTICS - ECONOMY - LAND USE
PARKS AND RECREATION COMMISSION	PROGRAM
TOURIST PROMOTION OFFICE	RECREATION DEVELOPMENT - HISTORICAL
JEFFERSON	
COUNTY COMMISSIONERS	VIEWS - PROGRAM
PLANNING COMMISSION	PROGRAM - POPULATION CHARACTERISTICS - ECONOMY - LAND USE
TOURIST PROMOTION OFFICE	RECREATION DEVELOPMENT - HISTORICAL
PUNXSUTAWNEY BORO ENGINEER	WATER QUALITY

ORGANIZATIONS

MAHONING CREEK LAKE DEVELOPMENT COMMITTEE	PROGRAM
INDIANA UNIVERSITY - DEPARTMENT OF BIOLOGY	WATER QUALITY - PROGRAM LAND USE
CARNEGIE MUSEUM	WILDLIFE SPECIES - HISTORICAL - ARCHEOLOGICAL
WESTERN PENNSYLVANIA WATER COMPANY	WATER QUALITY
AMERICAN YOUTH HOSTELS	EXISTING PROJECT CONDITIONS - PROGRAM
GENERAL PUBLIC	VIEWS AND COMMENTS

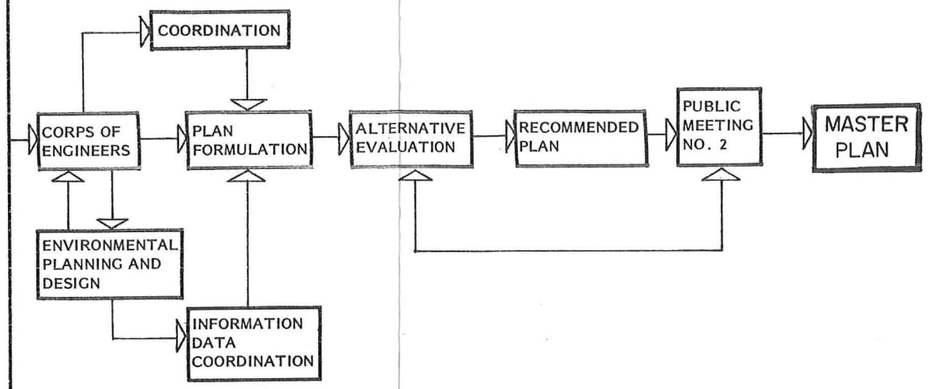


TABLE 7 -1
PARTICIPATING AGENCIES AND ORGANIZATIONS

An attempt was made to develop a Tri-County Park Authority to cost share in the development of facilities. This authority was to be comprised of Armstrong, Indiana and Jefferson Counties. After many meetings this venture was abandoned by the joint county commissioners. (See Exhibit G.)

Next, the three counties were contacted individually and asked if they were interested in participating in the project. Indiana and Jefferson counties replied that while they favored the project, they could not participate at this time. (See Exhibits I and J.) The Armstrong County Commissioners indicated that they favored the project and would be willing to cost-share in the development of some of the facilities within Armstrong County. However, they would have to withhold their final commitment pending a reply on their request to the Pennsylvania Department of Community Affairs for financial assistance in their share of development costs. (See Exhibit H.)

The local township governments were not contacted as potential cost-sharing partners because it was understood that the financial burden of such a program or any program would be too ambitious for their limited budgets.

7.4.2 Public Meeting

In response to public interest, the Pittsburgh District, on 20 April 1972, held a public meeting at the Dayton Area High School. Approximately 200 people attended the meeting. They represented governing bodies, public and private agencies, and interested citizens. Their response from oral statements, written statements presented at the meeting or submitted later to the District Office and answers to a handout distributed at the meeting generally indicated that the majority of the people favored the establishment of a higher summer pool and the development of recreation facilities as long as the end result was in balance with the existing natural character of the project. Those opposed to the project generally objected on the grounds that increased boating with unlimited horsepower would be hazardous and detrimental to the existing fishing.

7.4.3 Activities Requested

A compilation of the responses from the initial public meeting are listed below.

Activities	% to Participate	Average Number of Occasions Desired Per Respondent
Picnicking (family)	84	7.7
Fishing	67	13.2
Swimming	66	10.2
Sightseeing	66	9.1
Hunting	62	10.6
Hiking	58	7.1
Picnicking (group)	55	7.4
Nature Walks	44	5.6
Trailer Camping	39	10.1
Boating	33	4.7
Canoeing	25	6.4
Outdoor Games	23	4.4
Tent Camping	21	2.3
Bicycling	21	5.4
Riding	17	1.9
Water Skiing	15	2.0
Wading	14	1.0
Bird Watching	14	1.4
Trail Biking	13	7.0
Sailing	8	0.8

7.4.4 Follow Up

After the public meeting many workshops, telephone conversations and written communication occurred between the District Office and other interested participants to coordinate the necessary planning related to the development of a master plan.

7.4.5 Public Meeting No. 2

On June 5, 1974 a second public meeting was held at the Dayton Area High School to present the alternative plans considered during the master plan study, and the Recommended Plan.

Approximately 200 people, representing governing bodies, public and private agencies, and interested citizens, attended the meeting. Some concern was expressed about proposed land acquisition, indicated on the alternative plans, increased maintenance of local roads brought about by the anticipated increase in visitation, and the desires of some to maintain the status quo of the project area. However, the majority in attendance indicated their support for the Recommended Plan and urged that the project be completed as soon as possible.

In addition, the American Youth Hostels indicated that they would support the plan and would help in the development and maintenance of the proposed hiking trails. Both the Pennsylvania Fish and Game Commissions also expressed their support for the plan and the Armstrong County Commissioners read a statement indicating that they were in favor of the plan, but as previously stated, they would have to withhold their final commitment until they could work out the funding details with the Pennsylvania Department of Community Affairs.

SECTION 8.0 - COST ESTIMATES

8.1 CONSTRUCTION COSTS

8.1.1 General

The preliminary cost estimates for initial and future development are shown on Table 8-11 and total $1,211,000 and $705,000, respectively. These are based upon July 1976 cost levels and include a 15 percent construction contingency, 10 percent for engineering and design, and 10 percent for supervision and administration. The categories of cost-sharing responsibility are discussed in the following paragraphs.

8.1.2 Cost-Sharing Program

Construction costs in the amount of $840,000 for initial recreation and fish and wildlife enhancement to be developed on a cost-sharing basis are indicated by site in Tables 8-1 through 8-6. These costs would be used as a basis for a cost-sharing agreement between the Federal Government and the cost-sharing partners. They are Armstrong County, the Pennsylvania Fish Commission, and the Pennsylvania Game Commission. The summary of costs for their portion of the development of facilities is listed below:

Armstrong County	$470,000
Pennsylvania Fish Commission	285,000
Pennsylvania Game Commission	85,000

These costs are based upon July 1976 cost levels and include the preliminary estimates for the development of facilities, a 15 percent construction contingency, 10 percent for engineering and design, and 10 percent for supervision and administration.

Activities which would be cost-shared include facilities for fishing, hunting, hiking, boating, picnicking, camping, sightseeing and related utility systems.

8.1.3 One Hundred Percent Financing by the Corps of Engineers

Construction costs in the amount of $333,000 for the improvement of visitor facilities and construction of a maintenance complex at the Operational Area at the dam are indicated in Table 8-1. This development would be financed 100 percent by the Corps of Engineers.

8.1.4 One Hundred Percent Financing by the Pennsylvania Fish Commission

Fishing Access A below the dam is proposed to be developed by the Pennsylvania Fish Commission. Construction costs in the amount of $38,000 for the area are shown on Table 8-2.

8.2 OPERATION, MAINTENANCE AND MAJOR REPLACEMENT

The estimated annual costs of operation, maintenance and major replacement for public access facilities related to the development of recreation and fish and wildlife are summarized as follows:

Operation and Maintenance	$23,000
Major Replacement	9,000
Total	$32,000

8.3 TOTAL COSTS

Table 8-11, Summary of Costs, lists the costs for the development that would be constructed under the proposed program. Cost estimates have been prepared for initial, future and total development.

TABLE 8-1

COST ESTIMATE
PROPOSED 100% FINANCING BY CORPS OF ENGINEERS
MAHONING CREEK LAKE

RECOMMENDED PLAN - OPERATIONAL AREA
INITIAL DEVELOPMENT
(JULY 1976 COST LEVEL)

Item	Unit	Unit Cost	Quantity	Total
Creek Access 20' Wide, 10" Stone Base, with 2-1/2" Bituminous Surface	L.F.	$ 40	1,850	$ 74,000
Parking, 10" Stone Base, with 2-1/2" Bituminous Surface	Space	500	18	9,000
Picnicking	Unit	950	5	4,750
Trails	L.F.	5	2,600	13,000
Chemical Toilet (Single, 1 Male, 1 Female)	Each	10,000	2	20,000
Well and Hand Pump	Each	5,000	2	10,000
Information Kiosk	Each	3,000	1	3,000
Maintenance Complex	L.S.	--	--	100,000
Environmental Improvement	L.S.	--	--	7,000
			Subtotal	$241,000
			Contingency 15%	36,000
			Total Construction	$277,000
			Engineering and Design 10%	28,000
			Supervision and Administration 10%	28,000
			Total	$333,000

TABLE 8-2

COST ESTIMATE

PROPOSED DEVELOPMENT BY THE PENNSYLVANIA FISH COMMISSION

RECOMMENDED PLAN - FISHING ACCESS A
INITIAL DEVELOPMENT
(JULY 1976 COST LEVEL)

Item	Unit	Unit Cost	Quantity	Total
Access Road 18' wide - 8" Stone Base with Double Seal Coat	L.F.	$ 17	70	$ 1,200
Parking - 6" Stone Base with Double Seal Coat	Space	300	18	5,400
Chemical Toilet (Single 1 Male, 1 Female)	Each	10,000	1	10,000
Well and Hand Pump	Each	5,000	1	5,000
Environmental Improvement	L.S.	--	--	6,000
			Subtotal	$28,000
			Contingency 15%	4,000
			Total Construction	32,000
			Engineering and Design 10%	3,000
			Supervision and Administration 10%	3,000
			Total	$38,000

TABLE 8-3

COST ESTIMATE

PROPOSED COST-SHARING WITH ARMSTRONG COUNTY

RECOMMENDED PLAN - MILTON LOOP AREA
INITIAL DEVELOPMENT
(JULY 1976 COST LEVEL)

Item	Unit	Unit Cost	Quantity	Total
Road				
Access Road 18' wide - 8" Stone Base with Double Seal Coat	L.F.	$ 20	400	$ 8,000
Loop Road 12' wide - 8" Stone Base with Double Seal Coat	L.F.	15	3,250	48,750
Parking				
Car - 6" Stone Base with Double Seal Coat	Space	300	27	8,100
Camp Unit (Including Site Accessories)	Each	700	60	42,000
Collection Booth	Each	5,000	1	5,000
Chemical Toilet (Single 1 Male, 1 Female)	Each	10,000	1	10,000
Chemical Toilet - Storage Building	L.S.	--	-	40,000
Chemical Toilet (Double 2 Male, 2 Female)	Each	25,000	2	50,000
Well and Hand Pump	Each	5,000	6	30,000
Play Field	L.S.	--	-	10,000
Play Area	Each	5,000	2	10,000
Stream Path	L.F.	5	3,000	15,000
Picnicking	Unit	950	4	3,800
Picnic Shelter	L.S.	--	-	10,000
Sanitary Dump Station	L.S.	--	-	15,000
Electric and Telephone	L.S.	--	-	5,000
Environmental Improvements	L.S.	--	-	30,000
			Subtotal	$341,000
			Contingency 15%	51,000
		Total Construction		$392,000
	Engineering and Design		10%	39,000
	Supervision and Administration		10%	39,000
			Total	$470,000

TABLE 8-4

COST ESTIMATE

PROPOSED COST-SHARING WITH THE PENNSYLVANIA FISH COMMISSION

RECOMMENDED PLAN - MILTON LOOP AREA
INITIAL DEVELOPMENT
(JULY 1976 COST LEVEL)

Item	Unit	Unit Cost	Quantity	Total
Road				
Access Road 20' wide - 8" Stone Base with Double Seal Coat	L.F.	$ 20	3,400	$ 68,000
Parking				
Car - 6" Stone Base with Double Seal Coat	Space	300	24	7,200
Car-Trailer - 6" Stone Base with Seeded Surface	Space	500	51	25,500
Boat Launch Ramp - 3 lanes	L.S.	--	-	10,000
Floating Courtesy Docks	Each	5,000	2	10,000
Chemical Toilets (Double 2 Male, 2 Female)	Each	25,000	1	25,000
Well and Hand Pump	Each	5,000	1	5,000
Trails	L.F.	2	600	1,200
Environmental Improvements	L.S.	--	-	20,000
			Subtotal	$172,000
			Contingency 15%	26,000
			Total Construction	$198,000
			Engineering and Design 10%	20,000
			Supervision and Administration 10%	20,000
			Total	$238,000

TABLE 8-5

COST ESTIMATE

PROPOSED COST-SHARING WITH THE PENNSYLVANIA FISH COMMISSION

RECOMMENDED PLAN - FISHING ACCESS B
INITIAL DEVELOPMENT
(JULY 1976 COST LEVEL)

Item	Unit	Unit Cost	Quantity	Total
Access Road 18' wide - 8" Stone Base with Double Seal Coat	L.F.	$ 17	100	$ 1,700
Parking 6" Stone Base with Double Seal Coat	Space	300	25	7,500
Chemical Toilet (Single 1 Male, 1 Female)	Each	10,000	1	10,000
Well and Hand Pump	Each	5,000	1	5,000
Trails	L.F.	2	2,000	4,000
Environmental Improvements	L.F.	--	-	6,000
			Subtotal	$34,000
			Contingency 15%	5,000
			Total Construction	39,000
			Engineering and Design 10%	4,000
			Supervision and Administration 10%	4,000
			Total	$47,000

TABLE 8-6

COST ESTIMATE

PROPOSED COST-SHARING WITH THE PENNSYLVANIA GAME COMMISSION

RECOMMENDED PLAN - HUNTING ACCESS
INITIAL DEVELOPMENT
(JULY 1976 COST LEVEL)

Item	Unit	Unit Cost	Quantity	Total
ACCESS A				
Access Road - 18' wide - 8" Stone Base with Seeded Surface	L.F.	$ 15	200	$ 3,000
Parking - 7 Cars - 8" Stone Base with Seeded Surface	Spaces	320	7	2,240
Trails	L.F.	2	1,500	3,000
(Note: Typical All Areas)				
			Subtotal	$ 8,200
			Contingency 15%	1,200
			Total Construction	$ 9,400
			Engineering and Design 10%	900
			Supervision and Administration 10%	900
			Total	$11,000
ACCESS B				
Access Road	L.F.	$ 15	200	$ 3,000
Parking - 7 Cars	Spaces	320	7	2,240
Trails	L.F.	2	1,800	3,600
			Subtotal	$ 8,800
			Contingency 15%	1,300
			Total Construction	$10,100
			Engineering and Design 10%	1,000
			Supervision and Administration 10%	1,000
			Total	$12,000
ACCESS C				
Access Road	L.F.	$ 15	800	$12,000
Parking - 7 Cars	Spaces	320	7	2,240
Trails	L.F.	2	2,000	4,000
			Subtotal	$18,200
			Contingency 15%	2,700
			Total Construction	$20,900
			Engineering and Design 10%	2,100
			Supervision and Administration 10%	2,100
			Total	$25,000

TABLE 8-6 (Continued)

Item	Unit	Unit Cost	Quantity	Total
ACCESS D				
Access Road	L.F.	$ 15	200	$ 3,000
Parking - 7 Cars	Spaces	320	7	2,240
Trails	L.F.	2	2,300	4,600
			Subtotal	$ 9,800
			Contingency 15%	1,500
			Total Construction	$11,300
	Engineering and Design		10%	1,100
	Supervision and Administration		10%	1,100
			Total	$14,000
ACCESS E				
Access Road	L.F.	$ 15	150	$ 2,250
Parking - 7 Cars	Spaces	320	7	2,240
Trails	L.F.	2	2,000	4,000
			Subtotal	$ 8,500
			Contingency 15%	1,300
			Total Construction	$ 9,800
	Engineering and Design		10%	1,000
	Supervision and Administration		10%	1,000
			Total	$12,000
ACCESS F				
Access Road	L.F.	$ 15	200	$ 3,000
Parking - 7 Cars	Spaces	320	7	2,240
Trails	L.F.	2	1,500	3,000
			Subtotal	$ 8,200
			Contingency 15%	1,200
			Total Construction	$ 9,400
	Engineering and Design		10%	900
	Supervision and Administration		10%	900
			Total	$11,000

TABLE 8-7

COST ESTIMATE

PROPOSED COST-SHARING WITH ARMSTRONG COUNTY

RECOMMENDED PLAN - GLADE RUN BOAT-IN AREA
FUTURE DEVELOPMENT
(JULY 1976 COST LEVEL)

Item	Unit	Unit Cost	Quantity	Total
Floating Courtesy Docks	Each	$ 5,000	1	$ 5,000
Picnicking	Unit	950	2	1,900
Trails	L.F.	5	2,000	10,000
Chemical Toilets (Single 1 Male, 1 Female)	Each	10,000	1	10,000
Well and Hand Pump	Each	5,000	1	5,000
Environmental Improvements	L.S.	--	-	2,000
			Subtotal	$34,000
			Contingency 15%	5,000
			Total Construction	$39,000
			Engineering and Design 10%	4,000
			Supervision and Administration 10%	4,000
			Total	$47,000

TABLE 8-8

COST ESTIMATE

PROPOSED COST-SHARING WITH ARMSTRONG COUNTY

RECOMMENDED PLAN - FURNACE RUN BOAT-IN AREA
FUTURE DEVELOPMENT
(JULY 1976 COST LEVEL)

Item	Unit	Unit Cost	Quantity	Total
Floating Courtesy Dock	Each	$ 5,000	1	$ 5,000
Picnicking	Unit	950	2	1,900
Trails	L.F.	5	3,000	15,000
Tent Camping	Site	300	10	3,000
Chemical Toilets (Single, 1 Male, 1 Female)	Each	10,000	1	10,000
Well and Hand Pump	Each	5,000	1	5,000
Environmental Improvements	L.S.	--	-	2,000
			Subtotal	$42,000
			Contingency 15%	6,000
			Total Construction	$48,000
			Engineering and Design 10%	5,000
			Supervision and Administration 10%	5,000
			Total	$58,000

TABLE 8-9

COST ESTIMATE

PROPOSED COST SHARING WITH ARMSTRONG COUNTY

RECOMMENDED PLAN - MILTON LOOP
FUTURE DEVELOPMENT
(JULY 1976 COST LEVEL)

Item	Unit	Unit Cost	Quantity	Total
Parking	Space	$ 300	8	$ 2,400
Trails	L.F.	5	900	4,500
Shelter	L.S.	--	-	10,000
Water Play	L.S.	--	-	10,000
Chemical Toilets with Change Area	L.S.	40,000	-	40,000
Well and Hand Pump	Each	5,000	1	5,000
Environmental Improvements	L.S.	--	-	8,000
			Subtotal	$ 80,000
			Contingency 15%	12,000
			Total Construction	$ 92,000
			Engineering and Design 10%	9,000
			Supervision and Administration 10%	9,000
			Total	$110,000

TABLE 8-10

COST ESTIMATE

PROPOSED COST-SHARING FACILITY WITH ARMSTRONG COUNTY

RECOMMENDED PLAN - MILTON LOOP EXPANSION
FUTURE DEVELOPMENT
(JULY 1976 COST LEVEL)

Item	Unit	Unit Cost	Quantity	Total
Access Road	L.F.	$ 17	1,700	$ 28,900
Loop Road	L.F.	10	3,250	32,500
Parking	Space	400	40	16,000
Camping	Unit	700	85	59,500
Collection Booth	L.S.	--	-	5,000
Chemical Toilet (Double 2 Male, 2 Female)	Each	25,000	2	50,000
Chemical Toilet and Storage Building	L.S.	--	-	40,000
Sanitary Pump Station	L.S.	--	-	15,000
Wells and Hand Pumps	Each	5,000	5	25,000
Picnicking	Unit	950	8	7,600
Trails	L.F.	5	2,000	10,000
Play Meadow	L.S.	--	-	10,000
Play Area	L.S.	--	-	5,000
Shelter	Each	10,000	1	10,000
Chemical Toilets (Single 1 Male, 1 Female)	Each	10,000	1	10,000
Environmental Improvements	L.S.	--	-	30,000
			Subtotal	$355,000
			Contingency 15%	53,000
			Total Construction	$408,000
			Engineering and Design 10%	41,000
			Supervision and Administration 10%	41,000
			Total	$490,000

TABLE 8-11

SUMMARY OF COSTS

RECOMMENDED PLAN
(JULY 1976 COST LEVEL)

Area	Initial Increment	Future Increment	Total
100% FINANCING BY CORPS OF ENGINEERS			
Operational Area	$ 333,000		$ 333,000
100% FINANCING BY PENNSYLVANIA FISH COMMISSION			
Fishing Access A	$ 38,000		$ 38,000
COST-SHARING FACILITIES			
Milton Loop Area (Armstrong County)	$ 470,000	$110,000	$ 580,000
Milton Loop Area (Pennsylvania Fish Commission)	238,000		238,000
Fishing Access B	47,000		47,000
Hunting Access A, B, C, D, E, F	85,000		85,000
Glade Run Boat-In Area		47,000	47,000
Furnace Run Boat-In Area		58,000	58,000
Milton Loop Expansion		490,000	490,000
SUBTOTAL COST-SHARING	$ 840,000	$705,000	$1,545,000
TOTAL	$1,211,000	$705,000	$1,916,000

SECTION 9.0 - ADMINISTRATION AND MANAGEMENT

9.1 GENERAL

The responsibilities for operation, maintenance and administration of project land and water areas for public use would be shared by the Corps of Engineers, Armstrong County, the Pennsylvania Fish Commission and the Pennsylvania Game Commission as shown on Plate 8 and described in general terms in the following paragraphs. A detailed coordinated plan for the administration and management of Mahoning Creek Lake will be prepared in cooperation with the other governmental agencies that would also be involved in the administration of the project. When completed this plan would be incorporated into the Project Resource Management Plan, Appendix A to this master plan. Other management appendices will be prepared to address the topics of Forest Management, Fish and Wildlife Management, Fire Protection and Project Safety.

9.2 CORPS OF ENGINEERS

The Corps of Engineers would operate, maintain and administer, in addition to their normal duties related to the dam, all public use facilities and activities within the Operational Area. The Corps would continue the role of overall administrator for the total project. This would include the defining of general administrative policy and procedures, providing direction for the other agencies involved in project management and reviewing the proposed policies and administrative practices of these other agencies. Active management activities would include patrolling of project boundaries to detect encroachments on Government land, compliance inspections of outgrants, enforcement of Federal regulations and maintenance of safety equipment at the dam.

9.3 ARMSTRONG COUNTY

9.3.1 Initial Development

The Milton Loop Area, consisting of 42 acres, would contain camping and day-use facilities. Armstrong County would be responsible for the operation of all lands and maintenance and administration of structures related to these activities. In addition, they would operate and maintain all facilities related to fishing activities at the Milton Loop and at Fishing Access A and B under a separate agreement with the Pennsylvania Fish Commission. Active management functions would include facility maintenance and replacement, fee collection, security, mowing and trash collection.

9.3.2 Future Development

Armstrong County would also operate and maintain all lands and structures related to the future development of recreation activities at the Milton Loop Expansion, Furnace Run Boat-In Area and the Glade Run Boat-In Area when they are provided.

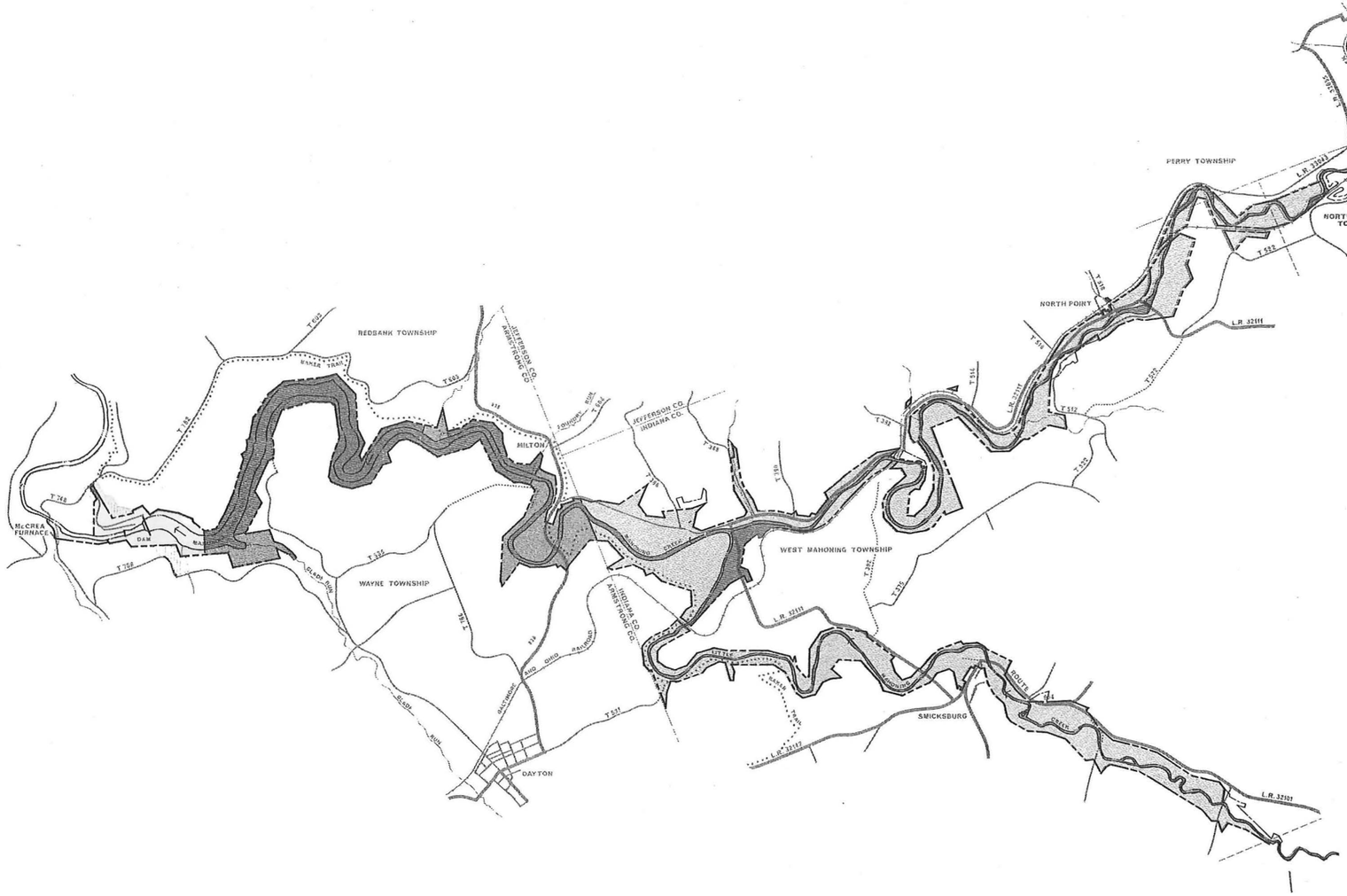
9.4 PENNSYLVANIA FISH COMMISSION

The Pennsylvania Fish Commission has agreed to sign a contract with the Federal Government accepting the responsibility for the operation, maintenance and administration of all water bodies within the Government boundary with the exception of the 36 acres of summer pool within the Operational Area. Within this area the Commission would develop a program for management of the fishery and enforcement of boating and fishing regulations. The long narrow character of the lake and steep shoreline will require some control of high speed boating to prevent degradation of the resource through shoreline erosion and increased turbidity and to prevent excessive conflict with fishing use of the lake.

In addition to their fishery management and enforcement responsibilities, the Fish Commission would also be responsible for the operation, maintenance and administration of all lands, structures and facilities related to fishing activities at Fishing Access Areas A and B and at the Milton Loop. It is further understood that everyday general operation and maintenance activities at these areas would be performed by Armstrong County under separate agreement.

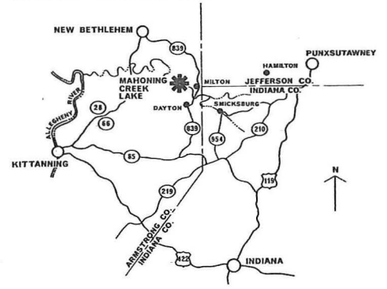
9.5 PENNSYLVANIA GAME COMMISSION

The Pennsylvania Game Commission has agreed to accept the responsibility for the operation, maintenance and administration of all lands, structures and proposed facilities within the Government boundaries in Indiana and Jefferson Counties. The only exceptions would be those lands along both creeks and at Fishing Access B which would be designated the responsibility of the Pennsylvania Fish Commission and the small picnic area to be leased to the Borough of Smicksburg. The letter permit to Indiana University to conduct outdoor biological research on several tracts within the area does not convey any right in Government owned land or limit public use of the area. Therefore, the Game Commission has agreed that this research area would remain within their lease area. The lands to be leased to the Game Commission would be managed for wildlife production and provision of public hunting opportunities. The area consists of both wooded and open habitat and would be managed for both small and big game species. Management activities would include share-crop agreements on the farmable land and silvicultural measures for the woodlots aimed at providing food and cover for wildlife. The Game Commission would also be responsible for the maintenance of the six small hunting access areas scattered throughout the area.



NORTH

PROJECT LOCATION MAP



LEGEND (MANAGEMENT AREAS)

- CORPS OF ENGINEERS
- ARMSTRONG COUNTY
- PENNSYLVANIA FISH COMMISSION
- PENNSYLVANIA GAME COMMISSION
- U.S. GOVERNMENT BOUNDARY LINE
- CREEK CHANNEL
- FLOWAGE EASEMENTS
- DIRECTION OF FLOW

RECOMMENDED PLAN

LAND MANAGEMENT MAP

MAHONING CREEK LAKE

ALLEGHENY RIVER BASIN, PENNSYLVANIA

MASTER PLAN

SCALE 1" = 2000'

2000 0 2000 4000

U.S. ARMY ENGINEER DISTRICT, PITTSBURGH, CORPS OF ENGINEERS
OFFICE OF THE DISTRICT ENGINEER, PITTSBURGH, PA. 19 MAY 1975

SUBMITTED: CHIEF PLANNING BRANCH

APPROVAL RECOMMENDED: CHIEF ENGINEERING DIVISION

APPROVED: COLONEL CORPS OF ENGINEERS DISTRICT ENGINEER

CHECKED BY: G.C.Z.

SECTION 10.0 - CONCLUSIONS AND RECOMMENDATIONS

10.1 CONCLUSIONS

On the basis of the data and information developed in this master plan and the stated views of other interested agencies and the concerned public, the following is concluded.

1. The establishment of a higher summer pool at elevation 1098 m.s.l. would result in a significant enhancement of the recreation potential of the project without seriously impairing its flood control capacity. The raise in summer pool elevation would have only minor environmental impacts and be in conformance with expressed public desires.

2. There is a need for additional recreation and fishing and hunting opportunities in the Mahoning Creek Lake market area. The development proposed in this master plan would provide increased opportunity for the public to enjoy the natural resources of the project area and meet a portion of the regional need for additional recreation opportunities.

3. The Mahoning Creek Lake project area has exceptional natural beauty and a natural and unspoiled character. The primary aim in continued development of the project is to preserve this passive and unspoiled natural character while still providing additional recreation opportunities. The number of recreation activities and the size of the individual facilities have been carefully planned so as to not over-tax the resource base and have been planned to harmonize with the rural character of the natural landscape.

4. The shared responsibility for operation and maintenance and administration of project land and water areas among the Corps of Engineers, Armstrong County, the Pennsylvania Fish Commission and the Pennsylvania Game Commission would provide for optimum development and management of the project consistent with the conservation weighted project theme.

10.2 RECOMMENDATIONS

It is recommended that this master plan for Mahoning Creek Lake be approved and serve as the basis for an operational change for the establishment of a summer conservation pool at a higher elevation and serve as a guide for the cost-shared development of recreation and fish and wildlife facilities to provide access to the new pool.

It is further recommended that this master plan serve as the overall guide for the continued development and management of the Mahoning Creek Lake project.

MAX R. JANAIRO, JR.
Colonel, Corps of Engineers
District Engineer

United States Department of the Interior

BUREAU OF OUTDOOR RECREATION
NORTHEAST REGIONAL OFFICE
Federal Building - Room 9310
600 ARCH STREET
Philadelphia, Pennsylvania 19106

IN REPLY REFER TO:

SEP 9

Major Richard W. Wylie
Acting District Engineer
Department of the Army
Pittsburgh District, Corps of Engineers
Federal Building, 1000 Liberty Avenue
Pittsburgh, PA 15222

Dear Major Wylie:

We have received your preliminary draft of the Technical Report and Appendices for the Special Report, Post-Authorization Change for Mahoning Creek Lake, Allegheny River Basin, Pennsylvania. We find that the recreational aspects of the post-authorization changes are in conformance with the Pennsylvania Statewide Comprehensive Outdoor Recreation Plan.

We are impressed with the diversity of recreational experiences which are proposed for Mahoning Creek Lake, particularly the trail system, and the preservation of the natural canoe rest areas. We do suggest that your support of local desires for a restriction on the amount of horsepower that can be used to propel boats on the Lake be more specifically and vigorously stated in the draft of this report. Presently, there are only two references to limited horsepower boats on pages III-23 and III-31.

Thank you for the opportunity to review and comment.

Sincerely,

Regional Director

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

EXHIBIT A

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
John W. McCormack Post Office and Courthouse
BOSTON, MASSACHUSETTS 02109

District Engineer
Pittsburgh District
New Federal Building
1000 W. Liberty Street
Pittsburgh, Pennsylvania 15222

OCT 7 1974

Dear Sir:

This letter constitutes the U. S. Fish and Wildlife Service's report on your Special Report, Proposed Post-authorization change for Mahoning Creek Lake, Allegheny River Basin, Pennsylvania, dated August, 1974. The existing, single-purpose flood control project was authorized by the Flood Control Acts (Public Laws No. 738, 74th Congress and No. 761, 76th Congress). Preparation of the special report for post-authorization changes was authorized by three separate documents:

1. ORDPD-R letter of June 19, 1968, "Conservation Pools at Completed Projects".

2. ER 1165-2-305 "Significant Post-authorization Changes in Corps of Engineers Projects" dated September 25, 1968.

3. EM 1165-2-303 "Conservation Pools in Reservoir Projects", dated November 1, 1961.

This Service's report was prepared and submitted in accordance with the provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and in cooperation with the Pennsylvania Fish and Game Commissions. Their comments will be forwarded upon receipt. Your special report proposes implementation of the "Recommended Plan" for the development of fish, wildlife and recreation within the project area.

DESCRIPTION OF PROJECTS

Existing Facilities: The existing concrete gravity-type dam is located on Mahoning Creek in Armstrong County, Pennsylvania, 21.6 miles upstream from the creek's confluence with the Allegheny River. The reservoir has a permanent pool of 170 surface acres, at elevation 1075 1/ and extends a distance of 4 miles on the main stem of Mahoning Creek. The flood

1/ All elevations refer to mean sea level datum.

EXHIBIT B

pool at elevation 1162 encompasses an area of 2370 acres and extends 19.5 miles. The permanent pool has a depth of 67 feet at the dam. The outlet works consist of three gated conduits with invert elevation at 1015 and two emergency conduits at invert elevations 1021 and 1025, respectively. Reservoir discharges are essentially the same as inflows except for temporary reductions due to flood control storage.

Water quality of the reservoir is suitable for maintenance of warmwater fish and other aquatic life. Productivity, however, is limited as the result of mine acid emanating from upstream strip mining. Public access to the reservoir and project lands is extremely limited. Fishing access is provided at the reservoir tailwater and an access site with a boat launching ramp and parking area exists two miles upstream from the dam. Some public access is available to upstream areas on Little Mahoning and Mahoning Creeks via road crossings.

No public hunting access to project lands has been provided. All project lands and waters are under license to the Pennsylvania Fish Commission except project operations areas. Local farmers lease 632.6 acres for limited agriculture, consisting previously of pasture and haying.

Recommended Plan: The modified reservoir will have a permanent pool elevation of 1098 feet, surface area of 280 acres, and backwater length on the main stem of approximately 6 miles. One additional access site will be developed at Milton Loop which will include a 3-lane boat launching ramp, canoe launch platform, 51 car-trailer parking area plus additional space for 24 cars. A fishing access area for bank fishing will be developed upstream from the dam at the confluence of Mahoning and Little Mahoning Creeks. This site will have sanitary facilities and parking space for 25 cars. An additional fishing access area will be developed downstream from the dam at McCrea Furnace. This site will have parking area for 18 cars and sanitary facilities.

Wildlife resource development will consist of six separate land tracts totaling 1015 acres for wildlife management and hunter use.

In addition, some 1238 acres of land interspersed between the wildlife management tracts will be available for public use. A system of hiking and bicycling trails will be developed on lands surrounding the project area. The Corps of Engineers will acquire an additional 63 acres of land around the dam. All other lands to be developed are currently under license to the Pennsylvania Fish Commission except for 118 acres of operational land and 84 acres of flood easement land. Pertinent project data are summarized in Table 1.

TABLE 1

Specification	Existing Project	Recommended Plan
Permanent Pool Elevation	1,075	1,098
Permanent Pool Area	170 acres	280 acres
Backwater length of summer pool (on main stem)	4 miles	6 miles
Boat Launch Facilities	1 lane	3 lanes
Fish Access Areas	2	5
Hunting Access Areas	---	6
Recreation Areas	120 acres	245 acres
Conservation Areas	515 acres	1,238 acres
Wildlife Enhancement Areas	---	1,015 acres

FISHERY RESOURCES

Without-the-project

Fishery habitats within the project area include 170 surface acres of warmwater lake-type habitat within the reservoir, approximately 21 miles of warmwater streams upstream from the reservoir summer pool to flood pool elevation and a warmwater tailwater fishery extending one mile downstream from the dam. Fishery productivity of the impoundment is low. The deep, narrow reservoir contains limited shallow area for fish production. Approximately 19 percent is less than 20 feet in depth. Fertility, indicated by alkalinity, is low to moderate. The streams have good physical features, such as gravel-rubble bottoms, riffles and pools, for warmwater fish production. Fertility is moderate.

Principal fish species harvested from the streams and reservoir include largemouth bass, smallmouth bass, walleye, crappie, sunfish, northern pike, channel catfish, bullheads, yellow perch and suckers. Most smallmouth bass and walleye are harvested in the streams.

Fishing pressure, in relation to the available resources, is moderate on the streams and low on the reservoir. Fishing use of the impoundment is extremely limited due to lack of access, boat launching facilities, and steep shoreline. Road access to the upstream areas contribute to moderate fishing use on the streams, while the access site at the reservoir tailwaters provides considerable fishing opportunities where

fish concentrations contribute to high harvests within a relatively small area.

Based upon the foregoing, estimated average annual fish-use and related recreation values of the resource areas without-the-project are:

Reservoir----------	3,000 fisherman-days,	$3,750
Upstream Areas--------	3,100 fisherman-days,	$6,200
Reservoir Tailwater --	2,800 fisherman-days,	$5,600

With-the-project

The modified reservoir will increase the summer pool by almost 41 percent. Although surface area will be increased by 110 acres, productivity per unit area will decrease because of increased depth. The percentage of productive shallow area of the enlarged impoundment will amount to only 11 percent of the total surface area. The expanded summer pool will obliterate approximately 2 miles of stream fishery habitat. The enlarged reservoir and the additional fishing access sites provided will, however, greatly increase overall fishing opportunities.

Estimated average annual fishing use and values with-the-project are:

Reservoir----------	5,900 fisherman-days,	$ 7,375
Upstream Areas-------	2,700 fisherman-days,	$ 5,400
Reservoir Tailwater--	5,600 fisherman-days,	$11,200

WILDLIFE RESOURCES

Without-the-Project

None of the lands are specifically managed for wildlife. Most of the lands within the project area have been left in their natural state except for the 632 acres leased to farmers and the operational areas. Access is limited to a few existing roads around the project area. Project lands provide hunting for grouse, rabbit, dove, pheasant, squirrel, turkey and deer. The steep, narrow strip of lands bordering the main portion of the reservoir support little wildlife while most wildlife and hunter-use is in flood plains of the upper reservoir along Mahoning and Little Mahoning Creeks. These areas provide an estimated 1044 hunter-days with an estimated value of $3,312 annually. Non-consumptive use

of wildlife such as bird watching and nature study is negligible due to limited access and a few developed trails.

With-the-Project

The increased permanent pool elevation will flood a small area of land along the stream but the steep slopes and reservoir fluctuations afford negligible wildlife habitat. Therefore, wildlife looses resulting from reservoir inundation are insignificant. Development, management and hunter-access of project lands, as provided in the Recommended Plan, will increase wildlife populations and public hunting. This land use is expected to result in an estimated average annual hunter-use of 1600 man-days with a recreational value of $5,072. The development of hiking and bicycle trails will enhance non-consumptive use of wildlife. A summary of fishing and hunter-use and related recreational values without and with-the-project are shown in Table 2.

TABLE 2

	FISH		WILDLIFE		
	Fisherman days	Value	Hunter-days	Value	Non-consumptive Use
Existing Project	8,900	$15,550	1,044	$3,312	small
Recommended Plan	14,200	$23,900	1,600	$5,072	large
Increase over the Existing Project	5,300	$ 8,350	556	$1,760	

DISCUSSION

The Recommended Plan proposes to close the existing access area and boat launching facility located 2 miles upstream from the dam and instead, provide a single boat launch facility at Milton Loop. Boats would be required to put-in at the Milton Loop and travel the entire length of the narrow impoundment, to reach fishing areas near the dam or the Glad Run boat-in area. This will create excessive prop wash along the banks, increase turbidity and reduce fishing success and productivity in the upstream one-half of the reservoir. We believe that an improved boat launch area at or near the existing location would increase fishing use in the lower portion of the reservoir and improve fishing success. This boat launch area would also alleviate the otherwise detrimental effects mentioned above. Computed benefits with an additional access site at the lower portion of the reservoir amount to an estimated 1,800 fisherman-days annually with recreational values of $2,250.

Potential for conflicting recreational uses of the impoundment exists and must be considered in development of project plans and computation of recreation benefits. Activities, such as water skiing and other high-speed boating would not be compatible with fishing-use or fish productivity in this long narrow reservoir. We, therefore, conclude that the fishery benefits presented in this report will not be obtained if high speed boating is permitted:

The U. S. Fish and Wildlife Service recommends that:

1. An additional fishing access site located within 2 to 3 miles upstream from the dam be incorporated in the project plan with provisions for parking and boat launching facilities.

2. High speed boating be precluded from the reservoir.

We would appreciate being advised of any additional changes in the final plans.

Sincerely yours,

Richard E. Griffith

Regional Director

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Post Office and Courthouse Building
BOSTON, MASSACHUSETTS 02109

JAN 14 1975

District Engineer
Pittsburgh District, Corps of Engineers
New Federal Building
1000 West Liberty Street
Pittsburgh, Pennsylvania 15222

Dear Sir:

Reference is made to the U. S. Fish and Wildlife Service's report, dated October 7, 1974, on your Special Report, Proposed Post Authorization Change for Mahoning Creek Lake, Allegheny River Basin, Pennsylvania, dated August 1974.

Our Upper Darby, Pennsylvania, Area Office staff has reviewed its percentage calculations for littoral zone habitat (less than 20 feet), created by the present summer pool elevation of 1,075 and the proposed elevation of 1,098, and found them to be in error. They have requested that the following corrections be made in the FISHERY RESOURCES section:

Without-the-Project - The fourth sentence should read: "Approximately 41 percent of the total surface area is less than 20 feet."

With-the-Project - The third sentence should read: "The percentage of productive shallow area of the enlarged impoundment will amount to only 28 percent of the total surface area."

We are attaching herewith copies of correspondence received from the Pennsylvania Fish Commission and the Pennsylvania Game Commission, Harrisburg, Pennsylvania, pertaining to this project.

Sincerely yours,

ACTING Regional Director

Attachments

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

EXHIBIT C

OFFICE OF
EXECUTIVE DIRECTOR
TELEPHONE
AREA CODE 717 - 787-3633

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA GAME COMMISSION
P. O. BOX 1567
HARRISBURG, PA. 17120

October 31, 1974

ADMINISTRATIVE DIVISIONS:

ACCOUNTING	787-4482
ADMINISTRATION	787-5670
LICENSE SECTION	787-2084
PERSONNEL	787-7836
INFORMATION & EDUCATION	787-6286
LAW ENFORCEMENT	787-5749
LAND MANAGEMENT	787-6818
REAL ESTATE	787-6568
PROPAGATION	787-6711
RESEARCH	787-5529

Richard E. Griffith, Regional Director
U. S. Department of the Interior
Bureau of Sport Fisheries and Wildlife
John W. McCormack Post Office
and Courthouse
Boston, Massachusetts 02109

Dear Mr. Griffith:

We have reviewed the draft report on the Proposed Post-authorization change for Mahoning Creek Lake.

The Game Commission concurs with your recommendations.

Very truly yours,

Glenn L. Bowers
Executive Director

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA FISH COMMISSION
HARRISBURG 17120

EXECUTIVE DIRECTOR

October 18, 1974

Mr. Richard E. Griffith
Regional Director
U. S. Fish & Wildlife Service
U. S. Post Office and Courthouse
Boston, Massachusetts 02109

Dear Dick:

In response to the request for comments on the review draft of your report on Proposed Post-authorization Change for Mahoning Creek Lake, Allegheny River Basin, Armstrong County, Pennsylvania, may we offer the following:

In the without-the-project discussion of the fishery resources, you state that 19% (or 32.3 acres) is less than 20 feet deep. In the with-the-project discussion, the shallow area is listed as 11% (or 30.8 acres). Are you referring to the same 20-foot depth? If so, it is rather difficult to see how 80 acres of the 110-acre increase will be between 20 and 23 feet deep.

As for your recommendation for an additional fishing access area, this is a very good idea, but due to the extreme steepness of the terrain, such an access is impractical from an engineering viewpoint. We have looked into this possibility with the Corps of Engineers, but a suitable site hasn't been found.

Restricted horsepower may be better for the fisherman,

but as our duties include managing recreational boating as well, a decision has not been reached on boating regulations for this lake.

Thank you for this review opportunity.

Sincerely,

Ralph W. Abele
Executive Director

A/t

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF ENVIRONMENTAL RESOURCES

P. O. BOX 1467

HARRISBURG, PENNSYLVANIA 17120

The Secretary

In reply refer to
RM

October 5, 1973

Col. Norman G. Delbridge
District Engineer
U. S. Army Engineer District, Pittsburgh
Corps of Engineers
Federal Building - 1000 Liberty Avenue
Pittsburgh, Pennsylvania 15222

Dear Col. Delbridge:

As requested in your letter of August 6, 1973, we have reviewed your request for consideration of cost-sharing on additional recreation development at Mahoning Creek Lake, Pennsylvania in accordance with Public Law 89-72.

In reviewing the Mahoning Creek Lake Project, it is noted that the original project was authorized by the Flood Control Acts of June 22, 1936 and June 28, 1938. While the project has been operated and maintained since 1941, less than minimum recreation facilities have been provided by the Federal Government for public use of the reservoir area.

We believe that studies by your office should be continued in order to determine the type and extent of facilities that can be utilized at the site. It is noted that your recent review of the hydrologic aspects of the project indicates that you can maintain a 280 acre summer conservation pool at Elevation 1098 m.s.l. and not seriously impair the flood control capabilities of the project. The 280 acre summer conservation pool, if properly developed, would provide additional recreational facilities for the visiting public.

In reviewing the proposal for expanding the recreation development at Mahoning Creek Lake, we find that such facilities would not be in conflict with our Statewide Comprehensive Outdoor Recreation Plan. Consequently, we feel that your office should further explore the feasibility of providing additional recreation facilities at the site.

In your letter, you requested our views concerning cost-sharing of additional recreation facilities under Public Law 89-72. While we feel that the construction of additional recreation facilities at the site are justified, it is regretted that the Department is not in a position to cost-share on the construction and operation and maintenance costs of new facilities

EXHIBIT D

at the Mahoning Creek Lake Project. We have been encountering serious difficulties in obtaining sufficient operations and maintenance funds for our Pennsylvania State Park System. Consequently, it would not be possible for the Department, at this time, to assume any additional responsibility for operation and maintenance or construction of additional recreation facilities at the projects.

In my letter to you on August 27, 1973, I discussed in detail our views concerning the applicability of Public Law 89-72 to the Shenango River Lake, Tionesta Lake and the Youghiogheny River Lake projects. As in these 3 reservoirs, it is our feeling that the Federal Government has never constructed recreational facilities at Mahoning Creek Lake to meet the minimum needs of the visiting public. In view of the fact that Public Law 89-72 generally covers the construction of new projects after July 9, 1965 and that the Mahoning Creek Project has been in operation since 1941, we feel that the additional recreational facilities required at Mahoning Creek Lake should be provided for and operated by your office.

Sincerely yours,

Maurice K. Goddard

MAURICE K. GODDARD

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA FISH COMMISSION
BUREAU OF FISHERIES AND ENGINEERING
BOX 70, R. D. #3
BELLEFONTE, PENNSYLVANIA 16823

AREA CODE 814-359-2754

November 28, 1973

Colonel N. G. Delbridge
Pittsburgh District Engineer
Corps of Engineers
Department of the Army
Federal Building
1000 Liberty Avenue
Pittsburgh, Pennsylvania 15222

Mahoning Creek Lake, Pa.;
Conservation Pool Study

Dear Colonel Delbridge:

On November 19, 1973 Messrs. Paul Kolesar and Alex Otto of your staff, along with Mr. Rich Hagen, representing the consultant firm of Environmental Planning and Design, met with Messrs. Edward R. Miller, Wilbert F. Hobbs, and Clark Shiffer, representing the Bureau of Fisheries and Engineering, Pennsylvania Fish Commission. The purpose of this meeting was to discuss fishing and boating enhancement proposals for installation at the subject project on a cost-sharing basis.

During this meeting, Mr. Hagen presented preliminary development plans for a total of eight (8) different sites having a total estimated cost of slightly more than $1,037,000. Discussion centered on the need to provide adequate facilities to enable full public utilization of the increased recreational pool to be provided by an adjustment in summer pool levels, while at the same time keeping development costs at a level commensurate with the Fish Commission's funding capabilities. At the conclusion of this presentation and discussion, it was decided that total development costs for fishing and boating enhancement should be held to an upper limit of $300,000, thereby requiring a maximum contribution by the Fish Commission of no greater than $150,000.

The question of maintenance of the newly created recreational facilities was also discussed and the consensus was that efforts should be made to secure commitments from Armstrong County and local townships to assume these responsibilities. Mr. Otto indicated that he would pursue this matter with the respective local groups.

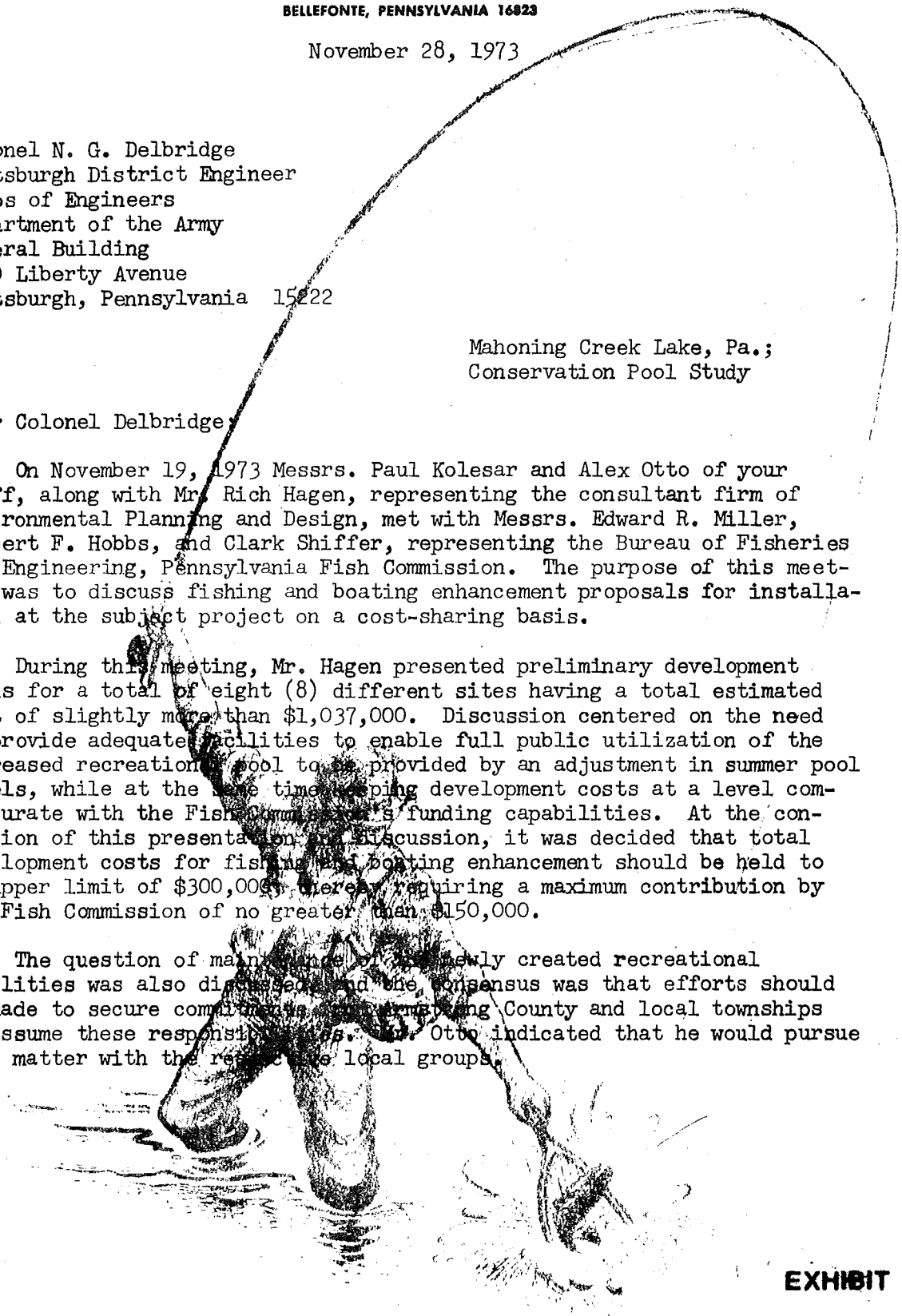


EXHIBIT E

The question of control of the land surrounding the reservoir was briefly discussed, and it was indicated that the Commission wants to maintain control of the conservation pool perimeter shoreline, and the area containing any public access facilities which involves Commission funding. The Commission will continue to encourage multiple usage of the lake and its facilities and is not adverse to relinquishing some of the lands surrounding the reservoir for other public uses. Since the increased lake will provide both fishing and boating recreational benefits and it appears that restricted horsepower motor boating may be feasible, the Commission is proposing to provide its share of funding from both the Fish and Boat Fund sources. In addition, the Commission wants to maintain fexibility to perform some of the engineering work and perhaps some of the actual construction work by its own forces in the event funding restrictions at the time of development make a total cash contribution impossible. Mr. Kolesar and Mr. Otto agreed that it was acceptable for the Commission to maintain this flexibility in their planning.

At the present time, the Pennsylvania Fish Commission is interested in the development of three (3) fishing and boating enhancement sites. These areas are Site No. A located below the dam structure which could develop into a good tailwater fishery if water quality continues to improve; Site No. B (loop area) which will provide the major boating access facility along with fishing enhancement development; and Site No. C located at the confluence of Little Mahoning Creek and Mahoning Creek, upstream from the proposed conservation pool which will be primarily a fishing access site. At the present time, the Commission is not in a position to consider development of any of the remaining five proposed sites. Area A and Area C will require additional stream biological surveys and study before their feasibility can be fully determined. Area B (loop area) will be developed principally for boating access and usage, and appears to be feasible based on current information. It is also expected that this facility will be the principal fishing usage area, both for shore and boat fishermen, and it is recommended that this site be given first priority for additional planning and development. It is also suggested that present preliminary plans for Sites A, B and C be revised so that initial Fish Commission and Federal development costs will not exceed $300,000. A suggested breakdown of these costs is Area A - $50,000; Area B - $210,000; and Area C - $40,000, with Areas A and C to be developed only when it is proven that water quality at these locations is acceptable, and resultant fishery benefits justify the development costs.

Once an adequate public access facility is developed, it is the Fish Commission's desire to limit all access activities to properly developed areas. This means that an existing launching ramp on the south side of the present summer pool could be closed and this hazardous situation eliminated.

I trust that this report will provide the information required from the Pennsylvania Fish Commission at this time. It has been a pleasure working with Mr. Kolesar and Mr. Otto of your staff, and I am looking forward to a continued joint effort to successfully develop this new recreational facility.

Sincerely yours,

Edward R. Miller, Director
Bureau of Fisheries and Engineering

ERM:dk

cc: R. W. Abele
C. E. Leising
W. F. Hobbs
A. D. Bradford
R. B. Hesser

OFFICE OF
EXECUTIVE DIRECTOR
TELEPHONE
AREA CODE 717 - 787-3633

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA GAME COMMISSION
P. O. BOX 1567
HARRISBURG, PA. 17120

September 13, 1974

ADMINISTRATIVE DIVISIONS:

ACCOUNTING	787-4492
ADMINISTRATION	787-5670
LICENSE SECTION	787-2084
PERSONNEL	787-7836
INFORMATION & EDUCATION	787-6286
LAW ENFORCEMENT	787-5743
LAND MANAGEMENT	787-6818
REAL ESTATE	787-6568
PROPAGATION	787-6711
RESEARCH	787-5529

Major Richard W. Wylie
Acting District Engineer
Pittsburgh District, Corps of Engineers
Federal Building, 1000 Liberty Avenue
Pittsburgh, Pennsylvania 15222

In re: Mahoning Creek Lake, Pa.; Draft Cost-Sharing Contract for Wildlife Development

Dear Major Wylie:

We discussed various changes in the draft copies of the contract and lease for Wildlife Development on Mahoning Creek Lake with your staff. They stated that our recommended changes listed in letter dated August 30, 1974, were acceptable to the Corps of Engineers.

Therefore, we concur with the terms of the contract and lease which includes our comments in the aforementioned letter and will costshare on this project at a 50 - 50 rate. Current cost estimate is $80,000 or $40,000 each.

Very truly yours,

Glenn L. Bowers
Executive Director

EXHIBIT F

Office of County Commissioners
of Jefferson County
Brookville, Pennsylvania
15825

TELEPHONE (814) 849-2328

COMMISSIONERS
JOHN R. CALDWELL, CHAIRMAN
BLAKE E. MEANS
SILAS A. WEAVER

CHIEF CLERK
MARGARET W. RICHARDS
SOLICITOR
DONALD J. DENNISON, ESQUIRE

September 21, 1973

Colonel N. G. Delbridge, District Engineer
U. S. Army Corps of Engineers
Pittsburgh District
Federal Building
1000 Liberty Avenue
Pittsburgh, Penna. 15222

Re: Mahoning Creek Lake, Penna.

Dear Colonel Delbridge:

The County Commissioners of Armstrong, Indiana, and Jefferson Counties met on Monday, September 17, 1973 to discuss the proposed project on Mahoning Creek as outlined by representatives from your office on September 13, 1973.

After much discussion of the proposed project, and the alternatives to the project, the respective Commissioners, at the present time, feel the proposed changes could definitely enhance the area in the recreational field. However, after careful consideration of the Counties economic conditions, we feel that the Counties involved could not financially share in the project without a more indepth study as to the financial feasibility of such a project.

Even with the formation of a Tri-County Authority, the respective Counties would be required to guarantee a bond issue prior to sale of the Bonds. This, it is felt, could not be done without seriously affecting the annual budgets of the three Counties.

It is recommended that the Corps of Engineers approach other avenue of funding on a local level such as the Pennsylvania Fish Commission and the Pennsylvania Game Commission as to the sources of a local sponsor.

EXHIBIT G

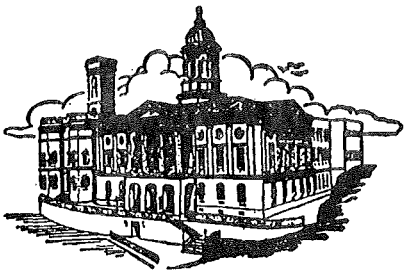
As to the project itself, you have our full endorsement and we offer any Planning and/or Technical assistance we may be able to provide.

Sincerely,

John R. Caldwell, Chairman
Jefferson County Commissioners

Grover Myers, Chairman
Armstrong County Commissioners

Andrew J. Kuzneski, Jr., Chairman
Indiana County Commissioners



COMMISSIONERS' OFFICE

ARMSTRONG COUNTY

KITTANNING, PA. 16201

November 20, 1974

Colonel N. G. Delbridge
District Engineer
Corps of Engineers, Pittsburgh District
Federal Building, 1000 Liberty Avenue
Pittsburgh, Pa. 15222

Dear Colonel Delbridge:

The Armstrong County Board of County Commissioners are currently in negotiation with the Department of Community Affairs for a supplemental recreation assistance grant to be applied as part of the local share for the Mahoning Creek Lake Development. To this point we have received no commitment from DCA on the amount of funding that might be available; because of this indecision at the present time, the County Commissioners wish to defer temporarily any additional commitment on the Project's continuation.

Sincerely,

ARMSTRONG COUNTY BOARD OF COMMISSIONERS

Grover Myers, Chairman

Dean P. Wyant, Secretary

Ott K. Heilman, Commissioner

EXHIBIT H

Indiana County Commissioners

ANDREW J. KUZNESKI, JR.
WILLIAM R. McMILLEN
JAY B. DILTS
COUNTY COMMISSIONERS

LYNN SHIELDS
CHIEF CLERK

Phone 465-2662

Indiana, Pennsylvania

PIERCE & DOUGLASS
SOLICITORS

463-0991

February 28, 1974

Col. N. G. Delbridge
District Engineer
U. S. Army Corps of Engineers
Federal Building
1000 Liberty Avenue
Pittsburgh, Pa. 15222

Dear Colonel Delbridge:

Please be advised that the Indiana County Parks and Recreation Commission has reviewed your last proposal regarding the Mahoning Creek Project. Their review and evaluation of the proposal has been based upon considerations to be taken into account, concerning the project as an independent one and considerations to be taken into account, concerning the project proposal in relation to our other County Park and Recreation developments.

The Big and Little Mahoning Creeks are situated in a unique and natural setting and under the management of the Pennsylvania Fish Commission they provide one of the best fishing facilities in Indiana County. The Parks and Recreation Commission believes that the developments proposed for the areas located within our county could possibly inhibit a valuable recreation activity that already exists. The Parks and Recreation Commission also believes the Mahoning Creek areas should be preserved in an indigenous setting for those who are willing to put forth a little extra initiative to enjoy the benefits of the area and the area should not become a general public use facility. Finally as an independent project the Parks and Recreation Commission recommends that we retain our position of (1) encouraging the maintenance of the Mahoning and Little Mahoning as free flowing streams for fishing purposes, (2) encouraging the preservation of the natural and wildlife qualities of those Corps lands located within the borders of Indiana County and (3) recommending that the Pennsylvania Fish Commission and the Pennsylvania Game Commission carry out their established policies and agreements concerning those Corps lands within Indiana County.

In relation to our four other County Park and Recreation areas, which are being developed for many diverse recreational activities, it seems to the Parks and Recreation Commission members that any consideration to be given to expanding the size of our system should concentrate on the thought of expanding the acreage of our existing areas.

EXHIBIT I

In addition, lack of sufficient funds has delayed very important capital improvements at existing sites and with the expected decrease in travel distance, we anticipate more response for using our parks by our county citizens. Therefore, it will be necessary to look more closely at priority improvements in the four existing areas before any other type of expansion could be considered.

At the present time, our system is understaffed and under-equipped; to accept a project such as the one proposed, would place a strain on our Parks and Recreation Commission that could not be withstood.

It has been a very difficult job in attempting to provide park and recreation facilities to meet the needs of our county citizens. Even though we have come a long way with regard to meeting some of their leisure time needs, a great deal more needs to be done. Keeping these things in mind we have accepted our Parks and Recreation Commission's recommendation as previously stated.

Sincerely yours,

Indiana County Commissioners

Andrew J. Kuzneski, Jr.

William R. McMillen

Jay B. Dilts

Office of County Commissioners
of Jefferson County
Brookville, Pennsylvania
15825

TELEPHONE (814) 849-2328

COMMISSIONERS
JOHN R. CALDWELL, CHAIRMAN
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CHIEF CLERK
MARGARET W. RICHARDS
SOLICITOR
DONALD J. DENNISON, ESQUIRE

March 13, 1974

Colonel N. G. Delbridge, District Engineer
U. S. Army Corps of Engineers
Pittsburgh District
Federal Building
1000 Liberty Avenue
Pittsburgh, Penna. 15222

Re: Mahoning Creek Lake Project

Dear Colonel Delbridge:

This letter is in response to a recent request by your office for a current statement by the Jefferson County Commissioners relative to participating in the Mahoning Creek Lake Project.

As you are aware, this office along with the County Planning Commission have attended several meetings with the Corps of Engineers, Indiana and Armstrong Counties, regarding this project.

We have indicated in the past that unless funding of the project can be overwhelmingly supported by the State and/or Federal grants, Jefferson County could not find it economically feasible to make the commitment.

Quite obviously, other points which have been considered are the minimal project acreage in our County and other pressing planning priorities which preclude any further commitments, other than in principle, at this time.

Should you wish to discuss this matter further, please feel free to contact my office at your convenience.

Respectfully yours,

JEFFERSON COUNTY COMMISSIONERS

John R. Caldwell, Chairman

EXHIBIT J

APPENDIX G

MASTER PLAN

MAHONING CREEK LAKE
ALLEGHENY RIVER BASIN, PENNSYLVANIA

HYDROLOGIC REVIEW

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EXHIBITS

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MASTER PLAN

MAHONING CREEK LAKE

ALLEGHENY RIVER BASIN, PENNSYLVANIA

HYDROLOGIC REVIEW

1. Introduction - The Mahoning Creek Reservoir, as authorized and constructed under the Flood Control Acts of 22 June 1936 and 28 June 1938, provides for control of floods by impoundment between a permanent pool elevation of 1075 and a full pool at elevation 1162. Hydrologic studies regarding the feasibility of maintaining a recreational summer pool level at elevation 1098 indicate there would be only a slight adverse effect on the flood control capability of Mahoning Creek Dam.

2. Existing Operations - Mahoning Creek Reservoir is presently operated for flood control only. During periods of low flow, the lake level normally fluctuates between elevations 1075 and 1080. When excess runoff occurs in the reservoir's basin, it is temporarily stored in the reservoir, to be released afterward at a rate sufficient to draw the lake level down to the normal range within 5 to 10 days without causing the recurrent downstream flooding. This procedure is followed throughout the year.

3. Outflow Facilities - The outlet works at Mahoning Creek Dam consist of three main conduits, each controlled by two (one service and one emergency) 5-foot 8-inch by 10-foot gates at invert elevation 1015, and two low-discharge conduits, regulated by 24-inch gate valves with invert elevations of 1021 and 1025. The gate valves are used to pass the normal summer low flow up to about 250 cubic feet per second, while the larger gates are used for higher discharges. Since these outlets are drawing water from the bottom of the reservoir, causing mixing throughout the reservoir, little or no stratification takes place.

4. Proposed Storage Allocation and Water Release Schedule - The proposed higher storage within the reservoir during the summer months would provide for the enhancement of the recreation and fishery potential of the project. A winter pool, elevation 1075 (4,480 acre-feet, 170 acres) and a summer conservation level 1098 (9,520 acre-feet, 280 acres) were selected as the minimum seasonal levels for recreation during normal operation of the project. Above these pools, a winter flood storage capacity of 3.84 inches of runoff and a summer flood storage capacity of 3.53 inches would be provided. PLATE 1 shows curves for pool area and capacity versus elevation.

5. A summer pool at elevation 1098 provides the greatest surface area with suitable depths for recreation with only a slight infringement on summer flood storage potential. Winter pool would remain at the present permanent pool level at elevation 1075, since the maximum flood storage potential is needed during this period and recreational usage would be minimal.

6. The proposed schedule for the modified storage plan provides for filling the lake from winter to summer pool levels during the month of May. PLATE 2 shows the storage and release schedule with the proposed summer pool elevation 1098. During this period, the rate of storage and release of water from Mahoning Creek Dam would be coordinated with the other Allegheny River basin reservoir outflows so that scheduled flows at Lock 4, Natrona, would not be jeopardized. This is the control station for operation of Kinzua Dam for low-flow augmentation. Since mean flow at Natrona is well over 10,000 c.f.s. for the month of May, and Kinzua Dam regulation is not critical beyond a controlled low flow of 7,000 c.f.s. at Natrona, the small amount of flow reduction by Mahoning Creek Dam would not adversely affect downstream schedules in May during the period when the lake would be filled to elevation 1098. The normal inflow would be passed in the same manner as at present, from June through early September; therefore, there would be no change in downstream effects from Mahoning Creek Dam operations during this period. Kinzua Dam would continue to operate to maintain flow and quality schedules at Natrona. It is during the drawdown in September and October that releases from Mahoning Creek Lake could provide some incidental low-flow augmentation and quality benefits, as stream flow in the Ohio River system is often low during these months and the relatively good quality of Mahoning Creek water would be of use in counterbalancing the poor quality water from the Kiskiminetas River.

7. The proposed impoundment to elevation 1098 would take place during May, when the normal lake inflow is 721 c.f.s. The 5,040 acre-feet of storage necessary to raise the pool to this level during this month would require an average excess of inflow over outflow of 81 c.f.s. The lowest mean inflow of record for May was 218 c.f.s. The probability of raising the pool to elevation 1098 by the end of May is thus virtually 100 percent. The normal minimum flow of 30 c.f.s. will be maintained in Mahoning Creek below the dam during the impoundment period.

8. In the period from June through the first week in September, the pool would fluctuate between elevations 1098 and 1101, with an average elevation of about 1099. No change in the present flow release schedule would be necessary, as the inflow would be passed to hold the pool within the three-foot range, except during periods of excessive runoff.

Damsite flow has been known to reach as low as 10 c.f.s. at times during this summer recreation period with many monthly flows ranging from 282 c.f.s. in June to 8 c.f.s. in September. During the drawdown period of September and October, the normal flow of 115 c.f.s. could be augmented by at least 40 c.f.s., resulting in a total average release of 155 c.f.s., or about 135 percent of normal. The actual rate of drawdown, however, may vary so that the most advantageous downstream flow pattern can be provided. If early September river flows are above normal, higher rates of outflow and drawdown may be delayed until later in the scheduled period.

9. Sedimentation - The field measurements of sediment in Mahoning Creek Lake have been made. The first was in 1948 and the second in 1965. The total accumulation of sediment in the lake for the 24-year period, 1941-1965, was 1,400 acre-feet, or 1.89 percent of gross storage. This amounts to an average annual accumulation of 58.3 acre-feet. At this rate the total accumulation by 1973 would have been about 1,900 acre-feet.

10. The highest level at which sediment was observed during the 1965 survey was elevation 1153, or nine feet below full pool elevation 1162. However, approximately 60 percent of the sediment deposit was below minimum pool elevation 1075. Although no determination was made regarding the seasonal variation in rate of sedimentation in Mahoning Creek Lake, it is reasonable to assume that the great majority of this sedimentation occurs between October and May, when surface runoff is greatest and there is little or no vegetation to impede soil erosion. Therefore, the summer pool level of 1098 from May to October should have very little effect on the sediment distribution or rate.

11. Frequency of Reservoir Storage Magnitude - A partial duration series frequency curve of the magnitude of separate reservoir storage events has been developed for the proposed impoundment schedule using streamflow records before the dam was built (1917-1941) and inflow computations since construction. Consequently, all events were considered for the 55-year period from July 1917 through June 1972. A review of these reservoir storage and release routings indicates that the March 1964 flood would have imposed the most critical storage condition for the entire period of record at the damsite. Plotting positions for the frequency curve development were computed according to "Statistical Methods in Hydrology, October 1962, ER 1110-2-1450". The maximum water surface elevation attained for the standard project flood was assumed to have a recurrence interval of 500 years. PLATE 3 presents the lake storage frequency curve with the proposed summer pool at elevation 1098, designated as Curve A. The storage frequency for the present permanent pool at elevation 1075 is designated as Curve B. Curve C shows the storage frequency for the period from May through October with the summer pool, and Curve D shows the storage frequency for May through October for present conditions.

12. The proposed change in summer pool level would have a small detrimental effect on the reservoir potential for storage and modification of a major summer flood. A review of reservoir storage showed that the maximum pool elevation reached during the period May through October was 1160.2 on 27 June 1972.

13. An investigation of streamflow records at the damsite prior to construction (1917-1941) showed that only two summer storm periods, one in May 1933 and the other in September 1926, would have resulted in storage over two inches. The May 1933 period of storage would have been from 8 to 17 May with a series of multiple peak inflows, and 2.99 inches of runoff would have been stored. In September 1926, storage from inflow from the 4th to the 8th would have amounted to 2.42 inches of runoff.

14. Flood Routing - The Muskingum method of flood routing was used with studies of flood wave movement to obtain the effect of storage by the Mahoning Creek Dam on downstream damage points. Flood reductions with the lake level held at the higher summer recreational elevation 1098 would be exactly the same as reductions under the present conditions, provided the outflow during flood storage periods remained the same.

15. Inflow and outflow hydrographs for the March 1936, March 1964, and June 1972 floods are presented in PLATES 4, 5 and 6, respectively. PLATES 7 through 15 show the effect of Mahoning Creek Dam on stages at the Kittanning, Natrona and Pittsburgh damage points.

16. Flood Frequency - Downstream flood frequencies would not be altered by the raising of the summer pool level if no deviation from present methods of flood operations takes place. Stage frequency curves for Kittanning, Natrona and Pittsburgh, Pennsylvania, are shown on PLATES 16, 17 and 18. These plates present the natural frequency, the frequency reduced by Mahoning Creek Dam operating alone, and the frequency reduced by all existing reservoirs.

17. Reservoir Design Flood - There were no computations made of a reservoir design flood during the design of Mahoning Creek Dam. The flood control capacity of Mahoning Creek Lake is 3.84 inches of storage. The reservoir design flood is defined as that flood which a reservoir is designed to control under the adopted method for normal operation during the life of the project. The March 1936 storm produced the highest flood of record at the damsite. This flood occurred at the end of a cold winter season with high runoff augmented by snowmelt. It had a total runoff of 3.20 inches from the drainage area above the damsite and produced maximum stages of record along the lower Allegheny and upper Ohio Rivers. Storage of flood inflow would have resulted in a maximum lake elevation of 1159.2, about 91 percent of total available storage. Graphs of lake inflow, storage and release are presented on PLATE 4. Since this flood occurred in March, when the higher summer pool level would not be in effect, no difference in storage would have resulted.

18. In March 1964, rain and snowmelt occurring on the 4th-5th and 8th-10th caused Mahoning Creek Lake to rise to elevation 1161.32 on the 11th. This was the highest of record since storage began at the dam in 1941, and represents about 98 percent of the flood control storage. No difference in storage for this flood would result as the higher summer pool level would not be in effect during the winter season. This flood could be considered as the reservoir design flood.

19. June 1972 Storm and Flood - The flood of June 1972 was the result of a tropical storm designated as "Agnes", which struck the Gulf Coast on 19 June. On 20 June, while "Agnes" was situated over Georgia, moist Atlantic air carried by the counterclockwise circulation flowed over Pennsylvania and Virginia, bringing widespread rainfall. At the same time, a north-south cold front was approaching the Pittsburgh District.

20. Rainfall began over the Mahoning Creek watershed about 1:00 p.m. on 20 June. By midnight, a total of 1.15 inches had fallen over the basin. By the morning of 21 June, "Agnes" had moved into North Carolina, and the resultant Atlantic moisture precipitated in a band from northwestern Pennsylvania to southern Virginia. Rainfall continued throughout most of the Pittsburgh District on 21 June as "Agnes" moved northward along the Atlantic coast with continued westerly circulation. By the morning of 22 June, an additional 0.55 inch of rain had fallen over the reservoir watershed. During the 22nd, "Agnes" continued her northerly course along the New Jersey shore. The rain increased substantially in intensity over most of the Pittsburgh District near noon and continued at a high rate until the morning of the 23rd. "Agnes" had moved westwardly during the night and was now centered over northwestern Pennsylvania.

21. From the beginning of the rainfall to 7:00 a.m. on 22 June, the Mahoning Creek Lake level had risen from elevation 1077 to elevation 1082. From 7:00 a.m. on the 22nd to 7:00 a.m. on the 23rd, a total of 2.66 inches of rain fell over the reservoir watershed. The pool began to rise rapidly late on the 22nd, reaching a rate of rise of over two feet per hour early on the 23rd. The heavy rainfall ended about 8:00 a.m. on the 23rd, but the pool continued to rise throughout the 23rd and 24th. At noon on 24 June, after the Ohio River at Pittsburgh had crested at 35.8 feet, post-flood release was initiated at Mahoning Dam. By this time the reservoir pool was at elevation 1151 and rising about 0.5 foot per hour. The outflow was increased to 5,400 c.f.s. by noon on 25 June, but the pool continued to rise. At 7:00 p.m. on 26 June the outflow was cut sharply, as additional rain had fallen in the Allegheny River basin and recurrent downstream flooding was feared. At 9:00 a.m. on 27 June, the reservoir pool peaked at elevation 1160.2, only 1.8 feet below full pool. This represents about 94 percent of net flood control storage.

22. Had the pool been maintained in the elevation 1098 to 1101 range prior to this flood, it would have reached a maximum elevation of 1161.95, or 0.05 foot below full pool. The peak inflow of 22,400 c.f.s. which occurred on 23 June 1972 was, by far, the maximum inflow over the lake area during May through October for the entire 55-year period of record. Since operation of the dam was initiated, the greatest previous summer inflow had been 10,800 c.f.s. in May 1953. This occurred with the pool at elevation 1090 and resulted in only 1.4 inches of storage, causing the pool level to rise to elevation 1129.

23. Transposed June 1972 Storm and Flood - During the period of 20-26 June 1972, about seven inches of rain fell over the Mahoning Creek Lake basin. About 50 miles south-southwest of the basin, over 12 inches of rainfall occurred in a localized cell, with totals dropping off to seven inches within 5 to 15 miles. Transposing this rainfall over the Mahoning Creek Lake basin results in an average rainfall over the basin of 8.44 inches. The peak inflow would have been 29,100 c.f.s., about 30 percent higher than the actual inflow. It would have been possible to contain this flood below full pool without opening the crest gates of the dam. Using the surcharge storage curves on PLATES 19 and 20 and starting at minimum pool, elevation 1075, the peak pool elevation for the transposed storm would have been 1160.20. The peak outflow would have been 8,200 c.f.s. Starting at proposed summer pool elevation 1098, the peak pool elevation and outflow would have been the same, as the surcharge schedule would have dictated an earlier opening to the maximum setting of two sluice gates open fully. PLATE 21 shows the inflow, outflow and pool elevation curves for the transposed June 1972 flood both with and without the summer recreation pool.

24. Standard Project Flood - The standard project flood is defined as one which would be exceeded to magnitude only on rare occasions. It establishes a standard for design of structures that would provide a high degree of flood protection without regard to economic or other practical limitation. The standard project flood, however, is substantially less than the probable maximum flood.

25. The standard project flood for Mahoning Creek Lake was developed in the manner set forth in Civil Engineer Bulletin No. 52-8, Office of the Chief of Engineers, dated 26 March 1952, subject "Standard Project Flood Determinations". The lake level was assumed to be at elevation 1098 at the onset of the flood. This flood, with a peak inflow of 63,200 c.f.s., when routed through the reservoir and discharging according to the surcharge curves on PLATES 19 and 20, would have an outflow of 34,400 c.f.s., and a maximum water surface at elevation 1167.6. PLATE 22 presents the reservoir inflow hydrograph, the natural and outflow hydrographs, and pool elevation for the standard project flood. Also shown is the outflow hydrograph and pool elevation for present conditions with the permanent pool near elevation 1075 at the beginning of the storm. The use of the higher summer pool would have increased the maximum pool elevation by 0.6 foot and the outflow by 400 c.f.s.

26. Spillway Design Flood - Flood computations used in the design of the Mahoning Dam spillway were made in 1938, prior to its construction. The reservoir was assumed to be at full pool elevation 1162 at flood inception. The maximum level reached during storage was elevation 1172, with a peak inflow of 144,000 c.f.s. and a peak outflow of 120,000 c.f.s. This is shown on PLATE 23.

27. The spillway design flood has been redetermined with present criteria. The theoretical maximum rainfall values used for this recomputed flood were obtained from Hydrometeorological Report No. 33, "Seasonal Variation of Probable Maximum Precipitation East of the 105th Meridian . . .", prepared by the Hydrometeorological Section of the U. S. Weather Bureau. These estimates represent the limiting precipitation rates during three types of storms that would result in the most severe flooding in the Pittsburgh District. These three types were previously designated in Hydrometeorological Report No. 2, "Maximum Possible Precipitation, Ohio River Basin above Pittsburgh", as Types I, IV and V. They are, respectively, a winter-spring storm accompanied by snowmelt, a decadent tropical storm occurring in late summer or early autumn, and a summer convectional storm.

28. The computed spillway design flood, Type V, was found to be the most critical. With the reservoir at elevation 1122.1 (equivalent to midway in storage between proposed summer pool elevation 1098 and spillway crest elevation 1135) at storm inception, the maximum level reached was elevation 1169.7. The peak inflow was 120,600 c.f.s. and the maximum outflow was 102,800 c.f.s. With the present summer level at 1075, the pool level at the beginning of the design storm would be at elevation 1118.2, equivalent to midway in storage between elevation 1075 and spillway crest elevation 1135. The peak outflow rate using the proposed summer pool would increase the pool elevation by 0.2 foot and the outflow by 500 c.f.s. Reservoir outflows were determined by means of the surcharge storage curves in PLATES 19 and 20. PLATE 24 shows the inflow, natural and outflow hydrographs and the pool elevation for the spillway design flood with the proposed summer pool. Also shown on PLATE 24 are the outflow hydrograph and pool elevation that would occur under present operating conditions with the permanent pool at elevation 1075. Maximum values for both conditions are lower than those originally determined for structure design.

29. Storage Loss Alternative - Since Mahoning Creek Lake would have only 3.53 inches of flood control capacity above the proposed summer pool elevation of 1098, the outflow could be increased by 500 c.f.s. during flood storage periods to compensate for the loss of 5,000 acre-feet of capacity. The normal storage period during a flood event is about five days. The 500 c.f.s. increased release would evacuate

5,000 acre-feet in the five-day period. Downstream flood stages would be increased by about 1/2 inch with the release of an additional 500 c.f.s. from the dam. Flood control benefits in the Kittanning, New Kensington and Pittsburgh damage reaches would have been reduced by an estimated average of $25,500 per year during the 32-year period of record, 1941-1972. However, it is recommended that no increase be made to the outflow during flood storage periods since the change in the filling frequency is minimal.

30. Water Quality - Water samples have been taken from Mahoning Creek Lake outflow twice monthly since August 1952. The temperature of the water is taken at the time the sammples are collected. Samples are analyzed by the District Water Quality Laboratory of the Hydrologic Engineering Branch for pH, free CO_2 and HCO_3 alkalinity, turbidity and hardness.

31. Water quality tests for Mahoning Creek Lake outflow show that the pH is practically always between 6.0 and 7.0. Total acidity as $CaCO_3$ is usually less than 10 parts per million. The maximum hardness is about 50 parts per million. Because of the good quality of Mahoning Creek water, routine increases in outflow are sometimes timed so as to reach the lower portions of the Allegheny River coincident with increased Kiskiminetas River flows, thereby serving as a slight dilutant to the river.

32. Recreation Season Weather - Wind data are available from the National Weather Record Center for Pittsburgh, Pennsylvania, about 50 miles southwest of Mahoning Creek Dam. This is the nearest National Weather Service Station with applicable wind records. Records cover the 21-year period of 1945 through 1965. These records indicate the average wind velocity during the summer months is about seven miles per hour. The maximum sustained velocity along the dominant axis of the reservoir paralleling the shore from the west during the recreation season is about 60 miles per hour. Winds of this magnitude on Mahoning Creek Lake would generate waves from 1.5 to 2.0 feet in height. More frequent short-duration winds, which might be experienced every year, have velocities of about 40 miles per hour. Waves from such winds would be about one foot in height. An occasional wave could attain a height 50 to 60 percent greater.

33. EXHIBIT I shows the wind roses for Pittsburgh for the months of May through October. These wind roses indicate the percent of time that winds in this general area have occurred from the various directions as defined by the 16 compass points. They show the percent of time that the lake would be calm, with winds from zero to three miles per hour; the percent of time the wind would be within the three-to-ten mile per hour range and lake recreation could be safely conducted; and the percent of time with winds greater than 10 miles per hour. These wind roses should provide a guide for boating on the lake and activities along the shore.

34. EXHIBIT 2 presents average temperatures for the period from May through November and the amount of daytime sunshine and cloudiness that the vacationer may normally expect during the recreation season at Mahoning Creek Lake. The top graph shows, in half-month periods, the average afternoon or maximum temperatures, the mean daily temperatures, and the average dawn or minimum temperatures. These temperatures are critical to campers and the early morning anglers. The second graph on this exhibit shows the average percent of daytime sunshine and cloudiness from May through November.

35. EXHIBIT 3 shows average precipitation conditions that may be expected from May to November. The graph at the top shows the average number of days per month that 0.1 inch or more precipitation may be expected monthly from May through November. Except for October and November, rainfall during the recreation season generally occurs as thundershowers. Most rainfall in the summer season only temporarily interferes with recreation.

36. EXHIBIT 4 shows the average pool elevations for June through November which would have existed during the period from 1941 through 1970, had the pool been held between elevations 1098 and 1101 during the recreation season. Since no water is released for low-flow augmentation, the pool should not fall below the scheduled minimum level except during rare occasions of extreme drought conditions.

37. The median pool elevation for the recreation season with the proposed summer pool would be 1099.6. At this elevation, reservoir storage is 9,980 acre-feet and the surface area is 300 acres. EXHIBIT 5 shows duration curves for pool elevations with and without the summer pool.