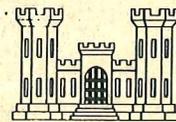


# Woodcock Creek Lake

## Master Plan



**Design Memorandum No.8**



**U.S. Army Corps of Engineers  
Pittsburgh District**

ORDPD-R (25 Jul 75) 3d Ind  
SUBJECT: Transmittal of Master Plan for Woodcock Creek Lake, Design  
Memorandum No. 8, French Creek Basin, Pennsylvania

DA, Ohio River Division, Corps of Engineers, P.O. Box 1159, Cincinnati,  
Ohio 45201 10 December 1975

TO: District Engineer, Pittsburgh, ATTN: ORPED-PL

Referred for appropriate action.

FOR THE DIVISION ENGINEER:



DONALD T. WILLIAMS  
Chief, Planning Division

1 Incl  
nc

*See notes on attached sheet*

DAEN-CWO-R (25 Jul 75) 2nd Ind.

SUBJECT: Transmittal of Master Plan for Woodcock Creek Lake, Design  
Memorandum No. 8. French Creek Basin, Pennsylvania

DA, Office of the Chief of Engineers, Washington, D.C. 20314 3 Dec 75

TO: Division Engineer, Ohio River  
ATTN: Chief, Planning Division

Subject Master Plan for Woodcock Creek Lake is approved subject to the following:

a. Page 5-27, paragraph 5.1.7. Sewage System. The estimated amount of Federal cost, including the annual share in the treatment plant cost, required for connecting into the Saegertown Regional Sewage System should be expressed and compared with the total cost to the Federal Government (first cost plus operation and maintenance) for treatment on Federal land before a final decision is made for disposing of waste materials.

b. The formal inclusion of Plates 3 thru 12 is considered repetitious and should have been combined and presented in fewer plates (i.e., recreation, wildlife, forest management, etc.). The combined analysis of the information presented would have been most adequate and more useful.

FOR THE CHIEF OF ENGINEERS:

1 Incl.  
wd two cys.

  
MARVIN W. REES  
Colonel, Corps of Engineers  
Executive Director of Civil Works

*See notes on attached sheet*

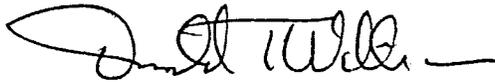
ORDDP-R (25 Jul 75) 1st Ind  
SUBJECT: Woodcock Creek Lake, French Creek Basin, Pennsylvania;  
Design Memorandum No. 8, Master Plan

DA, Ohio River Division, Corps of Engineers, P.O. Box 1159, Cincinnati,  
OH 45201 19 August 1975

TO: HQDA (DAEN-CWP-V) WASH DC 20314

Approval is recommended.

FOR THE DIVISION ENGINEER:



DONALD T. WILLIAMS  
Chief, Planning Division

1 Incl  
wd 2 cy

*See notes on attached sheet*



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

ORPED-PL

25 July 1975

SUBJECT: Woodcock Creek Lake, French Creek Basin, Pennsylvania; Design  
Memorandum No. 8, Master Plan

Division Engineer, Ohio River  
ATTN: ORDPD-R

Seven (7) copies of the Master Plan for Woodcock Creek Lake are submitted herewith for review and approval. This Master Plan has been prepared in accordance with ER 1120-2-400 and other applicable regulations and manuals.

1 Incl (7cys)  
as

  
RICHARD W. WYLIE  
Major, Corps of Engineers  
Acting District Engineer

PER  
DC  
EWT  
JSM  
RW

WOODCOCK CREEK LAKE  
French Creek Basin, Pennsylvania

MASTER PLAN  
Design Memorandum No. 8

<u>PREVIOUSLY ISSUED DESIGN MEMORANDA</u>	<u>SUBMITTED</u>	<u>APPROVED</u>
Review of Reports on French Creek Basin, Pa.	1 Sep 60	23 Oct 62
1. General Design	5 Aug 66	19 Jan 67
2. Feature Design Memorandum - Highway Relocations	3 Feb 67	19 Apr 67
3. Preliminary Master Plan - Part of the Master Plan	3 Feb 67	17 Apr 67
3-A - Section C1 - Operation and Rec- reation Areas near Structure	13 Jul 67	29 Nov 67
Section C2 - Colonel Crawford Recreation Area	14 Dec 67	18 Sep 68
Supplement No. 1 - Total Beautification Program	15 Dec 69	28 Apr 70
4. Real Estate		
Part I - Dam Site and All Lands Within the Project Area	11 Aug 67	5 Dec 67
Part II - Land for Radio Communications Facilities	19 Jun 68	10 Sep 68
5. Sources of Concrete Aggregate	23 Feb 68	21 Mar 68
6. Feature Design Memorandum - Relocation of Power & Communication Distribution Lines	20 Nov 69	9 Mar 70

	<u>SUBMITTED</u>	<u>APPROVED</u>
7. Dam, Spillway and Outlet Works	30 Jan 70	28 May 70
Supplement No. 1 - Review Conference	22 Apr 70	28 May 70

CURRENTLY SCHEDULED DESIGN MEMORANDA

TO BE SUBMITTED

NONE

THE CONTENTS OF THIS REPORT ARE NOT TO BE USED FOR  
ADVERTISING, PUBLICATION OR PROMOTIONAL PURPOSES

U. S. Army Engineer District, Pittsburgh  
Corps of Engineers  
Pittsburgh, Pennsylvania 15222

WOODCOCK CREEK LAKE  
FRENCH CREEK BASIN, PENNSYLVANIA  
DESIGN MEMORANDUM NO. 8

MASTER PLAN

Prepared by  
Fahringer, McCarty, Grey, Inc.  
Monroeville, Pennsylvania  
(Contract No. DACW59-73-C-0073)

Prepared for  
Department of the Army  
Pittsburgh District, Corps of Engineers  
Pittsburgh, Pennsylvania

July 1975

WOODCOCK CREEK LAKE  
FRENCH CREEK BASIN, PENNSYLVANIA

DESIGN MEMORANDUM NO. 8  
MASTER PLAN

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EXHIBITS

<u>Letter</u>	<u>Description</u>
A	LETTER - Letter from the Crawford Historical Society to the A/E reporting the results of a project investigation of historical sites. Two sites of local historical significance are located and described and tentative recommendations are made for interpretive activities within the project. Letter dated 2 April 1973.
B	LETTER - Letter from Carnegie Museum to the A/E and copy of a report on the results of a September 1964 archeological field investigation of the project. Very little of archeological significance was found. Letter dated 21 February 1973.
C	LETTERS - Letters from the chairman of the Crawford County Commissioners to the Director of the Pennsylvania Fish Commission

TABLE OF CONTENTS (cont.)

EXHIBITS (cont.)

<u>Letter</u>	<u>Description</u>
C (cont.)	expressing the county's desire that power boating on Woodcock Creek Lake be restricted to boats with motors of 10 horsepower or less. The request is also made to prohibit water-skiing altogether. It is further stated that if, after an appropriate trial operation period, these restrictions fail to create the desired results, more stringent lake regulations may be requested. Letters dated 4 April 1974.
D	LETTER - Letter to the chairman of the Crawford County Commissioners from the Pittsburgh District office confirming the results of the 6 April 1972 meeting with the Commissioners, the Saegertown Sanitation Authority and the Corps of Engineers. It was confirmed that, because of "timing, sewage authority limitations and economics," a separate treatment plant was to be constructed within the project for the Colonel Crawford Recreation Area. Letter dated 20 April 1972.
E	LETTER - Letter to Pennsylvania's Department of Environmental Resources, Bureau of Water Quality Management from the Pittsburgh District office in response to this agency's 15 January 1973 inquiry about Woodcock Creek Lake's proposed sewage system. It is indicated that the Corps' established policy is to be aware of and to meet all reasonable state standards. It further states the Corps policy "to connect to regional sewerage systems when feasible" and that the Pittsburgh District office is "committed to this course at the Woodcock project site." Letter dated 7 February 1973.
F	LETTER - Letter to the United States Environmental Protection Agency from the Pittsburgh District office in response to EPA's sewage treatment facilities recommendations. The Corps states that it "is committed to tie in to the regional sewage system when the interceptor is available and a tie-in is feasible." Letter dated 7 March 1973.

TABLE OF CONTENTS (cont.)

EXHIBITS (cont.)

<u>Letter</u>	<u>Description</u>
G	LETTER - Letter to the A/E from an Allegheny College (Meadville, Pennsylvania) hydrogeologist and geologist describing the expected wind and wave action of Woodcock Creek Lake. Letter dated 10 July 1973.
H	LETTER - Letter from the Public Health Service of the Department of Health, Education and Welfare to the Pittsburgh District office, citing the French Creek Basin need for water storage and streamflow regulation for quality control purposes. Based on the projected year 2010 population of Meadville, it will be necessary to maintain an estimated water quality control flow of 75 cfs in French Creek. Letter dated 27 June 1963.

APPENDIXES

<u>Letter</u>	<u>Title</u>
A	Project Resource Management Plan*
B	Forest Management Plan*
C	Fire Protection Plan*
D	Fish and Wildlife Management Plan*
E	Project Safety Plan*
F	Recreation Visitation Methodology
G	Recreation Development Costs

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

WOODCOCK CREEK LAKE  
FRENCH CREEK BASIN, PENNSYLVANIA

13 10 94  
Acres  
DESIGN MEMORANDUM NO. 8  
MASTER PLAN  
revised to catch

SECTION 1.0 - INTRODUCTION

1.1 PROJECT PURPOSE. As presently authorized, the overall purpose of the Woodcock Creek Lake project is three-fold--to reduce downstream flooding, to improve downstream water quality and to provide a diversified array of general outdoor recreation opportunity. Additional incidental recreation opportunity will also accrue through the project's fish and wildlife communities. A discussion of each project purpose and its respective benefits as of July 1974 is presented in the following paragraphs.

1.1.1 Flood Control. It is anticipated that the impoundment and control of Woodcock Creek will result in downstream flood control benefits amounting to approximately \$750,000 per year.

1.1.2 Recreation. Annual recreation and incidental fish and wildlife benefits derived through the construction of the Woodcock Creek Lake project have been estimated at \$770,000.

1.1.3 Water Quality Control. It is estimated that the downstream water quality control benefits of this project will amount to approximately \$166,000 per annum.

1.1.4 Comparison of Benefits and Costs. Based on the above July 1974 figures, the total annual benefits of the Woodcock Creek Lake project are estimated at \$1,687,000. Using the authorization interest rate of 3-1/8 percent, the annual project costs are estimated at \$1,186,000. The benefit/cost ratio for the project thus becomes 1.4:1.

1.2 PROJECT AUTHORIZATION.

1.2.1 Authorizing Law. Woodcock Creek Lake is one of three flood control projects included in the authorized French Creek flood control system. This system, including Muddy Creek and Union City Dams, replaces the previously authorized French Creek Reservoir near Cambridge Springs. Authorization

for these three projects is contained in Section 203, Title II - Flood Control, of the Omnibus Rivers and Harbors and Flood Control Act of 1962, House of Representatives, 87th Congress, Second Session, Report Number 2557, approved 23 October 1962. As originally designed and authorized, the Woodcock Creek Lake project was to be a dual-purpose, flood control and recreational project. However, subsequent investigations revealed that it would be both feasible and desirable to modify this project. A chronology of these post-authorization project modifications is presented in Paragraph 1.2.2.

1.2.2 Project Document. The three project French Creek Basin project document is Senate Document No. 95, 87th Congress, Second Session. Design Memorandum No. 1, General Design, for the Woodcock Creek Lake project was based on this document; however, as detailed in Design Memorandum No. 1, substantive revisions stemming from post-authorization changes have altered the original project concept. Post-authorization investigations revealed the desirability of adding a water quality control function to the Woodcock Creek project. (See H. E. W. letters, Exhibit 3, Design Memorandum No. 1). This project revision necessitated the modification of the dam design to facilitate 5.7 feet of additional water storage and also required the acquisition of additional project lands. This post-authorization change was approved by the Office of Management and Budget (OMB) on 27 November 1970. As a result of this initial post-authorization modification, the maximum summer pool area was increased from 103 acres to 325 acres and subsequently through minor changes to 333 acres. This enlarged recreational potential precipitated a re-evaluation of the proposed recreational development around the lake and a re-estimation of public visitation. As a result of this re-investigation (Design Memorandum No. 3, Preliminary Master Plan, Part of the Master Plan, February 1967), the planned recreational development was considerably expanded in accordance with the new visitation estimates (i.e., the initial visitation increased from 80,000 to 500,000 annually and the ultimate visitation estimate increased from 206,000 to 1,000,000 and subsequently decreased to 900,000 annually). This project modification was approved by OMB as a post-authorization change on 24 February 1972.

1.2.3 Requirements for Local Cooperation. As stated in the General Design Memorandum:

"Local cooperation involved under project authorization consists of local interests informing affected interests in the French Creek Basin at least annually, in a manner satisfactory to the District Engineer, that the system of reservoirs of which Woodcock Creek Reservoir is a part, will not provide protection against maximum floods."

The Commonwealth of Pennsylvania has agreed to assume this responsibility for Woodcock Creek Lake. The Crawford County Commissioners have expressed an interest in leasing and operating the project's recreation facilities under the terms set forth by the Federal Government. The County has operated and maintained Colonel Crawford Park including the Stainbrook Recreation Area since 24 May 1974.

1.2.4 Application of Public Law 89-72. As detailed in Paragraph 3 of the 5th Indorsement to Section C2 of Design Memorandum 3A and in conformance with ER 1120-2-404:

". . . . this project is a Category 'C' project, as determined by the Office of Chief of Engineers in their letter of 28 April 1969, subject: "Status of Authorized Reservoir Projects Regarding Cost-Sharing Requirements in Recreation" and therefore development of future recreation will be in accordance with authorizing legislation, which, in this case, requires all development of future recreation to be the responsibility of local interests. Accordingly . . . the County is to be advised that the development of future recreation facilities is the responsibility of local interest and is not eligible for cost sharing under Public Law 89-72."

Thus, in conformance with the above, all initial recreational development costs have been or will be borne by the Federal Government. As presently envisioned, future expenditures for recreational development will be the sole responsibility of Crawford County. However, this requirement will not preclude the county's application to the Commonwealth of Pennsylvania or to Federal agencies other than the Department of the Army for future development funding. Nor will it preclude cost sharing for future development with the Department of the Army should future policy changes or interpretations allow such action.

1.3 PRIOR PERTINENT REPORTS. There are a series of previously published reports concerning the Woodcock Creek Lake project that are particularly pertinent to this Master Plan. The following paragraphs describe the significance of each of these publications and their relationship to the development of the project area.

1.3.1 Design Memorandum No. 3, Preliminary Master Plan - Part of the Master Plan. The preliminary Master Plan was prepared in accordance with EM 1130-2-302 to guide the development, use and treatment of the project's land and water areas with the specific purpose of determining the amount and location of lands to be purchased or set aside for public recreation. This D.M. was submitted on 3 February 1967 and was approved on 19 April 1967.

1.3.2 Design Memorandum No. 3A - Part of the Master Plan, Section C1 - Operation and Recreation Areas Near Structure. This section of D. M. 3A presented the proposed recreation and beautification developments in areas that were immediately affected by construction of the Woodcock Dam and relocated State Route 198. This section of D. M. 3A covers the dam operation area, the public overlook area, the beautification of these two areas and the dam, the Woodcock Recreation Area (presently the Stainbrook Recreation Area) and the proposed boat launching area along the south shore of Woodcock Creek Lake near the mouth of the spillway. This section of D. M. 3A was submitted on 13 July 1967 and was approved on 29 November 1967.

1.3.3 Design Memorandum No. 3A - Part of the Master Plan, Section C2 - Colonel Crawford Recreation Area. This portion of D. M. 3A was prepared to present the remaining recreational facilities that were proposed for initial development within the Colonel Crawford Recreation Area (presently the main part of Colonel Crawford Park) along the southern shoreline of Woodcock Creek Lake. The development proposed in this document resulted largely from the expanded recreation potential of the enlarged summer recreation pool. This report was submitted on 14 December 1967 and was approved on 18 September 1968.

1.3.4 Design Memorandum No. 3A - Part of the Master Plan, Section C2 - Colonel Crawford Recreation Area, Supplement No. 1, Total Beautification Program. This supplement presented the beautification program (i.e., erosion control, grading, tree planting, reforestation and seeding) for the remainder of the initial recreation development not covered previously in Section C-1 for the Woodcock Creek Lake project. This program was submitted on 15 December 1969 and was approved on 28 April 1970.

1.3.5 Design Memorandum No. 4 - Real Estate. Part I of this D. M. provided detailed information on the land requirements for the Woodcock Creek Lake project and evaluated the acquisition costs of these various parcels. This portion of D. M. 4 was submitted on 11 August 1967 and approved on 5 December 1967. Part II of this D. M. presented detailed information on the real estate requirements for providing radio communications between the Woodcock Creek Lake project and the Pittsburgh District office. Part II was submitted on 19 June 1968 and approved on 10 September 1968.

#### 1.4 PURPOSE AND SCOPE OF THE MASTER PLAN.

1.4.1 Purpose. This Master Plan has been prepared with two purposes in mind. The first of these has been to develop environmentally sound, long-

range guidelines for the optimum development, use and management of the natural and man-made resources of the Woodcock Creek Lake project. The second purpose has been to present more specific guidance in the form of site plans, cost estimates and approximate construction schedules for the development of additional future recreation facilities within the project boundaries.

1.4.2 Scope. To accomplish the above purposes, the following three planning devices have been prepared as part of the Master Plan.

1.4.2.1 A Comprehensive Land Use Plan. On the basis of a careful analysis of the project's physical resources, a comprehensive land use plan was prepared that identifies those areas within the project that are environmentally best suited for outdoor recreation, forest management, wildlife management and fishery management. Because sizable portions of the project had already been committed to specific uses prior to the preparation of this land use analysis (i.e., those development areas detailed in Design Memorandum No. 3), these areas were generally investigated in less detail than the remainder of the project lands.

1.4.2.2 Management Plans and Guidelines. For each of the land and water uses designated in the land use plan, long-range management policy and guidelines have been developed. More detailed management plans will be prepared in the future for those land use areas identified as forest, wildlife and fishery management areas. These plans will be prepared in coordination with appropriate state and federal agencies and, when completed, will become appendix elements of this Master Plan.

1.4.2.3 A Recreation Master Plan. A comprehensive analysis has been made of not only those project areas identified in the land use plan as being best suited for recreation, but also those sites that already have or are being developed for this purpose. On the basis of this investigation, a comprehensive recreation development plan has been prepared. This plan consists of analysis and estimation of the existing and projected recreation demand, preliminary site plans, cost estimates and an approximate construction schedule for future development.

1.5 COORDINATION. In accordance with the requirements of ER 1120-2-400, coordination has been maintained with appropriate federal, state and local governmental agencies; county and local planning bodies; local interest groups; and interested individuals and institutions. While a great deal of this activity occurred during the preparation of Design Memorandum No. 3, coordination

has continued during the preparation of the Environmental Statement and this Master Plan. A brief chronology of this coordinative process follows.

#### 1.5.1 Coordination for Design Memorandum No. 3.

1.5.1.1 U. S. Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife (BSFW). This agency prepared a conservation and development report on the French Creek Basin in 1961. Subsequent to this report and to substantial project changes, this bureau prepared a supplemental report discussing the effects of these changes on the fish and wildlife resources of the project. This supplemental report was submitted to the Pittsburgh Engineer District in April 1965 (Exhibit 2, D. M. No. 1). This report was further revised when water quality control was added as a project purpose, necessitating additional project changes. The revised report, also included in D. M. No. 1 as Exhibit 2, was submitted to the Pittsburgh District office in December 1965. Despite the increased acreage and depth of Woodcock Lake required to provide water quality control, this report concluded that the fishing benefits would remain the same as previously estimated (i. e., 6,000 fisherman days). However, a report jointly prepared by this agency and the Bureau of Outdoor Recreation and dated 1 April 1971 substantiated an increase in these benefits.

1.5.1.2 Bureau of Outdoor Recreation (BOR). BOR and the Bureau of Sport Fisheries and Wildlife jointly reviewed the development information that was eventually presented in Sections C1 and C2 of D. M. 3. Their review comments dated 1 April 1970 (Exhibit H, D. M. 3) contained visitation estimates that were significantly lower than those calculated by the Pittsburgh Engineer District. Subsequent to this review and to use of "Technical Report No. 2" procedures for estimating initial project attendance, the previous attendance estimates for the Woodcock Creek Lake project were re-evaluated. This re-evaluation resulted in visitation estimates that supported those contained in the D. M. 3. A meeting with BOR on 14 October 1970 failed to resolve the considerable disparity between the BOR projections and the revised Pittsburgh District visitation estimates. However, the joint BOR/BSFW report of 1 April 1971 presented estimated recreation and fish and wildlife benefits that were within 14 percent of those estimated by the Pittsburgh Engineer District. Hence, the District visitation estimates were subsequently considered valid.

1.5.1.3 Department of Health, Education and Welfare (Public Health Service). In accordance with P. L. 87-88, the Public Health Service was asked by letter dated 27 December 1962 to evaluate the water supply and

water quality control benefits of the three proposed French Creek projects. In their letter of response dated 27 June 1963, it was stated that there was no foreseeable water supply need; however, because of waste assimilation needs and recreational use of French Creek below Meadville, there was a need for water quality control. This purpose was added to the project and the Public Health Service was again asked to review the projected water quality flows. Their response by letter of 7 September 1965 indicated concurrence with the Woodcock Creek Lake project changes but recommended that multiple-level discharge outlets be installed in the dam to facilitate thermal mixing.

1.5.1.4 Federal Power Commission. In November of 1964, the Pittsburgh District office inquired of the Federal Power Commission as to this agency's views on possible hydroelectric power development at Woodcock Dam. Their response by letter dated 10 November 1964 concluded that the costs associated with such development would far exceed any potential power benefits.

1.5.1.5 U. S. Department of Agriculture (Soil Conservation Service). In November 1964, the Soil Conservation Service was asked by the Pittsburgh District office to review the Woodcock Creek Lake plans. This agency responded that there was no conflict between this proposed project and any small watershed proposals under Public Law 566.

1.5.1.6 National Park Service (NPS). This agency was asked to conduct an archeological survey of, among other areas, the Woodcock Creek Lake project. This survey was conducted by Carnegie Museum of Pittsburgh in September 1964, and the information obtained was forwarded to the Pittsburgh District office by the NPS in August 1965. No sites of importance were found in the Woodcock project area according to the Carnegie Museum report.

1.5.1.7 Pennsylvania Department of Forests and Waters. This agency was asked to consider operation of the recreation areas of Woodcock Creek Lake. In a letter to the Pittsburgh District office dated 27 January 1967, the Secretary of Forests and Waters stated that the Commonwealth was already heavily committed to other recreational development in northwestern Pennsylvania and was, therefore, unable to assume any additional commitments at that time.

1.5.1.8 Pennsylvania Fish Commission. The Fish Commission was asked to review and comment on the U. S. Fish and Wildlife Service's 28 April 1965 report on the Woodcock Creek Lake project. While generally concurring with the findings of this report, the Fish Commission felt that the initial visitation

should be increased to 500,000 per year. A meeting of the Crawford County Commissioners, representatives of the Pittsburgh District office and representatives of the Fish Commission was held in November of 1966, at which this agency reiterated the contention that the project will initially attract 500,000 visitors annually. This was also stated in a letter to the Pittsburgh District office dated 22 November 1966.

1.5.1.9 Pennsylvania Game Commission. In October 1965, the Game Commission also reviewed and commented upon the 28 April 1965 U. S. Fish and Wildlife Service report on the Woodcock Creek Lake project. The Game Commission generally concurred with the findings of this report.

1.5.1.10 Pennsylvania Department of Transportation (Penn DOT). This agency was asked by the Pittsburgh District office to review the proposed project-related highway relocations in January 1966. This agency concurred with the proposed roadway relocations.

1.5.1.11 Pennsylvania Department of Health. In a letter dated 29 September 1967, the Department of Health informed the Pittsburgh Engineer District of the results of its vector and sanitary site survey. The only substantive recommendation contained in this report was that all sewage effluent be piped to the dam outfall and not discharged into Woodcock Creek Lake.

1.5.2 Coordination for the Environmental Statement. In compliance with the National Environmental Policy Act, PL 91-190, the Pittsburgh District office prepared a draft Environmental Statement for the Woodcock Creek Lake project. This statement, published in November 1971, was circulated to appropriate federal, state and local agencies for review and comment. On the basis of these remarks, the Environmental Statement was revised and the Final Environmental Statement was published in January 1973. This statement was used for background information in the preparation of this Master Plan. Prior to preparation of the Final Environmental Statement, coordination was maintained with, and comments received from, the following agencies and groups:

1.5.2.1 Federal Agencies.

- A. U. S. Forest Service (USDA)
- B. Soil Conservation Service (USDA)
- C. National Park Service
- D. Bureau of Sport Fisheries and Wildlife

- E. Bureau of Outdoor Recreation
- F. Environmental Protection Agency

1.5.2.2 Pennsylvania Agencies.

- A. Department of Environmental Resources  
(Penn DER)
- B. Department of Transportation (Penn DOT)
- C. Historical and Museum Commission

1.5.2.3 Interested Groups.

- A. Crawford County Planning Commission
- B. Sierra Club
- C. Trout Unlimited
- D. Carnegie Museum

1.5.2.4 No Response. In addition to the above, comments on the Draft Environmental Statement were unsuccessfully solicited from the following groups:

- A. Western Pennsylvania Conservancy
- B. French Creek Valley Conservancy
- C. Izaak Walton League of America
- D. League of Women Voters
- E. National Wildlife Federation
- F. Boy Scouts of America
- G. Outdoor Boating Club
- H. National Safe Boating Association

- I. Propeller Club
- J. Audubon Society of Western Pennsylvania
- K. Pittsburgh Explorers
- L. National Campers - Hikers Association
- M. Environment Pittsburgh
- N. French Creek Watershed Association
- O. Upper Ohio Valley Association

1.5.3 Coordination for the Master Plan. The preparation of this Master Plan has relied heavily on information obtained through previous coordination. It was necessary, however, to supplement these background details with additional information obtained through further coordination during the master planning process. The following is a chronology of this Master Plan coordination.

1.5.3.1 U. S. Soil Conservation Service (SCS). The Crawford County office of SCS was contacted and a copy of the county's soil survey was obtained, along with other SCS county land use reports. The soils information was used throughout the master planning process as a criterion for land use decisions within the project.

1.5.3.2 Pennsylvania Bureau of State Parks (DER). This agency has been contacted periodically throughout the master planning work to obtain information and assistance pertaining to current state park design standards and criteria.

1.5.3.3 Pennsylvania Bureau of Forest Management (DER). The Bureau's Service Forester for Crawford County was contacted early in the master planning process, and valuable insights were obtained regarding the forest conditions of the Woodcock Creek Lake project area and the general forest conditions of Crawford County. This information proved useful in the preparation of this planning document.

1.5.3.4 Crawford County Historical Society. Although it had previously been determined in accordance with Executive Order 11593 that the project area contained no historical sites of national significance, it was

imperative to identify sites with local or county historical importance. The Crawford County Historical Society was contacted and information on sites within the project that are worthy of preservation was requested. This organization's views and comments (see Exhibit A) were quite useful in planning for this project.

1.5.3.5 Carnegie Museum. As indicated previously, Carnegie Museum of Pittsburgh conducted an archeological analysis of the Woodcock Creek Lake project. The museum was contacted early in the planning process and a partial copy of its original report was obtained. As described in Exhibit B, there is very little of archeological significance within the project area.

1.5.3.6 Crawford County Commissioners and Planning Commission. Because most of the Woodcock Creek Lake project area has been planned as a Crawford County park, coordination with the county has been essential throughout all of the project's planning. The county commissioners and/or planning commission has been kept advised on all matters pertaining to the development of this area, and their comments have been solicited as needed. A record of this past coordination is contained in the correspondence between the Pittsburgh District office and the County and is included in Design Memorandum Nos. 1 and 3. While there is no reason to document this coordination herein, it will be helpful to cite the dates of some of the more critical information exchanges. The county commissioners first expressed their intent to apply for and execute a lease for the operation and maintenance of the Woodcock Creek Lake project recreation development in a letter to the Pittsburgh District office dated 4 September 1969. This intent was reconfirmed in a subsequent letter of 24 December 1970. Although it had originally been anticipated that the Corps of Engineers could cost-share future recreation development expenditures with Crawford County, it was subsequently determined that, in accordance with the project authorization, the securing of future development funds would be the responsibility of Crawford County. This fact was conveyed in letter form to the county commissioners on 20 December 1971. In addition to this past coordination, numerous meetings have been held with various county representatives since the initiation of Master Plan preparation. Two such meetings were held in Meadville on 14 February and 8 August 1973 and another was held in Pittsburgh on 27 September 1973. Additional meetings with Crawford County officials were also held in 1974. Of particular importance was the 14 February 1974 meeting held in Meadville, where water zoning and boating regulation options were discussed. Subsequent to this meeting, the commissioners formally defined the county's position on the regulation of boating on Woodcock Creek Lake and made their wishes known to the Pennsylvania Fish Commission (see Exhibit C) by letters of 4 April 1974. The regulations suggested by the commissioners were adopted and are currently enforced by the Fish Commission at Woodcock Creek Lake.

1.5.3.7 Woodcock Township Supervisors. As with the county commissioners, the supervisors of Woodcock Township have been kept informed and involved in the planning process as it has progressed. Representative supervisors attended most of the past coordination meetings held in Crawford County.

1.5.3.8 Saegertown Sanitation Authority. As described in Exhibit D, a meeting was held with the Saegertown Sanitation Authority on 6 April 1972 to determine the practicability of connecting the Woodcock Creek Lake project with the proposed Saegertown disposal plant. For reasons of economics and scheduling, it was determined that such a connection was impractical at that time. However, as indicated in Exhibits E and F, the anticipated future extension of the Saegertown sewer system along Woodcock Creek to the vicinity of the project would make such a connection feasible. In October 1974, representatives of the authority's engineering consultant were informed that the Pittsburgh District is committed to connecting to an authority treatment plant when feasible. It is, therefore, expected that the project's sewer system will be connected to the Saegertown system when the Woodcock Creek Valley collector is constructed.

1.5.3.9 Samuel S. Harrison, Ph.D, Consulting Hydrogeologist. Doctor Harrison was asked to evaluate the Woodcock Creek Lake project in terms of possible wind-induced wave action and the impact this might have on the location and orientation of shoreline recreation facilities. His response (Exhibit G) was useful in planning the additional recreation developments around the lake.

1.5.3.10 Existing County and Regional Plans. An attempt was made to coordinate the planned development of this project with the existing comprehensive plans for Woodcock Township and Crawford County. Both of these documents were quite helpful in providing background information on the general project area.

## SECTION 2.0 - LOCATION AND DESCRIPTION

- 2.1 PROJECT LOCATION. The Woodcock Creek Lake project is located on Woodcock Creek in Woodcock Township, Crawford County, Pennsylvania. Woodcock Creek joins French Creek at Saegertown. The dam is located approximately five air miles northeast of Meadville and 4.1 miles upstream of Woodcock Creek's mouth at Saegertown. As shown on Plate 1, the Woodcock Creek Lake project is located very near the center of Crawford County, a short distance east of both U. S. Interstate Route 79 and U. S. Route 19. These two major north-south highways are the main routes of travel between Erie and Interstate Route 90 to the north and Interstate Route 80 and Pittsburgh to the south. There are a number of large population centers within a 50-mile air distance of the project. The urban complex of Erie and the Youngstown-Sharon metropolitan areas are both within a one-hour driving distance. Oil City, Franklin, Mercer and Titusville are also within a short driving distance of the Woodcock Creek area.
- 2.2 PROJECT AREA GENERAL DESCRIPTION. Crawford County and the Woodcock Creek Lake project are located within a relatively undeveloped, rural section of northwestern Pennsylvania. The urbanizing pressures common to the Erie area to the north and the Youngstown-New Castle-Franklin zone to the south are not extant in central Crawford County. Farming still prevails and undeveloped rural countrysides are commonplace. Small towns and rural crossroad settlements still satisfy the bulk of local commercial needs. The project area is typical of these rural environs. Most of it is presently being farmed, and dairy farming and related agricultural pursuits account for the bulk of the project's previous land use. Its headwater wetlands and narrow tributary drainages are wooded. Blooming Valley, shown on Plate 2 near the upstream end of the project, is the largest community within the drainage basin. This community's total 1970 population was 360 persons. The topography of the Woodcock Creek Basin has been shaped and molded by successive periods of glaciation. As a result of this geological activity, the Woodcock Creek Valley is quite broad, relatively flat and uniform. Woodcock Creek meanders lazily throughout the length of the project, and it is flanked on either side by low, uniformly gentle slopes. Wet, poorly drained soils are common within this basin. As shown on Plate 3, the mean annual temperature within the basin is 48.2° F and ranges from a July high of 70.4° F to a February low of 26.2° F. The mean annual precipitation is 40.44 inches, and the mean annual snowfall is 69.0 inches. The prevailing wind direction is from the northwest. As shown on Plate 1, the Meadville-Woodcock area is very near the center of northwestern

Pennsylvania outdoor recreation activity. As determined by Pennsylvania's State Planning Board, this section of the Commonwealth is second only to the northeastern Poconos area in terms of outdoor recreation popularity. Lake Erie and Presque Isle State Park, Pymatuning Reservoir, Cooks Forest, Shenango River Lake, Conneaut Lake and the upper reaches of the Allegheny River annually attract many millions of recreationists and vacationers to this section of the State. The widespread popularity of this region creates a demand for new recreation facilities that far exceeds that which is generated by the resident population. If viewed solely within its regional context, the Woodcock Creek Lake project would not be expected to compete with these other, more extensive regional recreation attractions. However, by virtue of this area's popularity, a significant amount of spillover will occur that will directly affect the Woodcock Creek Lake project. Access into the region from other sections of western Pennsylvania and eastern Ohio is quite good by way of U. S. Interstate Routes 79, 80 and 90 and U. S. Routes 8, 19, 6 and 322.

## 2.3 PROJECT DATA.

2.3.1 Data Summary. Table 1 is a summary of the most significant Woodcock Creek Lake project data.

Table 1

### PERTINENT DATA

#### (General Information)

Drainage Area at Dam . . . . . 45.7 Sq. Miles

#### Dam:

Type . . . . . Rolled earth embankment  
 Length . . . . . 4,650 Feet  
 Height Above Streambed . . . . . 90 Feet

#### Spillway:

Type . . . . . Uncontrolled saddle type

#### Spillway Design Flood:

Peak Inflow . . . . . 38,700 c.f.s.  
 Peak Outflow . . . . . 24,400 c.f.s.

Project Lands Acquired in Fee . . . . . 1,733 Acres

(Elevations Above Mean Sea Level)

Top of Dam . . . . .	1227.0
Streambed at Dam . . . . .	1137.0
Spillway (crest elevation of weir). . . . .	1209.0
Maximum Summer Pool . . . . .	1181.0
Maximum Winter Pool . . . . .	1165.5
Full Pool . . . . .	1209.0
Minimum Pool . . . . .	1162.5

Limits for Clearings:

All Material (trees, brush, etc.) To . . . . .	1184.0
Floatable Construction To . . . . .	1209.0

Control Tower:

6'-0" x 8'-0" Arched Reinforced Concrete	
Conduit (Invert) . . . . .	1138.0
Two 4'-0" x 23'-6" Intakes (Invert) . . . . .	1138.0
Two 4'-0" x 8'-0" Service Gates (Invert) . . . . .	1138.0
Two 3'-0" x 3'-0" Water Quality Control	
Intakes (Inverts) . . . . .	1157.5 & 1167.0
Two 1'-6" x 3'-0" Water Quality Control	
Gates (Invert) . . . . .	1138.0

(Pools)

Length Above Dam:

Full Pool . . . . .	3.2 Miles
Maximum Summer Pool . . . . .	2.1 Miles
Maximum Winter Pool . . . . .	1.1 Miles
Minimum Pool . . . . .	1.0 Mile

Shoreline Length:

Maximum Summer Pool . . . . .	6.5 Miles
Maximum Winter Pool . . . . .	3.0 Miles

Area:

Full Pool . . . . .	775 Acres
Maximum Summer Pool . . . . .	333 Acres
Maximum Winter Pool . . . . .	145 Acres
Minimum Pool . . . . .	118 Acres

Gross Storage:

Full Pool . . . . .	20,000 Acre-Feet
Maximum Summer Pool . . . . .	4,930 Acre-Feet
Maximum Winter Pool . . . . .	1,350 Acre-Feet
Minimum Pool . . . . .	960 Acre-Feet

2.3.2 Reservoir Characteristics. As previously indicated, the Woodcock Creek Lake project is located within a sub-basin of the French Creek drainage. Woodcock Creek valley has been heavily glaciated and has a relatively flat stream gradient. The lateral tributary valleys are more steeply pitched and many have their origins in poorly drained, marshy headwaters. The bulk of the project lands fronting on the proposed Woodcock Lake are gently sloping and developable. Most of these lands have been tilled until recently, and tree cover along the lateral slopes is sparse and scattered. The lands bordering the headwater area near Blooming Valley and further east are quite wet and forested. The water quality of Woodcock Creek is quite good and few sources of pollution are known to exist. Stream siltation or its turbidity is about normal for streams of this size in this portion of northwestern Pennsylvania. Similarly, the amount of organic nutrients entering Woodcock Creek from its drainage area does not pose any known water quality problems at this time. Those pollutants that are found in the stream at the present time originate from the normal leaching processes from the surrounding agricultural lands and from occasional discharges of sewage effluent from the town of Blooming Valley. Woodcock Creek presently supports a stocked trout fishery that is maintained by the Pennsylvania Fish Commission, and many of the more popular warm-water game fish can also be found in this stream. The 333-acre maximum summer pool of the Woodcock project affords an excellent opportunity to provide a wide array of outdoor recreation activities. As shown on Plate 5, two areas of recreational development have been constructed in Colonel Crawford Park--the main portion of the park on the left or southern bank of the lake and the Stainbrook Recreation Area below the dam. With the exception of the Dam Overlook on the right or north bank near the dam, the remainder of the lake's periphery is undeveloped. However, a fishermen's access area has been constructed on the right bank of Woodcock Creek below the dam and development of the Bossard Nature Area north of Pennsylvania Route 198 will be completed

during 1975. One purpose of this Master Plan is to identify an optimum plan of resource development for these remaining project lands.

2.3.3 Project Structures. As shown on Plate 15, there are three existing major structures that will control the operation of the Woodcock reservoir. These are the dam, the outlet works and the spillway. Each of these structures are discussed in the following paragraphs.

2.3.3.1 Woodcock Dam. The existing dam is a rolled, earth-fill embankment composed of random fill with an impervious core. The length of the dam is 4,650 feet and the elevation at the top is 1227.0 or 90 feet above the 1137.0 streambed elevation. It is 24 feet wide at the top and an 18-foot wide bituminous roadway traverses the length of the dam from the right abutment to a turnaround area overlooking the spillway through the left abutment. The impervious core material is 10 feet wide at the top and flares on both sides at a slope of 3 on 1 to its base. It is faced on the upstream side by random fill at slopes of 1 on 3 below and 1 on 2-1/2 above elevation 1207.0, respectively, and is overlain with a 6-inch thick filter layer and 15 inches of protecting stone. The random fill on the downstream face of the dam is sloped at 1 on 2-1/2 below and 1 on 2 above elevation 1207.0, respectively, and is seeded to prevent erosion. The toe of the downstream face of the dam (below elevation 1147.0) is protected with stone.

2.3.3.2 Outlet Works. The Woodcock Creek outlet works consists of an intake or control tower located at the upstream toe of the embankment and a stilling basin at the downstream end of a discharge conduit which passes through the dam. All controlled releases from Woodcock Lake pass through these outlet works. The top of the 33'-6" by 25'-0" reinforced concrete intake tower is approximately 110'-3" above its base. The elevation of the operating floor is 1227.5--6 inches higher than the top of the dam. The tower is a wet-well type and is constructed of reinforced concrete. The control gate structure has two service gates and two low-flow water quality control gates. Two four-foot wide by eight-foot high water passages with invert elevations of 1138.0 are controlled by two slide gates of the same dimensions. The three-foot square water quality control intake openings are located on the upstream face of the control tower. One intake has an invert elevation of 1157.5 feet while the other's invert is at 1167.0 feet. Water passing through these intakes is piped downward through 24-inch flow meters and discharged into the main water passage at elevation 1138.0. This discharge is controlled by two, three-foot high by one-foot, six-inch wide service gates. An arched, reinforced concrete conduit, eight feet high by six feet wide in section, and approximately 342 feet long, conveys the control tower discharge to the stilling

basin. The downstream invert elevation of this conduit where it enters the basin is 1136.0. The stilling basin has an overall length of 111 feet. The upstream portion of this basin is 49 feet long and flares from a width of six feet at the conduit discharge point to a width of 20 feet. It drops in elevation from 1136.0 to 1121.7 where it joins the second or downstream portion of the basin. This lower segment is 62 feet long and has a uniform inside width of 20 feet. The water from the stilling basin flows into a stone-faced, 30-foot wide discharge channel that connects with the Woodcock Creek stream channel approximately 300 feet downstream of the basin.

2.3.3.3 Spillway. As shown on Plate 15, the spillway is constructed around the left abutment of the dam and discharges into the undisturbed channel of Stainbrook Run below the embankment. It has three major elements--the approach channel, the spillway weir and the discharge channel. The approach channel is approximately 2,800 feet long and varies in width from 330 feet to 550 feet. The channel slopes into its center for drainage. From the downstream end it slopes towards the reservoir at a 0.4 percent slope. This channel intercepts Stainbrook Run and all of the drainage from this stream flows into Woodcock Creek Lake. The spillway weir is a standard, ogee-shaped, uncontrolled, 41-foot wide concrete structure with its crest at elevation 1209.0. The overall length of the spillway crest is 140 feet. The discharge channel below the spillway is the natural stream channel of Stainbrook Run. The downstream toe of the dam at the mouth of this stream channel is protected from erosion by a 3,000-foot long, stone-faced deflection dike.

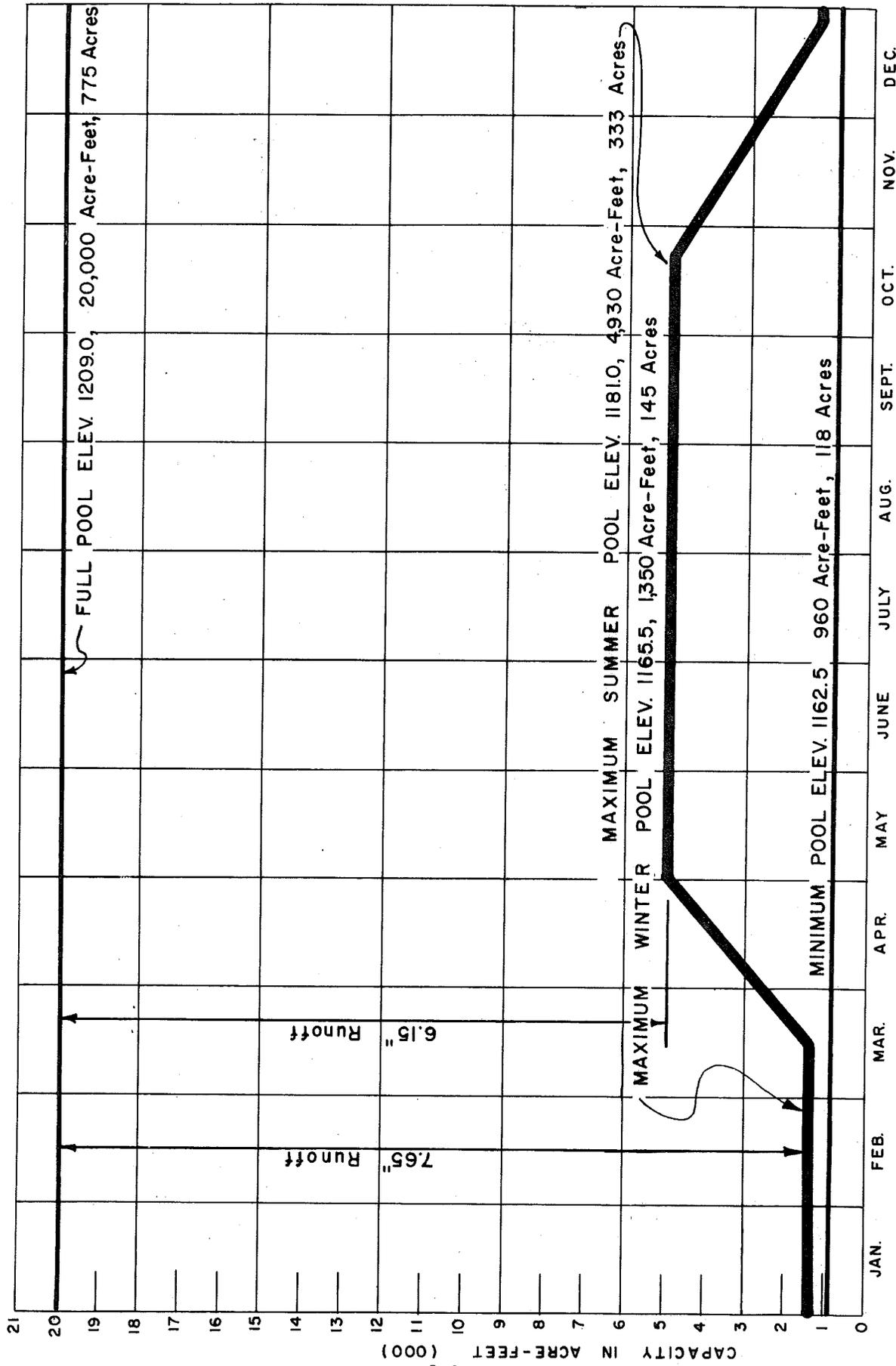
2.4 RESERVOIR OPERATION. The operation of Woodcock Creek Lake will be dependent upon the project purposes previously identified. The provision of flood storage, the maintenance of water quality and the provision of a summer recreation pool will all require certain operational actions. As a collective, these actions constitute the reservoir's plan of operation. This plan is summarized in the following paragraphs.

2.4.1 Background Considerations. The downstream communities along French Creek have long been concerned with this stream's frequent flooding. Meadville, the largest population center in the French Creek Basin, has been particularly troubled by this problem. The most severe recorded flooding occurred in January of 1959 when the Meadville gaging station recorded a water depth that was 5.5 feet above flood stage. Additional severe flooding occurred in 1947 when water at this same station reached a height of 4.05 feet above flood stage. This past flooding of the French Creek Valley precipitated a series of basin studies which in turn led to a number of flood

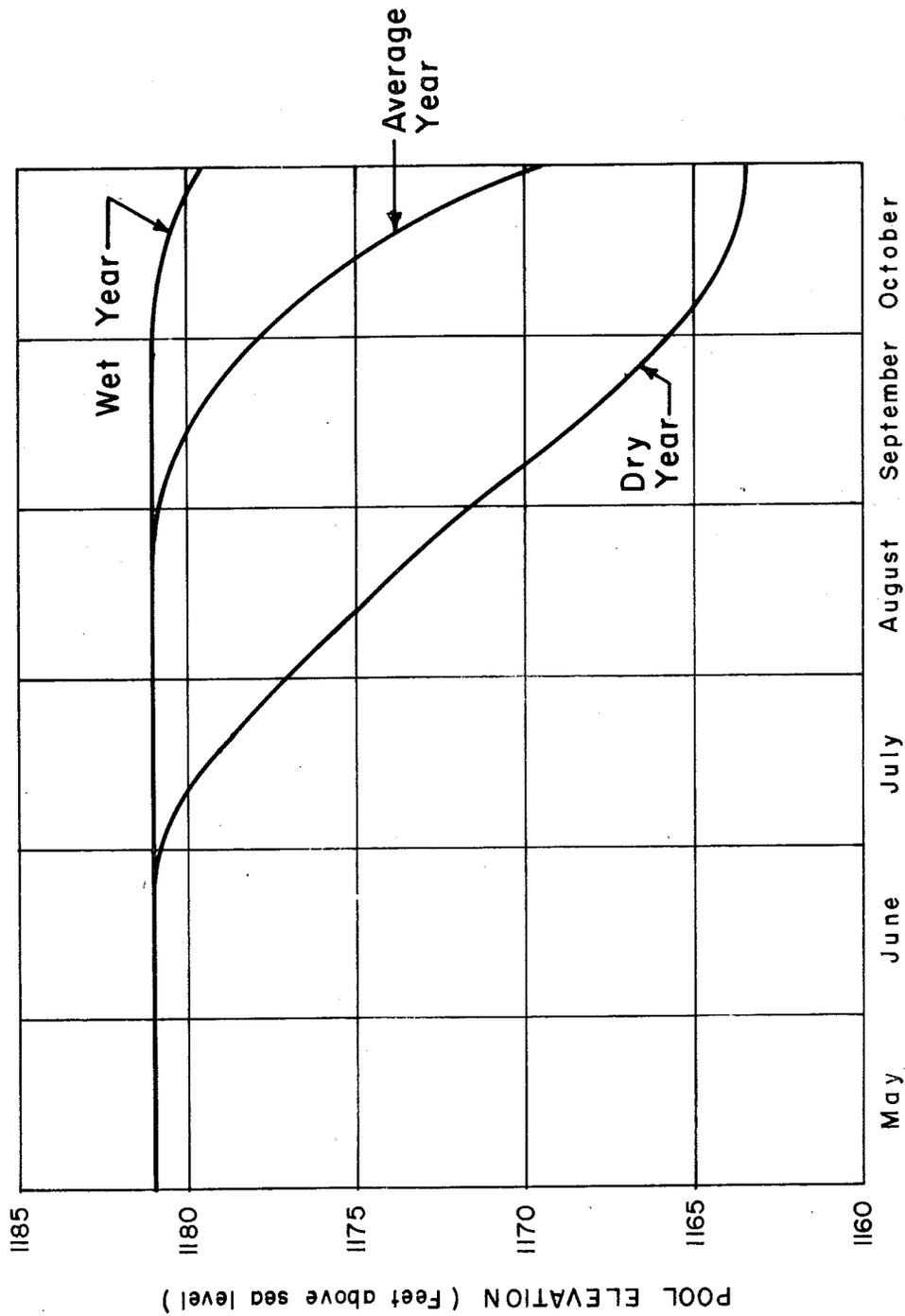
relief projects. The first of these (the previously authorized French Creek Reservoir) involved the construction of a large dam and reservoir in the Cambridge Springs area of Crawford County. Local opposition to this proposal led to additional studies and the current three reservoir system that includes Union City Dam, Woodcock Creek Lake and Muddy Creek Dam. In addition to the flooding problem mentioned above, the French Creek areas south of Meadville also experience water quality difficulties during periods of low flow in late summer. The treated waste that is presently being discharged into French Creek by Meadville is barely being assimilated during these dry summer periods. Without efforts to augment these late summer flows, the widespread recreational use of French Creek below Meadville would have to be drastically curtailed. Investigations showed that the Woodcock Creek Lake project is the best suited of the three French Creek projects to provide stream flow augmentation and water quality control for the Meadville area. This function was, therefore, added to this project's purposes.

2.4.2 Plan of Operation. The impoundment of Woodcock Creek began during the winter of 1973-74. As cited above, the operation of this impoundment is primarily controlled by flood storage and water quality management requirements. However, the recreational use of this lake also affects its operation. The requirements of each of these project functions are summarized in the following paragraphs.

2.4.2.1 Flood Storage. As shown in Table 1, at the full pool elevation of 1209.0, Woodcock Creek Lake will occupy an area of 775 acres. At this elevation, the total flood storage capacity of the project will be utilized and the lake will discharge uncontrolled over the spillway crest. The frequency of this flooding has been estimated as occurring about once in 200 years. Maximum flood storage will be available when the lake is at the minimum pool elevation of 1162.5. When at this elevation, Woodcock Creek Lake will only occupy an area of 118 acres. However, as reflected by the Storage-Release Schedule on Chart 1, the lake's elevation will primarily be maintained at various elevations between these two pool extremes. During the winter months of an "average" year, the lake will be kept at an elevation of 1165.5, or approximately 19.5 feet above the top of the flood storage release gates. With the advent of spring runoff at about mid-March, these gates will be closed and the pool's elevation will be gradually raised to its summer level, or approximately 1181.0, by around the first of May. As shown on Chart 2, the autumn drawdown will normally begin at the end of August, and the pool will be returned to its winter level (elevation 1165.5) by mid-December. However, as subsequently discussed, unseasonably dry weather will cause the fall drawdown to begin during the latter part of June,



STORAGE - RELEASE SCHEDULE  
CHART I



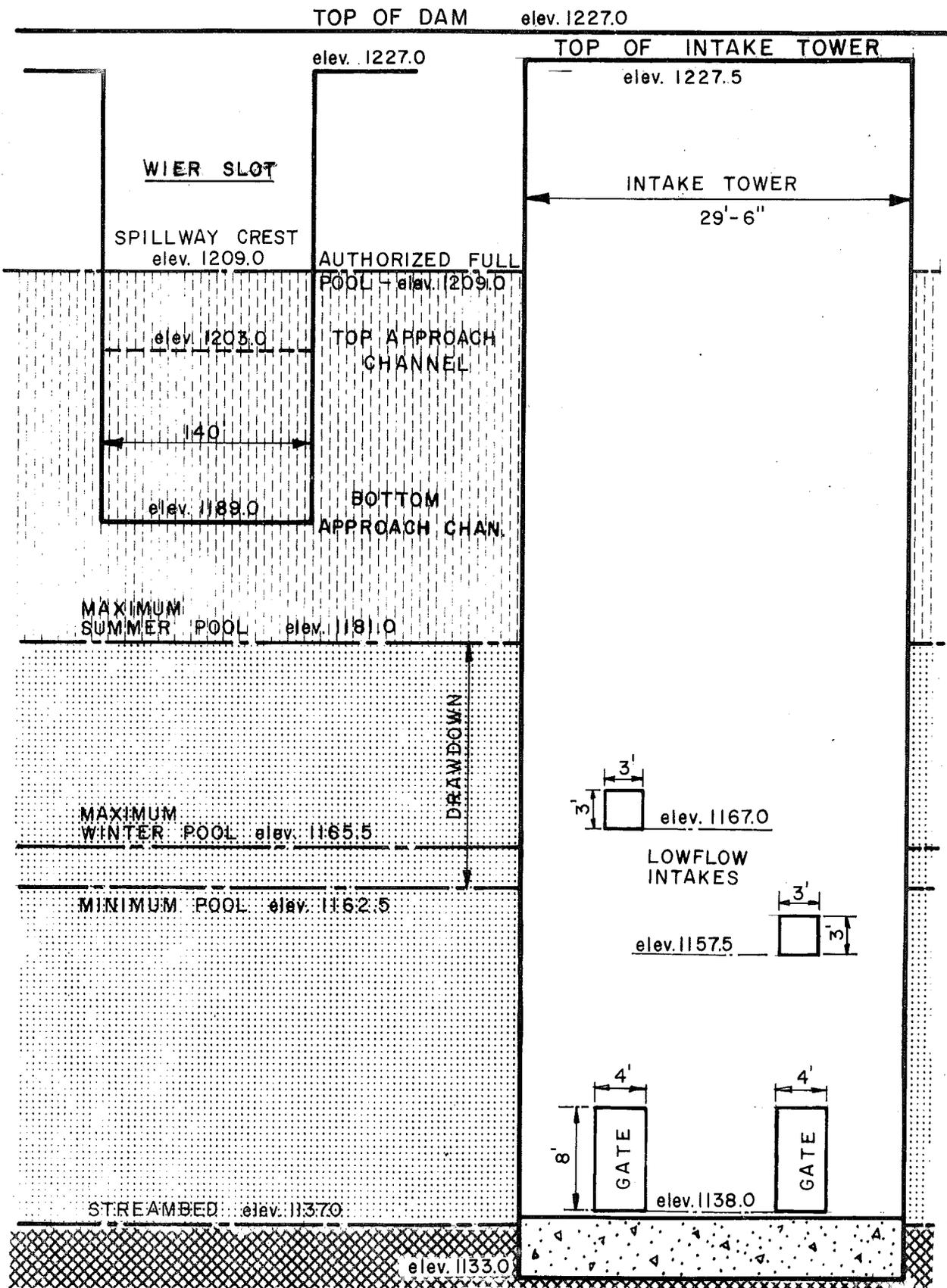
DRAWDOWN DURING THE  
SUMMER RECREATIONAL SEASON  
CHART 2

in order to satisfy the downstream water quality needs. Conversely, during wet years, the autumn drawdown can begin as late as the end of September. As detailed in paragraph 2.3.3.2, the control of Woodcock Creek Lake's elevations and all discharges are facilitated through the operation of the control tower. The relationship of the various pool elevations to the discharge gates of the outlet works is shown on Chart 3.

2.4.2.2 Water Quality Control. The water quality control needs of the Meadville area have been based on the estimated future organic waste loads in French Creek and the amount of water that will be required to assimilate this material. As determined by the U. S. Department of Health, Education and Welfare (see Exhibit H), the water needs are predicted on the basis of maintaining a minimum of 5.0 mg/l of dissolved oxygen. As stated in Exhibit H, HEW estimated the year 2010 minimum summer flow requirement to be 75 c.f.s. As indicated in the preceding paragraph, providing this minimum flow during the late summer months of a dry year will require the release or drawdown of the summer recreation pool prior to the end of the recreational season. The impact of this drawdown on the recreational use of this lake will be discussed in a subsequent paragraph. As shown on Chart 3, the water quality control discharges are released from two levels of the lake. By varying the amounts of each of these discharges, an optimum temperature can be obtained that maximizes the oxygen content. The water quality intakes are located on the upstream face of the control tower at elevations 1157.5 and 1167.0.

2.4.2.3 Recreation. As previously cited and as shown on Chart 1, the summer recreation pool will be maintained at an elevation of 1181.0 throughout the length of the recreation season (May through August) during years of normal rainfall. However, as shown on Chart 2, during years of unseasonably low rainfall, summer drawdowns for water quality control purposes will have to be initiated during the recreation season. On the basis of 1920-1964 rainfall data, it has been determined that the possibility exists of having to begin water quality discharges as early as mid-June. By the end of August, such a drawdown would result in the lowering of the recreational pool by almost 10 feet. While such a drawdown is admittedly an extreme possibility, summer drawdowns of lesser magnitude will occur quite frequently and will have a direct negative impact on the recreational use of Woodcock Creek Lake. The extent of these adverse drawdown influences on the recreation potential of this project is more fully analyzed in paragraph 4.8.

2.4.3 Costs. Based on a July 1974 estimate, the annual operation and maintenance cost for the Woodcock Creek Lake project ultimately will be \$622,600. Of this total amount, \$242,600 per year is attributed to the



OPERATION SCHEMATIC - WOODCOCK CREEK LAKE

CHART 3

operation and maintenance of the full initial recreation development. This annual cost is expected to increase to \$422,600 with the operation and maintenance of future recreation facilities. The remaining portion of the ultimate annual operations and maintenance cost is distributed unevenly between flood control and water quality control project functions, as well as miscellaneous operational expenses not specifically linked to any of the three project purposes.

## SECTION 3.0 - RESOURCE INVENTORY

3.1 CLIMATOLOGY. The climatological data presented in the following discussion is a summary of information gathered from a number of stations both within and outside of the French Creek Basin.\* Each of these weather elements bears directly upon the design and ultimate use of the Woodcock Creek Lake project. Additional information is given on Plates 3 and 4.

3.1.1 Temperature. The mean annual temperature of the project area is 48.2° F. The monthly variation in mean temperature ranges from a high of 70.4° in July to a low of 26.2° F in February. Extremes in temperature have been recorded at the Meadville station from 104° to minus 23° F. Temperatures below 0° F occur on an average of nine days per year, while on an average of 11 days per year the temperature exceeds 90° F. The mean monthly temperatures during June, July and August (the summer recreation season) are 66.7, 70.4 and 68.7° F, respectively.

3.1.2 Days of Sunshine. As a maximum, the Woodcock Creek project area receives sunshine during 60 percent of the daylight hours in May, 67 percent in June, 68 percent in July, 67 percent in August and 63 percent in September.

3.1.3 Precipitation. The mean annual precipitation in the Meadville area is 40.44 inches. The month with the greatest mean precipitation is June with 4.31 inches. The driest month is February with only 2.52 inches of precipitation. The Woodcock Creek area is located in the midsection of the French Creek drainage basin. It receives, therefore, considerably less snowfall than the more northern portions of this basin. An example, Corry, Pennsylvania receives a mean annual snowfall of 109.7 inches, while the Woodcock area

\* These sources include the following:

1. Climatography of the United States, No. 11-32, (Supplement to the Climatic Summary for Pennsylvania for 1931 through 1960).
2. Climatological Data for Pennsylvania: Climatic Summary of the United States, Section 87--Western Pennsylvania.
3. Harrison, Samuel S., Consulting Hydrogeologist, Allegheny College, Meadville, Pennsylvania.
4. Records from cooperating weather stations located at Corry, Meadville and Franklin, Pennsylvania.
5. Records of the U. S. Weather Stations at Erie and Pittsburgh, Pennsylvania and Youngstown, Ohio.

(Meadville) has only 69.0 inches per year. Franklin, located to the south at the mouth of French Creek, receives a mean annual snowfall of only 44.9 inches. The Woodcock Creek drainage basin receives most of its snowfall during the month of January when its mean accumulation is 16.0 inches.

3.1.4 Winds and Wave Action. Wind direction, velocity and duration bear directly on the design and ultimate use of a water resource--particularly its use for recreational purposes. The preparation of this Master Plan has, therefore, been tempered by what has been learned of the wind characteristics of the Meadville area. As detailed in Exhibit G, much of this information has been obtained from a consulting hydrogeologist familiar with this project and its environs. Briefly summarized, it was determined that winds in excess of 20 miles per hour will produce waves of one foot height or higher. As shown on Plate 3, winds of this velocity are most frequently from the southwest, west, northwest and northeast in this same order of frequency. Winds from the east, southeast, south and north are of minimal consequence in the project area. In addition to the direction, velocity and duration of these prevailing winds, local, terrain-induced wind activity also has an impact on wave activity. However, in the instance of the Woodcock Creek basin, topographic relief is quite small and local wind activity is thus also expected to be minimal. The impact of the prevailing winds on the wave activity of Woodcock Lake will be tempered by not only the direction and velocity of the winds, but also the presence or absence of long reaches of unprotected lake surface (fetches) in the same general orientation as the wind direction. Thus, as shown on Plate 3, wave activity will be greatest at the downwind extremes of the longest fetches. As shown on this drawing, winds from the northwest will produce a wave hazard area along the upper end of Woodcock Lake's southern shoreline. In a similar fashion, but to a less severe degree, winds from the west will also produce a large amount of wave activity along the upper two-thirds of the lake's northern shoreline. As reflected in the wind and wave analysis on Plate 3, only those close-in shoreline areas (within one-half mile of the dam and on the east side of the causeway) will be protected from wave activity. Wave activity will adversely affect the recreational use of exposed shoreline areas in a number of ways. Boat launching facilities and boat tie-up areas should not be located in such areas. Swimming beaches, if improperly constructed, will be eroded in a short period of time and will require constant maintenance. The existing boat launching ramp and swimming beach are located in areas of low or very low wave action. Only an expansion of the existing swimming beach and the provision of small boat mooring stations are proposed herein for future development. Other shoreline developments will be prohibited. The mooring stations will be constructed

only in areas free of significant wave action. However, as indicated in Exhibit G, the decision to locate boating facilities within embayment areas that are protected from surrounding wave action should only be made after sedimentation studies are made of any tributary streams entering these same bays.

3.2 HYDROLOGY. The hydrology of the Woodcock Creek basin is primarily a product of the physical characteristics of its watershed and streams. These are both discussed in the following paragraphs.

3.2.1 Watershed Characteristics. As shown on Plate 4, the Woodcock watershed is located in the central portion of the larger French Creek drainage basin. Woodcock Dam is located approximately five miles northeast of Meadville, about 4.1 miles upstream from Woodcock Creek's mouth at French Creek. The total area of the watershed above Woodcock Dam is approximately 45.7 square miles. This drainage area and its environs have been subjected to periodic glaciation, and the existing terrain is a product of this past activity. Relatively flat, upland plateaus are intermixed with gently sloping hills and flat-bottomed stream valleys. Maximum relief generally varies from 150 to 400 feet, and glacial till blankets the entire area. This till material varies from 5 to 20 feet deep on upland sites and has accumulated to depths of 200 feet along the valley floors. Generally speaking, the soils of the upland areas are relatively impervious with low infiltration rates and high runoff rates during intensive rainfalls. The soils of the valley floors, consisting primarily of glacial outwash, have a higher infiltration rate. Prior to the most recent periods of glaciation, the streams of this area flowed northward. The advancing ice sheets blocked these drainages, however, and the resulting impounded bodies of water forced new outlets to the south. The existing stream system is a by-product of this past glacial activity. Because of their relatively recent origin, the drainage patterns of this portion of Pennsylvania are not highly developed. As a result, many areas (both upland and valley floors) have wet soils. Woodcock Creek's watershed is typical of rural Crawford County. The existing land use is almost evenly divided between agriculture and forest cover. Dairy farming is the most common agricultural use with much of the basin devoted to associated crop and pasture lands. Heavily forested areas exist in the headwaters and along some of the tributary valleys. With the exception of Blooming Valley, there are no communities within the entire Woodcock watershed. The 1970 population of this community was approximately 360 persons. There has been minimal mineral extractive activity within the project area and its environs. Some commercial extraction of glacial gravel has occurred, however.

3.2.2 Stream Characteristics. The overall length of Woodcock Creek, from its point of origin in Randolph Township to its mouth above Meadville,

is 20.5 miles. Throughout the 12.5 miles of stream above the dam, the channel rises approximately 200 feet at a rather uniform rate. However, the headwater end of this stream has a considerably steeper gradient. Similarly, the gradients of lateral tributaries are also relatively steep. The stream channel is well defined and relatively stable throughout its length. The width of the channel at the dam is approximately 30 feet. As shown on Plate 4, Woodcock Creek has three major tributaries--two of these are identified by name and one is unnamed. Bossard Run enters the right bank of Woodcock Creek approximately 0.25 miles above the dam and has a watershed of approximately 2.2 square miles. Stainbrook Run, with a drainage area of approximately 3.16 square miles, entered Woodcock Creek on the left bank just below the dam. However, during the construction of the dam, this stream was diverted to enter the lake via the spillway approach channel. The largest tributary along this stream is unnamed. As shown on Plate 4, it enters the right bank of Woodcock Creek approximately 4.7 miles above the dam and has a total drainage area of 5.6 square miles. The water quality of Woodcock Creek is good. There are no known sources of pollution within the watershed other than those stemming from agricultural runoff and organic discharges from the community of Blooming Valley. The stream presently supports a stocked fishery of both brook and rainbow trout and native populations of bullheads, suckers, shiners, carp and chubs.

- 3.3 GEOLOGY. As previously noted, the Woodcock Creek project is located in the glaciated portion of the Allegheny Plateau Province. The project area has been periodically invaded by successive ice sheets during the Illionian and Wisconsin stages of glaciation. As a result of this glacial activity, significant changes were made in the physical characteristics of the pre-glacial terrain. It is known that pre-glacial streams of this area flowed northward. With the advancement of glacial ice sheets from the north, the mouths of these drainages were periodically blocked and huge lakes of impounded water were formed. As the depth of these impounded lakes increased, the watershed divides to the south were breached and new south-flowing drainages were formed. With each successive ice advancement, these new stream patterns became better defined and deepened until ultimately the existing drainage system emerged. Concurrent with the reformation of the drainage patterns, the alternating flow of successive glaciers over the Woodcock basin also reshaped the terrain. Hilltops and ridge lines were eroded, V-shaped valleys were considerably broadened and the topography was generally made less rugged. The physical features were further softened through the deposition of glacial till during the northward retreat of each ice sheet. Kame terraces, moraines and thick layers of water-borne sediment were also deposited by these receding ice sheets. Post-glacial geological processes further minimized extremes in relief as upland layers of till were eroded and washed into the stream valleys. Evidence

of this past geological activity is quite apparent in the Woodcock Creek Lake project area. The terrain is relatively uniform with little or no dramatic differentiation of features. The upland areas are relatively flat, while slopes are gentle and valleys are both broad and flat. Maximum relief generally varies from 150 to 400 feet. The entire area is covered with glacial till, with the upland sites having a residual layer that is 5 to 20 feet thick and the valley floor containing depositions of till that reach thicknesses of 200 feet. The bedrock underlying the project is flat-lying, interbedded siltstones and siltshales of the Chemung formation deposited during the Devonian age. This bedrock is exposed in the bed of Bossard Run and in the bed and walls of Stainbrook Run. Both of these tributary streams are shown on Plate 4. Because of the relatively recent origin of the drainage patterns within the glaciated portion of northwestern Pennsylvania, many stream systems are as yet incompletely defined. Headwater areas are poorly drained and "perched" marshy areas are common. Because of these immature drainage conditions, wet soils are quite common in the project area. The soils along the major stream valleys are of glacial origin and are made up of sand, gravels and clays. Because of the nature of these materials and their greater thicknesses, the valley soils have a higher infiltration rate than the more impervious, compacted soils of the slope and upland areas. Runoff during periods of intense rainfall from these slope and upland areas is, therefore, high and sheet erosion of exposed soils is common.

### 3.4 ECOLOGY.

3.4.1 Background. Prior to the arrival of settlers to this section of Crawford County, a relatively stable climax association of forest vegetation and wildlife existed. The forest community (type) native to this latitude is the beech-yellow birch-sugar maple type, with scattered stands of hemlock, red maple, black cherry, basswood, white ash and northern red oak also present. On many of the sandy well-drained sites, virgin stands of white pine were also very common. Early pioneers in the Woodcock Creek valley cleared small openings in this forest cover and cultivated the more level, better drained areas. Many of the less fertile sloping sites were also logged for lumber and other forest products, and the residual deposits of slash were burned to create open grazing areas for livestock. During this process, much of the soils' organic content was burnt or, when exposed, was washed away. Thus, through the early logging and farming efforts of Crawford County pioneers, the wilderness ecology--the product of thousands of years of natural processes--was violently altered in a very few years. As these pioneer homesteads further evolved into farmlands with somewhat fixed land-use patterns, ecosystems emerged that persist into the present. However, despite this relatively stable

land use, gradual changes in the flora and fauna have continued as the slow process of natural succession proceeds once again towards a climax community. Periodic disruptions such as repeated loggings, the cultivation of once abandoned fields and woodlot grazing makes progress towards an ultimate stage of succession extremely slow. The interdependency of plants and animals within the project's ecosystems does not readily lend itself to a separate discussion of each of these communities. However, for reasons of simplicity, this dichotomy is maintained throughout the remainder of this discussion.

3.4.2 Existing Plant Communities. Although the entire 1,733 acres of the project can generally be classified as farmland, only about 359 acres or 21 percent of this total was recently either presently being cultivated or being used for pasture. The remainder of the project, as shown on Plates 7 and 8, consists of reforesting abandoned fields, forested areas and a few stands of forest plantation.\* If these plates are further studied in conjunction with Plates 5 and 12, an association can be seen between areas having agriculturally unproductive soils or steep slopes and forested sites. It can also be observed that the cultivated fields were most often situated on sites that are relatively level and have well-drained soils. The most heavily wooded, least disturbed portions of the project are located upstream or east of Township Road 650, while the most intensively previously cultivated areas are located immediately east of this same roadway. As cited above, past patterns of land use have brought about distinct plant associations that typify various stages of ecological succession. These vegetation communities can be classified as follows:

- (1) Forest or woodlots.
- (2) Reforesting fields.
- (3) Farmland (cropland and pasture).

Each of these is a distinct ecosystem with its own compliment of species evolving towards an ultimate stage of succession. Because significant portions of the land management policy and land use decisions have been based in part on this vegetation and its ecological potential, each of these vegetation categories is further examined in the following paragraphs.

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\* Because construction within the project was begun prior to this inventory, it should be noted that approximately 298 acres or about 17 percent of the total project area has been scarred by this work and its vegetation has been eliminated or modified. These areas have, therefore, been excluded from this discussion.

3.4.2.1 Forest and Woodlots. As shown in the table on Plate 8, approximately 35 percent or 605 acres of the project was covered with farm woodlots or stands of forest prior to the impoundment in the lake. Approximately 90 acres of this wooded area was clear cut. The forested area remaining above the maximum summer pool will still constitute approximately 37 percent of the unflooded project area. As shown on Plates 7 and 8, these wooded areas occur throughout the project; however, the largest concentrations are located within the upstream or eastern end. As previously mentioned, these second- and third-growth stands of forest, with few exceptions, occupy sites that are steeply sloping or poorly drained. The principal species associated in these forested areas are common to the beech-birch-sugar maple forest type of this area. However, successive cuttings of prime species greatly altered the overall character and composition of these stands. Thus, as logged openings were created, less tolerant species such as aspen, elm, sycamore, black cherry and white pine became established. Stands of hemlock, where protected by narrow and deep stream valley topography, have remained relatively unchanged over the years. This is particularly true for the Bossard Run valley and in a number of valleys in the upper end of the project. Although the existing wooded areas are generally inferior in terms of acreage, stocking and composition, they will, if left undisturbed for an extended period of time, gradually re-establish themselves. Given an even greater amount of time for ecological succession, these stands will eventually develop a climax association. However, as subsequently discussed in Paragraph 5.4, there is little justification for encouraging such long-range development. More immediate project needs such as aesthetics and watershed management will define management actions that will interrupt the process of succession far short of its climax state.

3.4.2.2 Reforesting Fields. The abandoned field areas that are in the process of naturally reforesting can be seen on Plates 7 and 8. Such areas constitute approximately 30 percent or 413 acres of the project lands above elevation 1181.0. With very few exceptions, all of these reforesting sites were cultivated at some past point in time. For reasons of poor soils, drainage or slope, farming was discontinued and the process of natural regeneration was begun. The state or degree of reforestation that is present is linked directly to the length of time that has expired since the particular site was last cultivated. Regeneration normally begins with the invasion of herbaceous (grasses) and woody plants (goldenrod, milkweed) and shrubs (elderberry, gray dogwood) that had been present around the periphery of the field. This is accompanied by a similar invasion of wind and animal-borne seeds from species such as hawthorne, red maple, ash, black cherry, aspen and, depending on the site, white pine. These species establish a pioneer association that

eventually alters the soil and micro-climate conditions enough to encourage a new invasion of shade tolerant species such as hemlock, beech, birch and sugar maple. As these species slowly mature and overtop their pioneer predecessors, the less tolerant original plants disappear and a new but immature forest stand emerges. This in turn shelters additional understory invaders that subsequently replace some of their overstory associates. Carried to its ultimate stage of development over an uninterrupted period of many years, this process of ecological succession results in a relatively stable, climax association of forest species. All of the project sites classified as reforesting fields can be located near the beginning or immature end of this ecological continuum.

3.4.2.3 Farmland (Cropland and Pasture). As shown on Plates 7 and 8, approximately 230 acres or 16 percent of the project lands above the maximum summer pool were recently actively farmed. This is to say that these areas were plowed on either a yearly basis for feedgrains or other annual crops, or on a periodic basis as in the case of hayfields or intensively used pasture areas. If Plate 8 is compared to Plate 12, it can be noted that the locations of these farmed areas are, for the most part, coincidental with relatively level sites having well-drained soils. With the construction of the Woodcock Creek Lake project and the discontinuance of farming within its limits, all of these open farm fields, if left undisturbed, will eventually revert to a wooded condition. It should also be noted that, in terms of site-related forest potential, these relatively fertile, well-drained farm fields have the greatest potential for producing superior forest stands.

3.4.2.4 Management Interventions. The preceding discussions have broadly defined the various plant communities that exist within the project. They have also identified each community's known pattern of ecological succession. As indicated, if left undisturbed, all of these plant associations would eventually become forest communities. This fixed pattern of natural ecological succession is desirable, however, only if it does not conflict with the land use activities and goals that will be subsequently defined in this Master Plan. Thus, in the instance of day-use areas where playfields and picnicking facilities have been or will be provided, natural reforestation will be discouraged. In contrast to this, reforestation has been and will continue to be encouraged and supplemented through tree planting programs and other management techniques within camping areas. In similar fashion, ecological succession will be selectively interrupted to provide optimum cover conditions and habitat for wildlife species. Such actions may include cutting small feed-plot openings or silviculturally encouraging mast-producing vegetation. In other project areas, aesthetic considerations may well dictate additional interventions in the ecological process.

The resource management plans will identify these and similar interventions that are necessary to create or maintain some desired vegetative condition. They will similarly recognize and plan for unintentional disruptions of the project's vegetation. As an example, where intensive recreation use threatens to destroy the vegetative cover in one area, alternate recreation areas will be used while the first area is recovering. Similarly, any overbrowsing by wildlife will require a corresponding reduction in the wildlife population or an increase in the number of feed plots.

3.4.3 Wildlife. Crawford County has both an abundance and a wide variety of wildlife. Its rural countryside and relative absence of urbanization provides an ideal habitat for wildlife. The Woodcock Creek Lake project area is typical of the county and has a representative cross-section of its wildlife species. Wildlife management will thus constitute an important element of the project's overall management plan. The identification of the existing wildlife communities is a prerequisite to anticipating environmental impacts of the project as well as planning for the long-range perpetuation and enhancement of its wildlife.

3.4.3.1 Terrestrial. As detailed above, there is a diversity of vegetation and cover types within the project that ranges from poorly drained, marshy bottomland sites to heavily forested upland areas. This array of cover results in not only a variety of wildlife habitat, but also a diverse supply of food sources. Although terrestrial species do not necessarily restrict their range to one type of cover or habitat, because of feeding and nesting preferences, they can usually be associated with certain cover types. Thus, cultivated fields, fence rows and abandoned fields encourage and sustain certain species that are not found in more heavily forested habitats. The cottontail rabbit, groundhog, field mouse and ground squirrel are all residents of the project's open field habitat. Although skunk, opossum, raccoon, red and gray squirrels and red and gray fox usually locate their dens in wooded areas, they nevertheless are dependent on these same open fields for much of their food. White-tailed or Virginia deer similarly rely on open fields or reforestation areas for much of their browse material. Thus, it can be readily seen that the continued presence of these terrestrial species is directly linked to maintaining a diverse array of cover types within the project. The existing furbearing animals such as mink, weasel and muskrat are considerably less dependent on open field habitat, although they do use these areas for foraging if they are available.

3.4.3.2 Aerial. As with the terrestrial animals, the variety of cover present in the project similarly supports a variety of birdlife. The

array of seasonal songbirds is attracted to the project primarily because of the food and habitat provided in open fields and fence rows. Winter residents such as the cardinal and bluejay similarly rely on open field food sources. Predatory birds that frequent the project include redtailed hawks, marsh hawks, the great horned owl and the more common barn and screech owls. These birds are heavily dependent upon open field species such as field mice, ground squirrels and snakes for much of their food. Popular upland game birds such as the mourning dove and pheasant can also be found in fence rows and abandoned fields of the project. Woodcock and ruffed grouse, also present in the project, more commonly frequent reforesting bottomlands or abandoned fields. Wild turkey can be found in the project from time to time; however, because they are extremely shy, they frequent only the more remote, least trafficked sites. Northwestern Pennsylvania and the French Creek drainage are located along the Allegheny Flyway--the migratory route waterfowl use to travel between summer ranges to the north and the Ohio River Valley and winter nesting areas to the south. Lakes and wetland areas along this migratory route serve as resting and feeding areas during these seasonal migrations. Although very few ducks or geese previously visited the Woodcock Creek area, this pattern has already changed since the construction of Woodcock Creek Lake, as indicated by published reports of considerable numbers of waterfowl visiting the project by the Audubon Society of Western Pennsylvania. During the late winter and early spring of 1974, species observed included American wigeons, redheads, canvasbacks, old squaws, black scoters, gadwall and ring-necked ducks.

3.4.3.3 Aquatic. Woodcock Creek is a relatively small tributary of French Creek with a total drainage area of only 51.8 square miles. However, despite this small size, its water quality is good and it presently supports a limited yet desirable fishery. The Pennsylvania Fish Commission administers an annual trout stocking program for this stream that was responsible for the brook and rainbow populations that previously existed within the project reach. It is doubtful, however, that this stream would support a trout population without this stocking program. Fish that are now present throughout most of this stream's length excluding the project include smallmouth bass, trout, bullheads, suckers, shiners, carp and chubs. During the spring of 1974, muskellunge, largemouth bass and black crappie were introduced to the lake by the Fish Commission. It is anticipated that a few fish of these species will migrate to Woodcock Creek.

3.4.4 Anticipated Ecological Impact of Project. The construction of the Woodcock Creek Lake project and its attendant public use developments has had and will continue to have a profound impact on not only the

natural environment of project lands, but also on non-project lands in the vicinity of Woodcock Creek Lake. These project impacts are discussed in the following paragraphs.

3.4.4.1 Flora and Fauna. The symbiotic relationship existing between plants and animals of the project is quite fragile. A change in or elimination of a particular cover type brings about a corresponding change in the dependent animal community. As shown on Plate 8, the clearing of the dam and lake site has and will remove a substantial portion of the project's existing vegetation. This will have the greatest impact on the stream bottom and floodplain ecosystems of approximately two-thirds of the project. The bulk of the animals living within or dependent upon this streamside habitat will migrate out of the project, while some will relocate in the non-flooded, upstream end. Woodcock, raccoon, mink and muskrat have been most severely affected by this loss of project habitat. With the impoundment of Woodcock Creek Lake, approximately two miles of free-flowing Woodcock Creek was also lost. An additional one mile of streambed will also be periodically inundated when flooding extends the lake upstream. The loss of this stream environment is of negligible significance as compared to the greater fishery potential created by the formation of Woodcock Creek Lake. Thus, in terms of the aquatic species discussed above, their number and variety will be greatly increased. The impoundment of the maximum summer pool has been accompanied by a corresponding loss of approximately 180 acres of relatively open wildlife cover. The wildlife species that were dependent on this habitat have thus been compelled to relocate in other areas within the project or, as is more likely, outside of the project in similar but undisturbed areas. The development of recreation areas around the periphery of the lake has further disrupted and, in most instances, dislocated most of the wildlife within these public use areas. Because of the proximity of relatively abundant, similar habitat within a short distance of the project, wildlife species have relocated rather than face an uncertain future in a greatly altered habitat. This is particularly true for larger animals such as Virginia deer, wild turkey, fox and many of the more shy species such as ruffed grouse. This process has already taken place within the main part of Colonel Crawford Park and the Stainbrook Recreation Area where construction is almost completed. It will also occur within the proposed future recreation areas described in this Master Plan. The only portion of the project that can be expected to retain a representative portion of its wildlife is the heavily forested, upstream segment, a short distance north of Blooming Valley. In addition to these more immediate environmental impacts on the project's flora and fauna, long-range, more gradual environmental changes will occur as the project's open areas slowly reforest and open field vegetation decreases. If allowed to proceed unchecked, this process will bring about

a corresponding change in the wildlife communities as woodland species replace open field animals.

3.4.4.2 Water-related. As cited above, the construction of the project has resulted in the permanent loss of approximately three miles of free-flowing stream environment. This impact will be more than offset by the creation of Woodcock Creek Lake and its considerably larger fishery potential. In addition to this lake fishery, the below-dam stream environment will be considerably improved through low-flow augmentation and water quality control during seasonal periods of minimal rainfall. This will enhance not only the fishery potential below the dam, but will considerably improve the water quality and fisheries of French Creek as well.

3.4.4.3 General. In addition to the above listed impacts, a number of less direct, project related activities can be anticipated that will also affect the area's ecology. The construction of a public recreation area, particularly one containing a recreation lake, inevitably precipitates private development on adjacent properties. If unregulated, this development normally has a number of negative influences on not only the recreation resource itself, but on the long-range quality and value of the entire project area--both public and private. Because of the low infiltration capacities of the soils of the Woodcock Creek valley, on-lot sewage disposal systems are undesirable for lots smaller in area than one acre. The installation of septic tanks on homesites that are smaller than this minimum may result in the pollution of nearby streams and wells. Unrestricted small lot development around the periphery of Woodcock Creek Lake could, therefore, lower the water quality of this resource and eventually destroy its fisheries and water recreation potential. Private development, particularly incompatible commercial establishments, will also blight the aesthetics of the area and will result in the eventual depreciation of property values. The recent completion of comprehensive plans for both Crawford County and Woodcock Township is a very important first step towards the control of undesirable private development around the project. The existence of both township and county subdivision regulations that clearly define minimum standards for on-lot sewage disposal systems further assist the regulation of undesirable development. However, the absence of an adopted Woodcock Township Zoning Ordinance restricting both the type and amount of development around the project, constitutes a definite threat to the long-range character of this area. While the enactment and enforcement of local land use regulations and ordinances are the responsibility of local officials, their actions or inaction in these matters bear directly on the future viability and character of the Woodcock Creek Lake project.

3.5 HERITAGE SITES. The French Creek valley and its tributaries were a strategic link in the water route between the Great Lakes to the north and the Ohio and Mississippi River valleys to the south. During prehistoric times, Indians were frequent visitors to this area, and many settlements and campsites existed along these waterways. Early explorers of western Pennsylvania also used these water routes during their wanderings, and a string of frontier fortifications soon became established at strategic locations along their route of travel. Fort Erie to the north, Fort Le Boeuf at Waterford and Fort Machault at Franklin formed the northern bulwark against the wilderness to the west. Frontier settlements became established around early trading posts, and farmsteads, grist mills, iron furnaces and overnight stagecoach stops soon followed. Because of the intensity and significance of this prehistoric and historic activity, it is imperative that existing records and artifacts of this period be preserved where possible. The public's acquisition of the Woodcock project and the construction of Woodcock Creek Lake creates both an opportunity and a need to locate and preserve heritage areas and artifacts within the limits of the project. With this goal in mind, the following investigations were conducted.

3.5.1 Archeological Sites. Carnegie Museum of Pittsburgh, Pennsylvania, under contract with the National Park Service, conducted an archeological survey of the three authorized French Creek projects (Woodcock Creek Lake and Union City and Muddy Creek Dams). This work, under the direction of Dr. Donald Dragoo, was begun in February of 1964. The objectives of this investigation were: (1) "To make an extensive survey of the areas affected by the impounded waters to record any sites not heretofore observed and to check the conditions of sites previously recorded," and (2) "To collect surface samples and to conduct test excavations at as many sites as possible in order to determine those sites most urgently requiring salvage."\* Only one site (36 Cw 24) was located within the area flooded by the Woodcock project. This was a small area of occupation during the Archaic Period and is located on the first terrace north of Woodcock Creek, west of the mouth of Bossard Run and directly behind the dam. This site was known by local collectors and produced only scattered artifacts. It was concluded that this location has minimal archeological significance. Other smaller occupation areas were located above the flooded area; however, past farming activity has all but destroyed these.

\* Dragoo, Donald W., Archeological Investigations in the Monongahela River and French Creek Valleys of Western Pennsylvania, Carnegie Museum, Pittsburgh, Pennsylvania, 1964-1965.

3.5.2 Historical Sites. Although the National Register of Historic places had been previously consulted to determine that there were no registered landmarks in the project area, there was no effort made to identify locally significant historical sites. Therefore, the Crawford County Historical Society was contacted and asked to investigate the project area and to identify any sites that they felt were historically significant. As reported in their response to this inquiry (see Exhibit A): "All historic buildings within the Woodcock Reservoir development area have either been removed or razed." However, despite this situation, an opportunity remains to preserve two grist mill sites of historical value. As reported by the Crawford County Historical Society:

"Two early, water-powered mill sites were located--the Dewey and Dickson mills.

"At the Dewey Mill site are (presently) a series of stone foundation walls, the concrete mill flume and the earthen bank of the millrace. This mill was present at least as early as 1876 and operated as a sawmill in 1885. A small refuse dump near the millrace contains china and bottle fragments of the late 19th century. A house foundation across the road is possibly associated with this mill.

"The Dickson Mill site is historically the most significant in the reservoir area. It consists of at least two stone foundations, two small milldams, earthen banks of a millrace several hundred yards in extent and two discharge channels to carry the water away from the mill. The property was settled by James Dickson in 1796. A grist mill was in operation by at least 1800, making it one of the earliest in northwestern Pennsylvania. By 1814, he had added a fulling mill. The county tax book for 1831 shows him having a grist mill, fulling mill, carding machine and a sawmill. The fulling mill was removed in 1969 by Mr. Kenneth Bechtel and has been restored on his property near Blooming Valley. A refuse dump in one discharge channel has produced china, crockery, glass and iron tool fragments of possible early date. The foundation of the Dickson homestead is directly across the road from the mill site.

"Sites of lesser historical interest in the reservoir area include the former locations of a blacksmith shop, cheese factory, school house, post office, carpenter shop, grocery store and the Dickson Cemetery."

In addition to the two old mill sites above the maximum summer pool (elevation 1181.0), a third site is located immediately east of the south end of the causeway. The mill at this site was the first grist mill in Crawford County and was at one time operated by a man named Carringer according to the county commissioners. Because both the mill site and mill race will be under water most of the time, no interpretive efforts will be undertaken in connection with this site. However, any artifacts recovered from the site will be preserved and displayed at the museum discussed below.

The Crawford County Historical Society suggested that certain actions be taken to preserve and enhance these remaining project historical areas. These measures include the erection of appropriate markers, signs and interpretive devices at all historical sites within the project and particularly the Dickson and Dewey Mill sites. In addition to erecting interpretive devices, these latter two sites should also be kept free of development, cleared of brush and maintained in a manner that enhances their historical and educational values. A university-directed archeological investigation of the Dickson Mill site should be conducted with the dual purpose of reclaiming valuable historical artifacts, while at the same time better defining the outlines of the original features and structures. A museum will be constructed at the Colonel Crawford Park administration area in order to provide a centralized display area for collected historical materials and information. The approximate locations of both the Dickson Mill and the Dewey Mill sites are shown on Plates 14 and 17. A more complete discussion of the future interpretation program to be undertaken by Crawford County is presented in Section 5.0.

## SECTION 4.0 - PLANNING CONSIDERATIONS

- 4.1 OVERVIEW. Section 3.0 of this document identifies some of the broader or more generalized resources of the project. Each of these items has either directly or indirectly influenced the development of this Master Plan. However, additional, more specific considerations have further restricted and/or determined the specific types, locations and intensities of potential project land uses and activities. While the region's climate, hydrology and geology have generally shaped or determined the project's overall character, a specific site's topography and soils has more directly determined whether or not certain land uses are feasible. In a similar fashion, man's past activities within the project area and its ecology have largely determined this area's existing land use patterns and vegetation. These, in turn and in conjunction with the existing topography, have created scenic resources and values that further delimit development options. The public's access to the project area and to specific sites within this area similarly defines development possibilities and limits master planning considerations. This portion of the Master Plan addresses these and other resource constraints and describes the influence each of these has had on project planning.
- 4.2 TOPOGRAPHY. One of the greatest constraints to the potential development of an area is its topography--the more rugged the terrain, the less development is usually possible. However, as shown on Plate 5, most of the Woodcock Creek Lake project is relatively flat. As previously discussed, this topography is a product of the region's glacial history. The successive ice sheets that passed over the area rounded the ridge lines, broadened the valleys and deposited thick layers of glacial sediment on both, further "softening" the area's contours. As a result of this process, there are very few nondevelopable, steeply sloping areas within the project. The few steep slopes that are greater than 16 percent are primarily located along the minor tributary valleys of the project. While topography will, therefore, only minimally restrict development within the project, its flatness and "open" character does create an adverse condition worth noting. As can be seen on Plate 5, with few exceptions, all areas within the project are intervisible. This situation, coupled with the project's relatively small overall area, will, to some extent, reduce the possibility of providing either physical or psychological privacy between activity areas. The project's open character thus tends to underline the importance of existing and future vegetation, particularly tree masses.
- 4.3 SOILS. Soils are the surface by-products of thousands of years of geological process. Although modified through the gradual addition of organic materials

and the workings of man, the physical properties of soils are directly linked to the parent materials from which they were derived and the physical manner in which they were built up or deposited. Because of the wide variation in this process between and within geographic locations, distinct differences in soils occur. Categories of these differing soils are referred to as soil types. Each soil type has distinct properties that lend themselves more readily to certain land uses. Thus, once a soil type map is prepared, it is relatively easy to determine a given area's land use potential. The Soil Conservation Service (SCS) of the United States Department of Agriculture has typed and mapped the soils of Crawford County. The information developed in this agency's Crawford County, Pennsylvania; Interim Soil Survey Report, Soil Interpretations of 1970 was used in preparing this Master Plan. The SCS evaluated each soil type as to its suitability for, among other uses, recreation development, wildlife management and forest management. This information provided the means to map and evaluate the project's soils for each of these three potential uses. The following discussion describes the methodology used in this mapping process and also details the subsequent use of these maps in the preparation of this Master Plan.

4.3.1 Recreation. The SCS has rated each of the county's soils as to their suitability for seven types of potential recreation use. The soil properties that were considered in determining this suitability include, among others, the depth to bedrock, the depth to the seasonal high water table, slope, the surface texture, stoniness and flooding frequency. The seven recreation uses considered by the SCS were tent camping, trailer camping, the construction of recreation buildings without basements, the development of paths and trails, picnicking and intensively used play areas, athletic fields and golf fairways. Each soil was then evaluated by the SCS to determine whether it had severe, moderate or slight limitations for each of these uses. Because there will be no golf fairways constructed within the project, soil restrictions for this use were ignored by this Master Plan. Restrictions for athletic fields were similarly ignored, but for a different reason. As subsequently discussed, for purposes of master planning, the soil limitations listed for each recreational use were combined into three suitability categories--good, fair and poor. However, because athletic fields can only be situated on exceptionally well-drained or dry sites, the inclusion of this use in these combined suitability categories would unfairly discriminate against other less demanding recreational uses. As shown on Plates 9, 10, 11 and 12, a simplified soils rating system was devised for Master Plan mapping purposes. If a soil type does not have a severe limitation listed for any of the five recreation uses, it was classified as being

good for recreation development. A soil that has only one severe limitation was considered fair for such development and, if two or more severe limitations are listed, a soil was considered poor for recreational purposes. Plate 9 is a map of the project's soils that reflects these recreation classifications. A number of intensively used athletic fields will be constructed in the project. The location of these facilities was contingent upon the presence of exceptionally well-drained soils, and this determination was made independent of Plate 9.

4.3.2 Forest Management. The SCS also evaluated the soils of the project as to their suitability for forest management purposes. The criteria used were management problems, species suitability and site quality. For purposes of master planning, the latter two criteria were ignored, and only management constraints were used to determine the suitability of each soil type for forest management. The five management constraints identified by the SCS are erosion hazard, equipment limitations, seedling mortality, plant competition and wind-throw hazard. The soil characteristics that influence each of these constraints include fertility, exposure, slope and depth to bedrock. Each of the soils were classified as to whether it has severe, moderate or slight limitations in each of the five areas of management concern cited above. As with recreation, these ratings were further modified for master plan mapping purposes to indicate whether the soils are good, fair or poor for forest management. They were then mapped as shown on Plate 10.

4.3.3 Wildlife Management. Almost all types of soil will support some type of vegetation which, in turn, will sustain some wildlife species. However, for purposes of management for specific mixes of wildlife or game species, certain soil types produce better wildlife habitat and cover than others. Thus, from a resource management perspective, the identification of wildlife management areas is linked directly to soil characteristics. The SCS rated each soil type in the project as to its suitability for openland wildlife, woodland wildlife and wetland wildlife. Each soil was given a numerical rating indicating its suitability for each of these three wildlife uses (i.e., 1 = good; 4 = very poor). This four point rating system was further modified for master plan mapping purposes to create a suitable versus poorly suited classification (i.e., 1 and 2 = suited; 3 and 4 = poorly suited). These ratings were then mapped (Plate 11) to show those project areas that are best suited for wildlife.

4.3.4 Synthesis and Analysis. The three soils maps discussed above were used to determine a synthesized definition of the optimum suitability of the soils within the Woodcock Creek project. In the instances of areas

with conflicting suitabilities, subjective evaluations were made to determine which of the possible land uses was the most desirable or appropriate. Additional factors such as topography, location and existing vegetation became critical factors in this process. Plate 12 is the product of this analytical process. As previously noted, there are relatively few physical constraints to development within the project and much of its topography is reasonably flat. Thus, the information developed through this soils analysis became the critical determinant in defining an optimum land use plan for the project. As shown on Plate 12, the majority of the upstream or eastern end of the project has soils that are poorly suited for active recreational use. Such development will be possible, however, on both sides of Township Route 650 on both the north and south banks of Woodcock Creek Lake. On Plates 9 and 12 is a large area in the main part of Colonel Crawford Park which is indicated as poor for recreational use and suitable for wildlife management, respectively. Despite this indication, a substantial portion of the existing recreation facilities were constructed on this land because of its desirable topography and relationship to the lake. It should be noted that the above soils analysis has been done only to assist in the master planning process. Prior to the final design and construction stages of project development, more sophisticated site-specific soils information will be obtained as required.

4.4 EXISTING LAND USES AND VEGETATION. The existing land use pattern within the confines of the project is typical of the entire Woodcock Creek watershed. It is a product of an interrelated and complex series of determinants that includes social, economic and locational factors as well as physical characteristics such as topography, soils and climate. The existing vegetation is largely a product of past land use practices and additional ecological factors. The existing land use pattern and the existing vegetation have both influenced the master planning of this project.

4.4.1 Existing Land Uses. Within the confines of the project, agricultural land use prevails. Residential land use is confined to the periphery of the project, such as along Pennsylvania Route 198 or to individual farmsteads. The only nearby concentration of residential land use is in the vicinity of Blooming Valley outside of the project. This same community also contains the only commercial development in the area. The farmland within the project can be further categorized into cultivated fields and pastureland, non-used reforestation fields and farm woodlots. As previously discussed in Paragraph 3.4, the small stands of forest (farm woodlots) that are scattered throughout the project are the second- and third-growth remnants of the forest that once covered the entire Woodcock Creek valley. These stands

generally occupy the poorer sites within the project (e.g., steep slopes, narrow valleys or wet areas) and probably represent the highest and best use of these areas. The land use pattern shown on Plate 8 is essentially a picture of agricultural suitability. Generally, the sites best suited for agriculture, such as relatively level areas with well-drained soils, are also well suited for intensive recreation development.

4.4.2 Vegetation. The vegetation associated with each of the project's agricultural land use categories has been previously described in Paragraph 3.4. As noted in that discussion, this vegetation is a product of not only past land use practices, but also reflects other determinants such as climate, topography, exposure and soil characteristics. The physical characteristics of a site are essentially fixed and change very little over time. Thus, if left undisturbed, a native plant community occupying the site will proceed along a predetermined path of ecological succession until the ultimate or climax plant association is reached. Man's land use interventions disrupt this "programmed" ecological cycle. Thus, as cited above, the vegetation seen on Plates 7 and 8 is a living record of man's historic interaction with the project's land resources. The least used, poorly drained and steeply sloping areas have been able to achieve a higher or more progressed stage of ecological succession than their more intensively used counterparts. Thus, the most recently cultivated sites are now covered with grasses and some small shrubs, while those areas that have been only infrequently or never cultivated support advanced associations of forest species. Marginal lands that have been intermittently used now sustain mixed associations of shrubs, open field grasses and scattered forest species. This relatively fixed cycle of ecological succession, from open fields to forest stands, can be intentionally interrupted at any point to achieve or maintain a desired vegetative cover. The existing vegetation thus constitutes a valuable natural resource that is vital to the optimum management of the project. The location, character and future potential of this vegetation has been considered throughout the preparation of this Master Plan.

- 4.5 SCENIC VALUES. An area's scenic quality is dependent upon not only its physical attributes such as topography or vegetation, but also the subjective values of the observer. However, because of the expected diversity of future project visitors, this Master Plan has considered only those scenic resources that have been found to be attractive to the average outdoor recreationist. These resources can be divided into two categories--those that are more or less natural, and those that have or will result from the activities of man. The gently rolling, relatively "open" topography of the project constitutes a visual resource of the first category, while the primarily rural, "checker-board" land use pattern of the Woodcock Creek valley is, for the most part,

a visual resource of the second category. While the scenic resources of this valley cannot be considered unique, they have, nevertheless, been considered throughout the master planning of the project. These resources include, but are not limited to, the following:

1. The gentle slopes and "big sky" character of the Woodcock Creek valley.
2. The valley's relatively undisturbed, rural character.
3. The pleasing contrasts in vegetation between the open farm fields and the wooded tributary valleys and farm woodlots.
4. The relatively dense stands of hemlock and contrasting hardwoods within the upstream or eastern extremity of the project.

The creation of Woodcock Creek Lake and the accompanying development of public-use areas around its periphery have significantly altered the visual properties of this valley. Approximately two miles of free-flowing Woodcock Creek have been replaced by a 333-acre lake, and much of the project's valley floor will be occasionally inundated. The construction of new project roadways and the additional relocation of previously existing roadways has further altered the scenic characteristics of the valley. However, despite these physical disruptions, many of the visual resources remain more or less undisturbed and some have been enhanced. Implicit in this master plan is the desire to minimize disruptions to the remaining and enhanced scenic resources. All future project developments will, therefore, be designed and constructed in a manner that is harmonious with their individual surroundings. New roadways will be constructed with the topography and not against it, thus minimizing excessive cuts and fills. Exposed cuts and fills resulting from such construction will be immediately planted to reduce erosion and to restore a semblance of natural appearance. Other facilities in public use areas will be similarly designed in a sensitive fashion and "softened" through post-construction seeding and plantings. Hiking and interpretive trails will also be fitted to the terrain and will be designed in a manner that will optimize visual opportunities.

- 4.6 ACCESS TO PROJECT AREA. The existing highway network providing access to the Woodcock Creek Lake project will have a direct bearing on the amount of visitation this development will receive. Nonresidents of Crawford County will rely heavily on interstate and interregional high-speed highways to gain access to the Meadville-Woodcock area. Regional highways

and local service roads will then be used to gain access to specific recreation sites within the project. Thus, the presence of both inter- and intra-regional highways and roads will have a significant impact on the number of visits to and the use of this project's recreation facilities. As shown on Plate 1, northwestern Pennsylvania and the project area are quite accessible from points outside this region because of the presence of many high-speed federal highways. Federal routes 19 and Interstate 79 bisect northwestern Pennsylvania in a north-south direction and provide ready access to metropolitan residents of both Erie and Pittsburgh. There are a number of major interregional east-west highways that pass through or near Crawford County. These include Interstate Routes 90 and 80 and Federal Routes 6, 322 and 62. Thus, as shown on Plate 1, the heavily populated metropolitan areas of Erie, Cleveland, Youngstown and Pittsburgh are all within a short driving distance of the northwestern Pennsylvania recreation region and the Woodcock Creek Lake project. The interconnection of these major highways assures access to the Meadville-Saegertown area. Once in this area, visitors will be able to use one of the many state or local roadways to get to the specific project area of their choice. As shown on Plate 2, motorists from the Interstate Route 79 or U. S. Route 19 corridors can use Pennsylvania Route 198 (from Saegertown) or State Route 86 (from Meadville) to reach Woodcock Creek Lake. Visitors from the east can use Pennsylvania Routes 77 and 198 to arrive at the same locations. Circulation around Woodcock Creek Lake and between recreation areas is facilitated by the local network of roadways shown on Plate 2. The more critical elements of this local road system are Township Roads 584, 621 and 650 and Legislative Route 20063 and Pennsylvania Route 198.

#### 4.7 ESTIMATED PUBLIC VISITATION.

4.7.1 Background. The number of visits to a recreation area is dependent upon the amount of existing and potential user demand within a recreation facility's area of influence or "market area". While the quantification of this demand is admittedly a subjective process, it is, nevertheless, a prerequisite to planning an adequate number of facilities to accommodate visitors. The methodology used to estimate recreation demand can vary with the specific needs at hand. However, despite the specifics of the methodology used, each procedure must recognize and attempt to evaluate the influence of a number of critical determinants. These include the physical characteristics of the resource, an area's overall accessibility from nearby population centers, the demographic characteristics of its market area and the location, number, size and character of competing recreation areas. As described in Paragraph 4.6, there is a relative abundance of both major and secondary routes of access to the

project, both within Crawford County and in the northwestern Pennsylvania region in general. It is anticipated that this network of highways will adequately meet the needs of recreationists wishing to visit the Woodcock Creek Lake project. Two of the remaining visitation factors cited above, market area characteristics and competing recreation areas as well as the visitation that was experienced during the 1974 recreation season, are discussed in the subsequent paragraphs. While it is not possible to quantitatively determine the amount of influence each of these factors will have on project visitation, this discussion will depict each in a manner that will be helpful in estimating future recreation demand.

4.7.2 1974 Visitation. During 1974, nearly 334,000 visits to the Woodcock Creek Lake project were recorded. On 24 May 1974, the Crawford County Commissioners assumed responsibility for operation and maintenance of Colonel Crawford Park including the Stainbrook Recreation Area and the Fishermen's Access Area immediately upstream of the causeway on the left or south bank. Since that time, the project has attracted approximately 220,000 visitors and about 125,000 of these visited Colonel Crawford Park. Of the recreationists who visited the various parts of Colonel Crawford Park, only about 55,000 visited the main portion of the park. The majority of those who visited the Woodcock Creek Lake project during the period for which records are available were sightseers. While over 211,000 people representing about 63 percent of the total project attendance were sightseers, only about 60,000 of these sightseers visited project areas other than the dam and overlook. The second activity in popularity during the period of record was fishing, which attracted over 55,000 participants or about 16 percent of the project visitors. About 72 percent of this fishing activity occurred in the Stainbrook Recreation Area and in the Fishermen's Access Area below the dam. Picnicking and swimming opportunities attracted about 11 percent and 4 percent, respectively, of the project visitors during the period of record. Somewhat more than 1 percent of the attendance represents campers and slightly less than 1 percent represents boaters. The use pattern which emerges from the above visitation data is fairly typical of that experienced at other reservoir projects during the first year of public use. Sightseers usually account for a large portion of the first year visitation. While sightseeing attendance can be expected to remain relatively stable or, perhaps, decrease somewhat in future years, visitation associated with other activities can be expected to increase rapidly in the subsequent early years of project operation as first-year sightseers return to participate in more active pursuits and more potential visitors become aware of the project and the opportunities that it offers.

4.7.3 Market Area Characteristics. The Battelle Memorial Institute determined in its 1968 publication, Analysis of Recreation Data, prepared

for the former Pennsylvania Department of Forests and Waters (now Penn DER), that approximately 70 percent of the total day-use visits to a regional recreation facility (i.e., a state park or typical Corps reservoir project) originate within a one hour driving distance, or within a 40 to 50 mile radius of the recreation area. The one hour day-use market area for the Woodcock Creek Lake project is shown on Plate 1. As can be noted on this locational map, there are a number of relatively large population centers within this one-hour zone, including the towns of Erie, Meadville, Sharon, Franklin and Oil City in Pennsylvania and Ashtabula in Ohio. However, because most of these communities are located near the outer limits of this one-hour market area, the bulk of the day-use visitation to the project will stem from the day-in and day-out use by the nearby residents of the Meadville area. Thus, in terms of demographic determinants, the population characteristics of Crawford County will have a significant influence on future visitation to the project. A brief analysis of the characteristics of the day-use market area population will provide some general insights into the potential recreational use of the Woodcock Creek Lake project. The following discussion is based on 1970 U. S. Census information.

4.7.3.1 Demographic Profile. As shown on Plate 1, there are six counties within the day-use market area of Woodcock Creek Lake--Erie, Crawford, Forest, Mercer and Venango Counties in Pennsylvania and Ashtabula County in Ohio. It can also be noted on Plate 1 that there are only a few urbanized areas within this six county area; and, as previously cited, these are located near the outer limits of the market area. These include the towns of Erie and Sharon in Pennsylvania and Ashtabula in Ohio. The remainder and greatest portion of this six county area is rural in character and has a low population density. A number of critical characteristics of this population are listed in Table 2. While the information contained in this table does not provide a comprehensive picture of the day-use market area, it does give a general indication of the way its residents will participate in outdoor recreation.

4.7.3.1.1 Observations. The three most heavily populated counties listed in Table 2 are Erie, Mercer and Ashtabula. These same three counties also have the peripheral urban concentrations of population noted previously. Column 3 of Table 2 further reflects this urban-rural population distribution. Because of the inherent similarities of the urbanization process, various urban populations manifest similar characteristics. Because of the normally greater job opportunity within urban areas, cities tend to draw a disproportionate share of young job seekers from their surrounding rural areas. This migration of the young tends to lower the average age of

the urban areas while increasing the average age of the declining rural areas. Columns 4 and 5 of Table 2 reflect this age shift. As can be noted, Erie, Mercer and Ashtabula Counties (the most heavily populated, urbanized counties) all have lower percentages of people that are 65 years old and older and also have the lowest median ages of the six market area counties. The greater economic opportunity usually associated with urbanization is also reflected in Table 2. As can be noted in Column 6, these same three urban counties also have the highest median family incomes and, as indicated in Column 7, have the lowest percentage of families that have incomes less than their defined poverty level. Thus, Woodcock Creek Lake's day-use market area can be demographically described as being predominantly rural with urbanizing fringes. Those residing closest to the project have comparatively less income and are somewhat older than their more distant urban counterparts.

4.7.3.1.2 Public Use Implications. Although the market area population characteristics described above were not specifically used in the subsequent visitation calculations, they were useful in tempering the product of these calculations to better reflect market area conditions. If Table 2 is examined in conjunction with recently published U. S. Bureau of Outdoor Recreation (BOR) information concerning participation rates in outdoor recreation, the following implications can be noted. BOR has determined that participation in outdoor recreation increases with the degree of urbanization. Thus, the urbanized residents of Sharon, Erie and Ashtabula can be expected to recreate at a greater rate than the more rural residents of the day-use market area. However, this comparatively higher rate of urban participation will be largely offset by the travel distance to the project and the decreased participation usually associated with such distances. BOR has further determined that of all the independent variables associated with participation in outdoor recreation, the age of the individual recreationist has the greatest influence on the rate of activity--the older an individual, the less participation. As described above, the youngest and potentially most active recreationists are located within the relatively distant urban fringes of the market area. As shown in Table 2, those counties closest to the project have the oldest populations and will therefore tend to recreate less than their younger urban counterparts. BOR also established a positive correlation between family income and outdoor recreation activity. As indicated above, the more affluent urban populations are located at the outer limits of the day-use market area. The less affluent rural population is located closest to the project. For reasons of income alone, these rural residents will tend to visit the project less. Thus, in terms of the demographic implications contained in Table 2, it can be surmised that despite the presence of relatively

TABLE 2  
**DEMOGRAPHIC CHARACTERISTICS  
 OF DAY-USE MARKET AREA**

STATE AND COUNTIES	POPULATION			AGE		INCOME		EDUCA- TION	% UNEMP- LOYMENT
	(1) TOTAL POPULATION 1970	(2) POPULATION PERCENT CHANGE (1960 - 1970)	(3) PERCENT 1970 URBAN POPULATION	(4) PERCENT 65 YRS OLD AND OVER	(5) MEDIAN AGE	(6) MEDIAN FAMILY INCOME	(7) PERCENT OF FAMILIES LESS THAN POVERTY LEVEL INCOME	(8) MEDIAN NUMBER OF SCHOOL YEARS COMPLETED (25 AND OVER)	(9) PERCENT OF CIVILIAN LABOR FORCE UNEM- PLOYED
PENNSYLVANIA	11,793,864	+ 4.2	71.5	10.8	30.7	\$ 9,558	7.9	12.0	3.7
CRAWFORD	81,342	+ 4.3	29.4	11.4	29.1	\$ 8,658	10.2	12.2	3.5
ERIE	263,654	+ 5.2	75.0	9.4	27.7	\$ 9,363	6.8	12.2	4.1
FOREST	4,926	+ 9.8	0	15.5	34.5	\$ 8,291	8.2	11.4	5.0
MERCER	127,175	- 0.3	49.8	10.5	29.1	\$ 9,287	7.6	12.2	3.9
VENANGO	62,353	- 4.5	53.4	11.0	30.6	\$ 8,248	10.6	12.0	3.4
OHIO	10,652,017	+ 9.7	75.3	9.4	27.7	\$ 10,372	7.6	12.1	4.0
ASHTABULA	98,237	+ 5.6	49.6	10.2	28.4	\$ 9,894	7.5	12.1	4.0

INFORMATION OBTAINED FROM 1970 U. S. CENSUS DATA.

young and affluent urban population centers within the day-use market area, their relatively distant locations at the outer limit of this visitation zone will tend to offset these other positive participation determinants. It can, therefore, be anticipated that the day-in and day-out use of the project will be largely determined by those older, less affluent, primarily rural market area residents that reside within a short distance of Woodcock Creek Lake, although, because of its close proximity and more urbanized population, the city of Meadville will also contribute a substantial portion of the project's visitors. The amount of use this project will receive from visitors outside of the market area and region will depend in large part on the number and character of competing recreation areas. This is the subject of the following discussion.

4.7.4 Competing Recreation Areas. Northwestern Pennsylvania is the second most popular recreation and vacation area in the Commonwealth, surpassed only by the Poconos region in the northeast. The majority of the many public and private recreation areas located in this portion of the state are within a short driving distance of the project, as shown on Plate 1. The Pennsylvania Bureau of State Park's 1970 publication, Outdoor Recreation Horizons, classifies northwestern Pennsylvania as a recreation "in-flow area" because of its attraction to vacationers and recreationists from outside the region. Whether or not any of this in-flow will spill over into the Woodcock Creek Lake project will largely be dependent upon the number and character of nearby recreation areas. Table 3 is a listing of these publicly owned competing regional recreation facilities. As shown in this listing and on Plate 1, there are 11 existing or proposed major recreation areas within a one-hour driving distance of the project. Four of these are Corps projects and the remainder are state parks, including the two most popular parks in the Commonwealth. As listed in Table 3, Pymatuning Lake and its two state parks attracted a total of about 9,200,000 visitors in 1971, with nearly 7,000,000 of these visits occurring in Pennsylvania. Presque Isle State Park on the shore of Lake Erie is the second most popular park in the state and had approximately 4,000,000 visitors during 1971. There are 20 additional major public recreation areas within a two-hour driving distance of Woodcock Creek Lake. As listed in Table 3, the most popular area in this secondary market area is Kinzua Dam and Allegheny Reservoir which received over 2,000,000 visits in 1971. The newly opened Moraine State Park had almost as many visitors during this same year. In addition to the public parks listed in Table 3, there are also many other quite popular recreation resources in this region. These include Conneaut Lake, Canadohta Lake, Chautauqua Lake, the Allegheny River and Lake Erie. Thus, in light of the many attractive and extensively developed competing recreation areas in the region, it seems logical to assume that these facilities will continue to attract the bulk of the out-of-region visitors. This is not to

TABLE 3

**COMPETING PUBLIC RECREATION AREAS  
DAY-USE MARKET AREA  
0-1 HOUR DRIVING TIME**

AREA NAME	CHARACTERISTICS							GOVERNMENTAL ENTITY
	1970 ANNUAL VISITATION	LAKE	SWIMMING	PICNICKING	CAMPING	POWER BOATING (HP*)	AREA (ACRES)	
SHENANGO RIVER LAKE	1,096,862	•	•	•	•	U	14,905	U.S.
TIONESTA CREEK LAKE	576,723	•	•	•	•	U	3,390	U.S.
UNION CITY LAKE	N/A			UNDEVELOPED			465	U.S.
MUDDY CREEK LAKE	N/A			UNDEVELOPED			N/A	U.S.
MOSQUITO CREEK LAKE AND STATE PARK	2,013,370	•	•	•	•	U	11,857	U.S., OHIO
ALLEGHENY RIVER STATE PARK	N/A			UNDEVELOPED			3,568	PA.
MAURICE K. GODDARD STATE PARK	58,250	•		•		10	6,972	PA.
OIL CREEK STATE PARK	47,300			UNDEVELOPED			7,197	PA.
PRESQUE ISLE STATE PARK	3,876,282	•	•	•		U	3,100	PA.
PYMATUNING STATE PARK (PA.)	6,983,811	•	•	•	•	10	20,377	PA.
PYMATUNING STATE PARK (OH.)	2,193,634	•	•	•	•	10	8,500	OHIO

\*HP = KNOWN MOTOR HORSEPOWER RESTRICTION

U = UNLIMITED

TABLE 3  
(continued)  
**COMPETING PUBLIC RECREATION AREAS  
SECONDARY MARKET AREA  
1-2 HOUR DRIVING TIME**

AREA NAME	CHARACTERISTICS							GOVERNMENTAL ENTITY
	1970 ANNUAL VISITATION	LAKE	SWIMMING	PICNICKING	CAMPING	POWER BOATING (HP*)	AREA (ACRES)	
ALLEGHENY NATIONAL FOREST	N/A	•	•	•	•	U	700,000	U.S.
KINZUA DAM AND ALLEGHENY RESERVOIR	2,169,556	•	•	•	•	U	71,871	U.S.
BERLIN LAKE	1,103,700	•	•	•	•	U	6,880	U.S.
MICHAEL J. KIRWAN LAKE AND STATE PARK	948,115	•	•	•	•		8,456	U.S., OHIO
CHAPMAN STATE PARK	213,330	•	•	•	•		803	PA.
CLEAR CREEK STATE PARK	210,935		•	•	•		1,123	PA.
COOK FOREST STATE PARK	1,030,390		•	•	•		7,822	PA.
McCONNELLS MILL STATE PARK	207,740			•			1,925	PA.
MORaine STATE PARK	1,725,596	•	•	•	•	10	15,921	PA.
POINT STATE PARK	589,622						36	PA.
S. B. ELLIOT STATE PARK	2,910			•			721	PA.
BEAVER CREEK STATE PARK	235,991			•	•		2,026	OHIO
GENEVA STATE PARK	205,906	•	•	•		U	466	OHIO
GUILFORD LAKE STATE PARK	695,324	•	•	•	•	10	489	OHIO
HEADLANDS BEACH STATE PARK	829,983	•	•	•		U	120	OHIO
NELSON AND KENNEDY LEDGES STATE PARK	150,527			•			167	OHIO
PUNDERSON STATE PARK	999,257	•	•	•	•		733	OHIO
ALLEGANY STATE PARK	N/A	•	•	•	•	U	60,480	N.Y.
EVANGOLA STATE PARK	N/A	•	•	•	•	U	759	N.Y.
LAKE ERIE STATE PARK	N/A	•	•	•	•	U	355	N.Y.

\*HP = KNOWN MOTOR HORSEPOWER RESTRICTION

U = UNLIMITED

say that Woodcock Creek Lake will not also receive some of this in-flow visitation; however, because of its limited size and relative absence of uniqueness, this non-resident usage should be rather small. In light of the previously discussed market area characteristics and the presence of numerous competing recreation areas with significantly greater resource appeal, it is anticipated that the Woodcock Creek Lake project will function essentially as a county recreation area with a relatively limited county-wide appeal.

#### 4.7.5 Visitation Projections.

4.7.5.1 Background. The visitation estimating procedure used in this master plan is detailed in Appendix F. It is derived from data collected in a survey of existing U. S. Army Corps of Engineer projects that was begun in 1962. The reports detailing the findings of this study were published in 1969.\* Based on this study, a technique was developed for predicting future recreation use and to determine the number and types of recreation facilities needed to satisfy a given number of recreation days of demand (facility load criteria). As described in Appendix F, this technique was generally followed in estimating the theoretical visitation to the Woodcock Creek Lake project. Briefly summarized, a "most similar project" approach was used to select from the 52 projects for which information is given in Technical Report No. 2 those lakes that most resemble Woodcock Creek Lake. Once this selection was made, the known characteristics of the most similar projects were used to extrapolate theoretical visitation estimates for Woodcock Creek Lake. The most critical variables in this process were the relative locations of the nearest population centers and the per capita use rates of these populations as affected by travel. It was determined through these calculations that the total initial (1976) visitation will be about 500,000 recreation days, while the ultimate (2073) visitation would total about 900,000 recreation days. It was then possible to convert these numbers to required facilities. The product of these conversions are listed in Appendix F.

4.7.5.2 Application. As described more fully in Appendix F, the product of the above demand calculations seem reasonable in terms

\*Pankey, V. S. and Johnston, W. E., Analysis of Recreational Use of Selected Reservoirs in California, (Contract Report No. 1), U. S. Army Engineer District, Sacramento, July, 1969; and U. S. Army Corps of Engineers, Estimating Initial Reservoir Recreation Use, (Technical Report No. 2), U. S. Army Engineer District, Sacramento, October, 1969.

of what is known about the overall regional recreation picture of Northwestern Pennsylvania. However, in the instance of two activities, the projected demands exceed the physical capacity of the project. Thus, the proposed development plan is contingent upon not only future activity demand, but also, in the instances of boating and camping, area and resource limitations.

4.8 ADDITIONAL PLANNING CONSTRAINTS. The previous portions of this master plan have primarily discussed planning constraints associated with pre-development conditions. The construction of the Woodcock Creek Lake project and the project-related relocation of utilities and roadways introduce additional planning considerations that have and will continue to similarly influence project development. The following paragraphs discuss a number of these project-induced planning constraints.

4.8.1 Roadway Modifications and Utility Relocations. As shown on Plate 2, a number of major and minor roads have been relocated within and around the periphery of the project. However, in terms of project development, only two of these relocations significantly influenced project planning. The shifting of Legislative Route 20065 (Pennsylvania Route 198) to the north of its original location not only maintains the existing east-west traffic flow through and around the project, but also enhances the development potential of Woodcock Creek Lake's northern shoreline. The raising of Township Road 650 and the construction of its elevated causeway and bridge bisects the project (east to west) and effectively bars shoreline travel between the upstream and downstream portions of the project. However, this elevated roadway provides excellent access to the interior of the project, while at the same time providing a physical separation between potentially conflicting project activity areas. The utility relocations within the project were limited primarily to power and communication distribution lines. These facilities are owned by the Northwestern Rural Electric Cooperative Association, Inc. and the Meadville Telephone Company. The relocation of these lines along relocated roadways and the elimination of such facilities within the interior of the project further enhance the development potential of the lands around Woodcock Creek Lake.

4.8.2 Reservoir Plan of Operation. The seasonal and day-to-day operation of the Woodcock Creek Lake project will directly affect the elevation of the summer pool and, for this reason, its use for recreation. These pool fluctuations will have the greatest impact on the planning and use of facilities for boating, swimming and fishing. As described in Paragraph 2.4, pool fluctuations will result from the operational requirements of augmenting downstream flows during dry summer months and from the seasonal need to provide flood

storage capacity during the winter and spring months. The storage and release curves shown on Chart 1 indicate that during normal seasonal operation the flood storage drawdown will begin during the latter part of August and will continue until the lake's elevation reaches 1165.5, or a vertical drop of approximately 15.5 feet. This elevation will be maintained throughout the winter months until about mid-March when the gates will be closed and spring runoff will raise the lake once again to elevation 1181.0. As planned, the maximum summer pool elevation will be established during the early part of May. This flood storage drawdown cycle will not interfere with the recreational use of the lake during the normal summer recreation season. However, Woodcock Creek Lake's relatively flat lake bottom gradient coupled with the 15.5 foot drawdown will produce mudflat areas around the periphery of the lake that will limit its recreational use to some extent after drawdown is initiated. Spring and fall lakeshore access and, thereby, shoreline fishing and other more passive shoreline activities will be most affected by these mudflats, although they will still be possible, particularly during periods of dry weather. Boating access will be possible by way of the boat launching ramp constructed in the main part of Colonel Crawford Park. Assuring a downstream minimum flow of 75 cfs during the summer months will require periodic augmentation from Woodcock Creek Lake during seasonal dry spells. As shown on Chart 2, during seasons of normal precipitation, these discharges will have only a minimal effect on the water level of Woodcock Creek Lake. However, during prolonged periods of minimal rainfall, downstream discharges will be initiated much earlier than normal and will have a progressively negative impact on the recreational use of the lake as the dry period continues. As previously noted, because of the relatively flat lake bottom gradient, even small drawdowns of a few feet in elevation will cause large mudflats to be exposed in some of the more level shoreline areas of the project. Visitor access to the lake will, thus, be impaired in these locations.

4.8.3 Incompatible Sites. There are no known incompatible sites within the boundaries of the Woodcock Creek Lake project that will limit its further development. Although a large borrow excavation has been made along the north side of Woodcock Creek on the upstream side of Bossard Run, most of the excavation has been inundated by Woodcock Creek Lake.

4.8.4 Past Exploitation of Natural Resources. There is very little evidence of past natural resource exploitation within the project other than the relative absence of commercial stands of forest. Although the commercial extraction of gravel is common throughout Crawford County, only scattered, inoffensive evidence of this activity exists in the project. The presence of inferior forest stands has similarly not constituted a planning constraint since the production of forest products is not a project purpose.

## SECTION 5.0 - DEVELOPMENT AND RESOURCE PLANS

### 5.1 RECREATION DEVELOPMENT PLAN.

5.1.1 Planning Concepts. The previous sections of this master plan constitute an inventory of general planning information that was used in the preparation of the overall development plan for the Woodcock Creek Lake project. This discussion will review and make explicit the more salient considerations that led to the selection and planned development of the public use areas within the project.

5.1.1.1 Potential Recreation Matrix. Prior to the selection of specific sites for future recreation development, the recreation potential of the project as a whole was first considered. An optimum recreation matrix was thus determined that reflects the project's location, its resources, the location and nature of competing recreation facilities and the characteristics of the project's market area. Once defined, this activity check list provided both the rationale and the necessary guidance for the additional development of the Woodcock Creek Lake project. It was established in paragraph 4.7.4 that northwestern Pennsylvania is the second most popular outdoor recreation area in the Commonwealth. The annual influx of recreationists and vacationers from other parts of Pennsylvania and from adjoining states has created a demand for recreational opportunity that greatly exceeds the resident demand. There is, thus, a regionwide market for not only day-use activities, but also activities that appeal to overnight visitors and vacationers as well. The many water-oriented recreation areas located in northwestern Pennsylvania are, as previously noted, primarily responsible for the region's popularity with recreationists. Their presence and character, to a large degree, have also shaped the leisure patterns and desires of these same recreationists. Boating and related water activities such as waterskiing and fishing are extremely popular leisure pursuits, and the availability of this type of recreation opportunity further stimulates and shapes future demand. Because of the large number of nonresident recreationists attracted to this region, there is a substantial demand for overnight camping facilities. As detailed in the Pennsylvania Bureau of State Park's 1970 publication Outdoor Recreation Horizons, the demand for this activity exceeds the available supply of overnight facilities. Thus, in terms of a matrix of potential recreation activity, it can be seen that a relatively standard array of water-oriented facilities has been and probably will continue to be quite popular in this region. However, in light of the many attractive, quite large competing recreation areas in this section of the Commonwealth, it is reasonable to assume that Woodcock Creek Lake will

not become a major destination for visitors from outside of the region. As noted previously, while some nonresident visitation will occur, the bulk of the project users will be from Crawford County and primarily from the Meadville-Saegertown area. Therefore, the following types of recreation activity have been provided and will be augmented in the future within the confines of the project. Future facilities for these activities will be constructed as the demand for them arises and as funds become available.

5.1.1.1.1 Boating. The maximum summer pool of Woodcock Creek Lake has approximately 333 surface acres at elevation 1181.0. All of this surface is readily usable for boating purposes since, in order to optimize the boating use of this body of water, the Pennsylvania Fish Commission, at the request of the Crawford County Commissioners, has promulgated regulations permitting only boats with motors of 10 horsepower or less and no waterskiing on the lake. Boating opportunity will be greater with these restrictions (i.e., the use of small boats allows a greater boating density) and the use of boats on the lake will be less likely to exceed its capacity. The existing boat launching ramp in Colonel Crawford Park will be the only formal launching site on the lake; however, boat mooring facilities to be constructed adjacent to various activity areas around the periphery of the lake are planned. Adequate car-trailer parking will continue to be provided adjacent to the Colonel Crawford launch and a bait-bike-boat rental facility with seasonal rental moorages is also planned for this same general location.

5.1.1.1.2 Swimming. Swimming is expected to be one of the most popular activities within this project not only with day-use visitors, but with campers as well. The existing sand beach along the left or south bank of Woodcock Creek Lake will satisfy much of the swimming demand originating with the recreationists that are attracted to the main part of the park. However, because of the development of new activity areas throughout Colonel Crawford Park, the generation of additional swimming demand is anticipated. This will necessitate the expansion of the existing swimming facilities during a future phase of development.

5.1.1.1.3 Camping. Because of the large demand for camping in the region, it is expected that the existing Colonel Crawford campsites will become heavily used. In order to minimize overcrowding and to optimize the quality of the camping experience, an additional camping area should be constructed within the project adjacent to the existing Colonel Crawford Park facilities. A "walk-in" or primitive camping area is also proposed near the southeastern end of Woodcock Creek Lake. Group camping areas are also planned for the north side of the project along Pennsylvania

Route 198 and east of Township Road 650. These areas are intended to serve the special or unique needs of various groups and/or agencies. These areas might be designated for use by such groups or agencies as the Boy Scouts, Girl Scouts, golden age and camping clubs and various underprivileged groups. A daycamp area on the opposite or southern shoreline of the project has also been included in the plan as requested by Crawford County officials. Its use will be restricted to organized groups and/or agencies for daytime programs of outdoor activity. When constructed, both the daycamp and the group camping areas will have adequate parking provided to accommodate buses.

5.1.1.1.4 Picnicking. The existing picnicking facilities in the main part of Colonel Crawford Park serve the needs of the boaters, fishermen and swimmers as well as others visiting this day-use area. Adequate parking and toilet facilities have also been constructed in this area. A second picnicking area was constructed initially in the Stainbrook Recreation Area below the dam on the left or south bank of Woodcock Creek. It is expected that these facilities will be used by general day-users and fishermen. In addition to these two existing picnicking areas, it is proposed that much of the northern shoreline area of the lake between the existing overlook and Township Road 650 be developed for picnicking. Auxiliary facilities such as restrooms and parking areas will also be required at this location when picnicking facilities are constructed.

5.1.1.1.5 Trails. At the request of Crawford County officials, comprehensive systems of hiking and non-motorized bicycling trails around the periphery of the project have been included in this master plan. The hiking trail system will enable park users to encircle Woodcock Creek Lake. This system of trails will interconnect activity areas and various points of project interest. Horses, motorcycles and motorized bikes will not be permitted on these trails. An intra-system of interpretive trails is also proposed and will be discussed in a subsequent paragraph.

5.1.1.1.6 Overlooks. Because there are no areas within the project with unique overlook attributes, no major overlooks other than the existing one at the visitor's area northeast of the dam will be constructed. Project visitors are now provided the opportunity of comfortably viewing the dam and lake without having to drive or walk beyond the existing overlook.

5.1.1.1.7 Fishing. The fishing potential of the project resulting from the creation of Woodcock Creek Lake will attract many visitors to this site. Existing and proposed recreation developments will continue to enhance and adequately accommodate the fishing experience through the provision of a boat launching ramp, fishermen's access areas, parking areas, sup-

porting sanitary and picnicking facilities and the introduction of a small boat rental and seasonal mooring facility where boats, motors, gasoline and fishing provisions would be available. Intensive fishery management programs that will improve the fishery resource have also been initiated by the Pennsylvania Fish Commission. During the springs of 1974 and 1975, the Fish Commission periodically stocked the put-and-take fishery below the dam with legal sized trout. Muskellunge, bass and walleye will again be stocked in the lake during the fall of 1975 as they were during the preceding fall. Brown bullheads and other panfish have also been caught in the lake. Fish Commission plans presently call for the additional stocking of game and panfish. More detailed fishery management programs will be developed during the preparation of Appendix D.

5.1.1.1.8 Hunting. Because of the limited size of the project and the relatively intense degree of its existing and proposed development, hunting is prohibited in Colonel Crawford Park and is not expected to become a major project activity. No special features or facilities for this activity are recommended.

5.1.1.1.9 Interpretive Programs. The presence of a number of historically interesting sites within the project creates an opportunity to combine an historical interpretation and/or restoration program with a minor nature interpretation effort. The fact that the major historical sites are located within the relatively undisturbed, eastern extremity of the project further enhances this opportunity. A combined trail system with appropriate interpretive displays and a visitor's parking area along Pennsylvania Route 198 will be constructed in the area. The nature interpretive features of this system will augment the opportunities to be provided in the Bossard Nature Study Area north of the dam. The most formal interpretive effort will consist of the construction of a museum-interpretive center at the administration area.

5.1.1.1.10 Miscellaneous Activities. As detailed in Crawford County's Recreation and Open Space Plan, it will be possible to provide a great variety of year-around, outdoor programs and activities within the confines of the Woodcock Creek Lake project. Opportunities include, but are not limited to winter ice carnivals, hockey leagues, ice fishing, ice skating, summer water carnivals, concerts, fireworks displays, and fishing contests. It is anticipated that all or most of these types of activities will be sponsored by the county or by some other agency or civic group with the responsibility for program supervision and administration resting with the sponsoring body. Such activities can be accommodated within the project without the need for additional development of special facilities.

5.1.1.2 Existing Development. Once a listing of potential recreation activities was defined, it was then compared to the facilities that already exist at the project to determine the unsatisfied activity needs. As noted previously, the unmet facility demand of this portion of northwestern Pennsylvania exceeds the project's effective capacity. It, therefore, was necessary to restudy these existing areas to ascertain subsequent development options and the desired level of ultimate development. The amount and types of existing development to a large degree predetermine the logical location of certain future and expanded facility complexes. This is particularly true in the instance of camping, swimming and boat launching activities. The presence of the picnic facilities within the main part of Colonel Crawford Park further limits development options throughout the remainder of the project.

5.1.1.3 Topography. Efforts were next directed to choosing suitable areas throughout the project to accommodate the future facility complexes. One of the most critical site selection criteria is normally topography; however, as previously noted, the topography of the Woodcock Creek Lake project is relatively flat. As shown on Plate 5, there are very few areas in the project that are not subject to inundation and have steep slopes and most of these areas have slopes that are less than 16 percent. While topography will not prohibit development within the project, its flatness introduces design difficulties not otherwise encountered. The intervisibility of adjacent project areas will somewhat reduce privacy between activity areas and will greatly increase the importance of existing vegetation. Thus, the development of the remainder of the project will be contingent upon considerations other than topography.

5.1.1.4 Soils Analysis. The product of the soils analysis discussed in paragraph 4.3 was a series of soils suitability maps defining the project areas that are best suited for recreational development, forest management, and wildlife management (Plates 9, 10 and 11). The composite soil suitability analysis shown on Plate 12 is a synthesis of the information presented on the preceding three plates. In instances of suitability conflicts, recreation has been given a higher priority. Thus, as shown on Plate 12, the flatter, better drained areas have been designated as recreation areas while the more poorly drained and/or steeper sites have been shown as being best suited for forest or wildlife management. The areas with soils well suited for recreation development are scattered throughout the project. However, as noted on Plate 12, the bulk of these sites are located near and on both sides of Township Road 650. Much of the upstream or eastern end of the project has soils that are poorly drained and significant portions of the western end are similarly not as well suited as other project areas for intensive recrea-

tion development. Thus, in terms of soil suitability, the following areas can be noted as having the best recreation development potential: (1) the areas south and east of the existing facilities in the main portion of Colonel Crawford Park, (2) the left bank east of Township Road 650 to the first major unnamed tributary stream, (3) the right bank between the mouth of Bossard Run and Township Road 650 and (4) the right bank adjacent to the east side of Township Road 650 and along the eastern side of the second unnamed tributary stream.

5.1.1.5 Accessibility. Accessibility to a given area, whether existing or proposed but feasible, is an additional criterion used in determining the relative desirabilities of potential recreation areas. However, in the instance of Woodcock Creek Lake, access is not a criterial factor. As reflected on Plate 12, each of the potential development areas identified in the preceding paragraph is readily accessible by way of existing roads or through the construction of short lengths of new access road. Travel between each of these potential development areas will also be facilitated by the existence of numerous interconnecting state and township roadways. Of particular significance in this regard is Township Road 650 that connects the north and south shorelines of the project and passes by or close to the most developable sites in the project.

5.1.1.6 Characteristics of Woodcock Creek Lake. The size and configuration of the maximum summer pool at Woodcock Creek Lake has and will significantly influence the type, character and location of much of the recreation development within the project. As can be noted on Plate 6, the widest, deepest and most usable portion of this body of water lies to the west of Township Road 650. It was largely due to this configuration that the existing boat launching and swimming facilities were constructed in their present locations. The existing facilities within the main portion of Colonel Crawford Park provide ample access to the lake. Shoreline characteristics and lake access considerations will, therefore, have only minimal influence on the selection of the remainder of the project's development areas. Hence, the upstream or eastern portion of the project and the northern shoreline can be devoted to activities that are not directly dependent on ready access to the water. The full pool (elevation 1209.0) configuration shown on Plate 6 also limits development options. No permanent structures may be located within this floodable area unless they are constructed to withstand at least partial inundation. Development along the northern shoreline will, therefore, be restricted to a relatively narrow strip of land along the south side of relocated Pennsylvania Route 198. In a similar manner, permanent structures will be excluded from much of the low-lying area at the eastern or upstream end of the project.

5.1.1.7 Planning Overview. It has been shown that one of the major determinants in the selection of future development sites within the project is the drainage characteristics of the soils. On the basis of analysis, four potentially developable sites with relatively flat slopes and well-drained soils were identified. It was further determined that each of these sites has or could have ready access to the state and local road network that exists within the project. It was also noted that each of these areas is or could be made interaccessible via Township Road 650. The existing distribution and types of recreation facilities within the main part of Colonel Crawford Park further limit the need for certain types of development throughout the remainder of the project. Thus, there is no need for additional formal swimming and boating access sites around the remainder of Woodcock Creek Lake. With much of the "more traditional" water-oriented recreation opportunity being provided by the existing facilities, the possibility of providing some of the more parochial, county-oriented activity areas such as a daycamp and one or more group camps remains. The more intensive development requirements for a daycamp such as the need for regulation athletic fields, courts and game areas necessitate locating such a facility in an area that not only has well drained soil, but also has ready access to swimming facilities. Thus, the left bank site east of Township Road 650 seems ideally suited. The two relatively small areas with well-drained soils located east of Township Road 650 on the right bank of Woodcock Creek Lake can be beneficially developed as a group camping complex. The remainder of the eastern end of the project, in light of its wooded character and poorly drained soils, is best suited for conservation and passive recreational activities. A portion of this relatively undisturbed area can also be developed as a primitive or "walk-in" camping area. An additional picnic area can be established along the right bank of the lake west of Township Road 650. This site's elevated location provides uninterrupted vistas of the lower portion of Woodcock Creek Lake. The land uses shown on Plate 13 have, thus, been identified through an analysis of the project's existing facilities, soils, pool configurations, topography, vegetation and accessibility. The future development of each of these areas is the subject of subsequent discussions.

5.1.2 Circulation. The access routes to the Woodcock Creek Lake project and the secondary roadways within and through the project constitute its circulation system. The two components of this circulation system are identified below. The impacts of this system on the plan of development are also discussed.

5.1.2.1 Macro-circulation System. The major roadways used by visitors to arrive at the project can be noted on Plate 1. As previously

described, northwestern Pennsylvania and the Woodcock Creek Lake project are within easy driving distances from the metropolitan areas of Erie, Pittsburgh, Cleveland, and Youngstown. Residents of these and other areas outside of the region have ready access to the Woodcock Creek area by way of numerous, high speed Federal highways. Interstate Route 79 and U. S. Route 19 pass through Crawford County in a north-south direction. Interstate Routes 90 and 80 laterally intercept these highways at convenient interchanges to the north and the south of the project. In addition to these expressways, numerous routes such as U. S. 6, 6N, 322 and 62 and Pennsylvania Routes 98, 36, 77, 408, 27 and 18 also provide access to the Crawford County area. While it is anticipated that the majority of visitors to Woodcock Creek Lake will originate from within Crawford County, it is evident from Plate 1 that those wishing to travel to the project from outside of the region have an adequate number of access routes. Once within the central portion of Crawford County, these nonresident visitors can use Pennsylvania Routes 198 or 86 from the west or Pennsylvania Routes 77 and 198 from the east to reach the project. Travel around and within the project is facilitated by the micro-circulation system discussed below.

5.1.2.2 Micro-circulation System. As shown on Plate 2, circulation around and through the project is facilitated by an extensive system of state and local roadways. Relocated Pennsylvania Route 198 parallels the project's northern limits and provides ready access from both east and west to all development areas in the northern half of the project. Access to the existing fishermen's access area below the dam, the dam overlook, the proposed future picnic site, the proposed future group camping sites and the Bossard Nature Area is provided by way of this route. Access to the existing Stainbrook Recreation Area below the dam is provided by Pennsylvania Route 86 and Township Road 657. The proposed and existing areas of development within the southern half of the project are accessible from the south by way of Pennsylvania Route 77, L. R. 20063 and Township Road 650. The entrance to the existing main portion of Colonel Crawford Park is located along Legislative Route 20063, a short distance south of this route's intersection with Township Road 650. Except for the more distant development areas, such as those below the dam and the proposed future fishing access site north of Blooming Valley, all of the existing and proposed public use areas are inter-accessible, primarily because of the Township Road 650 causeway and bridge across the lake. In addition to determining the entrance locations to the various development areas, the project's expected traffic circulation has also indirectly influenced the types and locations of proposed facilities within each site.

5.1.3 Zoning Plan. During the preparation of this master plan, all project lands as well as water areas which are extant when the lake is at elevation 1181.0 (maximum summer pool) were zoned. Land use allocations for initial recreation areas were, of course, determined by the locations of existing facilities. In addition, the location of the Township Road 650 causeway and bridge played an important role in the formulation of the boating regulations which essentially comprise the zoning plan for the lake. The land and water zoning for the Woodcock Creek Lake project is shown on Plate 13. Also shown on this plate are the areas to be leased to Crawford County for public park and recreational purposes and those areas to be retained for project operation by the Pittsburgh Engineer District.

5.1.3.1 Land Use Allocations. All project lands which were acquired in fee by the Federal Government have been allocated in accordance with the land use categories given in ER 1120-2-400. There is a high degree of correlation between these land use allocations as shown on Plate 13 and the locations of existing and proposed future facilities shown on Plate 14. Although potential overlap of allocations occurs in some cases, the allocation procedure which is based on the highest and best use of land generally weighed in favor of allocation to the more essential use. According to ER 1120-2-400, interim uses, particularly for agricultural purposes, are permissible under several of the land use categories which appear below. However, the Woodcock Creek Lake project's land resources are relatively limited and will, to a large extent, be required to accommodate the anticipated visitation. It will be desirable to allow the establishment of tree cover through the natural ecological succession process on much of the land designated for future recreation development. Forest cover will also be beneficial to the management of the Woodcock Creek Lake watershed. For these reasons, any uses that are not set forth in this master plan including agriculture, provision of access over project lands to private property, mineral extraction and other uses which will interrupt the successional reforestation of unwooded project lands or which require a substantial amount of clearcutting on wooded project lands will not be permitted, whether proposed on an interim or permanent basis.

5.1.3.1.1 Project Operations. The lands allocated for project operations are those on which the dam, spillway and appurtenant structures are located. The site of the dam tenders' dwellings and reservoir manager's complex near the right abutment of the dam is also designated as project operations land. All of these lands with the exception of those areas where public safety and operational considerations prevail are available for public use. For example, project visitors are permitted to drive across the dam and trails are planned for the spillway area. Despite the public use

which will occur in this area, these lands have been allocated for project operations because it is the most essential use.

#### 5.1.3.1.2 Operations: Recreation - Intensive Use.

Lands allocated to this category were acquired for all project purposes and are presently used or proposed for future use for medium to high density recreational uses. The entire right bank of the lake from the existing overlook to the eastern extremity of the future group camping area and all of the left bank of the lake from the spillway area to the eastern extremity of the future walk-in camping area, with the exception of a large block of land that was acquired specifically for recreational purposes, are designated in this category. Also in this category is the site of the fishermen's access area on the right bank of Woodcock Creek below the dam.

#### 5.1.3.1.3 Operations: Recreation - Low Density

Use. Two areas within the Woodcock Creek Lake project have been allocated to this land use category. These areas are the Bossard Nature Area and all project lands east of the future group camping area and future walk-in camping area. The Bossard Nature Area, developed as an interpretive area, will be completed during 1975. The area east of the group and walk-in camping areas will be used primarily for nature conservation purposes; however, future facilities including a small fishermen's access area, hiking, bicycle and interpretive trails and a minor interpretive device for an historical site within the area are planned for future construction.

#### 5.1.3.1.4 Recreation Lands.

A substantial portion of the Colonel Crawford Park lands south of the lake, the Stainbrook Recreation Area and a narrow strip of land across Woodcock Creek from the Stainbrook Recreation Area are designated as recreation lands. These areas were acquired for recreation and are or will be used intensively for this purpose.

#### 5.1.3.2 Boating Regulations.

The boating regulations for Woodcock Creek Lake which were promulgated and are enforced by the Pennsylvania Fish Commission reflect the water zoning plan shown on Plate 13. The present regulations were in force during the 1974 recreation season and will be reviewed periodically by the Crawford County Commissioners, the Pennsylvania Fish Commission and the Pittsburgh District office and revised if such action is found necessary. The current regulations provide the following:

- "1. No boats permitted on the lake with motors having greater than 10 horsepower.

2. No waterskiing permitted.
3. In a zone defined by the area east of the L. R. 20063 (T-650) causeway, the Slow, Minimum Height Swell Speed condition shall be enforced."

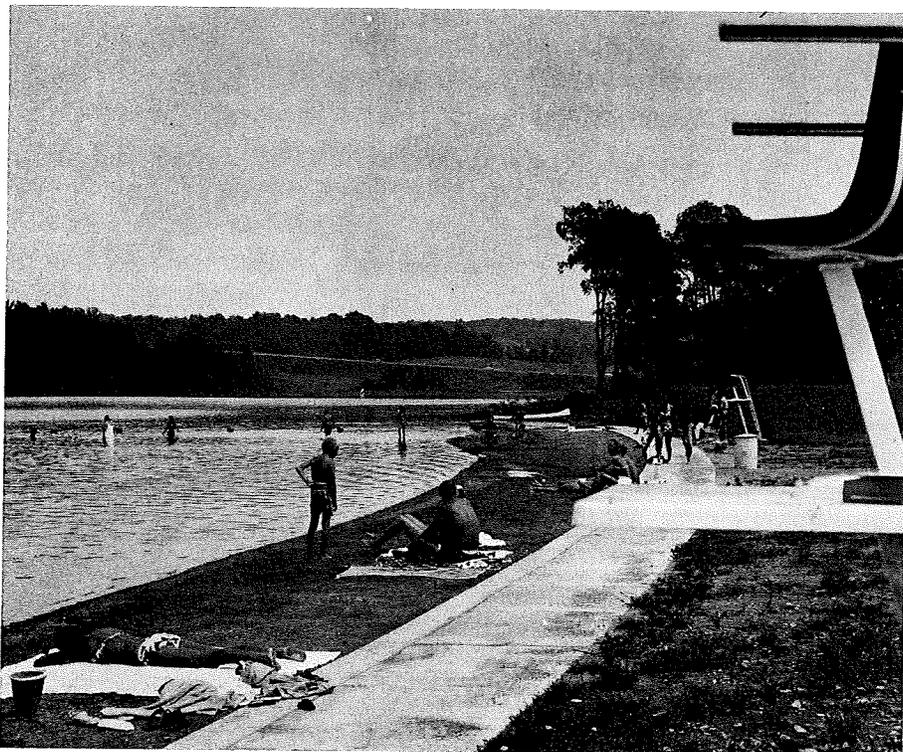
In addition to these regulations which apply specifically to Woodcock Creek Lake, certain provisions of the Commonwealth of Pennsylvania's boating law affect the zoning of the lake. The law requires that motorboats must maintain a slow, minimum height swell speed when operated within 100 feet of the shoreline, floats, docks, launching ramps, swimmers, anchored, moored or drifting boats or in areas marked with restrictive buoys. The zoning of the lake in accordance with this law for the maximum summer pool at elevation 1181.0 is shown on Plate 13; however, the law will apply and be enforced regardless of pool elevation.

5.1.4 Design Criteria. The project's proposed plan of ultimate development is shown on Plate 14. The location and design of each recreation area's facilities, to the degree practicable, are and will be in conformance with the applicable Crawford County policy and criteria, insofar as they are not at variance with the criteria discussed below and are acceptable to the Pittsburgh District Engineer. In the absence of such Crawford County policy or criteria, future developments will conform to the criteria outlined in EM 1110-2-400 (Appendix A) and other established Corps of Engineers policy and criteria as it may be revised or amended. As discussed in the following paragraphs, some variances from present Corps criteria have been and will be necessary. In each instance, the rationale for varying from the usual criteria is explained. Typical details of some of the facilities discussed below are also shown on Plates 18 and 19.

#### 5.1.4.1 Beach and Swimming Area.

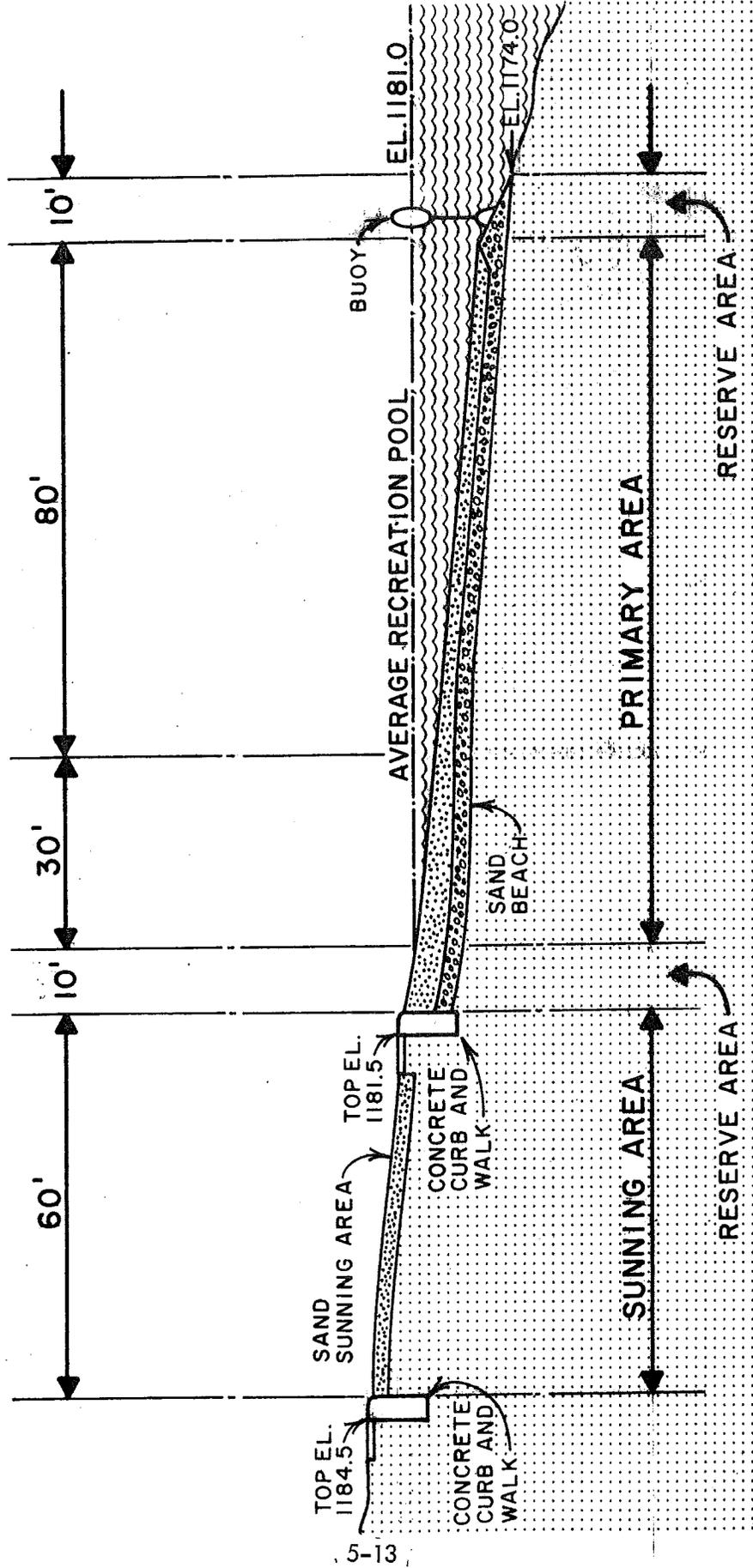
5.1.4.1.1 Size. The required size of the elements of a swimming complex such as the water area, beach and sunbathing space is contingent upon the calculated instant design load for swimming. On the basis of what is known about swimming habits in Pennsylvania state parks, the assumption was made that at any one time, 60 percent of the swimmers will be on the beach, 30 percent will be in the water and 10 percent will be elsewhere. Despite the more conservative standards listed in EM 1110-2-400 (Appendix A), beach and water areas have been more liberally allotted in keeping with nearby existing state facilities. Thus, for each swimmer, 70 square feet of beach area and 60 square feet of water area were used as space standards to confirm the

initial (1976) adequacy of the existing beach. These same standards were also used in sizing its proposed future expansion. As can be seen on Plate 19 and on Chart 4, shoreline length of beach is a function of the underwater beach gradient, the required area of swimming water, the magnitude of summer pool fluctuations and the desired maximum depth of swimming water. As specified in EM 1110-2-400 (Appendix A), the existing underwater beach has been constructed at a uniform five percent grade. It has been assumed that there will be only minimal fluctuations in the summer pool elevation during normal operating seasons. The designed maximum depth of protected swimming water is five and one-half feet when the pool is at its maximum summer level (elevation 1181.0).



Photograph 1. Colonel Crawford Park swimming beach. Photograph taken in early summer 1974 before turf was established. The 60-foot wide sand sunning area has been constructed to the right of the concrete walk.

# DIAGRAMMATIC BEACH SECTION



FOR PURPOSES OF CALCULATING  
 THE "IN WATER" AREA REQUIRED  
 FOR A BEACH, ONLY THAT LABELED  
 "PRIMARY AREA" SHOULD BE CON-  
 SIDERED.

5.1.4.1.2 Materials. The existing underwater beach has been constructed of sand, varying in depth from approximately two and one-half feet deep along the shoreline to a minimum underwater depth of 12 inches. This material is underlain with four inch plastic drainage tubing, placed 25 feet on center and diagonally to the shoreline. A concrete retaining curb 10 feet from the water's edge and a 4-foot wide concrete walk extending along the curb throughout its full length have been constructed on the landward side of the underwater beach. Beyond the concrete walk is a 60-foot wide concrete curbed sand sunning area. This part of the swimming facility was constructed in 1975. When constructed, the future beach expansion will essentially be a continuation of the initial facility to the east. Chart 4 applies equally well to the initial facility and to its future expansion.

5.1.4.1.3 <sup>Swimming</sup> Parking. The existing bituminous-paved parking area can accommodate 324 cars. Since it is expected that there will be four swimmers per car and that there will be a swimming turnover rate of three, the required number of future parking spaces will equal the future one day design load for swimming divided by twelve.

5.1.4.1.4 Bathhouse. The existing Colonel Crawford Park bathhouse provides adequate change and restroom facilities to accommodate the initial swimming visitation. However, the proposed future beach expansion will require a corresponding expansion of the bathhouse. There is adequate space available within the bathhouse complex to accommodate any required new construction including the suggested lifeguard-first aid-food concession facility shown on Plate 19, as well as future expansion. All facilities within this area will be designed to be aesthetically pleasing and to be compatible with the existing bathhouse.

#### 5.1.4.2 Picnic Areas.

5.1.4.2.1 Picnic Unit. The existing picnic areas in the main part of Colonel Crawford Park and the Stainbrook Recreation Area contain picnic units consisting of four picnic tables, one trash receptacle and two charcoal grills. It is anticipated that each table will accommodate an average of five and one-half picnickers at any one time. Future picnic areas will be constructed using the same basic units.

5.1.4.2.2 Number of Tables. Future picnic facilities are contingent upon the future instant design load for picnicking. Assuming

no substantive changes in present recreational use patterns and using a turnover rate of 2.0, the required number of tables will be determined by dividing this future demand by 5.5. The maximum number of tables per acre will be 12, or 3 units per acre, and the minimum spacing between tables will be 50 feet in order to maintain a desirable density and effective separation of groups in picnic areas.

5.1.4.2.3 Area Development. The maximum cross-slope in future picnic areas will be 20 percent. Each picnic area will also have areas provided for games and playfield activities, and each area will have picnic shelters provided at the rate of one structure for each 225 picnickers.

5.1.4.2.4 Restrooms. As shown on Plate 18, future picnic developments will have restrooms provided within 800 feet of all picnic tables, but no closer than 100 feet to any table. Within each picnic area, sanitary facilities will be provided on the basis of the following criteria: one fixture (water closet or urinal) for each 150 picnickers (instant design load) and one sink for every one and one-half water closets or urinals.

5.1.4.2.5 Parking. Convenient bituminous-paved parking areas will be provided within each future picnic area. As shown on Plate 18, parking will be provided within 400 feet of 90 percent of the picnic tables. Parking will be provided at the rate of approximately 1.3 parking spaces for each picnic table. Overflow (non-paved) parking areas will also be provided as required within each picnicking area for periods of peak usage.

#### 5.1.4.3 Day Camp Area.

5.1.4.3.1 Area Development. In planning the day camp area, the general standards of the American Association for Health, Physical Education and Recreation, as well as comparable plans developed by the U. S. Department of the Interior National Park Service, were considered. These criteria and standards will be adhered to, where applicable, in the design of day camp facilities. These standards were coupled with Crawford County's recommendations as contained in their Recreation and Open Space Plan. The county recommendations discuss a specific need for facilities to provide for regional gatherings, social activities and meetings of various civic groups and clubs and especially a wide variety of organized youth groups such as baseball and softball teams, tennis instructional leagues, dramatics clubs and nature study groups. As can be seen on Plate 16, the day camp provides for a variety of outdoor recreational pursuits for groups of up to 300 persons.

5.1.4.3.2 Recreation Building. A recreation building with running water, flush type sanitary facilities and an enclosed space for general indoor activities will be constructed for year-around use.

5.1.4.3.3 Parking. The day camp area will have parking areas provided that will accommodate approximately 100 cars and 10 busses; however, one parking area will be shared by day camp visitors and walk-in campers.

5.1.4.4 Family Camping.

5.1.4.4.1 Campsites. Like a campsite within the existing area, future family campsites will consist of one camping pad, one fire ring and one table. In addition, one trash can will be provided for every two campsites. Typical existing Colonel Crawford Park campsites are shown in Photograph 2. As specified in EM 1110-2-400 (Appendix A), the average distance between campsites will be 75 feet.



Photograph 2. Typical existing campsites in Colonel Crawford Park.

5.1.4.4.2 Area Development. Within the future camping area proposed as an expansion of the existing Colonel Crawford Park camping area, individual campsites will be designed to accommodate a party of four. Although EM 1110-2-400 (Appendix A) specifies a party of five, recent Pennsylvania state park records reveal that the average camping party in the Commonwealth is four. Each campsite will be designed to accommodate either a mobile camping vehicle or a tent. A drinking water source will be provided within 150 feet of each campsite. Additional information on campsite spur configurations and siting is shown on Plate 19.

5.1.4.4.3 Washhouses. Within the future family camping area all campsites will be within a maximum distance of 600 feet from washhouse facilities. In accordance with Pennsylvania state park planning criteria and Pennsylvania Department of Health standards, for every 100 campsites the following fixtures will be provided: three male and four female water closets, four male and four female lavatories, two male urinals and three male and three female showers. Laundry facilities will also be provided within the washhouse structure.

5.1.4.4.4 Sanitary Disposal Stations. As indicated on Plate 16, an existing sanitary disposal station is located along the entrance road to the main portion of Colonel Crawford Park. This facility will be available for use by mobile campers from both this area and the group camping area on the opposite side of Woodcock Creek Lake.

5.1.4.4.5 Control. Since all visitors entering the main part of Colonel Crawford Park will pass by the control building shown on Plate 16, no additional control efforts for the camping area will be required.

#### 5.1.4.5 Walk-In Camping.

5.1.4.5.1 Camping Unit. A walk-in campsite will consist of a tent site and a fire ring. One trash receptacle will be installed for every four tent sites. Each site is intended to accommodate four campers.

5.1.4.5.2 Area Development. Individual campsites will be no closer together than 100 feet and an average distance of 150 feet is desirable. Each tent pad will be slightly elevated and permanently ringed with a gravel filled drainage ditch. Two water hydrants will be located within this camping area.

5.1.4.5.3 Restrooms. As shown on Plate 17, two vault restroom buildings will be constructed in this area. Each building will have separate male and female facilities.

5.1.4.5.4 Parking. As shown on Plates 16 and 17, parking for the walk-in camping area will be located at the eastern end of the daycamp area. Approximately one-half of this proposed 60 car parking area will be designated for use by overnight campers (i.e., one parking space for each campsite).

5.1.4.5.5 Service Access. It is proposed that a 12-foot wide roadway be constructed, as shown on Plate 17, which will provide service access to the vault restroom buildings. This road, to be bituminous surfaced, will be for use only by service vehicles. A lockable gate constructed at the entrance from the day camp area will eliminate all vehicular traffic other than that required for service purposes from the area.

#### 5.1.4.6 Group Camping.

5.1.4.6.1 Camping Unit. A campsite within the vehicular group camping area will consist of a graveled trailer spur and adjoining auto parking space, one fire ring and a picnic table. Within the group tenting area, a campsite will consist of a slightly elevated, earth tent pad, a fire ring and a picnic table. Each two group campsites of either type will also be provided with a trash receptacle.

5.1.4.6.2 Area Development. The average distance between sites for both types of group facilities will be 75 feet. As is the case with family camping, it is intended that both types of group campsites will accommodate an average party of four campers. Three drinking water hydrants will be provided within the vehicular area and two hydrants will be provided within the tenting area. A 20-foot by 30-foot lodge building will be constructed within each group camping area to be used for classes, meetings, and during periods of inclement weather. A small outdoor amphitheater, as shown on Plate 18, is also proposed for the vehicular area.

5.1.4.6.3 Restrooms. A washhouse with running water, flush type sanitary facilities, showers and laundry facilities will be constructed in the vehicular overnight area. A single large vault-type restroom will be sufficient for the tenting area.

5.1.4.6.4 Parking. Both group camping areas should have parking areas provided that will accommodate approximately 20 car-trailers to allow for overflow and oversized vehicles. The vehicular area will also have additional space provided for parking at each campsite.

#### 5.1.4.7 Roads.

5.1.4.7.1 Design Standards. The following standards will determine recreation roadway design throughout the Woodcock Creek Lake project:

Road Type	Road Width (ft.)	Maximum Grade (%)	Design Speed (mph)	Shoulder Width (ft.)	Minimum Radius (ft.)
Circulation	18	12	30	4	150
Camp	12	12	20	4	150

Typical sections for each of these road types are shown on Plate 18.

5.1.4.7.2 Materials. All roads will be constructed of six inches of crushed aggregate or approved bank run gravel base material, four inches of bituminous concrete and one and one-half inches of bituminous surfacing.

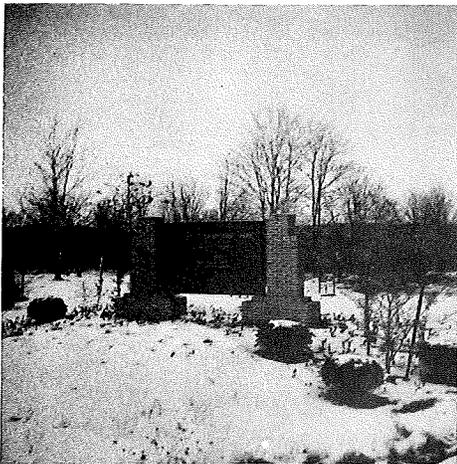
#### 5.1.4.8 Public Boat Launching Ramp.

5.1.4.8.1 Size. The size of the existing, six lane public boat launching ramp was determined in conformance with the criteria specified in EM 1110-2-400 (Appendix A) prior to the preparation of this master plan. In light of the additional proposed development throughout the project and the regulations promulgated and enforced by the Pennsylvania Fish Commission which limit boat motors to a maximum of 10 horsepower, it was necessary to verify the adequacy of this facility. The optimum boating capacity of Woodcock Creek Lake is 333 boats at any one time or one boat per acre of recreation pool. Assuming a reasonable turnover rate for boating of 1.5, the lake will comfortably accommodate a total of 498 boats per day. The present boat launching capacity of the ramp is 240 boats per day. Since only boats with small motors are permitted on the lake, it is reasonable to anticipate that the remaining 258 boats will be launched from car tops at the existing fishermen's access area east of Township Road 650, will be moored for the season overnight in the lake, or will be rental boats obtained from the proposed future boat rental concession.

5.1.4.8.2 Design. The six lane Colonel Crawford Park boat launching ramp was constructed in conformance with EM 1110-2-400 (Appendix A) at a grade of 12 percent and with 12-foot wide lanes. It extends four feet below the minimum pool elevation and upward to the five year flood frequency pool elevation.

5.1.4.8.3 Parking. In accordance with EM 1110-2-400 (Appendix A), 25 car-trailer parking spaces will ultimately be constructed for each launch lane. Seventy-five spaces are presently constructed and ultimately 150 spaces will be provided. In addition, 25 car-parking spaces to serve those mooring their boats for the season at the bait-bike-boat rental concession will be constructed along the access road to the boat launching area.

5.1.4.9 Signs. The size, number, placement and general character of the signs used throughout future project developments shall be similar and compatible to those already erected in Colonel Crawford Park. Typical examples of signs are shown on Plate 19 and on Photographs 3 and 4. The use of signs and markers within Colonel Crawford Park will be in conformance with the applicable Crawford County policy insofar as it is not at variance with the above criteria or, in the absence of such policy, will conform to the policy stated in Ohio River Division Regulation No. 1130-2-4, as subsequently revised or amended.



Photograph 3. Existing Colonel Crawford Park entrance sign.



Photograph 4. Existing Stainbrook Recreation Area entrance sign.

5.1.4.10 Power Distribution and Electrical Lighting. The project area is serviced by the Northwestern Rural Electrical Cooperative of Cambridge Springs, Pennsylvania. The power lines that were disturbed during project road relocations and/or construction were relocated underground. Thus, three-phase electrical service is available along Pennsylvania Route 198, Township Road 650 and Legislative Route 20063. An underground service line from L. R. 20063 presently provides electricity to the main part of Colonel Crawford Park. Similar underground service lines will be constructed for future developments as shown on Plate 20. All project lighting and night lighting specifically will be provided in accordance with the standards outlined in EM 1110-2-400 (Appendix A).

5.1.4.11 Winterized Buildings. Although special facilities for winter recreationists are not proposed, incidental winter use will occur within the project. In order to accommodate and enhance this anticipated recreation, certain buildings have been constructed for year-around use. As subsequently noted in paragraph 5.1.5, the proposed administration building and the maintenance building to be constructed in the near future will be used on a year-around basis by the Colonel Crawford Park staff. Provisions will, therefore, be made for heat in both of these buildings. The existing building at the dam overlook area is winterized and has heated restroom facilities that can now be used by winter recreationists. One wash-house within the Colonel Crawford area has been constructed for winter use. The proposed recreation building in the daycamp area is intended to function as a year-around facility to be used by various county groups for activities such as lectures, classes, slide-talks and meetings. It has been planned with these purposes in mind and will, therefore, be winterized.

5.1.5 Architectural Character. The following discussion is a general summary of the future architectural needs of the Woodcock Creek Lake project. It defines a number of overall design criteria that will be considered during the preparation of building designs. Each proposed future building type is also identified and general guidelines are defined for its construction.

5.1.5.1 Design Criteria. The character and design of future project buildings will be in conformance with the following architectural criteria.

5.1.5.1.1 All future buildings will be architecturally compatible with the existing project structures.

5.1.5.1.2 All buildings will be designed and sited to sensitively blend with their natural setting.

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

5.1.5.1.4 To the degree that is economically feasible, an attempt will be made to standardize architectural design, details and materials throughout the project. The exterior of future restrooms and washhouses will be identical in appearance to those existing in Colonel Crawford Park, insofar as such action is feasible.

5.1.5.1.5 To the extent possible, maintenance-free construction methods and materials that will withstand public abuse and vandalism will be used.

5.1.5.2 Building Types. As proposed in this master plan, future project development will require the construction of at least 11 types of buildings. Each of these is described in the following paragraphs. Also included are suggestions pertaining to their general character and design.

5.1.5.2.1 Vault-type Restroom. This type of public restroom building will be constructed in those locations where it is impractical to connect to the project's sanitary sewer system. They will be constructed over a reinforced concrete vault that will be periodically pumped out by way of an exterior manhole. As discussed previously, two restrooms of this type are proposed for the "walk-in" camping area and one is proposed for the east-em group camp. While there are no vault restrooms presently located in the project to serve as design prototypes, these three future vault facilities will have an exterior appearance that is similar to the existing restroom buildings.



Photograph 5. Typical existing Colonel Crawford Park restroom.

5.1.5.2.2 Flush-type Restroom. There are five additional flush-type restrooms proposed for the project--three in the main part of Colonel Crawford Park and two in the proposed north shore picnic area. This type of restroom building will have running water, flush-type sanitary units and will be connected with the project's sanitary sewer system. Insofar as it is feasible, these future structures will be virtually identical to the existing restrooms as shown in Photograph 5.

5.1.5.2.3 Washhouse. Two additional washhouse buildings are proposed for future project developments. One will be constructed in the family campground expansion area and one will be constructed in the western group camp. Washhouses are intended for exclusive use within camping areas and have, in addition to the normal restroom facilities, showers and a public laundry area. To the degree that it is practicable, future washhouses will be identical to those presently in use in the main portion of Colonel Crawford Park. An existing washhouse is shown in Photograph 6.



Photograph 6. Typical existing Colonel Crawford Park washhouse.

5.1.5.2.4 Administration Building. As shown on Plate 16, the administration building will be located in the south central portion of Colonel Crawford Park between Township Road 650 and Legislative Route 20063. A floor plan and rendering of this building as proposed are shown on Plate 24. The exterior walls will be of brick similar to that used for existing park structures. Rough cut and dark stained wood trim which will lend the same character as that on the existing buildings will be used. The roof will be covered with asphalt shingles.

5.1.5.2.5 Museum-Interpretive Center Building and Plaza. Located adjacent to the administration building, as shown on Plate 16, this building will also be similar in size and character to the administration building. However, the museum-interpretive center will also include a paved plaza for appropriate outdoor displays. Each such outdoor display will include an interpretive shelter like that shown on Plate 18 as well as any object(s) to be displayed.

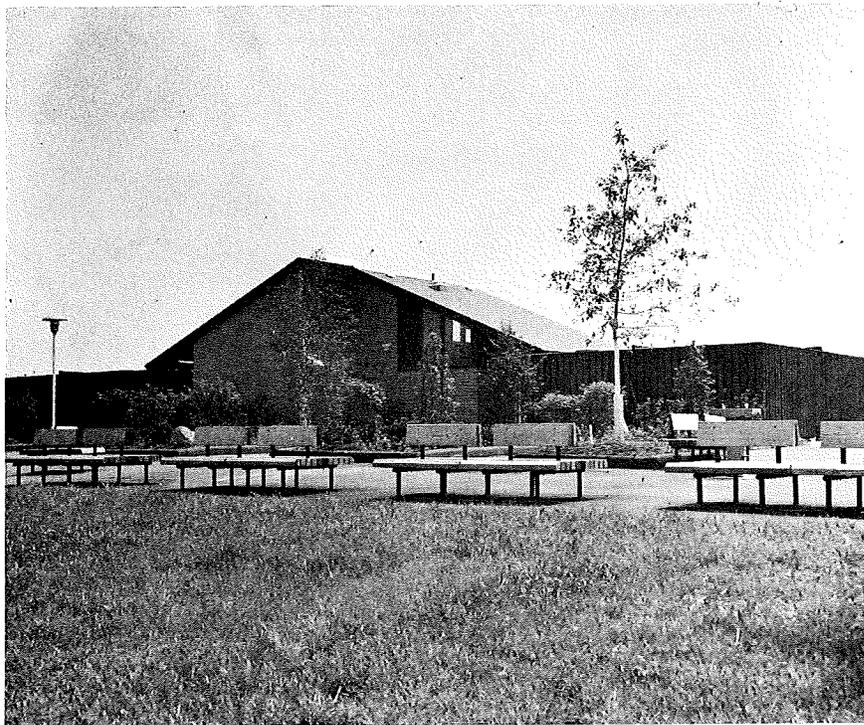
5.1.5.2.6 Control Building. The ultimate number of visitor control building(s) will be contingent upon the fee collection policy of Crawford County as it may be revised. As presently proposed, a temporary control structure will be located along the entrance road to the main part of Colonel Crawford Park, as shown on Plates 14 and 16. Fees for the use of some facilities will be collected from visitors at this location. A plan and perspective sketch of a typical control building is shown on Plates 23 and 24. Materials will include brick that is compatible with that of the existing buildings, rough sawn, dark stained wood trim and asphalt shingles.

5.1.5.2.7 Bait-Bike-Boat Rental Building. This rental building will be constructed next to the boat launching ramp in the main part of Colonel Crawford Park as shown on Plate 16. It will house a concessionaire's activities including rental of bicycles, bait and tackle sales and also rental and seasonal mooring of small boats. Because of its floodplain location and the difficulty of servicing this location with a sanitary sewer line, this building will not house public restrooms. A sketch and floor plan of the bait-bike-boat rental building is included on Plates 23 and 24. Like other proposed buildings, its exterior materials will consist of brick, rough sawn, dark stained wood and asphalt shingles.

5.1.5.2.8 Recreation Building. A recreation building will be located within the day-camp area, as shown on Plate 16. As indicated previously, this structure will be winterized for year-around use and will be available as a meeting and activity center for various local groups and clubs. It will be necessary to incorporate space for, among other

things, handicrafts, assemblies, storage, offices, restrooms and displays. Similar to the exteriors of the other buildings proposed for the Woodcock Creek Lake project, the recreation building will be constructed of brick veneer and rough cut, dark stained wood trim. The roof will be sheathed with asphalt shingles. Plates 23 and 24 show a floor plan and sketch of the proposed recreation building.

5.1.5.2.9 Lodge Building. As shown on Plate 14, one lodge building in each of the two group camping sites is proposed. While these buildings will serve primarily as inclement weather activity centers, it is also proposed that group cooking facilities or kitchens be provided within these structures. The lodge buildings will have a relatively large (20 feet by 30 feet) central meeting room with a wood burning fireplace at one end. The kitchen area will be located off of this room, behind the fireplace. While it is not proposed that a central heating system be installed initially, the potential should exist to winterize these structures at some time in the future. It is proposed that these buildings be constructed of brick veneer with dark stained wood trim and asphalt shingles in a style that will be com-



Photograph 7. Existing Colonel Crawford Park bathhouse. The proposed lifeguard and food concession building will be constructed on the plaza at the right near the drinking fountain.

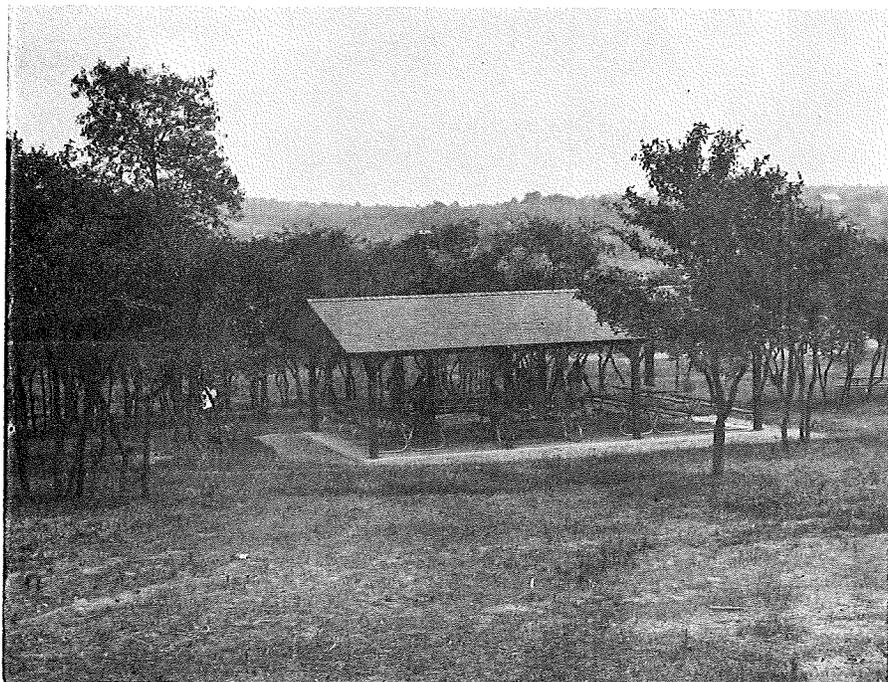
patible with other project structures. An acceptable design for these structures is contained in the Park Practice Design Handbook, Plate 541 B, Index O-5152, Control S-1074-0. This design was developed by the National Park Service.

#### 5.1.5.2.10 Lifeguard and Food Concession Building.

As shown on Plates 14 and 16, a small building will be constructed in the existing bathhouse plaza area to house a food concession and a lifeguard/first aid office. The suggested size and layout of this structure is shown on Plate 19. This facility will be constructed in a manner and style that is compatible with the existing bathhouse building which is shown in Photograph 7. Exterior materials will match those of the bathhouse in color and texture.

#### 5.1.5.2.11 Picnic Shelter.

There are 13 additional picnic shelter buildings proposed for the Woodcock Creek Lake project. Five of these are to be constructed in the proposed north shore picnic area, one is to be built in the picnic area east of Township Route 650, two are proposed for the day-camp area and five more will be added to the day-use area in the main portion of Colonel Crawford Park. Each of these future shelters will be similar to the picnic structures that now exist in the project, one of which is shown in Photograph 8.



Photograph 8. Typical existing Colonel Crawford Park picnic shelter.

5.1.6 Cost Estimates. The costs associated with both initial and future public use and environmental enhancement measures are given in Appendix G. Future estimated costs are subdivided by agency responsibility and by areas. Also given in Appendix G are estimated operation and maintenance as well as major replacement costs which will apply to public use developments administered by the Pittsburgh Engineer District and by Crawford County.

#### 5.1.7 Sewage System.

5.1.7.1 Background. The purpose of this discussion is to present and evaluate a proposed sewage system capable of collecting, conveying and treating wastewaters originating from the proposed future expansion of the project's recreational facilities. Implicit in this proposal is the premise that existing sewage facilities will be employed to their maximum capacity in order to minimize new facility costs. Further, all present and future facilities will conform, where practicable, to the recommendations of the Pennsylvania Department of Environmental Resources (PennDER). Comments and recommendations have been solicited from PennDER. It should be further noted that the potential exists, with the anticipated extension of the Saegertown sewage system, to connect all project sanitary facilities to the Saegertown treatment plant. While connection with this system is likely, the date of the actual connection is contingent upon the construction of the Saegertown treatment plant and the proposed Woodcock Creek valley collector line and successful consummation of a utility service contract. Thus, the proposed sewage system for the project, of necessity, has been designed to be self sufficient and independent of the Saegertown system. Once the Saegertown facilities are completed and the system is extended along the Woodcock Creek valley, the project's treatment facilities will be abandoned and project wastewater will be treated by the Saegertown Sewage Authority upon consummation of a utility service contract. Connection facilities will be provided by or through the action of the Pittsburgh Engineer District in cooperation with the Authority. Financial participation of the Pittsburgh Engineer District with the Authority would be under the provisions of Section 107 of the Water Resources Development Act of 1974 (PL 93-251). This law allows the Corps of Engineers to share in a reasonable portion of the cost of local treatment plants serving both local and federal interests and to pay a reasonable service charge to the local treatment plant administrator for services rendered. These costs will be based on the proportion of federal sewage flow to total sewage flow into the plant. The estimated existing and both existing and proposed ultimate wastewater quantities and characteristics are presented in Table 4. These estimated characteristics, as