

JUN 28 1997

CEMVS-PD-F

MEMORANDUM FOR Commander, St. Louis District

SUBJECT: Carlyle Lake, Illinois, Design Memorandum No. 10, The Master Plan (Updated 1997)

1. The updated Carlyle Lake Master Plan is submitted for review and approval.
2. The updated master plan provides a current inventory and assessment of land and water resources and physical improvements, a reformulation of resource use objectives, discussions of influences on lake operations and management and an evaluation of existing and future needs required to protect the value of the resource base. Emphasis has been placed on increasing the efficiency of operations and rehabilitation of facilities.
3. The technical review has been completed. Checklist and certification are attached
4. It is requested that approval be granted to provide or replace facilities described in Section 8 and the Maintenance and Repair Plan (Appendix II). The cost of new facilities is estimated at almost 2 million dollars and replacement or repair costs at approximately 12.2 million dollars.
5. In accordance with ER 1130-2-550, paragraph 3-2 h., approval of this plan by the District commander is requested.



OWEN D. DUTT  
Chief, Planning Division

CEMVS-DE 1st End

CEMVS-DE

THRU CEMVS-DP 

FOR CEMVS-PD-F

04 AUG 1997

Request for this plan is:

APPROVED

DISAPPROVED

  
THOMAS J. HODGINI  
COL, EN  
Commanding

# **THE MASTER PLAN**

**DESIGN MEMORANDUM NO. 10 (REVISED 1974, UPDATED 1979,1986,1997)  
CARLYLE LAKE, ILLINOIS**

**PREPARED BY:**

**U.S. ARMY ENGINEER DISTRICT, ST. LOUIS  
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## PREFACE

Construction of Carlyle Lake was authorized in July, 1958, and work began that year. The project was completed in June 1967. The original Master Plan was approved in 1962, then revised in 1974 and updated in 1979 and 1986. The Master Plan has served as the guide for the orderly development and management of the land and water resources at Carlyle Lake.

This updated Master Plan presents a current inventory and assessment of land and water resources and physical improvements, reformulated resource use objectives, discussions of influences on lake operations and management and an evaluation of existing and future needs required to protect the value of the resource base. Emphasis has been placed on increasing the efficiency of operations and rehabilitation of facilities for public safety.

Although Carlyle Lake is managed primarily by the St. Louis District Army Corps of Engineers, many others play a crucial role in the operation of the project. These important players, including the Illinois Department of Natural Resources, marina concessionaires, upstream and downstream interest groups, farmers, local and civic groups, hunters, fishermen, campers, sailors, businesses, wildlife observers and others have been involved in the update process. The objective of the Carlyle Lake Master Plan update is to meet the needs and interests of the various users of the project and outline a 10 year plan of action assuring that all project purposes are addressed.

All aspects of lake operation have been reevaluated due to changes which have taken place since the last update in 1986. In some instances, public lands have been reclassified to more fully reflect their present use. Studies that were completed as part of the process of updating the Master Plan include a marina market study, a maintenance and repair plan, and a wastewater feasibility study. Recommendations from these studies have been incorporated into this update of the Master Plan and are included as appendices. All recreation area site plans have been revised to reflect existing development.

The plan will be approved in the St. Louis District; however, this does not assure that all proposed projects will be completed. After approval, funding must be secured to complete the proposed projects.

PREVIOUSLY ISSUED DESIGN MEMORANDA

<u>MEMORANDUM NO.</u>	<u>TITLE</u>	<u>DATE OF SUBMITTAL</u>
1	Hydrology and Hydraulic Analyses) (Revised)	14 Feb 58
2	General Design Memorandum	18 Feb 58
	Supplement No. 1 to Design Memorandum No.2	27 Mar 59
3A	Real Estate Memorandum for Main Dam	31 Jan 58
3B	Real Estate Memorandum for Reservoir Area and Saddle Dam Sites and Supplements No. 1 through 9	29 Aug 58
3C	Real Estate Memorandum for Relocation of the Chicago, Burlington and Quincy Railroad	17 May 62
4	Detailed Design - Main Dam Embankment - First Stage	21 Apr 58
5	Availability of Construction Materials	6 Oct 58
6A	Relocations and Report of Necessity for Pipelines and Power and Telephone Lines	27 Feb 58
6B-1	Relocations - Roads	16 Mar 60
	Supplement No. 1 to Design Memorandum No. 6B-1	8 Mar 61
6B-2	Relocations - CB&Q RR (Revised)	24 May 61
6B-3	Relocations - Cemeteries	4 Sep 62
6C-1	City of Salem, Illinois, Supplemental Water Supply	5 Aug 60
6C-2	Boulder Bottom Oil Field	2 Aug 60
6C-3	West Patoka Oil Field	2 Aug 60
7	Design of Main Dam, Gated Spillway and Second Stage Embankment	8 Mar 60
8A	Saddle Dam No. 3	22 Dec 59
8B	Saddle Dam No. 2	21 Apr 60
9	Keysport Levee (Revised)	1 May 61
10	The Master Plan	13 Mar 62
13	Buildings - Utilities and Access Roads - West Abutment Area	24 Jul 59
14	Design Memorandum for Shoreline Erosion	Aug 80

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**INTRODUCTION**

MASTER PLAN  
DESIGN MEMORANDUM NO. 10 (REVISED 1974, UPDATED 1979, 1986, 1997)  
CARLYLE LAKE, ILLINOIS

SECTION I - INTRODUCTION

1-01 AUTHORIZATION

Carlyle Lake is located in south central Illinois, approximately 50 miles due east of St. Louis. The Corps of Engineers began construction on the multi-purpose lake in 1958 and completed the project in 1967. The lake is twelve miles long and 1-3 miles wide and has approximately 26,000 acres of water surface at summer pool. Lake shoreline is 83 miles and there are approximately 11,000 acres of public land associated with the project. The Corps of Engineers and the State of Illinois Department of Natural Resources (IDNR) operate recreation areas and manage the public lands and fisheries of the lake.

Federal laws provide that land and water areas of Department of the Army reservoirs, constructed for the primary purposes of flood control, navigation, and/or hydropower, shall be administered to encourage and develop all collateral uses such as water supply, public parks and recreation, conservation of fish and wildlife resources, pollution abatement, and other purposes in the public interest.

Carlyle Lake was authorized by the Flood Control Act of 1938 and modified by the Flood Control Act of 1958 based on Chief of Engineer's recommendations presented in House Document No. 232, Eighty-fifth Congress, 1st Session.

This plan has been prepared in accordance with guidance contained in

1. ER 1165-2-400 Water Resource Policies and Authorities, Recreational Planning, Development, and Management Policies (1985)
2. ER 1110-2-400 Design of Recreation Sites, Areas, and Facilities (1988)
3. ER 1120-2-404 Investigation, Planning and Development of Water Resources - Federal Participation in Recreational Development (1970)
4. ER 1130-2-400 Management of Natural Resources and Outdoor Recreation at Civil Works Water Resource Projects (1985)
5. EM 1110-1-400 Recreation Planning and Design Criteria (1987)
6. ER 1130-2-550 Chapter 3: Project Master Plans and Operational Management Plans (1996)
7. EP 1130-2-550 Chapter 3: Project Master Plans and Operational Management Plans (1996)
8. ER 1130-2-406 Shoreline Management at Civil Works Projects (1990)

## CARLYLE LAKE MASTER PLAN

### 1-02 PROJECT PURPOSES

The purposes of the project include flood control on the Kaskaskia and Mississippi Rivers, navigation releases for the Kaskaskia River, domestic and industrial water supply, water quality enhancement, fish and wildlife conservation, and recreation.

### 1-03 PURPOSE OF THE MASTER PLAN

The original Master Plan was intended as a guide for the orderly and coordinated development and management of all lands and water areas of the project. It presented data on the scope of development considered adequate for initial public use and an estimate of future requirements. Subsequent supplements, revisions and updates have continued to guide the use, development, and management of land and water resources at Carlyle Lake. This plan is an updated version of the 1986 plan. All planning, management and development actions should be consistent with the land use classifications and resource objectives presented in this plan. The master plan presents an inventory and assessment of land and water resources and physical improvements, analysis of resource use and an evaluation of existing and future needs required to protect and improve the values of the resource base. A study was conducted to estimate the demand for marina services and the best means to meet projected demand for wet and dry boat storage. The plan also incorporates the Maintenance and Repair Plan which includes a facilities inventory and ten-year replacement/rehabilitation schedule.

### 1-04 PRIOR MASTER PLANS AND SUPPLEMENTS

a. The original Master Plan, which was approved in June 1962, had accumulated by 1974, a total of nine supplements and three letter reports requesting changes or additions to the original document. The following is a brief summary of the twelve submissions:

(1) Supplement No. 1, 29 June 1964, presented revisions to the Patoka and Tamalco access and boat dock areas. It contained provisions for the development of additional basic public-use facilities by the Corps which were to have been furnished by the recreation service concessionaire at each area. The proposed facilities included a boat launching ramp with related parking, sanitary and picnicking facilities, and potable water. It was determined that the Corps would provide those basic public use facilities for which fees could not be charged to the public for use. This Supplement was approved by ENG CW-OM, 2d Endorsement, 4 September 1964.

(2) Supplement No. 2, 7 August 1964, proposed upgrading the surfacing for all access roads and parking areas. In recreational areas, all roads with A-1 or A-2 bituminous surface treatment and dust settling treatment would be improved to a type A-3 bituminous surface treatment. Upgrading of road surfacing was proposed as a result of additional studies which indicated that it was more economical to provide a higher quality surfacing, requiring less maintenance and lower operating costs. This Supplement was approved by LMV GU/LMV KO, 1st Endorsement, 13 August 1964.

(3) Supplement No. 3, 30 March 1967, proposed the upgrading of sanitary facilities at the Spillway, Dam West, and Dam East Recreation Areas. Improvements included converting the existing SC-2 comfort stations (vault type) to SC-1 waterborne comfort stations, and construction of a washhouse and trailer dumping station in the camping area at Dam West. Supplement was approved by LMV CO-O, 1st Indorsement, 21 April 1967.

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(4) Supplement No. 4, 19 June 1967, proposed the upgrading of sanitary facilities at the Coles Creek Recreation Area. Improvements included converting the existing SC-2 comfort stations (vault type) to SC-1 waterborne comfort stations, construction of a washhouse and a trailer dumping station, and construction of sewage treatment facilities. Supplement was approved by LMVCO-O, 1st Indorsement, 27 July 1967.

(5) Letter, LMSED-BR, this office, 12 January 1968, subject: Request for Change in Concession Boundary, West Access Area, Carlyle Reservoir, Illinois. Adjustment of the boundary provided more efficient means for administration and control for collection of user fees to the Federally developed camping facilities at the Dam West Recreation Area. In addition, the boundary change enhanced the attractiveness of the concession lease area parcel which had not yet been readvertised for bidders. Letter was approved by LMVCO-O, 1st Indorsement, 16 January 1968.

(6) Letter, LMSED-BR, this office, 11 October 1968, subject: Request for Change in Land Use - Carlyle Reservoir, Illinois. Because of the general topography at the project, availability of natural, protected concession harbors was limited. After an evaluation was made to consider the location of potential harbor sites, it was determined that an additional commercial concession area should be designated in the Master Plan. The purpose of this letter was to request a change in land use zoning from future camping area to future commercial concession for approximately 10 acres of land at the Coles Creek Recreation Area. Letter was approved by ENGCW-PV, 2d Indorsement, 12 November 1968.

(7) Supplement No. 5, 7 February 1969, proposed land use zoning of six sites for Priority II and III land use. The Carlyle Master Plan provided for the development of lands to meet Priority I needs, both initially and for future use. Lands to meet the project operational requirements were also designated in the Master Plan. The purpose of this supplement was to allocate lands for group quasi-public recreational purposes. The supplement was returned for further consideration by ENGRE-MI, 4th Indorsement, 30 April 1969. It was recommended that Priority I requirements be reevaluated to insure that adequate lands would be available over the planned economic life of the project. Consideration would then be given to the allocation of remaining lands for Priority II and III uses. The considerations were presented in SECTION VIII of the revised Carlyle Master Plan.

(8) Letter, LMSED-BR, this office, 25 April 1969, subject: Request for Approval of Commercial Concession Location, Coles Creek Recreation Area - Carlyle Reservoir, Illinois. In accordance with approval obtained from a letter described in paragraph (6) above, planning for a commercial concession at the Coles Creek Recreation Area was accomplished. It was requested that the plan and location as presented be approved. Letter was approved by ENGCW-PV, 2d Indorsement, 22 May 1969.

(9) Supplement No. 6, 26 November 1969, proposed improvements pertinent to the development of commercial concession sites as contained in the approved Master Plan for the Keyesport, Boulder, Coles Creek, and Dam West Recreation Areas. The scope of development for each of the concession locations which have been approved involved the excavation of boat harbors and the construction of breakwaters to provide protection for them. Supplement was approved by ENGCW-PV, 2d Indorsement, 9 March 1970.

(10) Supplement No. 7, 15 January 1971, proposed that electrical facilities for camping trailers be provided at the campsites in Coles Creek Recreation Area. In addition, it was proposed that such facilities be

## CARLYLE LAKE MASTER PLAN

installed in all Corps developed campsites at this project. Advance approval was requested for the Coles Creek Recreation Area to facilitate inclusion of the electrical facilities in a contract then being prepared for the upgrading of sanitary facilities. Supplement was approved by LMVPD-R, 1st Indorsement, 26 February 1971.

(11) Supplement No. 8, 2 April 1971, subject: Multi-purpose Forest Management Plan for Carlyle Lake. Returned for revisions by LMVCO-O, 1st Indorsement, 8 June 1971. This supplement was not resubmitted. It was included in the OPERATIONAL MANAGEMENT PLAN, which was a part of the Revised Master Plan.

(12) Supplement No. 9, 5 November 1971, proposed the upgrading of sanitary and recreational facilities at the Boulder Recreation Area. Modifications proposed included a washhouse structure, trailer dumping and waterfill stations, fish cleaning station, electric service at campsites, swimming beach, and a control station for campground management and collection of user fees. Supplement was approved subject to comments (which included deletion of the proposed electric service for campsites) by 2d Indorsement, DAEN-CWP-V, 9 March 1972.

b. The revised Master Plan, approved in February 1974, accumulated four supplements requesting changes to the document. The following is a brief summary of the four approved supplements:

(1) Supplement No. 1, 14 November 1974, proposed the upgrading of beach sanitary facilities at the Dam West and Coles Creek Recreation Areas to meet State of Illinois Recreation Rules and Regulations established by the Department of Public Health. This Design Memorandum was approved by LMVPD in a 1st Indorsement of 19 November 1974.

(2) Supplement No. 2, 21 May 1976, proposed an approach to the future development of commercial marina concessions at Carlyle Lake to insure economic survival of the existing concessionaires at the lake. This Design Memorandum was approved by LMVPD in a 1st Indorsement on 7 June 1976.

(3) Supplement No. 3, 21 January 1977, proposed approval of updated plans, submitted by the Illinois Department of Natural Resources, for recreation resource development on public lands managed by this state agency at Carlyle Lake. This supplement was approved by LMVPD in a 1st Indorsement dated 25 February 1977.

(4) Supplement No. 4, 31 July 1979, recommended approval of proposed land use reallocations, construction of several items needed to enhance or complete developed areas, and updated all site plans to reflect their as-built condition. This supplement was approved by LMVPD by a 3rd Indorsement dated 14 December 1979.

c. A letter from DAEN-CWO-R dated 31 March 1980 was sent to LMVPD-R and transmitted to LMSPD-R on 9 April 1980. This letter directed that ER 1105-2-167, Resource Use: Establishment of Objectives, was to be incorporated into future supplements/Master Plan Updates submitted for approval.

d. The updated 1986 master plan (Supplement No. 5) has accumulated two additional supplements. A brief description of the updated plan and additional supplements follows.

(1) Supplement No. 5, dated 11 December 1986, required review and approval of updated Master Plan. The prime purpose of this supplement was

to provide an update of all obsolete material in the text, revise the site plan drawings to reflect the current as-built condition, reevaluate the land use zoning designations project wide, develop resource use objectives, increase recreation area efficiency and reduce O&M costs and modify one comfort station to include shower facilities at the McNair Group Camping Area. Supplement was approved by LMV-PD-R on the 5th Endorsement dated 10 September 1987.

(2) Supplement No. 6, dated 28 September 1989 proposed the remodeling of two comfort stations to provide shower facilities, the removal of three vault toilets, and the construction of two water-borne comfort stations in the Dam West and Coles Creek recreation areas and the Lotus Cove Group Camp. Supplement was approved by LMV-PD-R on the 1st Endorsement dated 7 November 1989.

(3) Supplement No. 7, dated 6 July 1992 provided information concerning the proposed construction of a resort lodge and an eighteen hole golf course within and adjacent to the Dam West Recreation Area. Information was included regarding a land exchange of South Shore State Park for the resort area. An environmental assessment was attached to address environmental concerns associated with the proposed resort development. Supplement was approved by LMV-PD-R on the 1st Endorsement dated 10 August 1992.

#### 1-05 APPLICABLE PUBLIC LAWS

Development and management of federal reservoirs for various purposes is provided under several statutes. These laws cover development of recreation facilities, licensing of project lands for fish and wildlife purposes, protection of natural resources, and leasing of project lands for incidental uses other than recreation.

a. Recreation. Development and management of recreation facilities at Department of Army constructed reservoirs by the Corps of Engineers, by other governmental agencies, local groups, or individuals is authorized under the following public laws:

(1) Section 4 of the **Flood Control Act**, approved 22 December 1944 (Public Law 534, 78th Congress), authorizes providing facilities for public use, including recreation and conservation of fish and wildlife.

(2) The **River and Harbors Act**, approved 2 March 1945 (Public Law 14, 79th Congress), specifies the rights and interests of the states in watershed development and water utilization and control, and the requirements for cooperation with state agencies in planning for flood control and navigation improvements.

(3) The **Land and Water Conservation Fund Act**, approved 3 September 1964 (Public Law 578, 88th Congress, 78 Stat. 897), contains provisions by which the Corps may charge for admission and use of its recreation areas under prescribed conditions.

(4) The **Federal Water Project Recreation Act**, approved 9 July 1965 (Public Law 72, 89th Congress, 79 Stat. 213) contains cost sharing provisions for acquisition of lands and development of recreation facilities for water resources projects authorized after 1965. It also provides for cost sharing development of new areas that were not part of initial project construction.

## CARLYLE LAKE MASTER PLAN

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(5) The **Architectural Barriers Act of 1968** (Public Law 90-480) together with the acts and amendments listed in 6, 7, and 8, below provides information and guidance regarding universal accessibility for persons with disabilities to the U. S. Army Corps of Engineers recreation facilities and programs.

(6) The **Rehabilitation Act of 1973** (Public Law 93-112) and the Rehabilitation Act Amendments of 1974 (Public Law 93-516) (see 5 above).

(7) The **Rehabilitation, Comprehensive Services, and Developmental Disabilities Amendments of 1978** (Public Law 95-602) (see 5 above).

(8) The **Americans with Disabilities Act of 1990** (Public Law 101-336) (See 5 above).

(9) The **Omnibus Budget Act - Day Use Fees**, approved August 10, 1993 (Public Law 103-66), contains provisions by which the Corps may collect fees for the use of developed recreation sites and facilities, including campsites, swimming beaches, and boat launching ramps but excluding a site or facility which includes only a boat launch ramp and a courtesy dock.

b. **Fish and Wildlife.** The fish and wildlife aspects of resource development were authorized under the following public laws:

(1) The **Fish and Wildlife Coordination Act**, approved 14 April 1946 (Public Law 732, 79th Congress, 48 Stat. 401), provides authority for making project wildlife lands available for management by interested federal and State wildlife agencies.

(2) The **Fish and Wildlife Coordination Act**, approved 12 August 1958 (Public Law 624, 85th Congress, 72 Stat. 563), provides for more effective integration of a fish and wildlife conservation program with federal water resource developments.

(3) The **National Environmental Policy Act of 1969** as amended (42 USC 4321 et seq) declares a national environmental policy and requires that all federal agencies shall to the fullest extent possible use a systematic, interdisciplinary approach which integrates natural and social sciences and environmental design arts in planning and decision making.

(4) The **Endangered Species Act of 1973** as amended (16 USC 1531 and 1536) requires that federal agencies shall, in consultation with USFWS (or the National Marine Fisheries Service), use their authorities in furtherance of conserving endangered and threatened species and take such action as necessary to assure that their actions are not likely to jeopardize such species or destroy or modify their critical habitat.

(5) The **Water Resource Development Act of 1986**, Section 1135 provides for modifications in the structures or operations of a project, consistent with authorized project purposes to improve the quality of the environment i.e. restoration of fish and wildlife habitat.

c. **Forest Resources:** The production, protection and improvement of timber resources on project land is authorized and directed in the Forest Cover Act, approved September 6, 1960 (PL 717, 86th Cong., 74 Stat. 817). This law specifies that project land be developed and maintained so as to encourage, promote, and assure fully adequate and dependable future resources of readily available timber through sustained yield programs, reforestation,

and accepted conservation practices, and to increase the value of uses compatible with other uses of the project.

d. Other Incidental Uses: Title 10, United States Code, Section 2667, authorizes the lease of land at water resource projects for any commercial or private purpose not inconsistent with other authorized purposes, subject to specific restrictions thereupon, as set out in regulations, policy, and Delegations of Authority. Title 16, United States Code, Section 460d, authorizes use of public lands for any public purpose, including fish and wildlife, if it is in the public interest. Such uses are also subject to regulations, policy and delegations of authority. The use of project lands for easements and licenses is authorized in various Congressional Acts and codified in Titles 10, 16, 30, 32, and 43 of the United States Code. Lands and rights of way will be acquired pursuant to provisions of the **Uniform Real Property Acquisition and Relocation Assistance Act of 1970, P.L. 91-646**, as amended.

e. Cultural and Historical Considerations. A number of laws mandating the protection of cultural resources on public lands have been passed during the past 75 years. These laws and Executive Orders are summarized in Appendix A of St. Louis District Cultural Resource Management Policy (April 1982). The following laws subsume, clarify or supersede all previous cultural resource law:

(1) The **Archeological Resources Protection Act of 1979** (16 USC 470 et seq), Public Law 96-95, 96th Congress Revision and update of 1906 Antiquities Act. Protects archaeological resources and sites which are on public lands and Indian land, and fosters increased cooperation and exchange of information between governmental authorities, the professional community, and private individuals. The act requires and provides for permits to conduct scientific archaeological excavations by qualified individuals and also specifies criminal acts and provides for criminal and civil penalties.

(2) The **1980 Historic Preservation Amendment to the National Historic Preservation Act of 1966**, Public Law 96-515, 96th Congress states a policy of preserving, restoring and maintaining cultural resources and requires that Federal agencies take into account the effect of any undertaking on any site on or eligible for the National Register of Historic Places.

(3) The **Archeological and Historic Preservation Act** as amended 16 USC 469 et seq. (Reservoir Salvage Act) provides for the preservation of historical and archaeological data which might otherwise be lost or destroyed as the result of flooding or any alteration of the terrain caused as a result of any Federal construction projects.

f. Other Cultural/Historical Laws. The **Native American Graves Protection and Repatriation Act** (P.L. 101-601) November 16, 1990, requires Federal agencies and museums to inventory human remains and associated funerary objects and to provide culturally affiliated tribes with the inventory of collection. The Act requires repatriation, on request, to the culturally affiliated tribes and establishes a grant program within the Department of the Interior to assist tribes in repatriation and to assist museums in preparing the inventories and collections summaries.

## 1-06 SCOPE OF REPORT

This memorandum is the second update of the revised Carlyle Lake

## CARLYLE LAKE MASTER PLAN

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Master Plan. It is primarily oriented to reflect current conditions, eliminate outdated information concerning the allocation of lake resources, and to formulate resource use objectives. This update reflects the current status of Carlyle Lake land and water use allocations and the status of proposed and future plans.

**SECTION II**  
**PROJECT DESCRIPTION**

SECTION II - PROJECT DESCRIPTION

2-01      LOCATION

Carlyle Lake is located on the Kaskaskia River at river mile 94.2 upstream from its confluence with the Mississippi River and about one-half mile upstream of the town of Carlyle, Illinois. Carlyle is located in Clinton County, approximately 50 miles east of St. Louis, Missouri, on U. S. Highway 50. The project area is bounded by Interstate Highway 70 on the north, U. S. Highway 50 and Interstate 64 on the south, U. S. Highway 51 and Interstate 57 on the east, and Illinois State Route 127 on the west. The location of the project and reservoir is shown on PLATE 3. State parks, Corps projects and population density information within the zone of influence (100-mile radius of Carlyle Lake) are shown on PLATE 3.

2-02      LAKE DATA

a. Basin Hydrologic And Climatic Summary. The plan of lake operation provides for flood control, water supply, navigation, water quality enhancement, recreation, and fish and wildlife conservation.

(1) A table of pertinent data related to project features and information related thereto is as follows.

TABLE 1  
CARLYLE LAKE  
PERTINENT DATA

General

Purpose of project	Flood control, lower Kaskaskia River navigation, water supply, outdoor recreation, fish and wildlife conservation, and water quality enhancement.
Location of dam	
Stream	Kaskaskia River, Illinois
River mile, above mouth	94.2
County	Clinton
Nearest Town	Carlyle, Illinois
Location of reservoir	
River mile above mouth	94.2
Counties	Clinton, Bond, Fayette, and Marion
Drainage area	
Upstream from dam site(sq. mi.)	2,717
Upstream from mouth(sq. mi.)	5,840

## CARLYLE LAKE MASTER PLAN

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### Reservoir

#### Inactive pool (minimum pool)

Elevation, feet	429.5
Area, acres	7,100
Shoreline (excluding arms), miles	25
Depth of water, feet	25 feet maximum

#### Joint-use pool

Elevation, feet, National Geodetic Vertical Datum (NGVD)	429.5-445.0 (summer pool 445.0)
Pool area, acres at elev. 445.0 ft.	26,000
Shoreline (excluding arms), miles	55
Depth of water, feet	40 feet maximum

Public land area at 445.0, acres 12,833

#### Flood control pool

Elevation, feet, NGVD	445.0-462.5
Pool area, acres at elev. 462.5 ft.	58,447
Shoreline (excluding arms), miles	135
Depth of water, feet	58 feet maximum

### Main dam

Type	Earth-fill dam with gated spillway section
Elevation of crest, feet, NGVD	4 7 2 . 5
Height above streambed, feet	67.5
Length of crest, feet	6,610

### Spillway

Width, gross, feet	179
Width, net, feet	152
Elevation of crest, feet, NGVD	425.0
Crest gates	425.0
Number	4
Size, feet	38W x 39H
Type	
Tainter	
Elevation, top of gates (closed), feet, NGVD	463.5
Tailwater elevation for discharge	
Minimum release, 50 cfs	412.0
Maximum release, 10,000 cfs	427.0

#### Outlet sluices

Location	East abutment, Monolith 7D
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**CARLYLE LAKE MASTER PLAN**

Number	1
Size intake and intake invert elevation	30" at 417 feet NGVD
Size outlet and outlet invert elevation	24" at 404 Feet NGVD
Control	Venturi tube and regulating valve

**Saddle dams**

Elevation of crests, feet NGVD	472.5
Saddle Dam No. 2	
Maximum height, feet	44
Length of crest, feet	8,100
Saddle Dam No. 3	
Maximum height, feet	34
Length of crest, feet	23,400

**Keyesport Levee**

Elevation of crests, feet NGVD	469
Maximum height, feet	472.5
Length of crest, feet	9,945
Fee line contour, feet	450
Easement line contour, feet	465.5
Flowage Easement Lands, Acres	24,972
Total Fee Lands and Water, Acres	37,543

(2) The climate in this area is relatively moderate.

(a) Temperature. Occasional temperatures of 100° F. or higher have been experienced. The winters are usually short and moderate, although temperatures below zero are occasionally experienced. The average annual temperature in this area is about 55° F., and the average monthly temperature ranges from a maximum of 78° F. during July to a minimum of 30° F. in January. An extreme low of minus 34° F. was recorded in Lincoln, Illinois, in January 1927, and minus 28° F. was recorded in Morrisonville, Illinois, just outside the basin boundary. The maximum observed temperature of 115° F. occurred at Centralia, Illinois, on 22 July 1901, and again at Greenville, Illinois, on 12 July 1936.

(b) Wind. The maximum wind movement occurs in March, and the minimum average occurs in August. The average annual wind velocity is about 10.3 miles per hour. The prevailing winds over the basin are from the south, southwest.

(c) Humidity. The mean relative humidity varies from about 59 to 86 percent in the winter and from 51 to 89 percent during the other seasons of the year.

## CARLYLE LAKE MASTER PLAN

(d) Precipitation. The average annual precipitation over the drainage area is 40.2 inches of which about 22 percent falls in May and June. Although rainstorms are frequent in the spring, local cellular storms also occur in July and August. Snowfall is usually limited to the period from October through April and seldom covers the ground for more than a few days at a time. The average annual snowfall amounts to about 17 inches.

b. Lake Shoreline, Length, And General Character. The topography of the reservoir area consists of gently rolling land, with alluvial valleys and terraces developed along the Kaskaskia River. The reservoir area is one of moderately low relief. The highest point is some 4 miles southwest of the town of Carlyle and is approximately 580 feet in elevation, while the lower portions of the Kaskaskia River Valley have elevations near 400 feet. The uplands are generally flat, except where interrupted by occasional drift hills. Elevations of these uplands range between 450 and 550 feet, with the drift hills standing 30 to 50 feet higher. The reservoir, at joint use pool elevation 445.0, has a water surface area of approximately 25,000 acres and 87 miles of shoreline. The pool at this elevation extends upstream from the dam approximately 13 miles, intersected about 8 miles upstream by the Burlington and Northern Railroad crossing between Keyesport and Boulder, and varies in width at this elevation from 1 to 3 miles. The average water depth throughout the reservoir at joint use pool elevation is approximately 25 feet. Depths along the western shore are greater, due to the old riverbed, than along the eastern shore and in the upper reaches. Maximum depths of 40 feet are along the old riverbed and at several of the bottomland lake sites which existed prior to inundation. The shoreline of the reservoir at the joint use pool elevation is rather regular, except where several major tributary streams enter the main pool. By far, the major portions of deep water are along the bluff-like areas of the west and south shore of the reservoir. This condition exists even at inactive or minimum pool elevations.

### c. Project Structures.

(1) Main Dam. The main dam consists of a compacted earth-fill embankment and a concrete spillway section with tainter gates and sluices located about midway along the dam embankment. The crest of the dam embankment is at elevation 472.5 feet, and the crest of the spillway is at elevation 425 feet. The total length of the structure, including the spillway section, is about 6,610 feet. The main dam has a dam safety data collection system consisting of instruments installed both during and after construction. The purpose of these instruments is to monitor the performance safety of the earthfill embankment and the concrete structure.

(2) Saddle Dams and Pump Stations. Because of the topography, it was necessary to construct two earth-fill saddle dams on the lake rim, east of Carlyle, in order to contain the maximum pool level proposed for the reservoir. The total length of these embankments is about 31,560 feet, and the elevation of the crest of each dam is 472.5 feet, the same as that of the main dam. Drainage facilities for handling natural impoundment landside of the saddle dams consists of a system of drainage structures, collection ditches, and a pump station for each saddle dam.

(3) Keyesport Levee and Pump Station. The reservoir necessitates separate protection, consisting of an earthen levee and drainage and pumping facilities for handling interior drainage for the Village of Keyesport, opposite river mile 125. The net grade elevation of this levee is 469 feet, and it is 9,945 feet in length.

(4) Railroad Crossing. The Burlington and Northern Railroad, crossing the pool between Keyesport and Boulder was raised a maximum of

approximately 23 feet. The railroad levee is riprapped and has several flood openings. This structure separates the open water pool to the south from the flooded dead timber (now mostly stumps) and shallow water to the north.

(5) Relocations and Remedial Works. At the time of construction, existing local roads, oil lines, power lines and transmission lines, two water supply facilities, and several cemeteries required relocation or remedial measures.

## 2-03. LAKE REGULATION

Appendix B of the Kaskaskia River Basin, Illinois, Master Reservoir Regulation Manual contains the plan for reservoir regulation. The plan provides for flood control, water supply, water quality, navigation, recreation, and fish and wildlife conservation.

a. Reservoir Regulation And Pool Fluctuation. Water level management for water quality, water supply, and fish and wildlife has a minimal effect on regulation of the reservoir for flood control. The relationships of outflows with time of the year and reservoir elevations is illustrated on PLATE 12.

b. Water Quality Regulation. A minimum release rate of 50 cfs will be maintained to provide guaranteed downstream flows for pollution abatement and maintained stream flow. This volume of flow is in excess of the minimum flows experienced during the period of minimum stream flow record. Consequently, a minimum 50 cfs downstream release rate improves the stream flow characteristics that have been experienced during the period of minimum stream flow.

c. Inactive Storage Pool. The inactive storage pool of 50,000 acre-feet below elevation 429.5 feet is reserved for sediment retention.

d. Joint Use Pool. The joint use pool contains 230,227 acre-feet of storage between elevation 429.5 and 445.0 feet. Thirty two thousand, six hundred ninety two acre-feet (32,692 ac. ft.) of this storage is allocated to the State of Illinois for water supply. The State of Illinois is participating as a local interest by contributing the cost (payable when utilized) allocated to this storage for domestic and future industrial water supply needs. The remaining 197,535 acre-feet is allocated to the Federal Government. Stored water is regulated for Kaskaskia River navigation, fish and wildlife management, recreation, and to assure minimum flows downstream.

e. Flood Control Pool. The portion of the reservoir above elevation 445 feet and below elevation 462.5 feet has an authorized storage of 700,000 acre-feet for flood control. This storage is based on requirements determined from more recent criteria and hydraulic data subsequent to the authorization act. The rule curve, pool frequency, and duration curve is presented on PLATE 12.

## 2-04. VISITATION DATA

a. General. Visitation has increased steadily at Carlyle Lake since becoming operational in 1967. Visitation has fluctuated between 2.5 and 4.5 million recreation days over the past ten years. A recreation day is a visit by one individual for recreational purposes during any reasonable portion or all of a 24-hr period. Year to year variations in actual lake visitation can be attributed to the changes in weather conditions, fluctuations in lake levels, cost and supply of gasoline, general economic conditions, and the level of development of facilities occurring on the lake. Recreational opportunities will be continually reevaluated to insure maximum use by the public. In 1992,

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visitation began to be recorded as visitor hours and visits instead of recreation days. Actual visitation data in Table 2 reflect this change.

b. Past And Current Visitation. Carlyle Lake's zone of influence is shown on PLATE 3. The most recent visitor use survey provided data which showed that 54% of lake visitors travel a distance of less than 26 miles to reach the lake, 25% of lake users come from within a 26-50 mile radius, 9% from within a 51-75 mile radius, and 4% from beyond 100 mile distance of the lake. TABLE 2 presents a summary of actual and estimated visitation from 1967 through 1996. Recreation use days are estimated from 1992 on because of the switchover to Visitor Estimation Reporting System (VERS). Estimated visitation for the years 1992 to 1996 were developed by linear regression analysis of data from 1984 to 1991 to provide a more accurate trend in visitation. Marina patron visitation reflects a market area skewed toward St. Louis and is discussed in Section 4-03e.

c. Projected Visitation. A discussion of projected visitation at Carlyle Lake, is presented in paragraph 4-14.

TABLE 2  
CARLYLE LAKE  
VISITATION, 1967-1996  
RECREATION DAYS

1967	929,008
1968	1,563,877
1969	2,397,411
1970	2,022,246
1971	2,330,468
1972	2,262,449
1973	2,534,267
1974	2,658,564
1975	2,360,561
1976	2,310,186
1977	2,815,527
1978	3,103,273
1979	2,750,100
1980	2,763,499
1981	2,575,763
1982	3,424,750
1983	3,776,272
1984	3,559,551
1985	3,606,900
1986	3,931,039
1987	4,045,611
1988	3,530,773
1989	3,546,272
1990	3,880,531
1991	4,198,436
1992	4,345,954
1993	4,511,261
1994	4,394,159
1995	4,480,439
1996	4,566,719
	<u>VISITOR HOURS</u>
1992	23,730,673
1993	24,780,357
1994	21,811,481
1995	25,705,118
1996	23,760,870

**SECTION III**  
**RECREATIONAL AND**  
**ENVIRONMENTAL RESOURCES**

SECTION III - RECREATIONAL AND ENVIRONMENTAL RESOURCES  
OF THE PROJECT AREA

3-01. GEOLOGICAL

a. Bedrock and Glacial Formations. Bedrock materials are seldom exposed to view in the Carlyle Lake study area as they are buried by younger glacial age materials. The youngest bedrock is Pennsylvanian in age and the formations are the major zones of coal mining in Illinois. The Herrin #6 Coal is the major seam and lies about 500 feet deep under the project. Some of the City of Carlyle is undermined as are most of the surrounding towns along the railroad. Deeper and older rock formations yield oil and minor amounts of natural gas. The youngest materials found at the surface consists of glacial derived materials such as till and loess. The ice sheets eroded the upland and covered the area with glacial materials yielding a smooth plain with shallow valleys. The glacial till is exposed along the wave cut banks of the lake and is Illinoian in age. This glacial material is called the Vandalia Till and is typically silty with some pebbles. Another till, the Hagerstown, also is found in selected areas around the project. This till is usually found in the "hills" which surround the lake and it consists of sandy and gravelly deposits. The many sandpits around Keyesport are yielding materials from the Hagerstown Formation. Glacial age terrace deposits have been largely eroded away in the Kaskaskia River Valley or covered by lake waters. The islands east of Keyesport and west of Boulder are old terraces which are exposed above normal pool level.

b. Modern Soils. The modern soils of the project are located in two topographic positions. The "bottomland" soils, deposited by the Kaskaskia River are largely covered by lake waters. The upland soils are developed in the tills and a younger glacial derived material called loess. Loess is a silt-sized wind blown dust. The source of the dust was from the river valleys of the Kaskaskia and Mississippi Rivers. The loess is younger than the till thus overlies it. The loess derived soils of the world are among the richest in agricultural production.

c. Summary of Geologic Resources. Oil is still being produced within the project boundaries and is the most important geologic resource. The coal has not been mined subjacent to the project. The surface resources are not significant, thus, programs for protection and interpretation are not warranted beyond controlling soil and bank erosion.

3-02. ARCHAEOLOGICAL

a. Prior to the impoundment of Carlyle Lake, personnel from the University Museum of Southern Illinois University at Carbondale conducted a limited archaeological survey of the area to be inundated by the lake. Between 1958 and 1966, 84 archaeological sites were identified, and eight of these were excavated. The archaeological sites ranged from the Archaic through the Mississippian period (roughly from 8000 BC to AD 1500). Some of the investigations were nationally recognized as setting new standards in archaeological method and theory.

b. Pursuant to various federal legislation, particularly the National Historic Preservation Act of 1966, the St. Louis District has instituted a program to identify, evaluate, and manage archaeological sites on operational lands above the normal pool. Surveys of the shoreline have

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documented many new sites and the effects of shoreline erosion upon the sites. Now over 170 prehistoric and historic sites have been reported. In 1986, the Carlyle Lake Historic Properties Management Plan was written to set procedures and priorities for archaeological compliance activities. In 1989, the Data Synthesis of Carlyle Lake archaeology was completed which summarizes all known archaeological information, including descriptions of each site, and identifies existing gaps in our knowledge about the lake's archeology. Most of the artifacts and records from both pre- and post impoundment investigations have been transferred to the Illinois State Museum, Springfield, Illinois for proper curation as required by law.

### 3-03. HISTORICAL

a. In 1825, Charles Slade erected a toll bridge across the Kaskaskia River to replace the ferry which had been the only means of crossing the river. The bridge served the travelers on the Vincennes - St. Louis road until 1860 when a suspension bridge, one of the earliest in the Midwest, was constructed at a cost of \$45,000. In 1946, the Carlyle Suspension Bridge Restoration Association was formed to restore this picturesque structure which was deteriorating rapidly. Twenty-thousand dollars was appropriated in 1951 by the State Legislature for the restoration of the bridge because of its historical importance. When the restoration was completed, it was decided to name the bridge in honor of General William Dean, a native of Carlyle and a hero of the Korean war. On November 11, 1953, General Dean came to Carlyle to dedicate the bridge. In June 1973, the bridge was selected for inclusion in the National Register of Historic Places. The City of Carlyle renovated the bridge in 1992 at a cost of \$250,000. A cable snapped in 1993 and the bridge has remained closed to date. In 1995, the City of Carlyle contracted repair of the suspension bridge for \$200,000.

b. Elsewhere around the lake are sites containing remains of former homesteads and farm sites. These are included in the archaeological inventory and are similarly managed.

### 3-04. ECOLOGICAL CONDITIONS

a. Wildlife Resources. Located on the Carlyle project are numerous species of wildlife native to this area of Illinois. Wildlife include numerous types of rodents, small game birds and mammals, waterfowl, shorebirds, songbirds, reptiles, amphibians, furbearers, white-tailed deer, and predatory mammals and birds. The presence of the lake, together with management procedures on the public lands, have benefitted many of the species present and have attracted other species to the area, especially waterfowl. The flooded timber area above the Burlington-Northern Railroad provided at one time many nest trees for woodpeckers, wood ducks, and heron and egret rookeries. Since the lake was impounded, the number of snags has diminished considerably. Bald eagles and cormorants now nest in the area. These species can be found in much greater number now than before the lake environment was created. In addition, many more shorebirds and waterfowl utilize this area than ever before.

Land management practices are beneficial to songbirds, game birds, and mammals. Although the land area for the most part is limited, areas not utilized for high intensity recreation purposes are being managed for wildlife habitat. Trees and shrubs are planted to provide shelter from weather and predation and to provide nesting cover and food. Wildlife food plots varying in shapes and sizes and species composition are planted in areas in which additional food for wildlife is desirable. Succession control in the form of mowing eliminates woody species of plants while providing diversity among

herbaceous species of plants in contrast to adjacent unmowed areas. Nest boxes provide additional nesting spaces for wood ducks, purple martins, bluebirds, house wrens, tree swallows and squirrels. Together, the private farms and the public wildlife areas provide a proper balance of food and cover for wildlife over much of the project.

The IDNR manages the subimpoundment area (see plate 13A) for migratory bird species by planting crops and establishing moist soil plants during the growing season and flooding them during the winter. Other IDNR areas are managed to provide food for wildlife. Civic and private organizations working with the Corps and the IDNR are also helping by constructing and placing squirrel and wood duck nesting boxes on project property. Wetland projects are restoring moist soil areas in various locations around the lake. At the present time, Carlyle Lake does provide habitat for some endangered species. These species are addressed in Section 4-15.

b. Aquatic Resources. The fishes of Carlyle Lake and the lake spillway are typical of Midwestern waters. Major sport, commercial, and forage species are white and black crappie, bluegill, green sunfish, longear sunfish, yellow and black bullhead, channel and flathead catfish, white and yellow bass, walleye, sauger, largemouth bass, freshwater drum, carp, three species of buffalofishes, three species of carpsuckers, bowfin, three species of gar, gizzard shad, brook silversides, red shiner bullhead minnow, golden shiner, and western mosquitofish. All totaled, there are approximately 50 species of fish and several hybrid fish found in this area.

The waters of the lake and tailwater also have many diverse forms of phytoplankton, zooplankton, aquatic insects, crustaceans, amphibians, reptiles and mollusks. All, in one life stage or another, are an integral part of the food chain, necessary to sustain life of lake organisms. The food supply of the fishes is supplemented also by numerous terrestrial forms, particularly during periods of rainfall or strong winds. Maintenance of good water quality (relatively free of inorganic or organic pollutants) is also necessary for the well-being of the diverse aquatic populations. While presently not abundant, several species of semi-aquatic plants (smartweed, arrowhead, willow, buttonbush, reed grass, lotus, cattail) are established and contribute to the aquatic communities as a source of nesting, feeding, and protective cover. Very recently, sparse submerged beds of coontail have become established in some coves protected from wind and wave action.

Largemouth bass and white crappie populations are supplemented from nursery ponds managed by the Illinois Department of Natural Resources. Additional stocking of fingerlings is also done by both the Corps and the IDNR. Discarded Christmas trees are bundled together and placed in the lake by volunteers, IDNR and Corps personnel for the purpose of providing cover and food sources in given areas. Although sport fishing, as a whole, has increased substantially in the area since the completion of the lake, water level fluctuations, and fishing pressure have reduced some fish species to low population levels. Three fish rearing ponds are being developed in Eldon Hazlet State Park by the Illinois Department of Natural Resources. The fish rearing ponds will be managed by the Illinois Department of Natural Resources fisheries management team.

c. Vegetative Resources. Prior to construction, the lake basin area was dominated with a pin oak, cottonwood, pignut hickory, and soft maple forest. The undergrowth was largely young pin oak and pignut hickory, while the ground cover was composed of sedges and minor associations of grasses and

## CARLYLE LAKE MASTER PLAN

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forbs. Remnants of this forest-type can still be found along uncleared stream channels, the upper reaches of the lake and subimpoundments, and below the main dam. Along the upper portions of the Kaskaskia Valley, oak-hickory is the climax forest type. The understory consists primarily of oak-hickory saplings with minor herbaceous and woody associations. The upper portions of the valley also have numerous old field sites present. These are in various successional stages. Plant associations vary from almost pure stands of grasses and forbs to intermediate aged oak-hickory woods. Vegetative management practices vary from tree planting in recreation areas and some old fields maintaining wildlife clearings in other old fields and restoring wetland habitat. A natural ecological setting is being maintained by using minimal management practices on existing woodlands and many old fields and by planting tree and shrub species that are native or indigenous to the site. Restoration of wetland habitat has become a prime objective in appropriate locations around Carlyle Lake including Boulder Flats and Saddle Dam 3 area.

d. Insect And Vector Problems. For the most part, insects and other vectors are kept in ecological balance. At certain times of the year, mosquito problems arise when the area receives a combination of wet, warm weather. Vector problems other than mosquitos at Carlyle Lake have been minimal. Occasionally, skunks present a minor problem in recreation areas, living under structures or picnic table slabs. Checks of levees and dams on the project are conducted bi-annually to survey for damage caused by ground hogs and other burrowing rodents which weaken the dam structures. Pigeons roosting on the spillway gates of the main dam have created a health hazard and maintenance problems on the metal portions. There are no known significant adverse effects of any pest control programs now being carried out. Pest control programs are closely coordinated with appropriate agencies to insure that the environmental effects are adequately considered. Pest control programs are discussed in detail in the OPERATIONAL MANAGEMENT PLAN.

### 3-05. ENVIRONMENTAL AND SCENIC QUALITIES

a. Topographic Qualities. The topography of the lake area consists of gently rolling land with alluvial valleys and terraces developed along the Kaskaskia River. The lake area is one of moderately low relief with no significant geologic formations present. A more extensive description of Carlyle Lake's topography is presented in SECTION II, paragraph 2-02b.

b. Vegetative Qualities. The vegetative types were discussed in paragraph 3-04c above. These different vegetative types combine to form moderate scenic qualities along various parts of the lake shore above the area of shoreline erosion. Scenic qualities of the vegetation, visible from project roads and adjacent public roads, are of a low quality. Due to the small amount of land in federal ownership, the majority of road scenery is agricultural fields.

c. Land Uses. Land management on project lands is, for the most part, complementary to scenic qualities. Areas have been revegetated or are being revegetated for recreational, wildlife, and scenic purposes. Adjacent lands, some of which border the shoreline, are primarily agricultural.

d. Water Quality. The water in Carlyle Lake is of suitable quality for uses such as water supply, primary and secondary contact recreation, and provides support for desirable biological communities. The water of Carlyle Lake and the downstream river channel is generally good. See section 4-10 for a complete discussion of water quality.

e. Visual Qualities. The combination of features listed in the above paragraphs form the overall visual qualities. For Carlyle Lake, the overall esthetic qualities are rated as low to moderate. The primary reasons for this are the low relief topography, agricultural fields and old fields constituting the majority of adjacent land, severe shoreline erosion resulting from soil type, wind, and pool fluctuation, and the moderate to high turbidity.

### 3-06. RECREATION

a. Recreation Development Description. All the recreational developments at Carlyle Lake are utilized strictly for outdoor recreation. The major activities of the visiting public are sightseeing, fishing, boating, waterskiing, wildlife viewing, camping, picnicking, swimming, and hunting. Presently there are ten recreation areas (two state and eight federal) and four marinas. These include 6 camping areas, 11 picnic areas, 39 boat launching lanes and numerous nature trails. A 2,565 acre subimpoundment waterfowl hunting area, a 635 acre waterfowl resting area and numerous upland game hunting areas are managed by the State. The entire lake and spillway area are available for water based recreation. SECTION 8 presents a complete description of all recreational development - existing, proposed and future. Marina development is described in section 6-02c.(2).

b. Effects Of Recreation On The Environment. Recreational development has had little adverse effect on environmental or scenic qualities of the lake area. Structural and landscape designs blend with the surrounding area as much as possible. Waste collection and treatment is stringently regulated. Site deterioration due to overuse is kept minimal due to strict regulations governing the carrying capacity of individual areas and by erosion control, fertilization (low phosphorus) when indicated by soil sample, and other vegetative management practices. Roads and trails in certain areas have increased visitor enjoyment of different aspects of the lake's natural resources by providing a means of access to primitive, scenic areas which offer such features as seasonal concentrations of waterfowl, aesthetic wooded areas and lake overlooks.

**SECTION IV**  
**FACTORS INFLUENCING AND**  
**CONSTRAINING RESOURCE**  
**DEVELOPMENT AND MANAGEMENT**

SECTION IV - FACTORS INFLUENCING AND CONSTRAINING  
RESOURCE DEVELOPMENT AND MANAGEMENT

4-01. GENERAL LAND AND WATER CONSTRAINTS

a. Topography and Soils.

The geological elements of the area around Carlyle Lake do not present any particular known constraining influences to resource development and management. However, the other associated elements, topography and soils, do present resource management problems such as erosion control.

The relatively flat topography around the perimeter of the lake coupled with a fluctuating pool level causes extensive mudflat areas to be exposed at various times. These areas are not aesthetic and are difficult to manage. It is difficult to establish any type of vegetative cover which will grow under these adverse conditions. Due to the flat topography, portions of public access areas are flooded during periods of high water. In addition to the temporary loss of recreational use of these sites, the high water severely limits the variety of plant species which can be used to control erosion on the mudflats.

The soils of the area present several problems. They are quite erosive particularly when the shoreline of the lake is subjected to periods of high water combined with windy conditions. The lake is also located in the center of a zone of solonchic soils in Illinois. These are nitric soils, which have a high content of sodium, which present extremely difficult problems in establishing woody vegetation. Solonchic soils are definitely a constraining influence in resource development and management.

b. Water Constraints. The lake level may rise or fall depending upon the natural factors of flood and drought. During flood control operations, the level of the lake is allowed to rise so that additional water storage can be achieved, thereby lessening the adverse effect of flooding to the downstream area. As the level of the lake rises, additional portions of land used for recreation are inundated, thereby restricting their use. The degree and length of restriction depends upon the severity of the flood. A pool elevation of 450 NGVD has detrimental effects upon recreational activities at the lake. Although most recreation areas will remain open at this elevation, some swimming, picnicking, camping, and most boat launching facilities are closed. Adverse side effects will include the destruction of grass turf, killing of trees, accumulation of driftwood in mowed areas, erosion of the shoreline, and loss of revenue to the businesses around the lake. Floods in excess of a 450 NGVD will cause proportionately greater damages, and at pool elevations in excess of 455 NGVD, most recreation areas are closed. The closure of recreation areas, if prolonged over a good portion of the season, can cause economic hardship for tourist associated businesses around the lake. Flooding, as described, is generally considered very beneficial to aquatic ecosystems and a requirement for their optimum development. Constraints on the optimum development of these resources would include such factors as elevated turbidity and poorly timed water level fluctuation or stabilized water levels. This subject is discussed more fully in SECTION 4-07 below.

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### c. Area Development as a Result of the Project.

As a result of Carlyle Lake being constructed and operated, several pertinent situations have developed which to some extent affect the environment of the project areas. The land acquisition policy at Carlyle Lake was such that the great majority of fee land was only purchased to elevation 450 (programmed 5-year flood frequency); however, additional minor acquisition of real estate above this elevation has and is currently taking place due to extensive shoreline erosion in certain areas. This subject is discussed further in Section 10-08.

Rather than purchasing all the land outright for Carlyle Lake operations between 450 and 465.5 NGVD, the federal government only purchased the right to flood these lands. These lands are designated as flowage easement lands. The Corps currently owns flowage easement rights on 24,972 acres of land around Carlyle Lake. On tracts where flowage easements were acquired, residences can only be constructed on ground at or above 462.5 and must have a first floor elevation of 467.2. Any construction requires an approved flowage easement permit. Several subdivisions were developed on private ground adjacent to Corps community boat dock harbors during initial construction. Some developments are oriented to the overnight and vacation camper, however, they are more developed than the Corps and state facilities. Other developments include year-round homes and house trailers. The community boat docks are now grandfathered and no new harbors are permitted.

When easement tracts are developed for subdivisions purposes, an approved sewage system must be provided for all lots. The sewage treatment must meet State of Illinois, Department of Public Health standards. Outdoor toilets (open pits) are not permitted. Some developments are located entirely on private land. The Corps has no zoning control of these areas, but a county zoning ordinance was established in Clinton County in August 1992 to regulate future development.

### 4-02. DEMOGRAPHIC DATA

The following is a brief economic and demographic analysis of Bond, Fayette, Marion, and Clinton Counties, Illinois. The combined area is located northeast of the St. Louis, Missouri - Illinois Metropolitan Statistical Area (MSA). This investigation will focus on a statistical analysis of past, present, and future trends of the counties mentioned above. TABLE 3 and FIGURE 1 reveal a growth trend in the study area for the period of 1960 through 1980 with a slight decrease (3.5%) in the decades of the fifties and eighties. Overall in the last 30 years, the area has experienced an 9% increase of population from 99,384 in 1960 to 108,389 in 1990.

### 4-03 AREA OF INFLUENCE

General. A 100 mile radius of influence, centered on the dam site, has been adopted for purposes of this Master Plan. See PLATE 3, Population Density Map and Zone of Influence. This zone is preponderantly in southern Illinois, but includes the large metropolitan complex of greater St. Louis and a portion of east central and southern Missouri. The area is generally characteristic of the Midwest adjacent to the Mississippi Valley. The St. Louis Metropolitan Statistical Area (MSA) on both sides of the Mississippi River represents the significant concentration of both population and industry. The remainder of the zone is primarily agricultural in nature with numerous small cities, towns and villages offering commodities and services. The area is well served by freight rail service, road systems, and truck lines.

TABLE 3  
COUNTY POPULATIONS

	1990 <sup>1</sup>	1980 <sup>2</sup>	1970 <sup>3</sup>	1960 <sup>4</sup>
Bond	14,991	16,224	14,012	14,060
Clinton	33,944	32,617	28,315	24,029
Fayette	20,893	22,167	20,752	21,946
Marion	<u>41,561</u>	<u>43,523</u>	<u>38,986</u>	<u>39,349</u>
	108,389	114,531	102,065	99,384

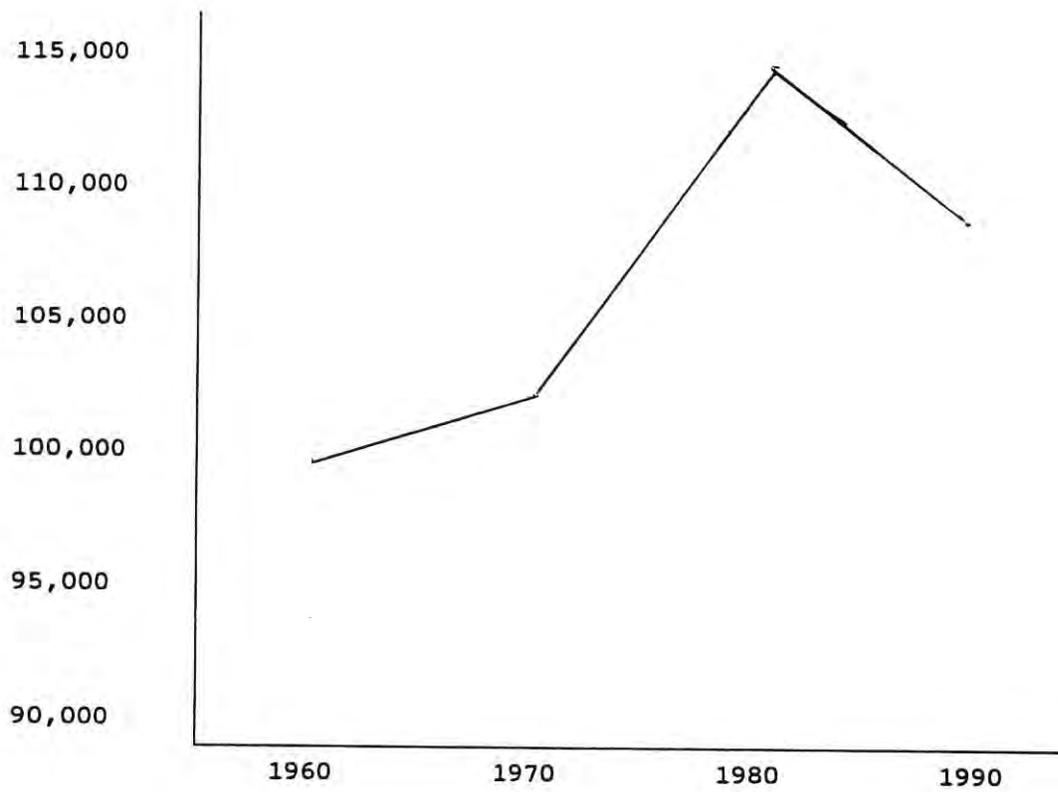
<sup>1</sup> U.S. Bureau of the Census, 1990 Census of Population, General Population Characteristics, Illinois. Pages 1 & 2.

<sup>2</sup> U.S. Bureau of the Census, 1980 Census of Population, General Social and Economic Characteristics, Illinois. Page 15-17.

<sup>3</sup> U.S. Bureau of the Census, 1970 Census of Population, General Population Characteristics, Illinois. Pages 15-87 and 15-88.

<sup>4</sup> U.S. Bureau of the Census, 1960 Census of Population, General Population Characteristics, Illinois. Pages 15-55 and 15-56.

FIGURE 1  
COMBINED POPULATION TRENDS OF FAYETTE, CLINTON, BOND, AND  
MARION COUNTIES, ILLINOIS  
1990



Source: TABLE 3

b. Industries. The concentration of population and industry in the St. Louis MSA has shifted from the city of St. Louis to St. Louis and St. Charles Counties. Manufacturing employed the greatest percentage of workers in the study zone in the 1970's, with the manufacture of shoes, malt beverages and air and spacecraft dominating. Even though the three major automobile manufacturing corporations and several leading defense contractors and major chemical companies are located in the zone, the employment trend in the last two decades has been away from manufacturing and into the service sector which employs 38 percent of all workers in the study zone. The service sector comprises such occupations as health services, financial services, educational, legal, and personal services. A wide variety of light industries, wholesale and retail commercial establishments operate in the study zone.

c. Transportation and Road Network. The St. Louis MSA is a major railroad center of the United States. Adequate freight service is available throughout the area. Passenger rail and service has decreased at an accelerating rate over time. Many towns in the zone of influence, formerly served by passenger rail service now have none at all and the remainder consider this mode of transportation to be inadequate. Passenger rail service's obsolescence was brought about in large part by the use of private automobile transportation and the expansion of passenger bus. In recent years rural passenger bus service is virtually non-existent and is only available in the larger cities.

In 1994, a light rail commuter line was completed between East St. Louis and metro St. Louis. Monies for expansion of this line east to the new airport at Scott Air Force Base have been appropriated and this segment may be completed over the next few years.

A number of smaller cities have small airports capable of handling light executive type aircraft and a number of cities have scheduled service by feeder airlines. The Lambert International Airport located in St. Louis County adequately meets the air transportation needs of the majority of the study zone. A commercial/military airport is being constructed adjacent to Scott Air Force Base. This joint use airport will serve southwest Illinois and is only 30 miles from the dam.

A comprehensive network of interstate, intrastate, primary, secondary and farm-to-market roads adequately serve the study zone. However, heavy traffic conditions prevail on metro interstates during rush hours on weekdays in the St. Louis/St. Charles area. The development of express bus service and light rail between Lambert Airport and East St. Louis has provided some relief for commuter congestion. More branch routes may be added which would further relieve rush hour and special event traffic congestion.

d. Relationship to Other Agencies Programs. State, federal and local agencies are advised and given the opportunity for input on future plans or impacts that affect Carlyle Lake. Currently, primary coordination efforts are with the Illinois Department of Natural Resources because of their extensive participation in the development and management of Corps owned lands; their ability to establish and enforce State Fish and Wildlife regulations and laws; and their enforcement capability as it relates to the Illinois Boat Registration and Safety Act.

e. Market Area Delineation for Boating.  
The Illinois market area consists of the following ten counties within approximately 50 miles of Carlyle Lake: Bond, Clinton, Fayette,

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Macoupin, Madison, Marion, Monroe, Montgomery, St. Clair and Washington. Metro-East communities such as Alton, Belleville, Collinsville, Edwardsville, Glen Carbon and Granite City, along with those closer to the lake such as Centralia and Salem, supply the majority of the Illinois market area boaters.

Carlyle Lake primarily serves weekend recreational boaters who prefer that their boats be located within an hour or less drive from their homes. Therefore, the primary service area for marina development at Carlyle Lake is based upon an approximate 50 mile radius of the lake. The shape of the market area is influenced by factors other than driving time, however, such as road patterns, population densities and competing facilities. Thus, some areas outside of the 50 mile radius may be included in the primary market while some areas within the 50 mile radius may be excluded. (See Plate 3)

The Carlyle Lake market is stronger to the west towards the St. Louis Metropolitan Area and weaker towards the sparsely populated areas east and southeast of the lake. The market area is also limited, to a minor degree, to the north and south by the market areas for Lake Shelbyville and Rend Lake, respectively.

A survey of zip codes conducted by West Access Marina on current and past marina patrons at West Access Marina and the 1994 members of the Carlyle Sailing Association revealed that 70.7 percent of customers and members come from Missouri locations. Twenty-six and two-tenths percent of customers and members come from Illinois locations and 3.1 percent are from other than 62xxx and 63xxx zip codes.

The Missouri market area consists of the city of St. Louis and the following counties from 40 to 70 miles west of the lake: St. Louis, Jefferson, and St. Charles. The numerous suburban communities within this area, such as Creve Coeur, Ferguson, Manchester, O'Fallon, and St. Charles, supply the majority of Missouri market area boaters.

### 4-04 ECONOMIC CHARACTERISTICS

There is a wide variety in the degree of economic health of the various areas that comprise the study zone. The total economy of the zone is considered to be highly stable. As indicated earlier, there is a wide variety of industry and commerce which tends towards general stability. Median family income has steadily increased, the percentage of families with income below the poverty level has steadily decreased and the unemployment rate for most counties of the study zone has remained below the national unemployment rate. Outside of the St. Louis MSA, east and west of the Mississippi River, the economy is predominantly agricultural, consisting of cash grain crop and dairy cattle farms. The major crops are corn, soybeans and wheat. Most of the smaller towns in the past depended largely upon business from the farm communities. Due to mechanization of farming, the on-the-farm population has steadily declined. This loss of farm population has precipitated loss of business opportunity to the small towns and rural areas. Insufficient new industry has moved in to offer additional employment opportunities, and as a consequence, the young people both from the farms and from the small towns have migrated to urban population centers to seek employment. However, because of improved road systems and public transportation, there seems to be an increased willingness to commute from further distances. The metro east portion of the St. Louis MSA has also experienced some difficulty with it's economy with an unemployment rate higher than most of the study zone. Industry is more dominant in the metro east general economy. Continued improvements in the efficiency of industrial production will affect the numbers of employed workers. However, it is believed that service sector

opportunities will increase due to riverboat gambling. East of the St. Louis MSA, the economy of much of the rural area and the smaller towns therein may be characterized as unsatisfactory. The coal mining industry shows a marked decline in the number of employees and, in fact, many mines have been closed. Some portions of southern Illinois are considered economically depressed areas.

#### 4-05. ACCESSIBILITY

a. Major Highways. The Carlyle Lake project is bordered on the north by Interstate Highway 70, on the east by U.S. Highway 51, on the south by U.S. Highway 50 and Interstate Highway 64 and on the west by State Highway 127. These major highways provide adequate and safe public access to all areas of the project. Two lanes of a divided, four lane, limited access highway (New U.S. Highway 50, FA 409) running east and west between Lebanon, Illinois and Carlyle, Illinois has been completed. This highway terminates at Rt. 127 1/4 mile south of the Dam West Recreation Area. Future plans call for the completion to four lanes, a bypass connection around Lebanon to I-64 and the extension of the highway to a point one and a half miles east of Carlyle on Route 50. This highway replaces existing U.S. Highway 50 (now referred to as Old Highway 50) and provides a means of quick, safe access to the lake complex from the St. Louis metropolitan area.

b. County Roads. The off project roads leading from the major highways to the recreation areas are maintained by the local county authorities. In general, the condition of these roads around the project is good. The following is a listing that gives the general location of all county roads considered to be the primary routes of access from the major highways to the recreation areas around the lake. These roads are indexed as numbered on PLATE 2.

- (1) Keyesport and Mulberry Grove Road north of Carlyle. Major access road to the Dam West Recreation Area, Eldon Hazlet State Park, Keyesport, Tamalco and subimpoundments. Clinton, Bond and Fayette Counties.
- (2) Eldon Hazlet State Park Road from Highway 127. Leads to Road No. 1 and Eldon Hazlet State Park.
- (3) Keyesport Road from Highway 127. Leads to Road No. 1 and Keyesport Recreation Area.
- (4) Huey Road. Leads to east end of South Shore State Park to Highway 50.
- (5) Boulder, Ferrin Road. Leads from Highway 50 to Coles Creek Road, Boulder and Patoka Recreation Areas. Clinton and Fayette Counties.
- (6) Coles Creek North and South Roads. Leads from Road No. 5 to Coles Creek Recreation Area.
- (7) Shobonier Road. Leads from Highway 51 to Highway 8-Subimpoundment Road.
- (8) Vandalia - Subimpoundment Road. Leads from Vandalia to Highway 40 to Subimpoundment to Road No. 1. To Subimpoundment; From Subimpoundment to Road No. 1.

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- (9) Patoka Road. Leads from High 51 (Patoka) to the Patoka Boat Access Area.
- (10) Tamalco Road. Leads from Highway 127 to Tamalco Boat Access Area.

### **4-06. RELATED RECREATIONAL AND HISTORICAL AREAS**

a. The following table is a listing of the recreational and historical areas within 25 miles of Carlyle Lake. The available facilities, general direction, and mileage are also listed.

TABLE 4  
RELATED RECREATIONAL AND HISTORICAL AREAS  
WITHIN THE DELINEATED MARKET AREA

	RACCOON CREEK RESERVOIR	RAMSEY LAKE S. PARK	STEPHEN A. FORBES S. PARK	VANDALIA LAKE	VANDALIA STATE HOUSE	WASHINGTON COUNTY S. PARK
Tent or Trailer Camping	X	X	X	X		X
Fishing	X	X	X	X		X
Swimming	X			X		X
Picnicking	X	X	X	X		X
Boating	X	X	X	X		X
Launch Ramps	X	X	X	X		X
Toilets	X	X	X	X	X	X
Nature Trails						X
Group Camp	X	X				
Lake	X	X	X	X		X
Drinking Water	X	X	X	X	X	X
Electricity	X	X		X		X
Hiking	X	X	X			X
Hunting		X	X			X
Showers	X	X				
Restaurant						X
Saddle Horses	X					
Acreage	1235	1919	3103		2	1417
State of Illinois		X	X		X	X
City-owned	X			X		
Mileage	SE10	N25	E27	N20	NE17	S25

None of these public attractions are comparable in size to Carlyle Lake. They all have outdoor recreational facilities with the exception of the Vandalia State House, a state memorial that was Illinois' first state capitol building. The others listed are either city owned areas or state parks. These areas, while not in competition with Carlyle Lake, provide supplementary points of interest to the visitors at Carlyle Lake. None of these areas have cabin or hotel accommodations within their boundaries, however, these facilities are obtainable locally.

**4-07. RESERVOIR PLAN OF REGULATION**

The plan of regulation of Carlyle Lake features a seasonally adjusted top of conservation (joint use) pool. The plan selected for the long-term regulation of the project requires the water surface level of the lake to be lowered from elevation 445 feet NGVD to elevation 443 feet NGVD on December 1 and held at 443 until April when it is increased to 444. On 1 May the pool is then allowed to return to elevation 445 for the recreation season. This plan was selected from several studies because it minimizes total damages to the project, both pool and downstream, and balances the damages between those experienced in the pool (mainly recreational) with those downstream of the dam (mainly agricultural). The winter drawdown will reduce the volume of water that must be released downstream during spring runoff, thus improving agricultural conditions, and also shortens the duration of time that the lake is above elevation 445.

Flood damages prevented by the Carlyle Lake and Lake Shelbyville projects since impoundment total approximately \$557,147,000. Flood damages prevented during the 1993 and 1995 flooding totaled \$ 145,000,000 and \$359,000,000 respectively. Most of the flood damage benefits were derived from the Lower Mississippi River floodplain.

Lake Shelbyville is located on the Kaskaskia River upstream of Carlyle at river mile 221.8 from it's confluence with the Mississippi River. Lake Shelbyville is regulated in part to maintain an equilibrium of flood control storage between the two lakes. The drainage area for Lake Shelbyville is 1,030 square miles.

High pool elevations and extended durations of flood control operations adversely affect recreational activities in the lake area and may have a similar impact below the lake in the natural river valley. The effects of pool regulation on the two most popular sport species were studied by researchers of Southern Illinois University at Carbondale during 1988-1993. In their study entitled *Factors Determining Largemouth Bass and Crappie Recruitment in Reservoirs*, it was found that the two primary limiting factors affecting largemouth bass and white crappie populations at Carlyle Lake were rapid pool fluctuations (rises and falls) and availability of flooded terrestrial shoreline vegetation during the spring spawning period. Further discussion can be found under paragraph b.(3) below.

a. Lake Regulation and Flood Control Storage. In order to provide flood protection to downstream property, mainly agricultural crops, water must be stored in Carlyle Lake during periods of high river flow that would result in out of bank conditions. The segment of Carlyle Lake between elevations 445.0 and 462.5 feet NGVD is designated as Flood Control Storage Pool and is for the purpose of storing water during high river flow periods. From 1 May until the crops are harvested, maximum effort is made to protect crops. During the dormant crop season the flow rate into Carlyle Lake is matched by outflow (as near as possible to natural flow) up to 10,000 cfs. The water stored will be evacuated as rapidly as conditions permit so as to have maximum flood protection available when the next wet period occurs. For further details see APPENDIX B to Kaskaskia River Basin, Illinois, Master Reservoir Regulation Manual.

b. Impacts of Flood Control.

(1) Downstream. As stated above, flood control has reduced flood damages downstream by hundreds of millions of dollars. However, flood

waters stored in Carlyle Lake at the peak of a flood must be released at a later time. The releasing of stored waters prolongs the high water period in the river channel downstream, which can be detrimental to bottom land use.

(2) Upstream. Because of the requirement to maintain a minimum pool, opportunities for recreational development were available and subsequent development has exceeded projections. However, as the level of the lake rises, much of the lands used for recreation are inundated, thereby restricting their use. The degree and length of restriction depend upon the severity of the flood. A pool elevation of 450 NGVD has detrimental effects upon recreational activities at the lake. Although most recreation areas will remain open at this elevation, some swimming, picnicking, camping, and most boat launching facilities are closed. Adverse side effects will include the destruction of grass turf, killing of trees, accumulation of driftwood in mowed areas, erosion of the shoreline, and loss of revenue to the businesses around the lake. Floods in excess of a 450 NGVD will cause proportionately greater damages, and at pool elevations in excess of 455 NGVD, most recreation areas are closed. The closure of recreation areas, if prolonged over a good portion of the season, can cause economic hardship for tourist associated businesses around the lake. The inundated areas are unsightly once the water recedes. Swimming beaches are developed so that they may be used with a fluctuating water level of plus or minus 3 feet with little affect upon the visitor. Greater fluctuations render them unusable due to the limits of spread sand. The extent to which picnic and camping areas at Carlyle Lake are affected by flood waters is dependent on their elevation. Coles Creek, Dam West and Eldon Hazlet State Park areas are impacted the most but are able to operate at least partially during high water levels below 455 NGVD. Boat dock facilities become unusable around 450 NGVD except for high water ramps at Dam East and Keyesport, thus limiting boater access. Marinas, are operable up to 455 NGVD. This plan proposes making several boat ramps useable during times of high water (See Section 10-04).

Management practices undertaken to reduce the effect of flooding on the recreation activities include the planting of water tolerant trees and shrub species to preserve vegetative cover on low lying recreation land, raising low portions of access roads to assure access to campgrounds and picnic areas during times of moderate flooding, riprap protection of key recreation areas which are subject to erosion at high pool stages, protecting lift stations from flooding so that toilet facilities can be used during moderate flooding, and drawing the pool elevation down to winter level after waterfowl season each fall so that additional flood storage capacity is achieved. The drawdown has the adverse effect of exposing mud flats in shallow reaches, thereby restricting access to portions of the lake by water. Since recreation activities are at a low intensity during the programmed drawdown between December and May, there is little adverse effect on recreation. Most years, however, seasonal pool cannot be reached by the first of May. This low water does affect recreation in that beaches are not fully usable, the bare strip around the lake is unsightly, and the desire for boating is much less. Steps taken to counteract for low water include the construction of boat channels from the launching ramps to deep water, excavation of marina boat harbors, and sufficient underwater portions of launching ramps to accommodate boats during a moderate drawdown.

(3) During Spring Spawning. One of the limiting factors of fish populations, particularly black bass and sunfish, is pool fluctuation during the spring spawning period. Spring water levels in Carlyle Lake fluctuate frequently, and often abruptly, as a result of normal flood control uses. This is generally detrimental to bass and sunfish which typically spawn in shallow water along the shore. Rapidly falling water strands nests, and

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rapidly rising water often causes nest abandonment. The fish population could be adversely affected if spawning coincides with receding high water or improved if high water is maintained during the spawn.

A water control strategy to maintain a constant to slightly rising pool during the spring fish spawn has been followed the last few years. The goal of the water control strategy is to enhance the fish spawn when hydrologically feasible within the parameters of the Pool Regulation Plan. The fish spawn requires a two step process. First, the water level is held steady or slightly rising for the eggs to hatch. Then once the fry are hatched the water should be raised enough to provide cover in grassy or vegetated areas. The time frame for this activity is limited because of weather conditions. Usually only one fish species can be helped each year. If there is high water, implementation of the water management strategy may not be possible due to the need to release water to keep recreation facilities from being closed during the summer.

The process is initiated when the IDNR informs the Corps water control staff of an impending fish spawn. This is coordinated with the lake staff and Corps Environmental Quality Section. The pool level is then manipulated to bring about the proper sequencing of water levels. The Corps also coordinates with downstream landowners prior to holding the pool slightly higher if necessary.

### 4-08. RELOCATIONS OF ROADS, CEMETERIES, RAILROADS AND UTILITIES

a. Highways. Elevation 462.5 was used as the guide elevation at which existing county and township road alterations and relocations were made. Where alternate routes were reasonably available at elevation 462.5 or above, road raises were reduced to less than 462.5. The general policy used in the plan of relocation was to maintain the continuity of the existing road network on each side of the reservoir and to provide access to remaining properties and residences adjacent to the reservoir substantially equivalent to that which they had previously.

Most all county and township roads (PLATE 2) are below 462.5 in one or more locations. PLATE 1 shows the flowage easement ground which is 465.5 or below.

b. Railroads. The operations of the Carlyle Reservoir affected that portion of the old CB&Q Railroad system (presently Burlington-Northern Railroad) from a point northwest of Keyesport, Illinois, to a point southeast of Boulder, Illinois. The affected section of track was relocated in the immediate vicinity and constructed with base of rail at minimum elevation 467.6. The relocation involved reconstruction of the main bridge over the Kaskaskia River to a low steel elevation of 463.8 feet NGVD, three overflow bridges in the Kaskaskia River bottom, and one over Brewster Creek immediately south of Boulder, with a low steel elevation of 463.8.

#### c. Utility Lines.

(1) There is one 138 Kv power line crossing within the limit of the joint use pool. All remaining power and telephone facilities within project limits have either been relocated or removed.

(2) In general, clearances are not less than those outlined in the National Electrical Safety Code, even for reservoirs or areas without boating.

d. Cemeteries. Eighteen cemeteries or burial grounds in the Carlyle Reservoir area were studied with respect to burial sites affected by the Carlyle Reservoir. Approximately 600 burials from 7 cemeteries and private burial sites required relocation. In addition, protective fills were placed in 3 major cemeteries to protect approximately 240 burials. The existing cemeteries in the vicinity of the project are not in the immediate vicinity of any public use areas, with the exception of family cemeteries located in the Eldon Hazlet and South Shore State Parks. The cemeteries do not create any problems and are interesting historical features.

**4-09. EARTH BORROW AND SPOIL AREAS**

The project has two minor borrow areas within its boundaries. The two areas have been revegetated and do not hamper the scenic qualities of the project. There are no spoil or major borrow areas on adjacent properties.

**4-10. WATER QUALITY**

a. A water quality investigation program is conducted on a continuing basis by St. Louis District, Corps of Engineers. The water of Carlyle Lake and the downstream river channel is generally good. The lake is a very shallow reservoir susceptible to high winds. These conditions prevent the lake from stratifying permanently during the summer months. During extended periods of very calm winds and high air temperatures the population of algae greatly increases. Upon subsequent die off, the dissolved oxygen is severely depressed. When this condition exists, along with minimum downstream discharge, minor fish kills have occurred in the lake and below the dam. Operational changes are then implemented to improve downstream water quality by changing the release source from the sluice gate to the spillway. This change also increases the minimum release from 50 cfs to 100 cfs. The lake appears to be a suitable source for drinking water both presently and in the future with the exception of possible taste and odor problems associated with algae.

b. All sampling sites - lake, tributary and tailwater - met their appropriate state standards except on a small number of occasions. The lake water met the state standards applying to primary and secondary contact recreation for the main purposes of swimming, boating, fishing and water skiing. Phosphorous levels have exceeded the state standards on a routine basis. Generally, the discharge from the pool has had lower phosphorous concentration than the incoming tributary flows. On a few occasions, the tailwater has not met the minimum dissolved oxygen standard established by the State of Illinois. The project area has several pollution potentials, but at present time, no major form of degradation to the lake or streams is apparent. Constant water quality monitoring will continue to help check future degradation of the area.

**4-11. PUBLIC USE OF THE SPILLWAY**

Recreational facilities are located adjacent to the Spillway immediately downstream of the dam. This area presently receives the heaviest fishing concentration of any area on the lake. The facilities are included as part of a day use area on each side of the spillway channel with picnicking facilities, waterborne comfort stations, picnic shelters, playground equipment, and adequate parking.

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### **4-12. FOREST AND MINERAL RESOURCES**

The exploitation of mineral resources on project lands has increased in recent years. Oil development has occurred in the Coles Creek Recreation Area and further mineral exploitation may occur. A District oil and gas development policy was developed and implemented in 1995 to manage mineral exploitation and to prevent conflict among user groups at Carlyle Lake. There is no ongoing or proposed exploitation of timber resources.

a. Timber Resources. With the exception of the Eldon Hazlet and South Shore State Parks, most of the timber was located below elevation 448 feet NGVD (3 feet above normal pool). Clearing of the reservoir area consisted of removal of all timber, fences, structures, etc., except in designated areas below that elevation. A total of approximately 16,500 acres were cleared, consisting of approximately 80 percent moderate to heavy timberland and 20 percent cultivated land.

b. Mineral Resources. The mineral resources of the Kaskaskia Basin consist of coal, petroleum, gas, limestone, sand, gravel, and clay. Coal and oil are considered the most important. Mineral resources of the project area, however, are chiefly oil, sand, and gravel. All structures or machinery formerly used for the extraction of these minerals have been removed. Prior to lake impoundment a total of 69 oil wells located in the pool area were plugged.

Mineral activity at the project has been reinitiated and there is scattered oil production in the vicinity of Carlyle Lake. Oil and gas reserves were purchased at the Boulder and West Patoka oil fields. The Bureau of Land Management is the government mineral rights manager and is responsible for leasing rights for oil and gas exploitation at those areas. Privately owned mineral interests were not purchased, but rather subordinated to the right of the United States to construct, operate, and maintain Carlyle Lake. Private mineral exploitation on or under public land is handled through the real estate division office at St. Louis. Exploration and exploitation are permitted but with Corps concurrence. No lake drilling is permitted. All oil wells must be above 450 NGVD and spill containment berms are required around oil operations for environmental protection.

### **4-13 WATER SUPPLY**

The Illinois Department of Transportation negotiated the revision of the water supply contract and a modified contract was signed in 1986. This relieved the State of Illinois from the obligation to pay for water storage operations and maintenance costs until that storage was actually utilized.

### **4-14. RECREATION ATTENDANCE AND FACILITY REQUIREMENTS**

a. Existing User Demand. Existing user demand is reflected using 1996 visitation as a basis for computations. Existing facility requirements are based on current visitation, design criteria, and guidelines detailed in the Institute for Water Resources' Research Report 74-R1. (Estimating Recreational Facility Requirements, Volume IV of V). Facility requirements are oriented toward key facilities which include camp sites, picnic units, boat launching lanes and beach area. This planning methodology estimates the number of facilities necessary to satisfy recreation use on an average weekend day during the peak month of visitation.

(1) Facility Design Day Load. This determination represents the anticipated number of users visiting the project on an average weekend day during the peak month of use. Based on 1996 visitation, the present facility design day load is estimated at 53,278. (See FIGURE 2, ACTUAL AND PROJECTED ANNUAL VISITATION).

FIGURE 2.

ACTUAL AND PROJECTED ANNUAL VISITATION  
CARLYLE LAKE, ILLINOIS

ACTUAL RECREATION USE DAYS VISITATION

1970 - 2,022,246	1979 - 2,752,486	1988 - 3,530,773
1971 - 2,330,468	1980 - 2,628,067	1989 - 3,546,272
1972 - 2,262,449	1981 - 2,575,763	1990 - 3,880,531
1973 - 2,534,267	1982 - 3,424,750	1991 - 4,198,436
1974 - 2,658,564	1983 - 3,776,272	1992 - 4,345,954
1975 - 2,360,534	1984 - 3,599,551	1993 - 4,511,261
1976 - 2,310,186	1985 - 3,606,873	1994 - 4,394,159
1977 - 2,815,527	1986 - 3,931,039	1995 - 4,480,439
1978 - 3,116,788	1987 - 4,045,611	1996 - 4,566,719

PROJECTED RECREATION USE DAYS VISITATION

2000 - 4,911,839	2005 - 5,343,239	2010 - 5,774,639
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(2) Summary of Existing User Demand. Utilizing the facility design day load, participation rates for each activity requiring facilities, and the appropriate activity turnover rates, the principal recreation facility requirements were estimated. The existing facility user demand estimate is presented in TABLE 5.

(3) Summary of Existing Facility Supply. The existing supply of key park and recreation facilities is presented in TABLE 5. The principal agencies developing facilities at Carlyle Lake are the Corps of Engineers and the Illinois Department of Conservation. The state contributes to the supply of campsites, picnic sites, and boat launching ramps.

(4) Evaluation of Existing Supply and Demand. Comparison of existing supply and demand, as presented in TABLE 5 indicates a shortage of campsites, and swimming beach to meet demand. Picnic units are slightly in excess of demand.

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TABLE 5

PRINCIPAL RECREATION FACILITIES:  
EXISTING SUPPLY AND DEMAND SUMMARY

Facility	Existing Supply			Demand	Existing Excess(+)/Shortage(-)
	Corps	State	Total		
Camp Units	422	397	819	887	-68
Picnic Units	345	372	715	697	+18
Boat Launch Lanes	32	8	40	32	+8
Swimming Beach (sq. ft. sand area)	200,000	0	200,000	260,000	-60,000

b. Projected User Demand. Utilizing projected visitation, current planning and design criteria, and the procedures and guidelines outlined in the Institute for Water Resources' Research Report 74-R1 (Estimating Recreational Facility Requirements, Volume IV), the projected recreation facility requirements through the year 2010 were computed and are presented in TABLE 6. Based on these estimates for existing and projected recreation facility requirements, additional campsites, picnic units, and swimming beach area are needed and there will be an increasing need through the year 2010. Further detailed evaluations will be required to substantiate the key facility demand levels identified by this planning methodology.

TABLE 6

SUMMARY: PROJECTED RECREATION FACILITY REQUIREMENTS

	2000	2005	2010
Camp Units	980	1,067	1153
Picnic Units	771	838	906
Boat Launch Lanes	35	38	41
Swimming Beach Area (sq. ft. sand area only)	285,000	310,000	335,000

**4-15. ENVIRONMENTAL AND ECOLOGIC CONCERNS**

The Carlyle Lake project and vicinity provides potential habitat for two federally endangered and threatened wildlife species. One federally threatened species, the bald eagle, has nested at the lake over the last few years and eagles are observed during the winter months. Bald eagles will be managed in accordance with the objectives of the Northern States Bald Eagle Recovery Plan and the Bald Eagle Management Plan for Carlyle Lake. Summer roosts of Indiana bats have been found in Bond County. It is likely that this species uses the forested habitat surrounding Carlyle Lake. The bald eagle is the only federally threatened wildlife species noted for the area. No federally threatened or endangered plant species are noted for the Carlyle Lake area as well.

In addition to the above, the list below shows Species of Concern (formerly Category 2 candidate species) recognized by the Fish and Wildlife service. Efforts should be taken to minimize potential impacts to these species and their habitats.

Several state threatened or endangered wildlife and plant species have been sighted at Carlyle Lake or the surrounding area. The Eastern Massasauga rattlesnake is listed as state endangered. The protection plan for the bald eagle and eastern massasauga include establishment of a protective zone and restricting management practices to appropriate times of the year.

The loss of forest cover is one of the most crucial habitat concerns in the Carlyle Lake Area. Forest interior bird species such as the Scarlet Tanager, Acadian Flycatcher, Red-eyed Vireo and Kentucky Warbler appear to be in need of special attention due to declining woodland habitats. Efforts will be made to preserve large undissected forest tracts, and to design habitats so that existing forests will be enhanced.

Additional observations and field study are needed to determine the presence or absence of any or all Federal and State endangered or threatened plants and animals on project lands and waters since much of this information is incomplete. Any operation and maintenance plans or actions will consider any possible effects on all species documented in the area. A list of federal and state plant and wildlife species located or potentially located on project lands and waters is provided in TABLES 7 and 8 below.

The following Tables were developed with assistance from lake personnel, Ms. Joyce Collins of the U.S. Fish and Wildlife office in Marion, Illinois, and Ms. Deanna Glosser, Illinois Department of Natural Resources, Natural Heritage Biologist, Region IV headquarters in Alton, Illinois.

**FEDERAL AND/OR STATE THREATENED AND ENDANGERED ANIMAL  
SPECIES SITED OR POTENTIALLY SITED IN THE  
CARLYLE LAKE AREA**

TABLE 7

Federal Wildlife List	Status	Scientific Name
Bald Eagle	T	<i>Haliaeetus leucocephalus</i>
Indiana Bat	E	<i>Myotis sodalis</i>
Kirtland's snake	P	<i>Clonophis kirtlandii</i>
Loggerhead shrike	P	<i>Lanius ludovicianus</i>
Double-Crested Cormorant	T	<i>Phalacrocorax auritus</i>
Greater Prairie Chicken	E	<i>Tympanuchus cupido</i>
Short Eared Owl	E	<i>Asio flammeus</i>
Northern Harrier	E	<i>Circus cyaneus</i>
Upland Sandpiper	E	<i>Bartramia longicauda</i>
Black Crowned Night Heron	E	<i>Nycticorax nycticorax</i>
Barn Owl	E	<i>Tyto alba</i>
Eastern Massasauga	E	<i>Sistrurus catenatus</i>
Cooper's Hawk	E	<i>Accipiter cooperii</i>
River otter	E	<i>Lutra canadensis</i>
Little Spectaclecase Mussel	E	<i>Villosa lienosa</i>
Spike Mussel	T	<i>Elliptio dilatata</i>

Table continued below

**CARLYLE LAKE MASTER PLAN**

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**Unique Species at Carlyle Lake** **Scientific Name**

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Eastern Massasauga P Sistrurus catenatus

- E - endangered
- T - threatened
- P - species of concern (Fish and Wildlife Service)

There are no federal endangered or threatened plant species listed for the Carlyle Lake area.

The following table lists some state endangered or threatened plants noted for the Carlyle Lake area.

TABLE 8  
STATE THREATENED OR ENDANGERED PLANT SPECIES  
NOTED OR POTENTIALLY NOTED IN THE CARLYLE LAKE AREA

State Plant List	Status	Scientific Name
Prairie Rose Gentian	E	Sabatia campestris
Water Pennywort	E	Hydrocotyle ranunculoides
Fibrous-rooted sedge	E	Carex communis
False Hellebore	T	Veratrum woodii
Drooping Sedge	E	Carex prasina
Ear-leafed Foxglove	T	Tomanthera auriculata
Blazing Star	T	Liatris scariosa var. nieuwlandii

- E - endangered
- T - threatened
- P - species of concern (Fish and Wildlife Service)

Additional Source: Checklist of Endangered and Threatened Animals and Plants of Illinois. Illinois Endangered Species Protection Board Illinois, Illinois Department of Conservation, 1994.

**SECTION V**  
**COORDINATION WITH**  
**OTHER AGENCIES**

**SECTION V - COORDINATION AND PARTNERING WITH OTHER AGENCIES**

**5-01. GENERAL**

A high degree of coordination was maintained with all appropriate federal and state agencies during preparation of the original Master Plan. Because this memorandum is an update of an existing plan, and is for a project that has been in operation for several years, the only agency currently involved with the Corps in the planning and coordination process is the Illinois Department of Natural Resources. A brief summary of agency coordination is contained in the following paragraphs.

**5-02. FEDERAL AGENCIES**

a. National Park Service. This agency reviewed the proposals for development contained in the original Master Plan and also made a field reconnaissance of the project area. On the basis of this study, comments were furnished in the form of a letter report that presented their findings, conclusions, and recommendations. Because compliance with the recommendations presented would have required increased land acquisition and other significant costs for the project, they were not implemented.

b. The U.S. Fish And Wildlife Service. During the early stages of project planning, the U.S. Fish and Wildlife Service and the Corps were in frequent contact to coordinate their respective programs for developing fish and wildlife resources at Carlyle Lake. The recommendations made by that agency have been incorporated in the provisions for conservation of fish and wildlife, as contained in "The General Plan and Cooperative Agreement." Paragraph 6-02b and the Operational Management Plan describe in detail the management program that is being implemented. On going projects impacting wildlife issues are coordinated with regional representatives of the Fish and Wildlife Service.

c. U.S. Public Health Service. After reviewing the provisions for water supply storage as set forth in House Document No. 232, Eighty-fifth Congress, First Session, the U.S. Public Health Service provided a letter of comment which expressed its general concurrence. In addition, this agency collaborated with the U.S. Fish and Wildlife Service, the Illinois Department of Natural Resources and the Illinois Natural History Survey in the investigation of potential pollution of the lake due to contaminants generated by the Boulder Bottoms oil field.

d. Natural Resource Conservation Service. This agency is consulted when land use issues regarding prime farmland and wetlands arise. The Natural Resource Conservation Service certifies land as acceptable for wetland restoration projects.

e. Department of Interior - Bureau of Land Management. All leases for federally-owned minerals at Carlyle Lake are granted and administered by the Department of Interior through the Bureau of Land Management. Although federally-owned minerals are under the administrative jurisdiction of BLM, consent from the managing agency must be obtained prior to granting a lease.

**5-03. STATE OF ILLINOIS**

Close liaison with the Illinois Division of Waterways, the Illinois Department of Public Health, and the Illinois Department of Transportation was

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maintained through the planning phases of Carlyle Reservoir. Currently, primary coordination efforts are with the Illinois Department of Natural Resources because of their extensive participation in the development and management of Corps owned lands; their ability to establish and enforce State Fish and Wildlife regulations and laws; and their enforcement capability as it relates to the Illinois Boat Registration and Safety Act. Close liaison with this department has been maintained for coordination purposes, the results of which are set forth in this Master Plan in sections 6-02b, and 8-04a.(3) and 8-04a.(7).

The Corps coordinates with the Illinois Environmental Protection Agency (IEPA) regarding the construction and operation of wastewater treatment facilities, the maintenance of effluent (NPDES discharge permits) and in-lake water quality standards.

### **5-04. LOCAL GOVERNMENTS**

There is considerable coordination with Clinton, Bond and Fayette counties and the municipal governments of Keyesport and Carlyle. As partners, the Corps advises them of general policy regarding public use of the reservoir and tentative plans. In addition, a number of visits to this office have been made by officials of local governments seeking information on these matters. Formal coordination with local government was effected by a series of meetings during early planning and construction of the project. Coordination with local governmental bodies continues to be conducted as actions/plans of mutual interest and/or impacts are developed at Carlyle Lake.

### **5-05 NON-GOVERNMENT PARTNERS**

Non-government partners include the Okaw River Basin Coalition, Ducks Unlimited, Mid-Kaskaskia Association, Carlyle Chamber of Commerce, Carlyle Lake Association, Waterfowl Hunters USA, Mid-Kaskaskia Basin Association, camping and sailing groups, Audubon Society, Boy Scouts, Girl Scouts, 4-H clubs, and Chambers of Commerce from adjoining towns.

In addition, four marinas are operated on the lake. These marinas provide services to the public that may not otherwise be provided by the federal, state or local governments.

### **5-06 PUBLIC INVOLVEMENT FOR THE MASTER PLAN UPDATE**

Federal, state and local elected officials, organizations, and the public were invited from the start to participate in the update of the Master Plan. Ten public meetings were held in 1993 in the campgrounds, marinas and local cities to cover public interests regarding development and land use around Carlyle Lake. Comments from these public meetings as well as lake feedback forms have been categorized and addressed in Part I-A of the Public Involvement Plan (PIP) included in the Master Plan. Comments concerning recreational developments and land use management were considered for inclusion in the Master Plan if they fell within an authorized purpose, were responsive to a regional need and were suitable to the project.

Copies of the draft plan were distributed to federal, state and local agencies, elected officials, local libraries and interested individuals. A 30 day comment period followed distribution of the draft plan. Two public workshops were conducted to discuss the draft and receive comments. Sixty-five written comments were received during the comment period. Written

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responses were mailed to individuals submitting written comments and are included in Part I-B of the PIP in Appendix V

Copies of the final approved plan may be reviewed at the Carlyle Lake Project Office, Eldon Hazlet State Park Office, the Carlyle Lake Wildlife Management Area Office and local libraries

**SECTION VI**  
**OPERATING PROJECTS: STATUS**

SECTION VI - OPERATING PROJECTS: STATUS

6-01. PROJECT DEVELOPMENT AND OPERATION CHRONOLOGY

Carlyle Lake was authorized by the Flood Control Act of 28 June 1938 and the Flood Control Act of 3 July 1958 for flood control and related multiple purposes. Construction started in 1958 and lake impoundment began on 1 April 1967.

6-02. CHRONOLOGY OF EXPENDITURES FOR PUBLIC USE AND ENVIRONMENTAL RESOURCE DEVELOPMENT

a. Federal Government.

(1) Recreation Area Development.

Eight public recreation areas, totaling 639 acres, have been developed by the Corps of Engineers. The following areas have been intensively developed: Dam West; Dam West Spillway; Keyesport ; General Dean Bridge; Dam East Spillway; Dam East; Coles Creek; and Boulder. The scope of development varies at each area. Some areas provide basic facilities such as access roads, picnic tables, comfort stations, and a launching ramp with related parking, while others provide swimming beaches, camp sites with electrical hookups, a washhouse, playgrounds, an amphitheater and nature trails. The total cost of recreational and environmental developments for the Corps developed areas was \$4,200,000. Of this total, \$1,850,000 was for initial development and construction of 3 major camp areas, 3 major picnic areas, 6 boat ramps, and 9.7 miles of bituminous road. Since initial construction, the Corps has continued to maintain facilities in the recreation areas. Table 9 summarizes existing recreational facilities at both Corps and IDNR managed areas at Carlyle Lake.

(2) Operation And Maintenance Cost.

Federal operations expenditures for the period 1 October 1995 through 30 September 1996 (Fiscal year 1996) amounted to \$3,048,479. Maintenance expenditures for the same period were \$1,681,797 for a total operation and maintenance cost of \$4,730,276.

b. Non-Federal Public Agencies. Three areas comprising 10,818 acres of land and water are under management by the Illinois Department of Natural Resources at Carlyle Lake. Two of these three areas provide public park and recreation facilities. Eldon Hazlet State Park lands and waters comprise approximately 2,335 acres, and South Shore State Park contains approximately 305 acres. The state sites, although not developed at the same level, provide day use areas with picnic and playground facilities, boat access areas with associated parking, hiking and nature trails, amphitheater with structured interpretive programs, year-around house keeping type cabins, fish rearing ponds, sailboat harbor access camping areas from vehicular sites with electric hookups to primitive large group areas, wildlife habitat and viewing areas, and visitor concession facilities. The remaining 8,178 acres of state managed areas at Carlyle Lake include all project lands and waters north of the Tamalco and Patoka Boat Access Points. These lands and waters are licensed to the Illinois Department of Natural Resources for fish and wildlife management purposes. In 1992, 7,502 acres were removed from the license for fish and wildlife management to allow the State to concentrate its resources on their

## CARLYLE LAKE MASTER PLAN

wildlife management area. Within this 8,178 acre area, provisions have been made through the placement of ring levees, crown levees and control structures to manage 3,200 acres as reservoir subimpoundments in order to provide a diverse habitat for wildlife and ample food supply during the waterfowl migration season. An additional 3,478 acres of land are managed to provide hunting opportunities for upland game species including deer, rabbit, squirrel, quail, dove, and raccoon. The remainder of the fish and wildlife area includes approximately 1,500 acres of open water and flooded timber zoned for consumptive (hunting and fishing) and non-consumptive use (Watchable Wildlife). The graphic on PLATE 13A includes all of the IDNR managed subimpoundment areas and shows all existing, proposed and future developments planned for that area. Access to this large area is provided at the Tamalco Boat Access Point, Patoka Boat Access Point, Cox Bridge Boat Access Area, Parking Lots 1, 2, and 3, which provide walk-in access to the subimpoundment areas, and the Hitogi Boat Access Area, located on adjacent State lands. The OPERATIONAL MANAGEMENT PLAN describes in detail how all project lands and waters are managed for fish and wildlife purposes. Capital investment for physical and environmental developments at the state controlled facilities through 1995 total approximately \$ 11,745,000. Proposed capital expenditures, those beyond 1996 though the year 2005, are estimated at approximately \$ 4,945,000. Future capital expenditures, those beyond the year 2005, are estimated at approximately \$ 9,579,000. See Appendix IV for a detailed breakdown of State capital expenditures (existing, proposed and future).

### c. Private Recreational Investment.

#### (1) Community Docks.

(a) A Shoreline Management Plan has been implemented to provide protection of desirable characteristics of the shoreline. The plan (now Section II Part D of the Operational Management Plan) was approved in May of 1976 and has been updated to comply with current regulation. The updated plan considers the entire shoreline and establishes the zoning classification of Carlyle Lake shoreline. All permits for lakeshore use will be in conformance with the Shoreline Management Plan.

(b) Since existing community docking facilities, which are listed below, are located in areas not approved for development under the Shoreline Management Plan, a grandfather rights provision applies. As long as such facilities are in acceptable condition they may remain. The docking facilities are indicated on PLATE 2.

Lakeshore Acres Community Association (CD-2)  
Tract 402-2 34 docks  
Permit 004, expires September 1999

Edgewater Beach Improvement Association, Inc. (CD-1)  
Tract 145-2 39 docks  
Permit 007, expires September 1999

Wade Hill & Dale Club (CD-3)  
Tract 712-E2 10 docks  
Permit 005, expires September 1999

Harbor Light Bay, Inc. (CD-4)  
Tract 726 34 docks  
Permit 008, expires September 1999

North Branch Harbor, Inc. (CD-5)  
Tract 789 16 docks  
Permit 009, expires September 1999

(2) Concession Leases. At present there are six commercial concession area leases or subleases at Carlyle Lake. Three of the areas are located at Corps developed public recreation areas. The remaining three are subleases located on land leased to the State of Illinois. The following is a description of the concession area leases:

(a) The commercial concession facility at the Dam West Recreation Area has been in operation since the 1969 recreation season. The current level of development includes 375 boat slips, boater's showers, sales and service building, boat and motor rentals, and fueling dock. The leased area comprises approximately 13 acres. A site plan of the leased area is presented on PLATE 4.

(b) The Keyesport Recreation Area commercial concession facility has been in operation since the beginning of the 1971 recreation season. Development to date includes 120 boat slips, bait shop, restaurant and sales building, boat and motor rentals, and fuel docks. The leased area comprises 14.0 acres. A site plan of the leased area is presented on PLATE 5.

(c) The commercial concession development at the Boulder Recreation Area has been in operation since 1971. Development includes 274 boat slips, sales and service building, snack shop, boat and motor rentals and fuel dock. The leased area comprises 17.1 acres. A site plan of the leased area is presented on PLATE 6.

(d) A 34 acre sailboat harbor area has been subleased by the Illinois Department of Natural Resources at Eldon Hazlet State Park to the non-profit Carlyle Sailing Association. The State has provided the association a harbor, sailboat storage lot, vehicle parking, boat hoist, boat launching ramp, toilet and shower building, harbor building, and other miscellaneous plumbing and electrical facilities. Services and facilities provided by the sublessee include an elevator hoist for launching and retrieving sailboats, floating boat docks, dry slip rental, a picnic area with a pavilion and playground, a pole storage building, decorative security fencing, landscaping and organized sailing activities such as regattas.

(e) The Illinois Department of Natural Resources also subleases two land area sites at Eldon Hazlet State Park for concessionaire owned and operated facilities. The Illini Campground site serves as a camping and picnicking supply store and the Allen Branch site serves as a mobile concession that is operated on a seasonal basis.

(f) A 39 acre area in the Dam West Recreation Area has been leased to the IDNR who in turn has subleased it to the City of Carlyle for development of a lodge/resort complex. The City is pursuing a developer for the site.

(3) Licenses One year, renewable licenses are used to provide a portable concession at Dam West Beach, laundry facilities at Dam West, Coles Creek and Boulder Campgrounds and soda machines in various recreation areas.

d. Overnight Accommodations. A 1986 Feasibility study for overnight accommodations at Carlyle Lake investigated the market potential for development of overnight accommodations and ancillary services. A strong market demand for resorts, rustic lodges and cabins in close proximity to

## CARLYLE LAKE MASTER PLAN

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lakes and other recreational activity centers was identified at that time. Since that time, private and public cabins have been developed around Carlyle Lake. Private cabins have been developed off project near Keyesport. The State is in the process of developing cabins at Eldon Hazlet State Park. A private developer is being sought by the City of Carlyle under lease agreement with the State of Illinois and the Corps of Engineers to develop a resort in the Dam West Recreation Area. Since the South Shore State Park area was previously selected as a potential site for a lodge/resort development, that option should remain open for future consideration. In the future, cabin development in South Shore State Park may be developed along the shore in the western portion of the park.

e. Summary of Recreation Facilities.

Table 9 presents a listing of all existing recreational facilities that have been provided at Carlyle Lake by the Corps of Engineers, the State of Illinois, and private concessionaires.

AREA	Amphitheatre	Campsite	Campsite Elec. Outlets	Group Camp Areas	Dump Stations	Wash Houses	Picnic Sites	Picnic Shelters	Swimming Beaches	Comfort Stations (Water)	Comfort Stations (Vault)	Fish Cleaning Stations	Fountain/Hydrants	Boat Ramp Lanes	Playground Equipment	Bathhouse	Comfort Station w/Shower	Covered Tables	Visitor Center
Dam West																			
Boat Access & Marina/Resort																			
Beach & Day Use							93	2	1							2	1	1	
Campground	1	118	113			1				2	2		8			2			
Visitor Center																			1
West Spillway							48	1		2	2	1	4			1			4
Keyesport																			
Boat Access & Marina										1		1	1	4					
Beach & Day Use							19	1	1				2			1			4
Gen. Dean Picnic & Boat Access							10				1			1					
East Spillway							46	1		2	2	1	5			1			3
Dam East																			
McNair Group Camp		66	25	5		1	47	3		2			5			1			
Beach & Day Use							10		1		1		1			1			1
Boat Access									1		2		2	5					
C.C. Beach Day Use Boat Access							42	3	1	2	2	1	3	5		2			
Campground	1	148	148			1				8			11			1			
Group Camp				1					1		1		1			1			
Boulder																			
Campground	1	90	77			1				3			5			1			
Boat Access, Marina, Picnic						1	30	1		2		1	2	5		1			
Outlying Access Points																			
Corps Total	3	422	363	6	4	3	345	14	4	24	13	6	57	32	15	2	2	12	1
Eldor. Hazlet State Park	1	364	328	1	3	4	250	8			20	1	42	7	4				
South Shore State Park		33			1		120	1			5		13	1					
State Total		397	328	1	4	4	370	9			25	1	55	8	4				
Grand Total	4	819	691	7	8	7	715	23	4	24	38	7	112	40	19	2	2	12	1

Table 9  
Carlyle Lake, Summary, Existing Public Recreation Development

**SECTION VII**  
**RESOURCE USE OBJECTIVES**

SECTION VII - RESOURCE USE OBJECTIVES

7-01. GENERAL

The purpose of this section is to define and prescribe a series of resource use objectives for Carlyle Lake.

Resource use objectives are statements specific to Carlyle Lake that describe the selected options for resource use, development, and management as determined through study and analysis of regional needs, resource capabilities and potentials, and public desires. As defined, resource use objectives provide general guidance and direction for the use, development, and management of project resources. Site specific resource use objectives include development and management measures.

As stated in SECTION I, the authorized purposes for Carlyle Lake are flood control, water supply, navigation improvement, recreation, and fish and wildlife conservation. Certain project purposes by nature can be conflicting. For example, under certain conditions, the lake's flood control purpose can conflict with other project purposes such as recreation and fish and wildlife management. The development of sound resource use objectives should assist in minimizing conflicts between project purposes through compromises which do not seriously detract from achievement of any or all project purposes.

Resource use objectives based on project purposes at Carlyle Lake are identified and discussed in the following paragraphs.

7-02. RESOURCE USE OBJECTIVES

Nineteen general resource use objectives, applicable to the project as a whole are presented below. They are formulated so as to provide general guidance and direction to the overall management and development of Carlyle Lake resources. The objectives are grouped into three categories: General, Recreation, and Environmental Stewardship.

a. General.

(1) Administration and Management.

Ensure that quality administration and management of all project lands, waters and other associated man-made and natural resources is consistent and thorough.

(Discussion). All project administrative and management decisions/actions will adhere to all applicable laws, regulations, policies, and agreements. Consistent coordination, both internally and with other applicable federal, state, and local government agencies, private organizations and individuals, will be maintained.

All actions and/or plans will be implemented in a manner compatible with authorized project purposes and all applicable social and environmental factors, to ensure maximum benefits. Compromise will be utilized to minimize conflicts in project uses and development.

The major concerns of management are identification of facilities for rehabilitation or replacement, provision of efficient support

## CARLYLE LAKE MASTER PLAN

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facilities, public health and safety, provision of accessible facilities, maintenance of a strong public involvement program and maintaining the integrity of the operational structures (i.e. main dam, saddle dams and pump stations). Hydropower will be accommodated if feasible and compatible with other project purposes.

### (2) Concession Development and Operations.

Provide adequate locations and incentives for viable recreation oriented concession leases - existing and proposed. These will include both lodging and marina type services.

(Discussion). There are currently 3 Corps administered full service marina concessions operating at the lake. All three are financially solvent and provide approximately 700 boat slip rental spaces at the lake. The Illinois Department of Natural Resources chose the Carlyle Sailing Association, a non-profit corporation, to operate the sailboat harbor at the extreme southern end of Eldon Hazlet State Park.

Two locations on the lake have been identified as suitable for development of an additional marina and ancillary services. When the need arises, the Corps will accommodate and support legitimate concession developments on either Corps or State of Illinois managed areas if they do not adversely affect the growth of existing concession services.

Prior to any additional concession development, the Corps will perform market analysis studies or require market analysis studies by interested parties, whichever is applicable, to determine demand for the level and type of concession services being considered. A marina market study was completed in 1994 and concluded that demand for marina services should first be accommodated at existing marinas and subsequently at a new marina.

### (3) Safe and Environmentally Appropriate Recreation Areas and Facilities.

Provide public use areas and facilities that are safe and environmentally sound.

(Discussion). New facilities and upgraded existing facilities must be as safe and environmentally sensitive as possible. The Corps has the opportunity to be innovative in the design and use of recreation support facilities. A facility inventory for replacement of degraded facilities will be implemented and maintained for efficient operation. Through proper planning and development, facilities and areas can be safe, environmentally sensitive, and economical while meeting the recreation needs of the public.

All developed recreation areas designated for recreation use are regularly evaluated for the presence of safety hazards and environmental compliance with the Environmental Review Guide for Operations (ERGO) guidelines. As any detrimental conditions are identified, they will be given priority for evaluating and implementing feasible corrective actions.

### (4) Partnering

Partnering with others agencies, groups, organizations and individuals will be employed to accomplish resource use objectives and improve efficiency in operations.

(Discussion) The use of partners to assist with the operation and management of the project will be fully employed. When feasible, donations and the challenge cost-share program will be utilized to accomplish work. Section 225 of Public Law 102-580 grants authorization to the Corps to enter into cooperative agreements with non-Federal public and private entities to provide for operation and management of recreation facilities and natural resources at civil works projects. The Corps may accept contributions of funds, materials and services from non-federal public and private entities. The services of volunteers are accepted under P.L. 98-63 to carry out any activity of the Corps except policy making or law or regulatory enforcement.

Relationships with our partner agencies and local constituent groups will be maintained and strengthened; volunteers will be utilized maximally and our use of cooperating associations will be continued. If feasible, agreements will be formed with local cooperating associations to assist with operations related to natural resource management, interpretive and visitor service activities. We will work to establish an agreement with and form a local Search and Rescue cooperating association.

b. Recreation.

(1) Recreation Quality.

As funds become available, renovate and upgrade recreation areas to improve the available facilities and to reduce maintenance costs.

(Discussion).

The recently developed Maintenance and Repair Plan (MRP) inventoried the existing condition of recreational facilities and recommended a priority for repair or replacement.

Opportunities to improve the quality of recreation experiences are influenced by carrying capacity, compatibility of activities, and site-specific design factors. At some existing recreation sites, such as Dam West, desirable or optimum carrying capacities of the recreation resource are exceeded. Incompatible activities should be separated by adequate buffer areas. Design of site facilities is to be sensitive to the landscape character of the site and region.

(2) Disabled Access

Identify and undertake the modifications necessary with goal to make facilities accessible to elderly, handicapped, and other disadvantaged groups as mandated by Uniform Federal Accessibility Standards (UFAS) and Americans with Disabilities Design Guidelines (ADAAG)

(Discussion). Physically or mentally disabled persons must be given access to a wide range of outdoor recreation activities through careful and appropriate planning, design and program implementation. Accordingly, consideration is given to access, facilities and services for disabled persons in the planning, design and operation and maintenance of existing recreation areas and the development of future public use areas at the project.

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### (3) Camping Facilities.

Maintain and improve camping facilities to redistribute use, meet public demand, reduce operation and maintenance costs and generate revenues for future operations and maintenance of recreation facilities.

(Discussion). Generally, the less developed and remote campgrounds and day-use areas receive less visitation. Convenient location and especially amenities are high on the priority list of the present day camper. By employing adjustable fees, the reservation system, provision of water and sewer hookups, an upgrade of electrical service and redesign of poorly situated campsites, campground use will become more evenly distributed and prevent problems associated with overuse.

There is an expressed demand to improve electric service at some camp sites. The need for lodging (cabin or resort) was expressed at several of the information gathering meetings and in written responses received during the update process.

### (4) Day-Use Recreation Opportunities.

Accommodate increasing water and land-based day-use activities in a manner compatible with other site activities while maintaining the integrity of the project's natural resources.

(Discussion) Day-use area activities requiring support facilities are boating, picnicking, swimming, sightseeing and fishing. Walking and biking are also done by a large percentage of visitors in a day-use setting.

Parking lots, boat ramps, comfort stations, fountain/hydrants, picnic tables and grills, group picnic shelters, bulletin boards, fish cleaning stations, and playgrounds are the primary facilities provided to accommodate day-use recreation at all areas. Walking or hiking trails are provided in some day-use areas while biking occurs on park roads, the main dam and saddle dams. A designated path for bicycles is proposed around the entire lake.

Four day-use areas provide swimming beaches. Support facilities provided for beaches include outdoor showers and change shelters. Sufficient sand, swimming area depth, buoys outlining the designated swimming area, depth markers, safety and rule signs, and "rescue stations" providing ring buoys, rope and reach pole are the primary beach components that require regular maintenance. Regulations prohibiting pets, food and alcoholic drinks on beaches minimize user conflicts while fulfilling public recreation demands.

Overcrowding and lack of high water boat ramps are two problems associated with day-use areas. Use of overcrowded day-use areas will be controlled by encouraging use of other areas via interpretive methods. Demand for additional day-use facilities will be monitored to assure adequate facilities are provided.

### (5) Interpretation Services and Outreach Program

Implement a meaningful interpretive services and outreach program to create a greater public awareness, understanding, and appreciation of the project and its resources, not only by using Corps resources but through the development of strong partnerships with

the Illinois Department of Natural Resources, local constituent groups and with the support of a Cooperating Association and volunteers.

(Discussion). An Interpretive Services Program has been in effect at Carlyle Lake since the mid-70s. The Interpretive Services and Outreach program enhances the Corps' image, stirs the public's interest in the scenic, recreational, biological and cultural values of the lake and surrounding area, and also promotes visitor safety on both land and water areas of the project. A Visitor Center, informational brochures, bulletin boards, interpretive nature trails, special events, campground, beach and Visitor Center presentations, and tours of the dam are incorporated within the scope of this effort. A Watchable Wildlife program has been established to inform the public where opportunities to view wildlife are most promising.

By acquainting visitors with the diverse resources of the project and stimulating them to ask questions and explore, interpretation enhances their recreation experience, assists in reducing management concerns, and helps to protect the lake's environment. The interpretive program is administered not only by Corps rangers, but also with the support of Corps of Engineers Resource Volunteers and through partnerships with the Illinois Department of Natural Resources, local constituent groups and a cooperative association.

c. Environmental Stewardship

(1) Protection of the Resource

Continue to monitor resources to ensure protection against fire, overuse, erosion, insect and disease infestation and take corrective actions when warranted.

(Discussion) To assure protection of resources, we will remain committed to providing responsible stewardship by the preservation and restoration of diverse habitat for the benefit of various ecosystems. Use of all areas for public enjoyment will be encouraged while minimizing any environmental degradation.

(2) Wildlife Habitat

Encourage optimal utilization by the greatest number of wildlife species through the manipulation, management and protection of diverse habitats.

(Discussion) The wildlife carrying capacity of public lands can be maintained through the application of a variety of habitat control measures. Management activities will include successional control, native grass plantings, food plot planting, tree plantings and selective timber thinning in areas that will maintain wildlife carrying capacities. Den trees will be saved wherever possible and artificial nesting structures erected to provide additional nesting sites for squirrels, songbirds and ducks. Shrub and vine cover between activity areas, near the periphery of recreation areas, and at fence corners will be established and maintained, providing food, cover, and nesting opportunities for a variety of wildlife. Sensitive areas within public use zones will be marked and protected from human intrusion.

Non-consumptive uses of wildlife such as nature study, wildlife watching and photography receive equal consideration with that of consumptive uses, such as hunting and trapping.

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### (3) Forest

Monitor and maintain the vegetative conditions of trees for their scenic, recreational and wildlife values.

#### (Discussion)

Forest resources will continue to be inventoried and managed for sustained yield. This involves management for the control of soil moisture, for erosion control, and for promotion of forest stand growth, as well as the protection of the forest resources from insects, disease, fire and overuse. Timber stand improvement will be accomplished to release or favor potential mast or other food and cavity producing trees. Older trees with unsound limbs and trunks that provide cavities for wildlife, such as squirrels, wood ducks, woodpeckers, raccoons, and honeybees, will be saved except where their preservation would constitute a safety hazard at developed recreation sites.

### (4) Prairies

Manage existing prairie areas and continue to reestablish scattered plots of native warm season grasses and forbs.

(Discussion) Prescribed burning along with additional plantings will help maintain those remnant tall prairies that existed prior to the settlement of Southern Illinois.

### (5) Wetlands

Reestablish and maintain high quality wetlands to improve water quality and to provide habitat for wetland dwelling species.

(Discussion) As wetlands in the region diminish due to intensive agriculture practices and other land uses, special effort will be made to provide wetland habitat. Development and maintenance of various wetland types will be implemented to support programs such as the North American Waterfowl Management Plan.

### (6) Fishery Management

Cooperate fully with the Illinois Department of Natural Resources (IDNR) in the maintenance and enhancement of a high quality fishery as a perpetual resource.

(Discussion) Sport fishing is an important activity at Carlyle Lake. With the combination of few suitable habitat areas, inadequate spawning sites, and fluctuating water levels for flood control at spawning time, stocking is required to maintain the sport fisheries at an acceptable level. The Corps will continue to provide locations and support for the development and operation of nursery and hatchery ponds, fish stocking and other fish rearing alternatives as determined necessary by the IDNR. Coordination will be maintained on project developments and actions that may affect the lake's fishery. Lake level fluctuations and fishery survey studies will be closely coordinated. Water level management will be adjusted if it doesn't interfere with project purposes. The Corps will continue to operate and maintain the Christmas tree program to bolster fish habitat and continue to cooperate in forage enhancement projects. Research to identify the factors inhibiting sport fish populations will be funded and coordinated with the IDNR.

(7) Aesthetics

Plan all management actions with consideration given to landscape quality and aesthetics.

(Discussion) To create the opportunity for a quality recreation experience, it is essential to consider the aesthetic impact of planned improvements as well as economic and functional requirements. Each design, installation, or maintenance action needs to be considered according to its potential visual impact. This includes its impact on the immediate vicinity, on the whole site, and on all areas outside of the site boundaries from which the improvements can be viewed.

Tree, shrub, forb and grass species used for landscape plantings and habitat improvements should be evaluated and selected based on aesthetics and food and cover qualities provided to native wildlife. Native plant species with the greatest aesthetic appeal should be placed in locations with the highest public visibility.

(8) Erosion Control

Control and stabilize land and shoreline erosion.

(Discussion). Primary methods used to reduce or eliminate erosion problems project-wide include promoting woody and herbaceous vegetative growth, manipulation of water run-off, identifying and monitoring erosion problems on and adjacent to public lands, waters and lakeshore. All public lands will have approved soil conservation plans developed in cooperation with the USDA Natural Resource Conservation Service.

Placement of revetment along streams, ditches and lakeshore areas highly susceptible to wind and water erosion; establishment of stabilizing vegetation, allowing the formation of natural beaches; and acquisition of additional lands outside the fee boundary that have been eroded by the lake are the most viable approaches for addressing large erosion sites at Carlyle Lake. In addition, lands acquired for erosion control extend project boundaries for the purposes of containing impacts to federal ownership/property interests and for future project operations and maintenance.

(9) Cultural Resource Management

Identify, evaluate, and preserve significant archaeological and historical sites.

(Discussion) Numerous archaeological and historical sites occur on Corps lands and waters. The implementation of a recently completed Cultural Resource Management Plan for Carlyle Lake will allow these sites to be identified, evaluated, and managed for the benefit of future generations. Planning and development will include considerations to protect and preserve these site locations. The plan provides for determination of their eligibility for listing on The National Register of Historic Places; it prescribes means of preserving significant sites; and it prescribes ways to increase public understanding and enjoyment through interpretation consistent with other interpretive programs and recreational land uses.

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### (10) Mineral Leasing

Make a maximum amount of land available for mineral leasing as is consistent and compatible with all other project objectives.

(Discussion) It is the policy of the Department of the Army to make a maximum amount of land available for mineral leasing as is consistent and compatible with military operations, national defense activities, and Corps of Engineers civil works requirements. All federally owned minerals will be leased and administered by the Department of the Interior through the Bureau of Land Management in cooperation with the Corps of Engineers and all privately owned mineral underlying the federal surface will be regulated by the Illinois Department of Mines and Minerals. All mineral exploration, drilling and abandonment activities will be in accordance with the St. Louis District Policy on Oil and Gas Development and the guidelines as established in the St. Louis District Handbook on Oil and Gas Development.

**SECTION VIII**  
**RESOURCE PLAN**

## SECTION VIII - RESOURCE PLAN

### 8-01 CLASSIFICATION OF LAKE LANDS AND WATERS - LAND AND WATER USE PLAN

#### a. Purpose

Recreational development has generally proceeded as described in the original Master Plan for Carlyle Lake. All lake area lands have been allocated for the authorized purposes for which they were acquired. The land and water area allocations are depicted on PLATE 1 and the land and water area classifications are represented by a letter or letter/number on PLATE 2. An analysis of the resources and use classifications of all lake lands and waters has been made. The objective of classifying lands is to integrate appropriate land and water uses into a balanced plan for the wise use of all lake resources in the public interest. Descriptions of the applicable land and water use categories are found below.

All lands at Carlyle Lake were purchased under the Eisenhower Administration Directive for public works projects. Only land needed for project operation and adequate public access for estimated future attendance was purchased in fee. At Carlyle, project required land was determined to be land at or below the 450' elevation contour. Additional lands needed for public access were purchased above this level. Flowage easement land was purchased to 465.5 as shown on PLATE 1. Because land was purchased before 1965 (P.L. 89-72), no separable recreation lands were identified. All lands at Carlyle were allocated to operations or project required lands according to authorized purposes. Project required lands have been further classified to provide for development and resource management consistent with authorized project purposes, regional needs, public desires and suitability of the resource. Land areas where principal recreation facility development has been carried out are shown on PLATE 1. The land use classification of project required lands is shown on PLATE 2.

The project master plan provides guidance for the orderly development, use, and management of the project's resources. Resource planning takes into consideration authorized project purposes, opportunities and constraints that influence development and management. All proposed development is screened to decide if it is compatible with the project's natural and cultural resources. Project planning and land classification deals with several factors: seasonal flooding, soils, ecological conditions, existing and projected recreation demand, state and local participation and interest, and applicable laws, regulations and policies.

Each area description includes a listing of existing facilities and proposed and future actions. Proposed actions are intended to be completed within ten years or by the next scheduled update. Future actions include alternatives that are being considered for development after 10 years.

#### b. Land Allocation

The project required public lands and waters total approximately 37,543 acres. These lands were allocated according to the authorized purposes for which they were acquired. One land allocation category exists for Carlyle Lake:

Operations. This allocation includes lands acquired according to the authorizing documents for operation of the project, i.e., flood control, water supply, downstream navigation, recreation and fish and wildlife conservation.

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### c. Land Classification

Land use classifications have been determined through the guidance contained in ER 1130-2-550 and are shown on PLATE 2 and listed in Table 10. Land use classifications and descriptions are as follows:

(1.) Project Operations. The objective of this resource classification is to provide adequate land for safe and efficient operation and management of the lake's land and water resources for all authorized purposes. Lands classified in this category include the main dam, saddle dams, levees and pump stations, sewage treatment plants, land waste treatment systems, impoundment areas and lands required for administrative and maintenance needs. Section 8-03 describes this land resource classification in further detail.

(2.) Recreation Lands. These park and recreation lands are developed to provide for the recreational activities of the visiting public. No agricultural uses are permitted on these lands except on an interim basis where the terrain is adaptable for maintenance of open space and/or scenic values. Factors such as road access, natural resources, recreational facility design and management practices make these lands conducive to accommodating major use by the visiting public. Lands in this classification include areas for concessions, quasi-public and group use development. Section 8-04a. describes the development and use of lands in this category in greater detail.

(3.) Environmental Sensitive Areas. In this classification, areas are identified for the preservation of scientific, ecological, historical, archeological and/or aesthetic values. Included in this category are areas providing habitats for rare or endangered species of flora or fauna. No agricultural practices are permitted in any of these areas. Development, if any, is limited to trails and observation points to reinforce the interpretation of these lands. The Operational Management Plan (OMP) provides a detailed description with additional information on management practices used in these areas. A general description of each is contained in Section 8-04e.

(4.) Multiple Resource Management. This classification includes four categories that further define lands based on their location and natural resources: (a) Recreation - Low Density, (b) Wildlife Management General, (c) Vegetative Management and (d) Inactive and/or Future Recreation Areas. These include lands that may be managed for one or more activities to the extent that they are compatible with the primary allocation(s). Areas in these categories are described in Sections 8-04b, 8-04c, and 8-04d.

Management activities are fully explained in the following sections:

(a.) Recreation - Low Density. Lands zoned in this category offer recreation to the public in an unstructured natural setting as an alternative to the experience generally associated with intensively developed recreation areas. These areas also serve as a buffer between other land uses. Uses for these areas include hiking, walk-in hunting and fishing and nature study. Lands required for ecological workshops and forums are also included in this allocation. Agricultural use is not permitted except on an interim basis to maintain open space and scenic values. Section 8-04b provides details on the development of lands in this category.

(b.) Vegetative Management Management activities for these lands include protection and development of forest and vegetative cover and wetland

restoration. All lands in government fee ownership are being managed to maintain their forest resources for recreation, wildlife, and scenic values. Section 8-04c. describes areas in this category.

The OMP describes the general practices and techniques employed to conduct a program for developing the forest resources of Carlyle Lake, such as tree planting and vegetation manipulation, to support management objectives. Timber will be harvested when required to achieve other management objectives such as wildlife habitat improvement. Forest management is a secondary purpose for areas zoned for recreation or low-density recreation. Specific resource use objectives and management practices are described in the OMP on an area by area basis.

(c.) Wildlife Management - General. Section 8-04d includes descriptions of lands being managed for fish and wildlife habitats. These lands are continuously available for low-density recreational activities. Agricultural leases, and in some cases timber harvesting, are allowed to the extent practicable and compatible with other uses of the project. These activities generate revenue and maintain habitat conditions beneficial to wildlife. Sections 7-02c. and 13-07 of this plan describe the objectives and goals of Corps operated and administered fish and wildlife management areas. The OMP describes the general practices and techniques employed to implement a viable program for fish and wildlife at Carlyle Lake. Lands on the northern end of the lake, managed by the Illinois Department of Natural Resources (IDNR), have been assigned to this land-use classification.

(d.) Inactive and/or Future Recreation Areas. These areas include those areas designated for future intensive recreation, or those lands that have been used for intensive recreation in the past and are now temporarily closed. When they recover or meet criteria for recreation use they will be opened (or reopened) for intensive recreation. Interim use should follow the guidelines described above for low-density recreation. No inactive or future recreation areas are identified at Carlyle.

(4.) Mitigation Lands. This includes land acquired or designated specifically for mitigation. Land classified in this category should be evaluated for consideration for lease or license to the Department of the Interior or IDNR. No mitigation lands are found at Carlyle Lake.

(5.) Easement Lands The Corps holds an easement interest on 24,972 acres of land outside the fee boundary. Use and management of these lands is in accordance with the terms and conditions of the easement estate which was acquired for the project. Easement lands at Carlyle Lake are, except for utility easements, flowage easements. These easements give the government the right to flood lands generally below 465.5 NGVD. Construction on easement lands is regulated by permit and permits are required for the placement of dredged or fill material. Easements lands are shown on PLATE 1.

(6.) Water Zoning The waters at Carlyle Lake are zoned into two major units. A minor area is designated as operational waters. The acreage figures for all project waters are specified at lake elevation 445.0 NGVD (normal pool). They are described as follows:

(a.) LF/H-1, Fish & Wildlife Area Waters, PLATE 2. These waters are primarily suited for hunting and fishing and fish and wildlife habitat. This zoning includes all 8,222 acres of flooded timber and open water north of the Burlington-Northern Railroad crossing.

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(b.) G-1, General Purpose Waters, PLATE 2. Acreage of open lake waters are zoned for use by all legitimate forms of water recreation. The Burlington-Northern Railroad crossing is the northern boundary for this zoning category and the main dam is the southern boundary.

(c.) O-1, Operational Waters, PLATE 2. An area of water around the upstream side of the spillway structure is buoyed and all public use is restricted in this area for safety reasons. This area is zoned as Project Operations (O-1) as a part of the Main Dam. PLATE 2 illustrates the water zoning units at Carlyle Lake.

### 8-02 SELECTED LAND AND WATER USE POLICIES

a. Shoreline Management. The following is taken from the St. Louis District Policy on Lake Shoreline Private Use Facilities, 4 September 1990. "It is the policy of the Chief of Engineers, U.S. Army Corps of Engineers, to protect and manage shorelines of all civil works water resource development projects under Corps jurisdiction in a manner which will promote the safe and healthful use of these shorelines by the public while maintaining environmental safeguards to ensure a quality resource for use by the public. The objectives of all management actions will be to achieve a balance between permitted private uses and resource protection for general public use. Public pedestrian access to and exit from these shorelines shall be preserved."

It is the policy that private exclusive use will not be permitted on new lakes where no private facilities existed as of 13 December 1974, the date of the original implementing regulation (ER-1130-2-406).

Preservation of the natural environment is essential to the proper maintenance and management of wildlife habitat, aesthetic quality of lake projects, and shoreline erosion control. Therefore, no shoreline use permits for vegetation modification activities such as clearing or mowing, etc., which would imply exclusive use of public land or otherwise deny full use of public land or water to the general public will be issued at St. Louis District projects. The only exceptions at Carlyle Lake are a 100 foot buffer from a housing structure for fire protection and for mowing roadways and levee berms.

The OMP includes a Shoreline Management Plan which consists of a map showing the shoreline allocations, related rules and regulations, and a discussion of what areas are open or closed to specific activities and facilities. It also includes information on how to apply for permits and information pertinent to the Corps management of the shoreline. Shoreline allocations are shown in this plan on PLATE 17.

#### b. Off Road Vehicles and Seaplane Use.

(1) The operation of off-road vehicles on Corps land will be in accordance with the policies, procedures and criteria set forth in ER 1130-2-550, Chapter 10; EP 1130-2-550, Chapter 10 and EXECUTIVE ORDER 11644. In addition, ER 1130-2-550, Chapter 11; and EP 1130-2-550, Chapter 11 sets forth rules and regulations governing seaplane operations at civil works projects.

(2) Seaplane Landings. In order to maximize the public use of Corps of Engineer lakes, Title 36 was amended to allow for seaplane landings and takeoffs. This activity is allowed with the following restrictions: Seaplane landing and take-off operations will be prohibited 600 feet from the shoreline, the dam and the Burlington-Northern crossing. In the timbered area north of the railroad crossing, all coves will be off limits. Selection of

seaplane mooring sites will follow the rules and regulations in Title 36, Section 327.3. Vessels and mooring will be allowed at previously designated sites for vessels.

c. Forest Resources. All lands in Government fee ownership are being managed to maintain their forest resources for recreation, wildlife, and scenic values. The Land and Water Use Plan (PLATE 2) shows these lands as Recreation and Recreation - Low-Density, Vegetative Management and Wildlife Management. The OMP describes the general practices and techniques that are used to conduct a program for developing the forest resources of Carlyle Lake, such as tree planting and vegetation manipulation, to support management objectives. Timber will be harvested when required to achieve other management objectives such as wildlife habitat improvement. Forest management is a secondary purpose for areas zoned for recreation or low-density recreation. SECTION XIII and the OMP detail specific objectives and management practices.

d. Agricultural Use. Portions of those lands managed by the IDNR have been placed under a sharecrop agricultural program. The plan contains provisions for agriculture as a corollary use to obtain food for wildlife, to prevent encroachment of undesirable vegetation and provide succession control. Agricultural leases may be granted on the aforementioned lands to keep the land in production or prevent undesirable vegetation. The granting of leases would be carried out by Real Estate Division after coordination with Planning and Operations Divisions, and would result in a 75 percent return in funds generated to the counties in which the lands are located. As agricultural use of project land is in no case an authorized purpose, except as an interim or corollary use, no lands have been allocated for this use.

e. Resort Concession Development. A specific objective of the Master Plan is to encourage a full usage of recreational opportunities. Traditionally, overnight camping has taken precedence over resort type facilities. In an attempt to meet public demand and accommodate recreation vehicles, full service campsites have been provided. Roads have been widened and parking space has been increased to accommodate recreational vehicles. As the demand for more sophisticated facilities increases, additional alternatives to traditional camping are being considered. Resort type facilities require less land, minimize the requirements for extensive roads and utilities, and offer a complementary alternative to full service campsites over large areas. The South Shore State Park area is identified for future concessionaire resort development.

### 8-03 PROJECT OPERATIONAL LANDS

This section and Section 8-04 include proposals for operational and recreational facilities respectively. Proposed facilities that are in addition to existing facilities are listed under the Proposed New Actions heading. A cost estimate of these facilities is provided in SECTION XII and their approval is requested.

Facilities that are proposed for renovation or are a replacement for existing facilities are listed under the Proposed Replacement Actions heading. These items are discussed in detail in the Maintenance and Repair Plan (MRP) included in Appendix II and are included below for informational purposes.

The following sections provide a brief description of all lands classified as Project Operations. Eight areas described below are allocated to project operations and are shown on PLATE 2:

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### a. 0-1, Main Dam, PLATES 9 & 11.

**General:** The main dam consists of a compacted earth fill embankment and a concrete spillway section with tainter gates and sluice, located midway on the dam embankment. The crest of the dam embankment is at elevation 472.5 NGVD and the crest of the spillway is at elevation 425 NGVD. The dam and spillway are about 6,610 ft. in length and comprise approximately 49 acres.

The service road on the main dam offers an excellent view of the lake and is heavily used by the general public for walking and biking. Interpretive dam tours and some bank fishing also occur here. The integrity of the main dam and security of the water control facilities must be maintained.

A hydroelectric power plant is proposed in the East Spillway adjacent to the main dam as discussed in Section 11-01 and presented on PLATE 9. The penstocks will pass through the dam above flood level. A control and maintenance building will be located adjacent and south of the power plant.

ER 1110-2-100 provides the authority and requirements for conducting periodic inspections of completed civil work structures. Through this inspection and reporting program items deemed to be deficient are reported. Inspections for Carlyle Lake Dam are scheduled on a five year basis. The latest periodic inspection was conducted in June 1996.

**Existing Facilities:** Two park benches are located along the main dam service road. Service road gates allow easy access for pedestrian and bicycle traffic.

**Proposed New Actions:** None

**Proposed Replacement Actions:** The main dam's service road will be designated as a bike path to allow safe bicycle access between Dam West and Dam East Recreation Areas. "Watchable Wildlife" interpretive signs/displays will be developed for pedestrian and bicycle traffic on the main dam service road.

Waste water lines from Dam East will be removed from the dam (concrete spillway section) and rerouted to allow for winter use of the East Spillway.

Given the age of the project, the life expectancy of some of the instruments, the failure of some instruments and technological advances in the past 35 years, it is expected that rehabilitation or replacement of the current instrumentation monitoring system will be needed in the near future. Major items of concern identified during the past inspection are the obsolete electrical/mechanical systems of the main dam and associated project pump stations, the stilling basin drainage system and a localized wet area in the earth embankment. These items could all have a detrimental impact on the future integrity of the project. Studies may need to be conducted to determine cause, impact, and corrective actions required.

**Future Actions:** Developing a bridge across the Spillway, in concert with State Route 409, would facilitate dispersal of Dam West visitation to the Dam East Recreation Area and South Shore State Park.

### b. 0-2, Corps Management/Maintenance Complex, PLATE 11.

**General:** This 40 acre area is located adjacent to the Dam West Recreation Area and is the administrative center for the Carlyle Lake project. A detailed

description of administration structures is contained in the OMP. PLATE 11, "Project Structures Site Plan" presents a general site layout of these facilities. This plate shows the approximate location of the proposed administration building.

**Existing Facilities:** Facilities associated with the administrative management area include a fenced maintenance compound with offices, workshops, a storage yard and buildings, an office trailer, a weather station, employee and visitor parking areas and the project management office.

**Proposed New Actions:** The administration building was constructed in 1962 for the resident engineer's office. Since completion of project construction, it has served as a permanent administration office for the lake management staff. The original office building was supplemented in recent years with a rehabilitated trailer and a rehabilitated portion of the old maintenance/garage building. An additional building has served as a lunch room, change area and impromptu meeting room. Changes have been made to the facilities in an attempt to accommodate the changing functions and responsibilities of the lake management staff. However, the existing office facilities are inadequate as a project headquarters.

Because the current administrative office complex has exceeded its design life and the current layout of offices is inefficient and does not meet current standards for accessibility, the development of a replacement consolidated administrative complex is necessary. Section 10-02 and Appendix III provide more information on the proposed consolidated administrative complex.

**Proposed Replacement Actions:** As stated above, the administration building is proposed for replacement, but is included in the SECTION XII cost estimate.

**Future Actions:** Developing a bypass road west of beach Access Road "A" would improve safety and control of the day-use area. Eliminating the through road and one entrance to this area would facilitate fee collection. See Section 10-09 for more discussion of problems and alternatives.

c. 0-3, Saddle Dam 2; and 0-4, Saddle Dam 3, PLATE 2.

**General:** Two earth-filled saddle dams are located along the southeast rim of the lake extending in an east-west direction. These saddle dams serve to contain waters that would flood low elevation land areas east of the lake if the maximum flood control pool level were achieved. The total length of these two embankments is approximately 31,560 feet, encompassing 422 acres. The elevation of the crest of each dam is 472.5 ft., the same as the Main Dam. Adequate lands were purchased on the land and water sides of the dams for drainage and ponding areas, drainage structures and collection ditches. PLATE 2 illustrates the locations and extent of Saddle Dam 2 and 3 lands. The physical integrity of each saddle dam cannot be compromised.

Saddle Dam 2, the smaller of the two dams, encompasses an area of approximately 92 acres. A paved public highway is maintained on the crest of the dam, serving as a transportation link between Dam East recreation areas and South Shore State Park. The dam extends from the entrance of the McNair Group Camp Area to the western entrance road to South Shore State Park. All fee lands between the dam and U.S. Route 50 and south of U.S. Route 50 are drainage areas and are included in the Saddle Dam 2 zoning unit.

Saddle Dam 3 encompasses an area of approximately 330 acres. A controlled access gravel service road is maintained along the crest of the

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dam. The dam corridor extends eastward almost 4 miles from the eastern portion of South Shore State Park. All fee lands directly adjacent to the earthen dam are classified in the Saddle Dam 3 zoning unit. Four access points are located in this area.

**Existing Facilities:** A paved road runs the length of Saddle Dam 2 and a gravel service road runs the length of Saddle Dam 3. A 1.5 mile portion of the service road on the western end of Saddle Dam 3 has an oil and chip surface. Bicycle and pedestrian traffic use this service road. A pump station is located at each saddle dam drainage impoundment. Gates with pedestrian and bicycle accesses are located at road crossings on Saddle Dam 3. The narrow strip of land located adjacent to Saddle Dam 3 is managed as a diversified wetland unit. Small berms with water control structures, and several ponds provide wetland habitat. Three access points and an accessible hunting site are located along Saddle Dam 3. Section 10-03 of this plan discusses an on-going study of the pump stations to determine ways to improve efficiency and reduce operations and maintenance costs.

**Proposed New Actions:** Provide wells and pump to aid in the management of this wetland area by allowing for fall flooding when adequate rainfall does not occur. If wells are not feasible for a water supply then development of a water line to the lake may be necessary. Watchable Wildlife interpretive signs and a wildlife viewing site will be placed along Saddle Dam 3 to increase visitor understanding of the area.

**Proposed Replacement Actions:** Maintain service and access roads for use by vehicles, bicycles, and pedestrian traffic.

Implement recommendations of the pump station study which has been completed including electrical/mechanical rehabilitation and automation.

**Future Actions:** Provide an improved and safer access from Highway 50 to the future marina site located between the Dam East Boat Access and South Shore State Park.

### d. 0-5, Keyesport Levee and Drainage Area, PLATE 5.

**General:** An earthen levee and drainage system covers approximately 53 acres of fee land within and adjacent to the Village of Keyesport. The net grade elevation of the levee is 469 NGVD and is 9,945 feet in length. The levee extends in a north-south direction from the B&N railroad to where it intersects 2250 E just south of Keyesport. The Keyesport Recreation Area is located primarily on the lake side of the levee and the Village of Keyesport is on the land side. Low elevation fee land was acquired as a natural drainage area and extends into the south central portion of Keyesport. A pump station carries the inflow from the impoundment area, feeding it back into the reservoir. Bypass water from the Keyesport water treatment plant constantly flows into the impoundment making mowing difficult. When the city connects to the City of Carlyle water system this runoff will stop and mowing will be easier. Levee integrity must be maintained. Walking and biking are popular activities taking place on the levee.

**Existing Facilities:** A pump station is located north of the levee and a gravel service road is located on the levee. Pump station inefficiencies and high operations and maintenance costs have been examined in a study discussed in Section 10-03 of this plan.

**Proposed New Actions:** None

Proposed Replacement Actions: Implement recommendations of the pump station study which has been completed including electrical/mechanical rehabilitation and automation.

Future Actions: None

e. 0-6, Coles Creek Land Treatment System, PLATE 7

General: A land treatment system for wastewater disposal is located in the Coles Creek recreation area. This facility occupies 10 acres on the eastern portion of the area south of the entrance road and west of 2400E. It replaced the twenty-five year old plant which no longer meets State of Illinois effluent discharge regulations.

Existing Facility: A land treatment wastewater system is located in this area.

Proposed or future actions: No actions are contemplated at the present time.

f. 0-7, Boulder Sewage Treatment Plant, PLATE 2

General: This package treatment plant is located on one acre in the northern portion of the Boulder Boat Access, Marina and Picnic Area.

Existing Facilities: One package treatment plant is located in the area.

Proposed New Actions: None

Proposed Replacement Action: This treatment plant will be replaced with an in-kind facility.

Future Actions: None

g. 0-8, IDNR Management/Maintenance Complex, PLATE 14.

General: Within the confines of Eldon Hazlet State Park, the Illinois Department of Natural Resources maintains a 15 acre area for its administration building, maintenance buildings, vehicle and equipment compounds and visitor parking. The recently renovated office building is the main headquarters for all daily operations at Eldon Hazlet and South Shore State Parks and is administered through the IDNR's Region IV office in Alton, Illinois.

Existing Facilities: Existing facilities include a site office and service area complex containing a 3-bay service building with employee support facilities, two 3-sided pole storage buildings, small tool shed, gravel service yard, gasoline facilities, and visitor/employee parking areas.

Proposed New Actions: None

Proposed Replacement Actions: Completely rehabilitate exterior and interior of all service area facilities. Improvements will include rehabilitation of existing facilities, addition of 2 service bays, additional employee support facilities, road and parking renovations; a new 30'x 60' pole storage building, utilities, phone service, landscaping and signs.

Future Actions: Other than the continued maintenance and rehabilitation of existing facilities and the construction of a site superintendents residence (at a location just south and east of this complex) no other future actions are identified.

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### 8-04 INFRASTRUCTURE/FACILITIES DEVELOPMENT

A description of all recreational development at Carlyle Lake is presented in this section. It includes a summarization of all existing facilities and proposed and future actions for each public access or recreation area. The following sub-paragraphs describe recreation areas at the lake as shown on PLATE 2, and individual plates as noted.

a. Recreation Lands. This section and Section 8-04 include proposals for recreational and operational facilities. Facilities that are proposed that are in addition to existing facilities are listed under the Proposed New Actions heading. A cost estimate of these facilities is provided in SECTION XII and their approval is requested.

Facilities that are proposed for renovation or are a replacement for existing facilities are listed under the Proposed Replacement Actions heading. These items are discussed in detail in the Maintenance and Repair Plan (MRP) included in Appendix II and are provided for informational purposes.

(1) IR-1, Dam West Recreation Area, PLATE 4. This highly developed and diversified 154 acre area, which receives the most visitation at Carlyle Lake, is located near the west abutment of the main dam. The primary features of this area include the project Visitor Center, the Willow Pond disabled accessible nature trail complex, a picnic area, a swimming beach, a boat launching area, a marina concession, a resort site and a campground. The Corps management/maintenance complex is located adjacent to this area.

A 39 acre area to the west that was previously part of West Access Marina has been identified for resort development. Located on land identified in the previous master plan for future concession expansion, this acreage was part of a lease exchange with the IDNR. An 85 acre area of the South Shore State Park lease was received in exchange for the Corps area. At the present time, the City of Carlyle is pursuing a resort/lodge complex development under a sublease arrangement with the IDNR. Further discussion of this development is contained in Section 6-02 c.(2)(f).

Existing Facilities: Development includes 118 campsites (113 with electric), one disabled accessible campsite, 93 picnic units, 2 group picnic shelters, a large swimming beach with bathhouse, 1 outdoor shower, 4 waterborne comfort stations, 1 waterborne comfort station with mini-shower, 2 vault toilets, 15 fountain/hydrants, 4 sets of playground equipment, 1 basketball court, an outdoor amphitheater, a trailer dumping station, a washhouse, 1 fish cleaning station, 1 covered table, a four-lane boat launching ramp, and a full-service marina concession operation.

Proposed New Actions: New items proposed in this plan include 14 campsite sewer and water hookups for Loop 3 and a picnic shelter for the day use picnic area. The potential revenue increase from sewer and water hookups for one year is estimated at \$2,520; estimated payback period is seven years.

Because of the larger size of groups using the Visitor Center, an 875 square foot addition to the audio-visual room is proposed. The addition will accommodate groups up to 150 persons. A cost estimate is included in SECTION XII and a typical is shown on PLATES 18 and 19.

The Visitor Center outdoor amphitheater which deteriorated and was removed is proposed to be replaced with a facility to the south of the Visitor Center for interpretive programming and special events. The amphitheater will feature a 20'x30' stage, a projector screen and 25 benches (shown on Plate 20).

**Proposed Replacement Actions:** The following MRP replacement items are addressed in detail in Appendix II of this master plan:

**Day-use area:** The comfort station near the boat ramp will be relocated out of an area subject to flooding and replaced with a disabled accessible facility. The other comfort station will be replaced with a disabled accessible facility. Due to the frequency and duration of high water at Carlyle Lake, it is necessary to develop a high water access for use during these periods. The boat ramp parking lot and ramp will be raised to be serviceable at elevations up to 455 NGVD.

The beach showerhouse will be modified for accessibility. Ten concrete picnic tables will be replaced with wooden tables. In addition, 6 fountain/hydrants, 85 grills, 2 lift stations and 3500 feet of 8" sewer line will be replaced.

**Campground:** Based on the findings of the MRP it is proposed that all campsite associated electrical facilities be replaced with electric service that meets current industry standards. This replacement is necessary because the existing electrical structure has exceeded its service life and is not compatible with many of the current camping units.

Twenty-four sewer and water hookups will replace the comfort station in Loop 2 which is low and frequently inundated. The construction and operation of 24 water and sewer hookups is more cost effective than an in-kind replacement of the existing comfort station. The comfort station that does not have showers in Loop 1 will be replaced with a handicapped accessible facility. It is proposed to modify the comfort station with showers in Loop 1 for accessibility and make campsites 40 and 42 accessible.

The campground access road will be elevated from 451 to 453 NGVD to permit access during times of high water. The shoreline of Loop #1 will be rebuilt and protected to curb erosion. The lift station will be replaced with a pressurized lift station system. Two water fountains will be replaced and 4 handicapped accessible sites will be created. Twenty-nine hundred feet of water lines and 6,670 feet of sewer lines will be replaced.

**Future Actions:** The West Access Marina harbor may be expanded to the west as demand for slip facilities increases or to compliment a potential resort/lodge development. Presently, the harbor capacity is 326 slips with a potential capacity of 500. Dredging of the area to the west of the harbor, identified on PLATE 4, would permit greater expansion. Expansion of existing harbors was recommended in the 1994 Market Study of Potential Marina Development at Carlyle Lake.

Traffic congestion and safety concerns in the Dam West Recreation Area were noted in the previous master plan and are further discussed in Section 10-09 of this plan. Expansion of parking and rerouting of the Access "A" traffic on a bypass road to the west may have the potential to eliminate concerns over overcrowding and pedestrian safety. This redesign would feature one access to the beach and picnic area (through traffic in beach parking area would be eliminated). Fees could be collected more efficiently and greater control of the area would be possible.

During high water events, low campsites are inundated and revenue from these facilities is lost. A solution would be to relocate low, frequently inundated campsites to the West Spillway. The West Spillway is not

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Table 10  
Water and Land Use Classification

PLATE	AREA CODE	AREAS	ACRES
<b>CORPS AND STATE RECREATIONAL LANDS</b>			<b>3,279</b>
4	IR-1	DAM WEST RECREATION AREA	154
4	IR-1A	WEST SPILLWAY RECREATION AREA	57
14	IR-2	ELDON HAZLET STATE PARK	2,335
5	IR-3	KEYESPORT RECREATION	30
6	IR-4	BOULDER RECREATION AREA	67
7	IR-5	COLES CREEK RECREATION AREA	87
15	IR-6	SOUTH SHORE STATE PARK	305
9A	IR-7	DAM EAST RECREATION AREA	136
9	IR-7A	EAST SPILLWAY RECREATION AREA	103
9	IR-7B	GEN. DEAN BRIDGE RECREATION AREA	5
<b>MULTIPLE RESOURCE MANAGEMENT - LOW DENSITY RECREATION</b>			<b>1,510</b>
2	LR-1	ALLEN BRANCH - HAZLET NORTHWEST	139
2	LR-2	IRISHTOWN	306
2	LR-3	MCNAIR BRANCH	318
2	LR-4	KEYESPORT - TAMALCO	112
2	LR-5	BREWSTER AND GIBBS CREEK	221
2,8	LR-6	LOTUS COVE	155
2	LR-7	COLES CREEK COVE - SANDY SHORES	259
<b>MULTIPLE RESOURCE MANAGEMENT - VEGETATIVE MANAGEMENT</b>			<b>1,791</b>
2	VM-1	HONKERS POINT	299
2	VM-2	KEYESPORT NORTH	151
2	VM-3	BOULDER FLATS	1,341
<b>OPERATIONAL LANDS</b>			<b>55</b>
2,9,11	O-1	MAIN DAM	49
2,4,11	O-2	CORPS MANAGEMENT/MAINTENANCE COMPLEX	40
2	O-3	SADDLE DAM NO. 2	92
2	O-4	SADDLE DAM NO. 3	330
2,5	O-5	KEYESPORT LEVEE AND DRAINAGE AREA	53
7	O-6	COLES CREEK LAND TREATMENT SYSTEM	10
6	O-7	BOULDER SEWAGE TREATMENT PLAN	1
2,14	O-8	IDNR MANAGEMENT/MAINTENANCE COMPLEX	15
<b>ENVIRONMENTAL SENSITIVE AREAS (acreage included in other areas)</b>			
	ESA-1	GRAY DAY SITE	
	ESA-2	TAMALCO - BALD EAGLES	
<b>MULTIPLE RESOURCE MANAGEMENT - WILDLIFE MANAGEMENT GENERAL</b>			<b>8,178</b>
2,13,16	WM-1	CARLYLE LAKE WILDLIFE MANAGEMENT AREA	8,178
2,13	WM-1A	RESERVOIR SUBIMPOUNDMENT AREA	3,200
2,13	LH/H-1	WILDLIFE AREA WATERS	2,525
		WILDLIFE AREA LANDS	5,653
<b>TRACTS TO BE ACQUIRED IN STATE AREA</b>			<b>10</b>
<b>PROJECT LANDS</b>			<b>12,833</b>
<b>FLOODED DEAD TIMBER</b>			<b>8,222</b>
2	G-1	GENERAL PURPOSE WATERS	16,4
<b>ALL PROJECT FEE LANDS AND WATER TOTAL</b>			<b>37,543</b>

susceptible to flooding and camping revenue would be maintained during times of high water.

(2) IR-1A, West Spillway Recreation Area, PLATE 4.

**General:** Located below the main dam on the west side, this 57 acre area is popular with bank fishermen and picnickers. The Little Prairie Natural Area and Nature Trail are adjacent to the West Spillway area.

**Existing Facilities:** The Spillway has 48 picnic sites, 2 waterborne comfort stations, 2 vault toilets, 1 group shelter, 1 playground, 1 fish cleaning station, 4 fountain/hydrants, 4 covered tables and a nature trail.

**Proposed New Actions:** The Visiting Nurse Association of Carlyle has offered to donate and install an exercise trail below the dam to the north of the entrance road. Maintenance of the facility would be accomplished through volunteer agreements.

**Proposed Replacement Actions:** A handicapped accessible comfort station will replace comfort stations 1 and 2. Based on an analysis of costs associated with rehabilitating and maintaining two buildings versus costs to build and maintain one consolidated facility, it is proposed to replace the two existing comfort stations with a centrally located, accessible facility. Other replacement actions include replacing the fish cleaning station with a freeze-proof, handicapped accessible facility; renovating the group shelter; replacing water fountains/hydrants with accessible facilities; revetting 1700 linear feet of spillway banks to prevent erosion and loss of spillway service roads; replacing 23 concrete picnic tables; replacing lift stations with pressurized lift stations and replacing 3300 feet of sewer line.

**Future Actions:** Low elevation campsites are frequently inundated in the Dam West Campground. Revenue and continued opportunity to camp could be maintained by relocating these sites to the West Spillway. The West Spillway has ample room for the development of a camping loop and these campsites would continue to be available even during times of high water.

(3) IR-2, Eldon Hazlet State Park, PLATE 14.

**General:** This 2,335 acre State Park is located on the west side of the lake approximately 4 miles north of Carlyle and is being developed and operated by the IDNR through a long-term lease agreement with the Corps of Engineers. The site is managed primarily for the preservation of its natural and cultural resources while still providing a diversity of resource oriented recreational activities that include boating, sailing, camping, hiking, picnicking, cabin lodging, resource interpretation/education, fishing, hunting and wildlife observation. Because of this site's regional popularity with the St. Louis metropolitan area; ability to accommodate a wide diversity of outdoor recreational uses; and given the sites existing and future levels of development, the IDNR has recommended that Eldon Hazlet be reclassified from a State Park to that of a State Recreation Area. As such, more intensive recreational uses may be allowed if found to be compatible with the existing resource base. Appendix IV presents a detailed breakdown of all existing, proposed and future capital expenditures for this area. PLATE 14 presents a detailed, annotated graphic for existing, proposed and future developments.

**Existing Facilities:** Existing park developments include picnic and camping areas (Class A through primitive), boat launching ramps and hiking trails. Facilities include a large campground that provides 328 developed campsites, 36 tent camping sites, 4 wash houses, and 3 trailer dump stations; a youth group camping area; 6 day use areas with 250 picnic sites; 42 fountain/hydrants, 8 picnic shelters, 20 vault toilets, 4 playgrounds, 1 amphitheater, 1 fish cleaning station, an archery range, seven and a half miles of hiking trail; 4 boat launching areas (7 lanes); a subleased harbor

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facility, specifically designed for sailboats, that is operated and maintained by the Carlyle Sailing Association (CSA); an office/service area complex; 3 fish rearing ponds, a privately owned concession building operated on a concession lease basis; and a sewage treatment plant.

**Proposed Actions:** Several developments are proposed for the park: hiking trail surfacing (approx. 7.5 miles) and trailhead facilities; the addition of a high water boat ramp at Apache Boat Access Area; service area and Apache Day-Use Area rehabilitation/improvement; 2 vault toilets at Allen Branch; 1 vault toilet at the CSA Day Use Area; a 3-car parking lot at the Prairie Trail trailhead, an additional 17-19 lodging cabins (approx. 800 sq. ft.) and associated amenities within the Pawnee Day Use Area; vault toilet building replacements at various locations; and an outdoor classroom for wetland education within the Allen Branch area.

CSA is essentially shut down at lake elevations of 450 NGVD and above because the electrically operated cranes are in water and inoperable. Providing high water facilities (up to 455.0 NGVD) would allow for partial operation of the CSA. Improvements would consist of placing riprap along Peppenhorst Branch, providing a rock road to a 110 ft. long high water ramp, regrading and elevating the catamaran storage field, adding an additional two-ton jib crane, rewiring the existing jib cranes and adding a parking area for boat trailers.

**Future Actions:** Several developments are scheduled for future consideration: a site residence, on-road bicycle trail (approx. 4.5 miles), seasonal hiking trail (approx. 3.5 miles), Illini Campground expansion-Phase III (80 to 100 developed campsites), a group RV camping facility with a new shower building, sailboat harbor improvement/expansion (as demand dictates), swimming beach/bath house (accommodating approx. 500 bathers), Peppenhorst Boat Access Area, handicap fishing pier, Allen Branch boat ramp area, CSA day-use area parking lot and Cherokee hiking trail rehabilitation/improvement. Other future items include associated infrastructure improvements and the expansion of the Allen Branch concession lease area. Allen Branch has been identified as a future marina site in the marina market study. Courtesy docks and a small services operation may be developed at the site.

### (4) IR-3, Keyesport Recreation Area, PLATE 5.

**General:** This 30 acre site provides access to the open water and the flooded dead timber area north of the Burlington-Northern Railroad trestle. The area includes a marina concession, beach and day-use area.

**Existing Facilities:** The site includes 72 car-trailer parking spaces and 60 car parking spaces, a four lane boat ramp, and a 120 slip marina concession. Other facilities in the beach and day-use area include 19 picnic units, 1 group picnic shelter, 1 waterborne comfort station, 3 fountain/hydrants, a fish cleaning station, basketball court, playground equipment, 4 covered tables and a swimming beach.

**Proposed New Actions:** Provide an outdoor shower at the beach.

**Proposed Replacement Actions:** The picnic shelter will be rehabilitated and the wooden stairway over the levee will be replaced. The comfort station will be rehabilitated for disabled accessibility and 3 water fountains will be replaced at the beach.

**Future Actions:** Placement of an additional breakwater to the south of the existing harbor breakwater would increase harbor capacity and protect private and public facilities.

### (5) IR-4, Boulder Recreation Area, PLATE 6.

**General:** This 67 acre area is located on the east side of the lake, immediately south of the Burlington-Northern Railroad crossing. It has been

developed as a multi-purpose area offering facilities to boaters, campers and picnickers. The site features a full-service marina, a campground and day-use area.

**Existing Facilities:** This area includes a full-service marina concession, a four-lane boat launching ramp and parking lot, a fish cleaning station, 30 picnic sites, 1 picnic shelter, 5 comfort stations, 77 campsites, 13 walk-in tent sites, 1 washhouse, 7 fountain/hydrants, 2 playgrounds, 1 trailer dump station, 1 amphitheater and a sewage treatment plant.

**Proposed New Actions:** Install sewer and water hookups at 13 campsites (sites 28-40). As in the Dam West Campground, the sites were chosen based on proximity to the existing sewer system. The potential revenue increase for one year is estimated at \$2,340; estimated payback period is seven years.

**Proposed Replacement Actions:** Comfort stations 1 and 2 in the day use picnic area are over 30 years old, are not in compliance with present disabled accessibility standards and have exceeded usable service life. Based on an analysis of costs associated with rehabilitating and maintaining two buildings versus costs to build and maintain one consolidated facility, it is proposed to replace the two existing comfort stations with a centrally located, accessible facility.

During high water events, the boat ramp becomes inundated and is unusable. A two-lane high water boat ramp on the high portion of the boat ramp parking lot will make the ramp usable to elevation 455 NGVD. An additional ramp is more cost-effective than upgrading the existing boat ramp. The high water ramp will be constructed above ordinary high water and will not increase the number of operating ramps on the lake.

It is proposed that all electrical facilities be replaced and upgraded to meet current industry standards. This replacement is necessary because the existing electrical wiring has exceeded its service life and is not compatible with many of the current camping units. The MRP also proposes replacement of 90 grills and grill pads, 7 water fountains, 3400 ft. of sewer line, 2 lift stations with 2 pressurized lift stations and the shower/laundry building roof. In addition, comfort stations 3, 4, and 5 will be rehabilitated and comfort station 4 will be made accessible. Fish cleaning stations and water fountains will be replaced with disabled accessible facilities, 2 campsites will be modified for disabled accessibility.

**Future Actions:** Boulder Harbor is presently at capacity with 274 boat slips. Dredging a shallow cove within the harbor lease area would allow room for the placement of 26 to 30 additional boat slips. This would create a more profitable operation and additional benefits to users.

If the elevation of the dredge material placement area to the east of the campground is raised with additional dredge material, this area may be usable for development of additional campsites.

(6) IR-5, Coles Creek Recreation Area, PLATES 7,8.

**General:** This 87 acre area was developed primarily for camping; however, facilities are also provided for such day use activities as boating, picnicking and swimming. The Lotus Group Camp area is located to the north on five acres. Generally, this recreation area has a low elevation (approximately 457 NGVD and below) and several areas were severely impacted during the flood control operations of 1993 and 1995.

**Existing Facilities:** The day use and campground facilities include 42 picnic sites, 2 vault comfort stations, 3 picnic shelters, 3 playgrounds, 14

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fountain/hydrants, a swimming beach, 1 bath house, a four-lane boat launching ramp, 1 sailboat launch ramp, a land treatment system, 1 fish cleaning station, 2 footbridges, 148 campsites, 8 waterborne comfort stations, 1 washhouse, a trailer dump station and an amphitheater with fire ring. The Group Camp Area is a 5 acre area which includes an enclosed picnic shelter, 10 platform tents, 1 fountain/hydrant, 1 fire ring, 1 vault toilet and a playground.

**Proposed New Actions:** A 900 foot road will be developed for a sixth loop of the campground. The sixth loop is necessary for the relocation of 15 campsites from the campground that are low and subject to flooding. Fifteen sewer and water hookups will be developed concurrently with the sixth loop development. Estimated revenue generated by sewer and water hookups is \$2,550; estimated payback period is ten years. Layout of the sixth loop will be compatible with future development of a campground to the south of this area discussed under future actions.

Due to the heavy utilization of this area throughout the recreation season, more parking areas are necessary. Four paved 80' X 30' parking areas are proposed for loops 1 through 4 in the campground. This additional parking area will help alleviate vehicle congestion within the campground during peak usage times.

At the Lotus Group Camp, ten electric hookups will be installed around the parking lot for visitors with camper/trailers. Annual revenue increase is estimated at \$1000; estimated payback period is 22 years.

### **Proposed Replacement Actions:**

**Day Use Area:** The boat ramp and parking lot were damaged in the 1995 Flood. It is proposed to replace the boat ramp parking lot base and surface and install a drainage system. To permit access during times of high water, a high water access ramp is proposed at the north end of the existing lot. Three hundred feet of revetment will be placed north of the old beach breakwater to prevent erosion of the area and the old beach parking area will be repaired and resurfaced. The deteriorating access walkway bridge between the boat ramp parking lot and the beach will be replaced. An electric lift station panel for the shower house is proposed for replacement. Vault comfort station 1 and the bathhouse will be modified for disabled accessibility. Vault comfort station 2 will be replaced with a disabled accessible waterborne facility. Forty-two grills and grill pads and a fish cleaning station will be replaced.

**Campground:** The campground's main gate and fee booth will be relocated to an area east of the entrance to the Lotus Group Camp area and a turn-around will be provided for vehicles with trailers. This will allow day use fees to be collected in addition to campground fees.

It is proposed to connect the day-use and campground areas with a pedestrian trail. Currently, the only route for pedestrians between the two areas is the heavily traveled access road into the area. The trail will allow visitors to travel safely between the beach and campground.

Seventeen campsites are low and frequently inundated by flood waters during the recreation season. These sites will be relocated to a new sixth loop located above 454 NGVD in the area designated for future camping.

The park road between Loops 2 and 4 will be raised from below 454 NGVD to 456 NGVD to allow access during high water. Sixty-three campsites that are frequently inundated will be floodproofed. Camp pads will be asphalted, electric facilities raised and campsites relandscaped with an impact site.

Two lift stations will be floodproofed. Replace 36 concrete picnic tables, 148 campsite grills and amphitheater benches.

Modify comfort station 4 for handicapped accessibility and make site 38 accessible. Supplement No. 6 to this master plan obtained approval to modify the comfort station in Loop 3 to include shower facilities. This will be changed to comfort station 4, Loop 1.

Replace electric service to 148 sites with facilities that meet current industry standards. Hookups will be placed on posts above 457 NGVD. Electrical breaker boxes will be wired according to elevation to allow maximum utilization of campsites which are not inundated. Two package lift stations will be replaced with pressurized units and floodproofed. A portion of the shoreline adjacent to Loop 4 will be revetted to prevent future flood damage.

At the Coles Creek Lotus Group Camp Area, implement installation of previously approved flush toilets and showers and replace the platform tents with weather-proof mini-shelters with removable walls. The picnic shelter will be rehabilitated and a fire ring installed.

**Future Actions:** An area south of the existing Coles Creek Campground is designated for development of a future campground. Development of 100 campsites with electricity (50 with sewer and water hookups) and 2 handicapped mini-shower/comfort stations may be implemented when sufficient demand exists for the new campsites to be cost-effective and funds are available.

(7) IR-6, South Shore State Park, PLATE 15.

**General:** This 305 acre State Park is located on the southeast side of the lake approximately 3 miles east of Carlyle and is being developed and operated by the IDNR through a long term lease agreement with the Corps. Approximately 85 acres of this site were returned to the Corps in exchange for a resort lease area in the Dam West Recreation Area. This site is primarily managed for the preservation of its natural and cultural resources while also providing limited resource oriented recreational activities that include a small boat access area wildlife observation, and undeveloped facilities for fishing, archery, camping and picnicking. Because of its popularity for wildlife observation, in particular the viewing of deer; lack of developed facilities; and the IDNR's desire to avoid recreational facility duplication, it is recommended that South Shore be reclassified from a State Park to that of a State Fish and Wildlife Area. As such, site management will primarily be directed at preserving, perpetuating, and if necessary re-establishing wildlife species and habitat. Recreational development will stress a natural or primitive theme and will be limited to and in keeping with that necessary to accommodate the planned resource use. The proposed reclassification; however, should not supersede the IDNR's option of providing a lodge/resort development at this site. See Appendix IV for a detailed breakdown of all existing, proposed and future expenditures for South Shore.

**Existing Facilities:** Facilities include a small camping area that provides 33 undeveloped camping sites and a trailer dump station, five day use areas with 120 picnic sites, a picnic shelter, 5 vault toilets, 13 fountain/hydrants, a one-lane boat launching ramp, a site residence, a 3-D archery range and a small service area facility.

**Proposed Actions:** Proposed developments include Hickory Hollow campground and Bluebell, Pine Grove, Crappie Cove, Lakeside, and Lakeshore day-use area rehabilitation and improvement; wildlife habitat enhancement; hiking trail

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(approx. 3.0 miles) and trailhead facilities; and site entrance revisions. Other proposed items include associated infrastructure improvements.

**Future Actions:** Future developments include site residence replacement; service area rehabilitation and expansion; resort/cabin area development; hiking trails (approx. 2.5 miles); Deer Run day-use and boat ramp area rehabilitation/improvement; Deer Run day-use expansion; wetland area enhancement and interpretive trails; and a scenic loop road development. Other future items include associated infrastructure improvements.

### (8) IR-7, Dam East Recreation Area, PLATE 9A.

**General:** The 136 acre Dam East Recreation Area provides both day use and camping facilities. This recreation area is comprised of two developed sub-areas: the McNair Group Use Area and the Dam East Boat Access Area. The East Spillway and General Dean Bridge were once included as sub-areas within Dam East, but have since been designated as separate recreation areas and are described below. The Dam East Boat Access area was an 85 acre unit in South Shore State Park. It is now managed by the Corps for reasons described in Supplement 7 to the Master Plan and synopsized in Section 1-04 d.(3) of this plan. The boat access is located on high ground north of Saddle Dam 2 and provides the only high-water access on the southeast side of the lake. Minimal facilities are provided. The McNair Group Use Area features group picnic and group camping areas as shown on PLATE 9A. Other group area facilities include the swimming beach and the Chipmunk Nature trail.

**Existing Facilities:** Dam East Recreation Area facilities include a trailer dump station, 57 picnic sites, 66 campsites (all in group camp areas, A through E), 4 group picnic shelters, 2 waterborne comfort stations, a vault comfort station, 8 fountain hydrants, a comfort station with mini-showers, 2 playgrounds, a swimming beach, a nature trail, 2 vault toilets, 1 four-lane boat launching ramp and a one-lane high water access boat ramp. Picnic sites and 25 individual campsites with electric are available only when group areas are not reserved.

**Proposed New Actions:** The existing walk-in tent camping area (Group Area E) is underutilized due to its remoteness from the parking area and the level of facilities provided. The area's 17 sites are proposed to be converted to a maximum level (Class A) camping facility with road access, impact sites and electricity. These 17 sites for camping will generate an estimated yearly revenue of \$9,180 and would provide a camping experience the public prefers. Payback period is estimated at 23 years. At the Dam East Boat Access Area, proposed facilities include a picnic shelter and an additional boat ramp lane for high-water access. Because of the additional facilities and the illuminated ramp, day-use fees will be charged at the boat ramp. Annual revenue generated by the picnic shelter and ramp is estimated at over \$3000. The additional high water ramp and the existing high water ramp will provide continued lake access when the four-lane ramp is closed because of high water.

**Proposed Replacement Actions:** A showerhouse is proposed in the area west of the group area entrance road to replace comfort stations 2 and 3 and the showers at the comfort station near the beach. The showers at the comfort station near the beach will be removed and the comfort station will be rehabilitated. The dump station will be relocated to the main entrance road and traffic flow will be revised in the group camp area. Twenty campsite electric hookups will be replaced with electric service that meets current industry standards. Twenty deteriorating concrete tables, two water fountains and fifty rusting grills will require replacement. The comfort station/shelter in group area "C" and the picnic shelter in group area "D" will be completely rehabilitated. The sewer line from Dam East will be

rerouted from the dam to permit winter operation. Flood damage to the breakwater area near the beach will be repaired. The existing picnic shelter in the boat access area will be rehabilitated.

**Future Actions:** In anticipation of development of a future marina, a safer access from Route 50 to the boat access should be considered. The east and west entrances to the Dam East Recreation Area are in locations that prevent adequate advance view for vehicles leaving and entering the area or traffic passing the area. Accidents have occurred near these entrances. A location is available between the entrances that would be safer.

(9) IR-7A, East Spillway Recreation Area, PLATE 9.

**General:** Located on 103 acres just below the main dam on the east side, this day use area features bank fishing and picnicking. Eighteen acres are presently developed.

**Existing Facilities:** The East Spillway includes 2 waterborne comfort stations, 1 vault toilets, 1 fish cleaning station, 1 playground, 1 picnic shelter, 5 fountain/hydrants, 46 picnic sites, and a nature trail. A parking lot, 3 covered tables, vault toilet, and handicapped fishing pier are located at the Lakeview parking lot.

**Proposed New Actions:** The area around the circular drive of the picnic area will be converted to an overflow primitive tent camping area by relocating 15 tables and grills from within the picnic area. These sites will meet a current demand for additional campsites on high-use weekends and generate additional camping revenue with minimum investment.

**Proposed Replacement Actions:** Comfort stations 1 and 2 will be replaced with a centrally located, disabled accessible comfort station. Based on an analysis of costs associated with rehabilitating and maintaining two buildings versus costs to build and maintain one consolidated facility, it is proposed to replace the two existing comfort stations with a centrally located, accessible facility.

Several other facilities will be rehabilitated or replaced. The picnic shelter will be completely rehabilitated. The fish cleaning station and 2 water fountains will be replaced with freeze-proof, handicapped accessible facilities and a lift station will be replaced with a pressurized lift station. Other facilities that will be replaced include 27 picnic tables and grills and 4,000 feet of sewer line. Fourteen hundred feet of the spillway shoreline will be revetted to protect the bank and the service road. The Lakeview vault comfort station will be converted to an accessible facility.

**Future Actions:** The Spillway area is not prone to flooding and there is ample room for expansion. This area could be used for relocating low, frequently inundated campsites from the Dam West Campground.

(10) IR-7B, General Dean Bridge Recreation Area PLATE 9.

**General:** Located downstream from the main dam, this 5 acre area features bank fishing, picnicking, a boat ramp and the General Dean Suspension Bridge: a registered historic landmark.

**Existing Facilities:** This area includes 10 picnic sites, a vault toilet, a one-lane boat ramp and an interpretive overlook.

**Proposed New Actions:** None

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Proposed Replacement Actions: The vault toilet will be modified for disabled accessibility.

Future Actions: None

(11) Outlying Access Points, PLATE 2.

Twenty-four access points to public lands and waters are provided at various locations around Carlyle Lake. These access points are in areas zoned for low density recreation, wildlife management, vegetation management, and operations. Access points are identified in the appropriate management units. Six access points have boat ramps.

b. Lands Zoned Multiple Resource Use - Low Density

These lands form a narrow band around the lake south of the Burlington-Northern Railroad crossing and are not suitable for vegetative management or recreation development.

(1) LR-1, Allen Branch - Hazlet Northwest, PLATE 2.

General: This area consists of approximately 139 acres. It includes two parcels located along Allen Branch (compartments 14 and 15 in the OMP) and lands along the west side of Peppenhorst Branch (Compartment 23). The Allen Branch and western portions of the Peppenhorst Branch area are riparian in nature. Management objectives are to control succession, create openings and thin forested areas to promote growth of hard and soft mast producers. Primary uses of the areas are hunting, trapping, hiking, birdwatching and sightseeing. No access exists for these areas. Lands along Peppenhorst Branch will be managed for low-density recreation activities. Two community boat dock associations, Lakeshore Acres and Edgewater Beach, occupy approximately 8 acres along Peppenhorst Branch.

Existing Facilities: None

Proposed Actions: Maintain habitat diversity through vegetative management. In compartment 15, improve the quality of timber stands through the planting of hardwoods and thinning as needed. In compartment 23, minimize encroachment of woody vegetation and establish permanent watering holes for wildlife.

Future Actions: Develop access points for each area. These areas are land locked and no access exists except by water.

(2) LR-2, Irishtown, PLATE 2.

General: The northern boundary of this area is Harbor Light Bay Community Dock Association and the southern boundary is Eldon Hazlet State Park. The area provides an essential buffer zone between the lake and private land. The area is utilized for low-density recreational uses such as hiking, nature observation, hunting and fishing. A majority of this 306 acre area is forested, the main tree cover being Oak-Hickory. The low areas have grown up in Maple and Black Willow and other associated water tolerant species. The few remaining open areas are being maintained through crop plantings for wildlife and waterfowl food. The northern one-third of this area is split off from the rest by a major embayment. There is no developed public access and an important cultural resource site is located in this area. Wade Harbor Community Boat Dock is located in this area.

Existing Facilities: Service roads provide access to the area for operations activities.

Proposed Actions: Vegetative management techniques will be used to improve environmental quality and maintain habitat diversity. Cultural sites will be protected from erosion and the environmental and recreational benefits of natural wetlands will be maximized.

Future Actions: No Corps access point is located in this area, although a State access lot is adjacent to the southern boundary. Public access to the central area should be developed.

(3) LR-3, McNair Branch, PLATE 2.

General: This 318-acre area is a narrow shoreline strip composed of open grassland, upland and lowland forest, marsh, and old field that is reverting to forest along the north and south sides of McNair Branch. The area lies between the Harbor Light Bay community boat dock association on the south and the City of Keyesport on the north. These lands are required for project operation and act as a buffer between the lake and private lands. Shoreline erosion is occurring in the area. One Corps access lot is in this area and is heavily used. The Harbor Light Bay and North Branch Harbor community boat dock associations are located in this area. The management objectives for this area are to maintain access to the area, manage habitat for aquatic and terrestrial species and protect cultural sites from erosion.

Existing Facilities: One access point is located in the area.

Proposed Actions: The community boat dock associations are proposing several actions. Harbor Light Bay's priorities, in descending order, are to rebuild the harbor banks and cover them with riprap, dredge the harbor and build a riprap levee to control washing of the harbor banks during high water. North Branch Harbor's priorities are to dredge the harbor entrance channel (approximately 400 yards) and add 30 more docks.

Future Actions: None

(4) LR-4, Keyesport-Tamalco, PLATE 2.

General: This 112-acre area lies between the Burlington-Northern railroad levee and the Tamalco access point. The southern portion is a broad, partially wooded area and includes a boat access point. The northern two-thirds of the area is a narrow, forested strip along the lake shoreline.

Existing Facilities: Two boat access points are provided in this area.

Proposed Actions: An access point will be designated to permit public access to the water from overnight public accommodations proposed for adjacent private property north of Keyesport. Other management actions include monitoring the area for State threatened species and planting bald cypress along island edges and old hedge rows above 445 NGVD.

Future Actions: None

(5) LR-5, Brewster and Gibbs Creek, PLATE 2.

General: This 221-acre area includes compartments 19 and 20 and one of the largest mature forests found at Carlyle Lake south of the Burlington-Northern Railroad crossing. Bottomland forest borders Brewster and Gibbs Creeks and the eastern shore of the lake south of the mouth of Gibbs Creek. Mature hardwoods and water tolerant tree species are interspersed in the bottomland area. East of the county highway crossing, a 71-acre mature mixed bottomland hardwood forest borders Brewster Creek. The dominant species are maple, ash, pin oak, and sycamore, with an understory of grasses and weeds. Many

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sapling-size willow, ash, maple, and cottonwood thrive on the western portion of the area, much of which is generally low and subject to periodic flooding. Major shoreline erosion is taking place within this area on land bordering the lake. Activities within this area include hunting, hiking, bank fishing and sightseeing. The area acts as a buffer between the lake and private lands and there is no public access.

Existing Facilities: None

Proposed Actions: Wildlife habitat will be improved through vegetative management techniques. The environmental and recreational benefits of natural wetlands will be maximized.

Future Actions: Provide access to public land and water.

### (6) LR-6, Lotus Cove, PLATE 8.

General: This 155 acre area is located just north of the heavily used Coles Creek Recreation Area. The area contains open fields, mature hardwood fence rows, and a reforested area containing oak, hickory, walnut, and pine. A low drainage area in the south central portion serves as a brood pond for stocking the lake and is operated by the Corps and the IDNR. The area serves as an outdoor education site for youth groups and receives extensive use for that purpose. Some of the open areas are being maintained through crop planting for wildlife by groups that use the adjacent Lotus Group Area. Oil wells and storage tanks are located in the western section of this area and north of the day-use area. They are shielded from public view and are surrounded by a protective berm.

Existing Facilities: One access point is located in this area.

No proposed or future actions are proposed at this time.

### (7) LR-7, Coles Creek - Sandy Shores, PLATE 2.

General: This 259 acre area contains every kind of vegetative type found on the project and is located between the intensively developed Coles Creek Recreation Area and South Shore State Park. The area borders Coles Creek with a majority of the acreage on the south side of the creek. During high water over half the area is inundated. Open fields are being maintained through the planting of field crops for both wildlife and waterfowl use. The Sandy Shores area includes a thin strip of land on the eastern shore of the lake from the mouth of Coles Creek to South Shore State Park. Old fields are being invaded with trees in some places. One area is being maintained by the planting of field crops for waterfowl use. Major shoreline erosion is taking place in this area. The access points are heavily used by people hunting, fishing and sightseeing.

Existing Facilities: Three access points are located in this area.

No proposed or future actions are contemplated at this time.

c. Lands Zoned Vegetative Management VM-1 is located north of the Dam West Recreation Area and VM-2 and VM-3 are located north of the Burlington-Northern railroad and south of Tamalco and Patoka respectively.

### (1) VM-1, Honkers Point, PLATE 2.

General: This 299 acre area consists of a large peninsula with an inlet stream flowing from the west and a northern portion of reforested farmland that includes a brood pond. In the southern portion, a series of small berms and water control structures provide enhanced habitat for fall and spring

migrants. Frequent inundation has limited mature woody vegetation to the higher land areas. Water tolerant species such as Black Willow in shrub form have come up in the heavily inundated areas. The reforested farmland consists of white oak, white pine, sweet gum, and bald cypress. The open field areas on the north end of this area are being maintained through the planting of food plots for wildlife use. An access point is used regularly by nature enthusiasts, hikers, fishermen and hunters. A brood pond that is operated by the Corps of Engineers and the IDNR is used for stocking the lake.

**Existing Facilities:** These include a brood pond, service entrance road, access point and small earthen berms with water control structures.

**Proposed Actions:** Several management objectives have been defined: continue to provide a diverse wetland habitat and maintain early successional stage, provide continued public access and recreational opportunities, continue operation of the brood pond with the IDNR.

**Future Actions:** None

(2) VM-2, Keyesport North, PLATE 2.

**General:** This 151 acre area lies north of the Burlington-Northern railroad and west of the Keyesport Road. The area is characterized by old field and young forest vegetation and is managed to provide a diverse wetland habitat. The area is used by people hunting upland game and viewing nature.

**Existing Facilities:** Existing facilities include an access point, two small ponds, and a small berm with a water control structure.

**Proposed Actions:** Bald cypress will be planted along island edges and old hedge rows above 445 NGVD.

**Future Actions:** None

(3) VM-3, Boulder Flats, PLATE 2.

**General:** The Boulder Flats area lies north of the community of Boulder in Clinton and Fayette Counties on the east side of Carlyle Lake. The Boulder Flats area consists of 1,341 acres located on the juncture of East Fork and North Fork tributaries of the Kaskaskia River. Mature hardwoods, open fields, and bottomland are noted. The majority of this area has a relatively low elevation and is inundated when the lake reaches elevations between 447 and 449 NGVD. Some natural permanent watering sources exist.

**Existing Facilities:** Five access points, two with boat ramps are located in the Boulder Flats area. A wetlands compensation area has been established in the Boulder Flats area for the purpose of consolidating and protecting replacement wetlands. Section 11-07 further describes the wetland compensation area.

**Proposed Actions:** The primary objective is to restore wetland habitat that has been lost due to past agricultural practices. Wetland restoration and vegetative management will consist of employing terraces and low level berms to control erosion, improve water quality and promote diversity to approximate the natural characteristics of this degraded wetland. Wetland benefits will be maximized with vegetative management emphasis placed on promoting the growth of native moist soil plants. Hardwood plantings in the bottomland will act as filter strips to retard erosion and recycle nutrients. Various locations of suitable elevation will be planted to oak, hickory and pecan. Shallow potholes will be formed that will allow a moist environment

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to be maintained for the maximum benefit to wildlife. Scattered plantings of warm season grasses will build the soil and serve as an additional food sources. Existing access areas will provide ample user access to the area.

A low level berm will be placed near the Wood Duck access to restore wetland habitat and control runoff. Growth of native moist soil plants will be promoted to provide a diverse wetland habitat.

Future Actions: None

d. WM-1, Carlyle Lake Wildlife Management Area, PLATE 13A. The Wildlife Management Area encompasses a total of 9,486 acres of land and water of which 1,308 are owned by the IDNR. The remaining 8,178 acres are licensed to the IDNR under a "General Plan and Cooperative Agreement" per PL 85-624, the Fish and Wildlife Coordination Act of 1958, for intensive fish and wildlife management purposes. IDNR facilities include the office/service area complex, site residence, Hitogi boat access area and the Eckert's Woods area. Although consisting primarily of reservoir subimpoundment areas managed for migratory birds and hunting, this 9,486 acre area also provides opportunities for the hunting of deer, squirrel, quail, dove, turkey and raccoon in the upland areas. Fishing, boating, hiking and wildlife observation are also popular activities. The site is presently served by six access points: Parking Areas 1, 2 and 3; Cox Bridge and Hitogi boat access areas and the Eckert's Woods area. Existing, proposed and future facilities are described below for all use areas and access points within the Carlyle Lake Wildlife Management Area:

(1.) WM-1A, Reservoir Subimpoundment Area, PLATE 2 Located on the north and west sides of the Wildlife Management Area, this 3,200 acre area consists of a series of ring levees, crown levees and various types of water control structures creating subimpoundments to insure feeding and resting areas for waterfowl during the migration season. The area contains four major management units.

Existing Facilities: Existing facilities include three pump stations; major ring levees (A, C, E and F); secondary crown levees (B and D); 88 numerous sub-levees; and various water control structures that include pump and drainage ditches, levee weirs, culverts and stop log structures. In management units 1 and 2, a federal 1135 project is under construction and provides for the rehabilitation of interior levees, construction of two sub-levees and drainage ditches, and the installation of various types of water control structures.

Proposed Actions: Shell/Marathon Oil Company is proposing the construction of two new sublevees paralleling the north side of their underground pipeline. Located within the southern portion of Management Units 1 and 2, the sub-levees will be constructed at oil company expense for spill containment purposes. A second 1135 project is being formulated for subimpoundments 3 and 4.

Future Actions: Future developments include the construction of additional footbridge structures at various locations for hunting and hiking access and nature/interpretive trail development.

(2.) Parking Areas 1, 2 and 3 Located on the north and west sides of the Wildlife Management Area, these parking areas provide walk-in access to the reservoir subimpoundment areas for waterfowl and upland game hunting, wildlife observation, hiking and related purposes.

Existing Facilities: Existing facilities include gravel access roads and three gravel parking lots, limited access trails, pedestrian bridge structures and a waterfowl viewing stand.

**Proposed Actions:** Proposed developments include a gravel parking area expansion to accommodate an additional 20-25 autos at Parking Area 1 and expansion for an additional 35-40 autos at Parking Area 2.

**Future Actions:** Future developments include vault toilets at Parking Areas 1, 2 and 3; a nature/interpretive trail access at Parking Areas 1 and 2; a waterfowl viewing stand at Parking Area 3; and road and parking area rehabilitation.

(3.) **Cox Bridge Boat Access Area** Located on the east side of the Wildlife Management Area, this area provides boat access directly to the Kaskaskia River and walk-in boat access to the southern portions of the reservoir subimpoundment area for fishing, hunting and hiking purposes.

**Existing Facilities:** Existing facilities include a paved access road and parking for 16 auto/trailer units, 1-lane concrete boat ramp for normal and low water use, vault toilets, limited access trails and a pedestrian bridge structure crossing the Kaskaskia River.

**Proposed Actions:** Proposed developments include two, 1-lane concrete boat ramps for high-water use and associated road and parking area improvements.

**Future Actions:** Future developments include road and parking area rehabilitation.

(4.) **Office/Service Area Complex**

**General:** Located on the central north side of the Wildlife Management Area, this state-owned area provides headquarters for site operations and maintenance, site security and visitor information services.

**Existing Facilities:** Existing facilities include a gravel access road and visitor parking, gravel service yard, site residence, pole storage building and a converted barn serving as an office/service building.

**Proposed Actions:** None anticipated.

**Future Actions:** Future developments include an office/service building with associated facilities and road and parking area rehabilitation.

e. Two areas at Carlyle Lake are identified as environmentally sensitive:

(1) **ESA-1, Gray Day Site** The Gray Day Site is a prehistoric archeological site located on a peninsula on the western lake shore. Contractor's work and numerous site visits and assessments by Corps personnel over the years have determined that the site is eligible for nomination to the National Register of Historic places.

(2) **ESA-2, Tamalco - Bald Eagle Site** Bald eagles have been nesting just north of the Tamalco Boat Access point since 1991. Three restrictive concentric buffer zones have been established around the existing nest. The primary zone is 330 feet from the nest. All land use and motorized access into this zone is prohibited at all times. The secondary zone is 660 feet from the nest. Land-use activities resulting in significant changes in landscape such as clear cutting, land clearing or major construction are prohibited at all times. Human entry and low level aircraft operations are prohibited from 1 January through 15 April. Roads and trails in this zone are closed from 16 November to 15 May. The tertiary zone is approximately located in the band between 660 feet and 1/2 mile from the nest. Some

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activities are permissible in this zone except during the most critical period from 1 January through 15 April.

### 8-05 IMPLEMENTATION

#### a. Introduction

The means of accomplishing a development program is equally important as the plan itself. Current national priorities limit development and renovation options more than they were in the past. There is considerably more emphasis, therefore, on the provision of recreation opportunities solely by local interests. At the same time, recreation visitation to Carlyle Lake is no longer increasing at the annual rates of the 1960's, 1970's and 1980's. Nevertheless, a need exists for the proposals contained in this master plan, and it is expected to become greater in the future. It should also be recognized that changing priorities could drastically affect the manner and schedule for implementing this master plan. Hopefully this master plan will have continuing utility despite any changing priorities that may affect its implementation.

#### b. Implementation Methods.

There are six basic implementation methods currently available for development at Carlyle Lake:

##### (1.) Cost Sharing.

Funding for cost sharing may well be more difficult to secure than in the past. In addition to providing at least 50 percent of the development costs of a proposal up front, the cooperating local governmental entity must also agree to operate, maintain, and provide major replacements for the new development.

Requirements for cost sharing recreational development with non-Federal public interests will be considered when the need for such facilities can be sufficiently demonstrated.

The current Corps regulation, ER 1165-2-400 requires that all recreational development be cost shared 50 percent by non-Federal public agencies. The non-Federal sponsor is required to enter into a cost sharing contract with the Corps prior to construction and agree to assume operation and maintenance responsibilities for the completed recreation facility. In addition, the non-federal sponsor must agree to more than offset the annualized federal investment by assuming the responsibility for operation and maintenance of existing recreation areas operated by the Corps. There are two exceptions to this policy. These exceptions permit the construction, operation and maintenance of new facilities without cost sharing.

One exception is the authority for upgrading sanitary facilities in existing Corps managed recreation areas to meet urgent sanitation needs in accordance with provisions of applicable State and Federal laws. The second exception involves the use of Special Recreation User Fee (SRUF) funds. These funds are authorized for expenditure on additional facility improvements, renovation and/or consolidation of recreation areas as long as it lowers recreation area operation and maintenance (O&M) costs and/or increases user fee revenues.

This Master Plan does not contain any cost sharing proposals, but may in the future serve as a basis for initiating such actions. Any program proposals will be based on a letter of intent provided by the non-Federal sponsor and shall include: (1) estimated cost of the proposed

development; (2) cost to be borne by cost sharing sponsor; (3) method of repayment the cost sharing sponsor will use to match Federal funds; and (4) understanding of cost sharing sponsor regarding assumption of operation and maintenance.

(2.) Development Solely by Local Interests Under an Outgrant.

As in the past, local governmental entities with all or part of a project in their jurisdiction, may obtain use, under a lease or license, of an area for approved recreational development. In such cases, all development costs are the sole responsibility of the local sponsor and operation, maintenance, and major replacements costs must be borne by them also.

(3.) Use of Special Recreation User Fee (SRUF) Revenues.

Special recreation user fee revenues which are rebated to the District will be available to accomplish a fairly wide range of actions. Essentially, these funds may be used to decrease project operation and maintenance costs and/or to increase user fee revenues, but only in existing recreation areas. Means of achieving these goals may generally include renovation, consolidation, separation of day-use and overnight areas, addition of facilities or features thereof, and payment of operation and maintenance costs including those for fee collection and other improvements on a case by case basis. According to October 1984 guidance on the use of SRUF funds, they may also be applied to the provision of barrier-free access for people with physical disabilities. Under this implementation method, operation, maintenance, and major replacement responsibilities would remain with the Corps of Engineers or, with changed local conditions, could conceivably be assumed by an outgrantee.

(4.) Regular O&M General Funds.

The use of regular O&M General Funds is restricted to use where facilities are in need of total renovation, reconstruction, or replacement. It is further restricted to where necessary work, even if involving a change in facilities or upgrading, could be accomplished at the same or less development and operation and maintenance cost than replacement or rebuilding of the original facilities.

(5.) Development by Concessionaire.

The fifth development method that could be used at Carlyle Lake involves the implementation of some of the plans proposed in this Master Plan by a concessionaire. Only activities for which there is a viable commercial market are eligible. For developments undertaken in this manner, operation, maintenance, and major replacements are also provided by the concessionaire.

(6.) Challenge Cost-Share

The challenge cost-sharing program provides opportunities for non-Federal public and private groups and individuals to contribute to and participate in the operation and management of recreation facilities and natural resources at Corps water resource development projects. Facilities constructed can not add to federal operations and maintenance costs.

**SECTION IX**  
**FACILITY LOAD AND OTHER**  
**DESIGN CRITERIA**

SECTION IX - FACILITY LOAD AND OTHER DESIGN CRITERIA

9-01 SITING

All proposed structures will be located above the 5-year flood pool with site selection based on soil types, erosion potential, and present shoreline erosion problems.

a. Buildings. Buildings are generally located in areas of tree cover providing the recreational user with isolation and screening from other activities and providing an aesthetically pleasing area. See PLATE 10.

b. Topography. The topography of the area will be utilized to the best possible advantage by placement of the buildings to provide the user with a scenic view.

c. Trails. The siting of trails was determined by the locations that would provide the best water and nature orientation. Trails are generally located below 462.5 flood pool elevation. In some cases, trails will be used by operational vehicles for service and maintenance of these areas.

d. Roads. Road sites where possible were limited to level areas located away from extensive tree cover.

9-02 CAMPING AREA ROADS - See PLATE 10.

9-03 BOAT LAUNCHING RAMPS - See PLATE 10.

9-04 PICNIC SHELTERS - See PLATE 10.

9-05 COMFORT STATIONS - See PLATE 10.

9-06 DAY USE SERVICE EQUIPMENT - See PLATE 10.

9-07 SIGNS

All new signs will be installed, as required, by project personnel and will conform to the OCE Sign Manual, and the Graphic Standards Manual, EP 310-106.

9-08 INTERPRETIVE DEVICES

Nature trails, markers, visual aids, and displays are provided by lake personnel, as required.

9-09 WASTE AND DISPOSAL

Trash and refuse collection and disposal services are contracted to private haulers.

9-10 WATER AND SEWER, DESIGN CRITERIA

a. Waste Collection and Treatment. The sewer system was designed to be in accordance with the requirements of the federal Environmental Protection Agency, Illinois Environmental Protection Agency and Corps of Engineers Memorandum EM 1110-1-400: Planning and Design Criteria, and other standards

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and conditions as required by the Corps of Engineers. Septic systems were not utilized.

Generally, sewers were located to obtain maximum use of gravity flow mains by following contours. Lift stations and force mains were provided as necessary to transfer flow from locations having low ground elevations relative to the ground elevation downstream. Where possible, gravity sewers from several buildings were grouped to intersect at a common lift station. Gravity sewers were 8-inch diameter PVC mains and 4-inch PVC service laterals.

Lift station sizing was based upon all sewage being pumped within an 18 hour day with a peak flow factor of 2.5 times and average of 30 gallons per day (GPD) per person for campers and 5 GPD per person for picnickers using waterborne toilets. Minimum size for force mains was 4-inch diameter. Minimum discharge from the lift stations was based on maintaining proper velocities within the force main and minimizing detention times.

Initially, sewage treatment was designed in accordance with the requirements of the Federal Environmental Protection Agency, Illinois Environmental Protection Agency and Corps of Engineers Memorandum EM 1110-1-400 "Planning and Design Criteria" and other standards and conditions as required by the Corps of Engineers. Facility loading was based upon all camping spaces fully occupied on a weekend day without any additional overflows permitted to occur during seasonal or holiday peaks. Peak population was based upon eight person per day for each campsite, and four persons per day for picnic tables. For planning purposes, facility sizing was based upon 20 pounds Biochemical Oxygen Demand (BOD) or less per 1000 cubic feet for an extended aeration package treatment plant. At campsites, the BOD per capita day was assumed at .08 pounds and at picnic areas the BOD per capita day was assumed at .02 pounds. For treatment plants of 40,000 GPD and above, dual aeration tanks were provided. Tertiary treatment was provided by use of gravity filters.

At the present time, the St. Louis District, to the maximum extent possible, is eliminating the package extended aeration treatment plants initially constructed. The alternative method of treatment is the land application of wastewater. Land application has been found to be more economical with regard to operation and maintenance than the package treatment plants. The land application of wastewater meets the Illinois EPA requirements and provides the same or better level of treatment as the package treatment facilities.

A 1995 wastewater feasibility study for the Boulder Recreation Area showed that the in-kind replacement of the extended aeration package sewage treatment plant (STP) would be more cost-effective. The design life of the STP would require the plant to be replaced four times during the design life of the alternative land treatment system.

b. Water System. The water system was designed to be in accordance with the requirements of the Corps of Engineers Memorandum EM 1110-1-400, "Planning and Design Criteria," and other standards and conditions as required by the Corps of Engineers.

The source of water supply for domestic purposes for each site was based upon 50 gallons per minute (GPM) at a pressure of 50 psi available at the connection to the main from the city of Carlyle system or the Clinton County Water District. The present water supply agreement with the water district does not provide adequate flows to meet fire protection demands.

Storage at each site was based upon a minimum supply of 50 GPM available from the water district. The total storage required was assumed as that necessary to provide for peak daily usage based upon 2.5 times the average daily consumption.

Domestic water demand was based upon 30 GPD average per person assuming that all water consumed in one day was used within 18 hours. The maximum hourly rate of demand was based upon a peak factor of 2.5 times average flow.

Main sizing was based upon peak domestic rate of flow. Looping of water lines has not been provided. Sizing of service lines to buildings was based upon fixture units flow requirements in accordance with the National Plumbing Code.

Water mains are considered to be adequately sized at peak flows to maintain required residual pressures for flush tanks.

**9 - 11 POLICIES AND PROCEDURES PUBLICATIONS.**

a. General policies and procedures for planning, design, operation, and maintenance of recreation facilities at USACE Civil Works projects are given in engineer manuals (EM), engineer regulations (ER), and engineer pamphlets (EP) referenced below:

EM 1110-1-400	Recreation Planning and Design Criteria.
ER 1110-2-400	Design of Recreation Sites, Areas, and Facilities.
ER 1110-2-102	Design Features to Make Building and Facilities Accessible to and Usable by the Physically Handicapped.
EP 1130-2-550	Chapter 3: Project Master Plans and Operational Management Plans
ER 1130-2-400	Recreation-Resource Management of Civil Works Water Resource Projects.
ER 1165-2-400	Recreational Planning, Development, and Management Policies.
EP 310-1-6	Graphic Standards Manual.
EP 310-1-6a and b	Sign Standards Manual.

b. These publications guide the development of recreational facilities to assure they are of the highest quality while serving the health, safety, and enjoyment of the visiting public.

**SECTION X**  
**SPECIAL PROBLEMS**

SECTION X - SPECIAL PROBLEMS

10-01 SEWAGE TREATMENT SYSTEMS - COLES CREEK AND BOULDER

The existing Coles Creek Sewage Treatment Plant is being replaced with a land treatment system. Replacement was recommended in a 1990 Letter Report, Carlyle Lake, Wastewater Feasibility Study. The purpose of the study was to examine alternative wastewater treatment systems that would comply with water quality standards and reduce treatment costs, as well as reduce operation and maintenance costs. The existing sewage treatment plant required a National Pollutant Discharge Elimination System (NPDES) permit from the Illinois Environmental Protection Agency (IEPA). The permit identifies effluent contamination limitations, monitoring, and reporting requirements that must be met by the treatment systems and plant operators. Since the promulgation of the NPDES permit, IEPA has made numerous revisions resulting in more stringent treatment requirements. Consequently, costly upgrades to the existing treatment facility would have been necessary, in order to comply. The 1990 study concluded that the wastewater land treatment system, is a favorable treatment to implement because these systems meet engineering, water quality and cost objectives. An IEPA Water Pollution Control Permit to construct and operate was issued February 23, 1996 (Permit No.: 1996-GA-0246). Construction is scheduled for completion in June 1997.

The letter report mentioned above recommended that the Boulder Sewage Treatment Plant be eliminated and that wastewater from the Boulder Recreation Area be hauled via septic truck to the Land Treatment System at Coles Creek. Since 1990, the wastewater flows experienced at the Boulder sewage treatment plant have increased four-fold. In addition, Clinton County imposes additional fees on trucks hauling over their roads. Considering both of these factors, the feasibility of hauling wastewater from Boulder to the land treatment system was questioned and a Wastewater Feasibility Study for the Boulder Recreation Area which considered both of the above factors was completed in December of 1995. Other alternatives examined were a land treatment system, piping the wastewater to the Coles Creek Land Treatment System and hauling the wastewater to the Coles Creek Land Treatment System. The recommendation of the study was in-kind replacement of the existing sewage treatment plant because it has the lowest total project cost for a 50 year design life. In addition, no real estate acquisition will be required and design and construction could proceed quickly. With a 15 year design life, the packaged sewage treatment plant will require replacement 3 times, over a 50 year period. Construction will begin in FY 97 or FY 98.

10-02 ADMINISTRATION AND MAINTENANCE FACILITIES

The existing office facilities at Carlyle Lake consist of an administration building, a trailer, a converted portion of an old maintenance/garage building and a smaller, older prefabricated structure referred to as a necessary building. The administration building was constructed in 1962 as a resident engineer's office and has since served as a permanent administration office for the lake management staff. The original office building was, in recent years, supplemented with a rehabilitated trailer and a rehabilitated portion of the old maintenance/garage building. The necessary building has served as a lunch room, change area and impromptu meeting room.

The existing office facilities are inadequate as a project headquarters. Over the years a number of changes have been made to the facilities in an attempt to accommodate the changing functions and responsibilities of the lake

## **CARLYLE LAKE MASTER PLAN**

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management staff. Nevertheless, the complex is deficient as the lake headquarters because of inadequate office space for staff, inefficiencies regarding staff meeting together or with the public, lack of a conference area, inaccessibility for persons with disabilities, inefficient utility systems, inefficient heating/cooling systems, leaky roofs and windows, inadequate insulation and a termite problem. The plan proposes that the administration office headquarters at Carlyle Lake, which now consists of four separate structures, be consolidated into one building. A special report on the replacement of the Carlyle Lake administration building is located in Appendix III.

The replacement building will be administratively and economically efficient, meet current accessibility standards and plumbing and electrical codes. The design will be consistent with the aesthetic qualities of the project area.

### **10-03 PUMP STATIONS**

The Keyesport Levee and Saddle Dams 2 & 3 prevent flood waters from inundating adjacent lands bordering Carlyle Lake. A system of electrical pumps are required at each structure to move impounded water into the lake. These pumps require manual activation and when in operation must be continually monitored by lake personnel. During times of heavy precipitation and run-off, these pumps require 24 hour monitoring, resulting in high operation costs.

A major problem with these pumps is the expense of their operation and maintenance. A study to determine methods to reduce pumping time and increase efficiency will be completed in FY-97. Options which will be analyzed are as follows: 1) reduce electrical cost and eliminate pumping (diversion of water to another watershed) 2) automated pump operation 3) improved forecasting and monitoring. After completion of the study, steps will be taken to initiate recommendations to improve efficiency and reduce operations and maintenance costs of the three pump stations.

### **10-04 HIGH WATER AND LOW ELEVATION OF FACILITIES**

Carlyle Lake fluctuates throughout each year, depending on rainfall and water control operations. During periods when the lake is above 450.0 referenced to the National Geodetic Vertical Datum (NGVD), public use of many of the lake's recreation facilities including boat ramps, campgrounds and day use areas is severely restricted or closed entirely. With the loss of these recreational facilities for an extended time, a significant negative economic impact may be experienced. A great number of customer complaints were received after recent high water events that led Congress to direct the Corps to conduct an economic study in FY-96 to gather baseline economic information. The study examined economic losses which occur at various pool elevations, upstream, and at various flow rates, downstream. A model was developed that will be used in making future decisions when a deviation from the Master Reservoir Regulation Manual is necessary.

The Carlyle Lake Maintenance and Repair Plan, outlines flood repair projects which will allow more facilities to be functional at pool elevations between 450.0 NGVD and 455.0 NGVD, which will reduce the negative impacts to users and the local economy.

The plan proposes renovation of the Coles Creek Recreation Area, including shoreline revetment, raising low areas of roads within the recreation area, relocating low campsites to a higher location, replacing

campground electrical to allow for the electrical shutoff on specific campsites based on elevation, and constructing impact sites for easier cleanup on sites which may become inundated. Other repairs include repairing damaged campsites in the Boulder Recreation Area and constructing impact sites adjacent to those sites which become inundated, replacing campground electrical to allow for electrical shutoff on specific campsites based on elevation in the Boulder and Dam West Campground, rebuilding eroding campsites and reveting a portion of the shoreline in the Dam West Campground, and completing repairs/revetment to numerous areas around the lake where erosion has occurred. Also proposed is the repair and heightening of the Keyesport Marina breakwater to provide additional protection to the marina harbor during future high water events.

Carlyle Sailing Association is essentially unusable at 450 NGVD because the electrically operated jib cranes used for boat launching are under water. The high water projects (up to 455 NGVD) consist of riprapping along a portion of Peppenhorst Branch to preserve the harbor closure and delay harbor silting, providing a rock road to a high water ramp for cabin boats, regrading and elevating the catamaran field to permit use up to 455 NGVD, installing a new two-ton jib crane, waterproofing the electrical system of existing cranes for one-design boats, and adding a parking area for boat trailers.

Currently, there are only two high water boat launching ramps which are usable when the pool elevation exceeds 450 NGVD. These are located at the Horseshoe Island Access which is north of Keyesport and in the Dam East Recreation Area. The existing high water ramps are not large enough to handle the large volume of users when the other ramps are out of service. Additional high water accesses are in demand by our customers and are also needed for lake management operations, to reduce congestion of the existing high water facilities and to eliminate the hazard of users attempting to use lower ramps during high water conditions. High water service ramps have been approved for Dam West, Boulder, and Coles Creek Recreation Areas and in Eldon Hazlet State Park at the Apache Boat Ramp. A high water ramp for the Dam East area is proposed in this plan. The ramps will consist of the placement of a concrete slab at a suitable elevation/location adjacent to existing parking/roadway infrastructure. Each of the service ramps will be usable when the pool elevation is above 450 NGVD and below 455 NGVD. These are not considered new ramps, but will permit continued boater access to the lake during times of high lake elevations.

#### **10-05 FISHERIES**

At Carlyle Lake, more visitors participate in fishing than in any other activity and maintaining a good fishery is essential. However, the lake has few coves and there is limited habitat to support the natural reproduction of largemouth bass and other game fish. At times, water level management causes fluctuating pool levels that may prevent a successful spawn. The combination of limited spawning sites and fluctuating water levels at spawning time necessitates the addition of fish to maintain the Carlyle Lake fishery. The proposed solution is to stock the lake from local rearing ponds.

The Illinois Department of Natural Resources (IDNR) and the U.S. Army Corps of Engineers recognize the need for an intervention strategy to enhance the fish population. The IDNR is developing a complex of three nursery ponds, totaling 30 acres, in Eldon Hazlet State Park to address fish management needs in Carlyle Lake. Included in the construction project is a raw water intake in Carlyle Lake, a screen to remove contaminating fish, a water distribution and drainage system, and harvest facilities. The project is slated for completion in 1997, with the first crops of fish to be reared in 1998.

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Five-inch largemouth bass fingerlings will be the primary species reared. Double-cropping in one pond may allow additional production of two inch fingerlings of white crappie or hybrid striped bass or walleye. Fish will be reared extensively; that is, on a diet of zooplankton, followed by forage minnows (in the case of the largemouth bass).

The IDNR will seek monies to mark fingerlings and to evaluate stocking success and the cost versus benefit of stocking various sizes of largemouth bass.

### **10-06 ARCHAEOLOGICAL AND HISTORICAL RESOURCES**

Shoreline erosion represents a problem in managing archaeological and historical resources. As discussed in SECTION III, paragraph 3-02, a cultural resource management plan has been established to enhance identification, evaluation and management of these resources. In part, the plan is designed to address and provide for solutions to this management problem area.

### **10-07 SHORELINE EROSION**

The lake level is expected to exceed elevation 450 NGVD approximately 10 percent of the time based on analysis of pool elevations from 1968 to 1996. The maximum pool elevation to date is 457.4 feet NGVD. During periods of high water, serious erosion has occurred as a result of wave action.

Shoreline erosion at Carlyle Lake is caused by a combination of factors: high water, normal and occasional high winds and glacial clay till soils that are eroded easily by wave action. With the lake at or above 450 feet NGVD and wind fetch reaches of up to 8 miles, wave action has caused severe bank caving and erosion on both fee and easement lands.

Authorization was granted in 1973 to acquire 26 tracts of easement lands totaling 310 acres due to extensive erosion. In addition, many miles of shoreline were riprapped to help correct the problem.

In 1980, additional shoreline erosion problems were identified and studied. This investigation resulted in a plan that authorized further revetment, and acquisition of eroded easement lands amounting to approximately 39 acres in four different areas. These acquisition areas are North Boulder and South Boulder, Lakeside Camping Area and Lake Villa subdivision.

As a result of further studies and analysis, it was determined that nine additional areas were endangered by continued erosion. In 1989, the District submitted a letter report to LMVD, outlining erosion in these nine areas. In six of these areas, the bank has eroded past the present property boundary. Supplement No. 9 to Real Estate Design Memorandum 3B, approved March of 1991 recommended acquisition of 22 tracts of land, encompassing approximately 60 acres. To date, five tracts have been acquired, 3.79 acres in fee. The primary factors that determined whether to revet, or purchase additional land to correct erosion problems were the extent of the erosion in relationship to the existing fee boundary, and economic feasibility analysis between the two alternatives.

These remedial measures were intended to resolve all future erosion problems for the remainder of the project's life. However, erosion is a problem along the shorelines of the Dam West, Coles Creek, Boulder, and McNair Recreation Areas and the eastern shoreline of Peppenhorst Branch. Bank stabilization will be required in these locations to prevent loss of recreation facilities. An erosion monitoring and stabilization program is

ongoing and future action such as acquisition, and/or revetment, may be still be necessary as addressed in Section 8.

#### 10-8 RECREATION CARRYING CAPACITY

The Dam West Recreation Area regularly reaches its carrying capacity and other recreation areas are expected to reach this capacity within the next five years. As visitation continues to increase and facilities become over used, the problem of land for the location of additional facilities arises. Since developed areas with capitol investment require land above flood pool elevations, virtually no land is available for future development or rotation of Corps managed recreation areas. The affects of this situation have been very noticeable the last several years and are continuing to get worse. In an effort to promote efficient use of developed facilities, dispersement of park visitors to all recreation areas is encouraged through public relations channels.

#### 10-9 DAM WEST RECREATION AREA - FUTURE DAM WEST RECREATION AREA DESIGN

The Dam West Recreation Area receives approximately 40 percent of the total Carlyle Lake visitation. This has resulted in congestion, user conflicts and safety concerns on occasion. Access Road "A" is a through road which runs from the city limits to Co. Highway 20. It is heavily used by beach visitors, boat ramp users, picnickers and sightseers. Conflicts between pedestrians and vehicular traffic arise when picnickers and swimmers who park along Access "A" have to cross this roadway to get to the picnic area and the beach. The lack of control for vehicular access to the Dam West day-use area compounds this problem. Once the boat ramp parking lot is full on weekends it becomes necessary to station a ranger at the boat ramp entrance to direct traffic. The adjacent picnic area and beach can become overcrowded under these circumstances.

The current problems with the Dam West day-use area indicate that the area may need to be re-designed to eliminate user conflicts, create a safer recreation area and allow for better control of vehicular access. Rerouting of through traffic or only allowing one-way traffic in the Dam West Area are two possible alternatives. These alternatives may also aid in the collection of day use fees.

Considering the problems associated with the present design of the day-use recreation area, a bypass road is proposed for future development to the west of the area. A concept plan may be developed in concert with partners in the future.

#### 10-10 RESORT CONCESSION DEVELOPMENT

In the previous Master Plan, South Shore State Park was designated as a site for a future concession resort development. A request for proposals was prepared by the Illinois Department of Natural Resources (IDNR). No interest was shown for that site. However, interest was expressed in the future concession expansion area in the Dam West Recreation Area and it was leased to the IDNR who, in turn, have sub-leased it to the City of Carlyle for resort development. Resort type facilities require less land, minimize the requirements for extensive roads and utilities, and offer a complementary alternative to full-service campsites over large areas.

In 1995, the City of Carlyle requested proposals for resort development in the Dam West area and received three. Developers presented packages that

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included a lodge, recreation facilities and cabins or camping areas. At the present time, the City of Carlyle is still seeking a developer.

**SECTION XI**  
**SPECIAL PROGRAMS**

**SECTION XI - SPECIAL PROGRAMS**

**11-01 HYDRO-POWER (Low-Head Hydroelectric Power Plant)**

In 1991, Southwestern Electric Cooperative (Southwestern) proposed the construction of a low-head (35 ft.) hydroelectric power plant on the main dam at Carlyle Lake. Since that time, Southwestern has removed itself from the project and the City of Carlyle purchased Southwestern's interest in the project. The City of Carlyle contracted a second study which determined the project was feasible. License approval and solicitation for bids is expected to be completed in 1997.

The City of Carlyle owns and operates its own municipal electric power generating plant and obtains all its electrical needs from the Illinois Municipal Electric Agency, "IMEA", with offices in Springfield, Illinois. Carlyle is committed to purchase all of its electrical requirements from IMEA, which includes the utilization of Carlyle's power plant by IMEA, with an exception for up to 5,000 KW of hydro-power. The proposed project will be electrically connected to the Municipal Electric Utility of the City of Carlyle, located approximately 3,000 feet from the main dam. The City of Carlyle would operate and construct the power plant. Final approval of the design for the construction of this proposed facility would rest with the Corps of Engineers.

The proposed power plant will be operated as a "Run-of-the-River" type operation. The present water releases called for in the Master Reservoir Regulation Plan VII, or as later may be amended and as adopted by the St. Louis District Office, U.S. Corps of Engineers for Carlyle Lake will remain the guidelines for releases. The feasibility study was prepared on the basis that no additional water will be released for the sole purpose of producing electricity. At a minimum, the plant would produce 51 KW and a maximum of approximately 76,000 KW of hydro-power.

The Corps of Engineers cooperated fully with Southwestern during the preparation of the feasibility study because the project has the potential to reduce operations and maintenance costs and it will help to achieve the national goal of the United States of America for energy independence. This represents the development of an alternative, renewable energy resource. Southwestern received a preliminary permit from the Federal Energy Regulatory Commission (FERC) for the purpose of studying this proposed project. A license application to obtain construction approval from FERC was prepared and submitted by the City of Carlyle upon completion of research and planning.

The site that was chosen for construction from among several alternatives is on the east side of the Kaskaskia near the spillway and gates as indicated on PLATE 9. Each penstock will pass through the dam above flood level. The power plant structure will be located below the spillway on the east bank of the Kaskaskia, south of the trainer wall. A control and maintenance building will be located adjacent and south of the power plant. Project completion time would be approximately 24 months from the time authorization to proceed is received.

Coordination with the Illinois Dept. of Natural Resources, State Historic Preservation Office, U.S. Fish and Wildlife Service, U.S. EPA and Illinois EPA has occurred throughout the study process and interim approval will be sought during application for a construction license. A preliminary environmental assessment has been conducted and no negative impacts were

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identified. The final environmental impact assessment was recently submitted to the Corps for approval. The plant is expected to cost about 10 million and will be paid for through revenue bonds.

### 11-02 MARINAS

The U.S. Army Corps of Engineers promotes recreational boating at Carlyle Lake by making public land available under lease agreement to private operators for provision of marina facilities and services. There are four existing public marinas on Carlyle Lake. Boulder Access Marina is located on the east side of the lake, six miles north of U.S. 50. Keyesport Marina is located on the west side of the lake in the village of Keyesport and is about five miles east of Illinois 127. West Access Marina is located near the west abutment of the dam, approximately one mile north of the city limits of Carlyle. A sailing harbor, operated by the Carlyle Sailing Association, is located at the extreme southern end of Eldon Hazlet State Park.

Boulder Marina is a full service recreational boating facility, offering not only storage and docking, but also fuel, repairs and long term dry storage. Although future demand for slips is evident, the site is severely constricted and only about thirty additional slips could be placed in the existing harbor. Overflow from the Dam West Area has already reduced vacancies. The most feasible means of adding additional capacity would be dry storage. Possible expansion would be limited to 26 wet slips and 30 for dry storage.

West Access Marina enjoys the greatest demand among the full service marinas and has the potential for expansion of both wet and dry slips. The location of this marina at the most popular destination point on the lake also makes it the most expensive marina to store watercraft and certainly the most crowded. These factors will act to disperse boaters in the future; however, West Access Marina regularly approaches capacity. Even if expansion occurs at the operator's planned rate of development (just 10% increase in slips per year) the marina would be fully occupied as early as the year 2003. Potential expansion is limited to 170 wet slips and 65 in dry storage.

The Carlyle Sailing Association (CSA), a non-profit organization, operates the concession on land leased to the IDNR for Eldon Hazlet State Park. At present, there are no plans to expand the facility or provide in-water storage; however, the potential dry storage capacity of the area is between 512-562. The present storage capacity of 365 is comprised of cabin boats up to 26 feet, catamarans, and boats in the ONE-Design class.

Keyesport marina is a special case and requires greater scrutiny among the marinas at Carlyle Lake. The size and location of the marina does not favor the predominant sailing boater demand. Moreover, the current focus of profit generation is a land patron based restaurant concession and therefore, Keyesport marina is not in an ideal marketing position to take advantage of overflow from the other marinas. It is believed that if the concession was reoriented toward a marina operation, future demand for slip rental at Carlyle Lake would make Keyesport an attractive and viable boat storage and maintenance facility. There is a potential for an additional 30 wet slips and at least 100 units of dry storage, but current demand at this location would not justify such an investment prior to upgrading existing marina facilities.

A 1994 marina market study, included in Appendix I, identified two sites for future marina development on Carlyle Lake. One potential site is the cove between Dam East Boat Access and South Shore State Park and the second potential site is at Allen Branch in Eldon Hazlet State Park. A conceptual

design has been developed for a 400 slip, full-service marina at the South Shore site. The South Shore site has long been considered a good marina site; however, a comparative analysis of both sites does not seem to give a decided preference to one over the other. There are obstacles to overcome at each site. The upper portions of Allen Branch site is important for natural reproduction of fisheries at Carlyle Lake while the South Shore site lacks the costly infrastructure i.e. electric and sewers. Assuming the accuracy of rental projections and the potential for marina expansion, the construction of a new marina at Carlyle Lake is probable within the next ten years. Construction of a new marina will only be considered if marinas are nearing capacity and are not able or willing to expand.

#### 11-03 MAINTENANCE AND REPAIR PLAN

The majority of facilities at Carlyle Lake were constructed in the early 1960's, therefore, most have exceeded their service life. Age of facilities, combined with increasing demands from visitors, have resulted in facility conditions in which routine maintenance is not sufficient. These facilities now require either major rehabilitation or complete replacement in order to remain operational. An extensive inventory and analysis was conducted of all facilities and structures at Carlyle Lake as part of the effort to develop a ten year maintenance and repair plan. The plan recommends necessary maintenance and replacement items for the next ten years. The plan was developed by analyzing conditions of existing facilities and evaluating customer usage trends in an effort to reduce project operation and maintenance costs, better serve our customers, and in some cases, increase user fee revenues. The entire plan is included as Appendix II.

#### 11-04 SHORELINE MANAGEMENT PLAN

The subject of shoreline management is fully addressed in the SHORELINE MANAGEMENT PLAN which is included in the Carlyle Lake Operational Management Plan. The Shoreline Management Plan was prepared and implemented as a management tool to lessen the impact of private exclusive use along the public shoreline of Carlyle Lake. The plan was prepared under authority of Title 16 United States Code 460d; Title 36 Code of Federal Regulations 327.30 Lakeshore Management at Civil Works Projects as implemented by Engineer Regulation 1130-2-406, 31 October 1990. The objective of the plan is to provide policy and guidance for the protection of shorelines. Four basic considerations were used in formulating and updating the Shoreline Management Plan. These were: a) the demand for water oriented recreational facilities is increasing while the amount of shoreline is fixed; b) development of private property adjacent to the project is certain to continue; c) shoreline erosion continues to be a problem at Carlyle Lake, and steps must be taken to minimize shoreline erosion, especially in recreation areas and areas with adjacent development; d) the ownership of land adjoining public projects does not convey special rights or privileges to use public land and waters. The Shoreline Management Plan is presented on Plate 17.

#### 11-05 MINERAL DEVELOPMENT

Two oil leases have been issued since 1987 for underground mineral rights totaling 740 acres. A 20 acre area, near the Coles Creek Recreation Area, is the only site which will provide surface occupancy and where all wells and production and storage facilities for this field will be located.

The Boulder Oil Field was discovered and extensively produced by Texaco from the early 1940's through 1963 when the field, along with the mineral

## CARLYLE LAKE MASTER PLAN

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rights were purchased for the development of Carlyle Lake. The field had produced approximately 8.1 million barrels of oil at the time of its abandonment.

With the advent of technology that allows companies to directionally drill to an oil reservoir from a location on the surface up to several thousand feet away, the Bureau of Land Management, with the consent of the Corps of Engineers leased the mineral rights beneath Carlyle Lake to maximize recovery of the oil resource while minimizing impacts to the surface.

The wells of the Boulder Field utilize horizontal drilling techniques. This procedure involves directionally drilling a gradual curved hole to the oil zone beneath the lake. By the time the drill bit reaches the prospective oil zone, it is in a horizontal position and drilling continues horizontally through the oil bearing rock. Although substantially more expensive than conventional drilling techniques, horizontal drilling allows a reservoir to be produced more efficiently with fewer wells.

Lease bonuses, rentals and royalties generated from the mineral development on public land are distributed 75% to the State of Illinois for dissemination to county of well location and 25% to the General Fund of the U.S. Treasury. The federal agencies involved do not receive any direct funding from the mineral receipts.

All new leases for federally-owned minerals at Carlyle Lake will be granted and administered by the Department of Interior through the Bureau of Land Management (BLM). Although federally-owned minerals are under the administrative jurisdiction of BLM, consent from the managing agency must be obtained prior to granting a lease.

All privately-owned minerals underlying Carlyle Lake will be regulated by the Illinois Department of Mines and Minerals. The mineral owner and/or his operator must coordinate with the District to use the federally controlled surface. At this time, no privately-owned minerals are being mined at Carlyle Lake.

All mineral development activities at Carlyle Lake will be reviewed by the St. Louis District's Mineral Development Assessment Team (MDAT). All mineral development activities will be in accordance with the St. Louis District Policy on Oil and Gas Development with guidance provided by the St. Louis District Handbook on Oil and Gas Development.

### **11-06 SECTION 1135 PROJECT**

Section 1135 of the Water Resource Development Act of 1986 allowed modification of completed projects to restore environmental benefits. The Carlyle Wildlife Management Area was selected as a project and funding was obtained to complete the project. Construction began in FY-95, and will be completed in FY-97.

The completed 1135 project will provide improved water control in subimpoundments 1 and 2 in the compartmentalized interior of the Carlyle Lake Wildlife Management Area as originally intended. Interior levees will be raised to provide several feet of freeboard and adequate compartment separation and set water levels will be established for each compartment. The interior levees will have rock weirs which will be set at one foot above the desired pool elevation. Gated culverts will be placed on the interior at strategic locations to allow adequate water transfer between compartments. The subimpoundments were not functioning as originally intended because of poor

water transfer capacity between pools, low interior levee heights and inherent levee instability during flood overtopping.

The modification is anticipated to increase the biological productivity of the Carlyle Lake Wildlife Management Area by about 20%. The importance of this improvement is highlighted by the fact that the Carlyle Lake Wildlife Management Area has proven to be one of the state's most important waterfowl use areas and is located along one of the most important migration flyways.

The project is being cost-shared 75-25 with the State of Illinois as authorized by Section 1135 of the Water Resource Development Act of 1986. The project is being funded with \$638,000.00 of federal funds and \$212,000.00 of state funds.

A second 1135 cost-share project between the Illinois Department of Natural Resources and the Corps of Engineers is being considered for subimpoundments 3 and 4 to correct original design flaws and allow for better water control in these areas.

**11-07 WETLANDS COMPENSATION AREA**

A portion of the Boulder Flats area, located near North Fork Branch and east of Boulder Road, PLATE 2, VM-3, is identified as a wetland compensation area. The compensation area is a block of protected land that will be restored to wetland as needed to fulfill wetland replacement needs for potential state and federal projects at Carlyle Lake. The area restored to wetland in the compensation area will be located on prior converted cropland. Consolidating replacement wetlands in a compensation area will assure their continuance as wetland habitat. All regulatory requirements will be determined by the appropriate offices.

**11-08 BIKE PATH**

Walking and bicycling activities have become very popular. Over 50% of the public, who have access to a walking trail, will use the trail. Over one-third of the public bicycles. These represent some of the greatest users of public lands and facilities.

Development of a bike path between Eldon Hazlet State Park, Dam West Recreation Area and Saddle Dam 3 is highly desirable. The necessary right of way required is one of the limiting factors to development. Between Eldon Hazlet State Park and the Dam West Recreation Area the road dimensions do not allow for a safe incorporation of a bike lane or path. The County is unable to contribute funds to widen the road or create an easement right-of-way. The Corps and the Illinois Department of Natural Resources have no authority to work on this stretch of road.

The Corps is accommodating bicyclists on the project with modified gates that allow easy access to the main dam and saddle dams and choosing road surfaces that enhance cycling.

**11-09 USER FEES**

Public Law 103-66, the Omnibus Budget Reconciliation Act of 1993, authorized the Corps to expand its recreation user fee program. The act authorizes the charging of user fees for day-use facilities. There is no authority for charging entrance fees at Corps operated recreation areas. Fees will be charged for the use of certain boat launching ramps and designated,

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developed swimming beaches in Corps operated day-use recreation areas. Total day-user fees collected will be no more than \$3.00 per vehicle per day. A day-user fee of \$2.00 will be charged to launch a boat at a ramp in a Corps operated day-use recreation area, provided that the total charge does not exceed \$3.00. A fee will be charged at recreation areas having a boat ramp and one or more of the following facilities: rest rooms, picnicking facilities, swimming facilities, or other developed recreation facilities except where facilities are associated with a campground. No fees will be charged where only a boat ramp and courtesy dock exists or where ramps are located in undeveloped or lightly developed shorelines with minimum security and illumination. A day user fee of \$1.00 per person, whether walk-in or in a vehicle, up to \$3.00 per vehicle, will be charged for the use of a designated, developed swimming beach in a Corps operated day-use recreation area provided a net revenue test is met.

### **11-10 PRISON LABOR PROGRAM**

A Memorandum of Agreement (MOA) between the Corps of Engineers and the Federal Bureau of Prisons is currently awaiting approval in the Pentagon. If the MOA is approved, inmates from the Federal Prison Camp in Greenville, Illinois will be working at the Carlyle project. The inmate workers will accomplish unfunded work such as grounds maintenance, carpentry, landscaping, etc. Civilian inmate labor will not supplant existing in-house resources or contract labor. Inmates will be used on a long-term basis to complete unfunded work and better serve our customers.

### **11-11 ENVIRONMENTAL COMPLIANCE**

Actions and activities that the Corps proposes must comply with all applicable environmental laws and regulations. Chief among these is the National Environmental Policy Act (NEPA), which directs that public officials make decisions that are based on an understanding of environmental consequences, and take actions that protect, restore, and enhance the environment. Public involvement is to be encouraged and facilitated for decisions that will affect the quality of the human environment. Environmental consequences of proposed actions and alternatives are to be described in NEPA documents, which are circulated for public review.

According to Corps regulations, many of the items proposed in this Master Plan are categorically excluded from the need for preparation of NEPA documents, because they do not individually or cumulatively have a significant effect on the human environment. Replacement or rehabilitation of existing facilities, or construction of new facilities in developed recreation areas, such as vault toilets, comfort stations, and picnic tables, are examples of categorical exclusions. On the other hand, the preparation of an environmental assessment (EA) is required for actions that will have substantial environmental effects. Examples of such actions are expansion of a campground into an undeveloped wooded area, or construction of water control structures in natural habitats for the purpose of vegetation management. Before construction can proceed for actions requiring an EA, the review of environmental consequences must conclude in a Finding of No Significant Impact (FONSI). If the review process results in a finding of significant impact, then an Environmental Impact Statement needs to be prepared before construction can commence.

NEPA documentation will be prepared in the future for all actions proposed in this Master Plan that are not categorically excluded. It is the Corps policy to identify and avoid adverse impacts as early in the planning

process as possible. Recreational and resource management projects will be designed to avoid and minimize adverse environmental impacts.

**11-12 WATER SUPPLY**

Interest in a future regional water treatment plant, to be located somewhere on the east side of Carlyle lake has been shown by community leaders in Alma, Centralia, Farina, Flora, Hoffman, Hoyleton, Iuka, Junction City, Odin, Patoka, Sandoval, Vernon, Walnut Hill and Carlyle. Several water districts have expressed an interest: East, Clinton County; E.J., Fayette County; FMC, Jasper; Northeast Marion County; Northeast Mt. Vernon; Raccoon; Western Wayne and Carlyle Southwest. From these groups, Gateway Water Company, a not-for-profit corporation has been formed which is comprised of all the users of the area. Phase I of the project could require as much as 10 million gallons of treated water per day. The Corps of Engineers supports this project and will cooperate with the water districts when project development occurs.

**11-13 PARTNERING**

Federal reservoirs provide an important recreation resource in the United States. Facilities for support of recreation are expensive to build and operate. Federal involvement is presently limited to provide minimum facilities to meet health and safety requirements of the visiting public. Federal investment of 50 percent of costs is available if non-Federal participating agencies provide 50 percent and operate and maintain the facilities. Marinas are the best known non-federally supplied public recreation service at Corps reservoirs. Scarce funds and other priorities have limited non-Federal participation in recreation at federal reservoirs. New Corps regulations allow non-federal partners greater opportunities to participate in the operation and management of recreation facilities and environmental stewardship.

The Carlyle Lake Project continues to seek new partnerships and strengthen existing ones as a means to accomplish project initiatives. The following Memoranda of Agreement (MOA) have been initiated with our partners.

The St. Louis District has entered into an MOA with the IDNR for the purpose of making improvements to the Carlyle Lake Wildlife Management Area, by utilizing existing St. Louis District administered Indefinite Quantity Contracts. The MOA is a mechanism for the IDNR to complete projects on lands leased from the Corps at Carlyle Lake by utilizing resources that would not be available without the MOA.

The Carlyle Lake Project Office has also entered into a MOA with the Greenville College, Institute for Environmental Studies. This agreement will allow the Corps to work with the College to accomplish resource management objectives. The college will also enhance and augment the Corps' interpretive services and outreach program goals and objectives by providing educational and outreach programs and assistance with visitor center exhibits.

As stated above in Section 11-10, a MOA between the Corps and the Federal Bureau of Prisons will permit inmate workers to accomplish unfunded work such as grounds maintenance, carpentry projects, and landscaping.

**SECTION XII**  
**COST ESTIMATES**

SECTION XII - COST ESTIMATES

12-01. INTRODUCTION

a. General. The following table shows preliminary cost estimates for development of proposed new actions at Carlyle Lake. The quantities and costs represent a typical Corps guide specification level of design and materials. During actual detailed design of each element, variations in types and quantities of materials, modifications of facilities, inflationary trends, and results from additional engineering tests, will undoubtedly occur. Costs are based on current prices received for similar items of work in the St. Louis District. Price level is 1996.

b. Summary of Costs. Cost estimates for the proposed new actions are as follows on page 12-2:

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<b>I. PROJECT OPERATIONS FACILITIES</b>				
1. Admin./Maintenance Building	Consolidation and Construction of New Building	1	job	\$650,000
				<b>SUBTOTAL</b> \$650,000
2. Saddle Dams	Wells and Pumps	2	ea	\$15,000 \$30,000
				<b>SUBTOTAL</b> \$30,000
<b>II. RECREATION AREAS</b>				
<b>1. DAM WEST RECREATION AREA</b>				
A. Dam West Day Use	Construct Picnic Shelter	1	job	\$30,000 \$30,000
B. Visitor Center	100 Person Outdoor Amphitheater	1	job	
	Concrete Pad for Stage 20 x 30 x 6"	600	sf	\$1.91 \$1,146
	Asphalt Shingle	875	sf	\$3.17 \$2,773.75
	Projector Screen 10 x 10	100	sf	\$6.9 \$690
	3" x 8" x 8' Wood Plank	25	ea	\$120 \$3,000
	Electric Service	1	job	\$5,000 \$5,000
	Expansion of A/V Room from 50 to 100/150 Person (add 875 SF)	1	job	\$52,500 \$52,500
C. Dam West CGround	Water/Sewer Hookups-Loop 3	14	ea	\$1,000 \$14,000
				<b>SUBTOTAL</b> \$109,109.75
<b>2. DAM EAST RECREATION AREA</b>				
A. McNair Group Camp	Convert Existing Tent Sites to R.V.	17	ea	\$3,000 \$51,000
	Road - Asphalt	3000	sy	\$6 \$18,000
	Electric			
	Campsite Conductor	2000	lf	\$4.5 \$9,000
	Distribution Panel	1	ea	\$8,000 \$8,000
	Receptacle Boxes	17	ea	\$275 \$4,675
	Trenching for Conductor	2000	lf	\$2 \$4,000
B. Dam East Boat Ramp	Construct Picnic Shelter	1	job	\$30,000 \$30,000
	Construct Highwater Access Ramp Useable to 455 NGVD	1	job	\$25,000 \$25,000
				<b>SUBTOTAL</b> \$149,675
<b>3. COLES CREEK RECREATION AREA</b>				
A. Coles Creek Day Use	Replace Vault C.S. w/ waterborne	1	job	\$40,000 \$40,000
	Construct Walking Path	1	job	\$10,000 \$10,000
B. Coles Creek CGround	Relocate site to Loop 6 - 17 Sites			
	Sites w/impact areas	15	ea	\$3,000 \$45,000
	Water and Sewer Hookups	15	ea	\$1,000 \$15,000
	Extend Access Road 300 Yards	4300	sy	\$6 \$25,800
	Construct 3 Car Parking Area	4	ea	\$800 \$3,200
C. Lotus Group Area	Install Electrical Pedestals	10	ea	\$1,560 \$15,600
				<b>SUBTOTAL</b> \$154,600
<b>4. BOULDER RECREATION AREA</b>				
A. Boulder Campground	Water and Sewer Hookups	13	ea	\$1,000 \$13,000
				<b>SUBTOTAL</b> \$13,000
<b>5. KEYESPORT RECREATION AREA</b>				
A. Keyesport Day Use	Outdoor Beach Shower	1	job	\$1,000 \$1,000
				<b>SUBTOTAL</b> \$1,000
<b>6. EAST SPILLWAY RECREATION AREA</b>				
A. E. Spillway Rec Area	Convert Picnic Sites to Campsites	1	job	\$3,000 \$3,000
				<b>SUBTOTAL</b> \$3,000
<b>III. VEGETATIVE MANAGEMENT AREAS</b>				
A. Boulder Flats	Wetland Restoration	1	job	\$130,000 \$130,000
				<b>SUBTOTAL</b> \$130,000
				<b>SUBTOTAL:</b> \$1,240,385
				CONTINGENCIES: (IN %) 25 \$310,096
				<b>SUBTOTAL</b> \$1,550,481
				P.E. & D. (IN %) 15 \$232,572
				C.M. (IN %) 12 \$186,057
				<b>TOTAL COST</b> \$1,969,110

**SECTION XIII**  
**OPERATIONAL MANAGEMENT**  
**PLAN OBJECTIVES**

## SECTION XIII - OPERATIONAL MANAGEMENT PLAN OBJECTIVES

### 13-01 INTRODUCTION

The Operational Management Plan (OMP), under separate cover, details implementation of several program areas only conceptually addressed in the Master Plan: recreation, safety, shoreline management, forest management, fire protection and fish and wildlife management.

### 13-02 RECREATION

#### a. SCOPE

A detailed discussion of project recreation management is contained in the OMP. The guidelines and policies set forth in this section are the basis for preparation and implementation of the OMP relative to efficient recreation management at the lake. The OMP will be updated after approval of the Master Plan.

#### b. GOAL

The goal of the lake recreation program is the efficient operation and maintenance of lake facilities to maximize public benefits and implement authorized project purposes. This is accomplished through the effective organization and utilization of manpower and materials.

#### c. PURPOSE

In the administration of the lake, management objectives contributing to lake efficiency and requiring the allocation of manpower and funding include:

- (1) The provision of a wide range of outdoor recreation opportunities and facilities in a relatively natural setting.
- (2) Reduction in conflict of use through activity and area zoning. The administration of lake lands as designated in paragraph 8-01, and on the Land and Water Use Plan (see PLATE 2).
- (3) The provision for visitor information regarding natural resources and ecologic areas along with any other outstanding features.
- (4) The development of policies which provide for maximum sustained public use without undue deterioration of lake resources.
- (5) The provision of additional recreational opportunities through the issuance of leases to private individuals, state governments and other political subdivisions for concession and public park development.
- (6) The maintenance of facilities and grounds to a high standard.
- (7) The provision of a safe and rewarding outdoor recreation experience to the visiting public.

## CARLYLE LAKE MASTER PLAN

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(8) The provision of populations of both game and non-game species so that all interest groups using lake facilities will have the opportunity of receiving benefits from wildlife. SECTION VII includes, in greater detail, the goals and objectives of the Fish and Wildlife Management Program.

### d. STAFFING

The total staff for Operations and Maintenance assigned to Carlyle Lake is 23.2 full-time-equivalents (FTE), including office, secretarial and management. At present, the total permanent staff is 18. An additional 9.0 FTE of student help is allocated per year.

The project manager and staff are responsible for all aspects of operations, maintenance and administration of a water resource development project and its natural and cultural resources. The ranger staff is responsible for natural resource management, outdoor recreation, administering service contracts, health and safety of visitors, pollution abatement, visitor assistance, boundary surveys and marking, working with state and local agencies and informing the public of Corps activities. Maintenance workers and contract personnel are responsible for maintaining and servicing the hydraulic structures, replacement of sand at beaches, realignment of protective buoys, erosion repair, seeding, fertilizing, tree and shrubbery planting, maintenance of trails, painting, repair of facilities (benches, tables and signs), road maintenance and repair, maintenance of comfort stations, shower buildings, miscellaneous facilities, and preventive maintenance particularly on all buildings.

### 13-03 SAFETY

a. GENERAL: A project safety program that identifies common, recurring hazards or unsafe conditions and presents actions that will eliminate or reduce them is included in the OMP. The objectives of this plan expressed in general terms will be: to assign responsibilities for administration of a viable safety program; to establish programs for training and familiarizing personnel in all aspects of safety; and to present guidelines relative to employee safety and visitor safety.

EM 385-1-1, "Safety and Health Requirements Manual" and Engineer Regulations in the 385 series establish the safety program requirements for all Corps of Engineers activities and operations. Pertinent provisions of EM 385-1-1 and other applicable regulations are applied to all activities. Resource personnel have become familiar with these instructions and implement and enforce those provisions applicable to all Corps personnel, contract personnel and the visiting public. Other measures that are employed to maintain health and safety include, but are not limited to the following:

(1) The project manager has appointed a member of the project staff as the project safety officer. The project safety officer will develop plans and programs to carry out the provisions of EM 385-1-1 and the Engineer Regulations in the 385 series.

(2) Safety education lectures are given to Government personnel by immediate supervisors as required by EM 385-1-1.

(3) Resource management training courses and requirements comply with Section 1 and 2 of EM 385-1-1.

(4) The project safety plan portion of the OMP is used in program planning and operation.

(5) Project personnel promote, develop, and maintain public interest in recreational safety through the establishment of water safety councils. Personnel also participate in and take advantage of programs offered by organizations such as the National Water Safety Congress, National Safe Boating Council, U.S. Coast Guard, Coast Guard Auxiliary, Power Squadrons, the American Red Cross, and the National Association of State Boating Law Administrations. Guidance and assistance is obtained from the District safety office.

(6) Safety equipment and materials such as first aid kits, search, rescue and recovery equipment; portable signs and barricades; communications equipment; vehicles; motor launches; and fire fighting equipment are maintained at each project.

(7) Restricted areas, swimming areas, danger zones, and hazardous areas are properly marked with the appropriate buoys, markers, signs, or barricades which conform to the current Uniform State Waterway Marking System and the Manual on Uniform Traffic Control Devices for Streets and Highways (U.S. Department of Transportation, Federal Highway Commission D6.1, 1978). Such devices are placed and maintained to insure the public is adequately safeguarded against hazards. Tailwater areas and areas immediately above spillways and dams are properly marked with signs, buoys, booms, or other markers. Project roads and boat launching ramps are adequately signed, marked, or barricaded for proper use and protection of the visiting public.

(8) All facilities and equipment comply with applicable Occupational Safety and Health Administration (OSHA) Standards.

(9) Commercial telephone for emergency use is provided in public use areas where feasible.

(10) Adequate security lights are provided at all boat launching ramps when the lights are available at a reasonable cost. In areas where electrical service is not readily available, reflective type signs/markers have been installed and maintained to identify ramp locations.

(11) Information bulletin boards are provided in public use areas containing location charts, emergency numbers, Title 36 rules and regulations, safety tips and other information of interest to the visitor.

b. Search, Rescue and Recovery. These activities are directed by the County Sheriff and normally conducted by state and local authorities. The safety of Corps personnel is a major consideration at all times during search and recovery operations. Corps personnel will have proper equipment and training for these activities. An updated search and rescue plan is being developed with the Sheriff departments of Clinton, Bond and Fayette counties.

#### 13-04 SHORELINE MANAGEMENT

The subject of shoreline management is fully addressed in the OMP. The Shoreline Management Plan was prepared and implemented as a management tool to lessen the impact of private exclusive use along the public shoreline of Carlyle Lake. The plan was prepared under authority of Title 16 United States Code 460d; Title 36 Code of Federal Regulations 327.30 Shoreline Management at Civil Works Projects as implemented by Engineer Regulation

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1130-2-406, 31 October 1990. The objective of the plan is to provide policy and guidance for the protection of shorelines where degradation has occurred. Four basic considerations were used in formulating the Shoreline Management Plan. These were: a) the demand for water oriented recreational facilities is increasing while the amount of shoreline is fixed; b) development of private property adjacent to the project is certain to continue; c) some areas of the lake are impractical for moorage due to physical factors such as access, water depths, aesthetics, wind or wave action; d) the ownership of land adjoining public projects does not convey special rights or privileges to use of the public land and waters.

### 13-05 FOREST MANAGEMENT

a. SCOPE The policies and guidelines established in this section are the basis for the preparation and implementation of the OMP.

#### b. POLICY

The goal of forest management at Carlyle Lake is to attain through prescribed silvicultural practices, a natural ecologically healthy forest component. Forest resources are being managed to increase their total recreation, wildlife, aesthetic and commercial values. Selected timber management practices are utilized for the control of soil moisture, erosion, increased forest growth and to promote adequate future supplies of timber through a sustained yield program carefully calculated to protect the total forest resource.

Adequate measures will be taken for protection of forest resources from insects, disease, fire, and overuse. The objective of the Forest Management Program is to increase the value of all lake lands for recreation, wildlife habitat maintenance.

#### c. PLAN PREPARATION

The OMP contains specific information regarding the forest management program in the Natural Resource Management Section. It is prepared through a coordinated District effort. The plan divides the land area into workable compartments and provides a treatment prescription for each consistent with its land use allocation.

#### d. FOREST MANAGEMENT OBJECTIVES

All lands in Government fee ownership are managed to upgrade their forest resources. The extent of management practices is largely dependent upon land use allocations. Lands are continuously and simultaneously available for their primary land use classification as well as forest manipulation. General management considerations on the basis of land use allocation are described below: (See PLATE 2 for the location of each category of land use described)

(1). Recreation Lands. The nature of these lands, when developed, require intensive management practices to protect and maintain their high aesthetic values. Cultural practices such as pruning and cutting are done only for public safety, construction, to increase turf vigor, and to improve aesthetics. Planting occurs where needed with top priority given to shade, screening and aesthetic values.

(2). Recreation - Low Density Use Lands. Public use of these lands is more limited than for high-density use lands. Therefore, forest management practices take a more intensive scope. Harvesting is accomplished for construction, wildlife habitat maintenance and timber stand improvement. Planting is given priority in old fields where new population tree and shrub species create high wildlife and aesthetic value.

(3). Wildlife Management Lands. The management of wildlife lands will be oriented toward developing habitat for both game and non-game wildlife. Where canopy closure is restricting, removal of a portion of the over story accomplishes necessary browse development. Where possible, planned thinnings will produce commercially marketable timber. During thinning cuts, consideration is given to trees that have the lowest potential value for den trees or the production of mast. Where openings are necessary to diversify the overall habitat, complete removal of all trees on certain areas is prescribed. Timber or firewood sales have proven to be an effective method to accomplish this. Adjoining fields will be evaluated and suitable shrubs or trees will be planted as the need arises.

(4). Environmentally Sensitive Lands. Natural areas are selected to preserve existing unusual specimens, ecosystems, unusual geological formations, etc. in their natural state, and no active forest improvements will be undertaken at such areas. Management on these areas is as follows: No timber stand improvements will be allowed; removals will be made only for the purposes of providing access or for construction; paths will be allowed between "set aside" natural areas but no development will be allowed within the actual natural area; these will be allowed to develop naturally without any outside influence. Any newly qualified sites discovered throughout the years will be recommended for designation through the Master Plan process. An attempt will be made to designate a significant acreage to this allocation where the quality and uniqueness are great enough to dictate this designation.

(5). Historical and Archaeological Lands. The trees and grasses will be managed to improve, preserve, and make available the features that have historical significance. Vegetation and trees may be removed to uncover structures, allow more light, remove dangerous trees, or to reconstruct parts of the features. No standard forest practices will be undertaken on the site or near enough to detract from its appearance. The historical and archeological lands will be managed as described above. When public facilities are constructed on lands in this category, they will be managed the same as Recreation Lands.

(6). Vegetative Management Lands. Management activities for these lands includes protection and development of forest and vegetative cover and wetland restoration. All lands in Government fee ownership are being managed to maintain their forest resources for recreation, wildlife, and scenic values.

## 13-06 FIRE PROTECTION

### a. GENERAL

A fire protection plan that serves as a guide for the prevention and suppression of forest and grass fires on Carlyle Lake lands is contained in the OMP. The objectives of a fire protection plan should be three-fold: fire prevention, presuppression, and suppression. These objectives should be based on the following guidelines:

## CARLYLE LAKE MASTER PLAN

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(1). Fire Prevention. To reduce the number of man-caused fires is the primary goal of management personnel. Fire problem areas must be determined, and prevention programs must be established to create public awareness of the destruction caused by fires.

(2). Presuppression. Presuppression planning will be aimed at establishing an efficient fire control organization utilizing project personnel. This fire-fighting force will operate in close coordination with similar units provided by the State of Illinois and local fire departments.

(3). Suppression. Once fires have been started, established procedures to control them must be implemented. These procedures will be outlined in detail in the OMP. The lake manager will update the Fire Protection Plan annually so that improved techniques learned from actual fire-fighting experiences may be incorporated into it.

### 13-07 FISH AND WILDLIFE MANAGEMENT

#### a. SCOPE

The objectives and guidelines established in this section will be the basis for the preparation and implementation of the portion of the OMP dealing with fish and wildlife management practices.

#### b. POLICY

The program objective is to provide the maximum number of fish and wildlife species desired for the use and enjoyment of the public, consistent with the multiple objectives of the lake and habitat carrying capacity. One purpose of the OMP is to outline the on going fish and wildlife habitat development and maintenance program for Carlyle Lake. The scope of the plan is to biologically evaluate fish and wildlife habitat on specific areas and prescribe practices for improving or maintaining habitat on these areas; to evaluate the success of the plan as it relates to wildlife production; and to maintain cooperation between the Corps of Engineers and other Federal and State agencies in the development of water resource programs. Non-consumptive uses of wildlife, such as sightseeing and photography, receive equal consideration with that of consumptive uses, such as hunting. Vegetative and water level manipulation and agricultural cropping, are the principal methods of fish and wildlife habitat improvement and are consistent with other joint uses and basic physical limitations at Carlyle Lake. Lake operation procedures are continually being reevaluated and updated as required to support this program. Coordination is maintained with the IDNR to establish criteria and programs for favorable water levels for fish and wildlife habitat.

#### c. SPECIFIC RECOMMENDATIONS PLAN PREPARATION

The OMP is a coordinated District effort and divides the area into workable compartments. The Plan provides a prescription for each area based upon its use as described in the Master Plan.

#### d. WILDLIFE MANAGEMENT OBJECTIVES

Fish and wildlife resources will be generally managed as outlined below:

(1). IDNR Fish and Wildlife Management Programs. A portion of the Government's fee land and water at the northern end of the lake has been licensed to the IDNR. On this 8,178 acres of land and water, the primary effort of the Department has been the intensive development of this area for quality habitat primarily for waterfowl.

The state's management objectives for the outgranted area are:

- (a) To manage the area to provide high quality habitat conditions for wildlife species that use the Carlyle Lake area;
- (b) To consider the overall ecology of the river basin from a conservation, aesthetic, and recreation standpoint;
- (c) To make these lands and waters available to the public and;
- (d) To provide the maximum days of recreation use that is compatible with the resources.

(2) Fisheries Management Program

Operation of lake levels for the purpose of fish management includes maintenance of stable or slowly rising water levels during critical spawning seasons (approximately May 15 to June 15), and possible fall and winter drawdowns to increase predation success and productivity.

The Division of Fisheries of the IDNR is responsible for those aspects of fish management at Carlyle Lake which do not pertain directly to changes in the surface elevation of the lake. The fish management program is supervised by a professionally trained Reservoir Fisheries Biologist stationed at Carlyle, Illinois.

The IDNR, in coordination with the Corps of Engineers, will conduct all fish rearing and stocking operations in the lake to insure sufficient and desirable populations of fish species.

In order to collect data to guide in management actions, a creel census and a fall fish population survey are conducted annually by the Department of Natural Resources.

(3). Corps Wildlife Management Program. Lands not outgranted to other agencies are managed for wildlife by the Corps. Seven general land management practices are used to develop or maintain wildlife habitat. Soil type, topography, elevation, size of area, access and land use determines which practice or combination of practices are used. Land units are divided into compartments and sub-units called areas. Soil is tested on all sites to be planted and the area fertilized according to soil testing laboratory recommendations. All compartments and areas have prescriptions including wildlife habitat improvement recommendations. One-fifth of the compartments will be reviewed and prescriptions updated annually. The seven land management practices are:

(a) At developed recreation areas, wildlife habitat improvement is limited to the planting of tree and shrub species beneficial to wildlife.

(b) Natural plant succession will be allowed to occur. A natural progression from annual weeds to biennial and perennial vegetation, including shrub and tree planting, is permitted.

## CARLYLE LAKE MASTER PLAN

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(c) Natural succession is allowed to occur, but moderate agricultural practices are applied aimed primarily at prolonging the annual weed production stage. Natural plant succession is managed to favor an interspersed of food, nesting, and cover-producing vegetation.

(d) Practice No. 4 will be an expansion of Practice No. 3. Practice No. 3 is implemented, but with the added establishment of shrub rows in fields. These hedge rows provide food, cover, and more edge environment.

(e) Agricultural food plots are developed where needed or along shrub rows developed as in Practice No. 4. Food plots are established at areas where there is no adjacent private cropland food source or the cropland is over one-fourth of a mile from the hedge row.

(f) Controlled burns are required for some habitat types. This practice is used to manage existing or reestablished mature tall grass prairie. Controlled burning is recommended every three years.

(g) In wooded areas various forms of timber stand improvements are required to release more desirable mast bearing trees and create varying basal area desirable for different forms of wildlife.

(4). Endangered Species. The bald eagle is the only federally listed threatened or endangered species known to presently inhabit the Carlyle Lake vicinity. However, a public awareness of endangered species will be developed through the posting of informative material on the animal or plant. Lake personnel will report any observations obtained of endangered species to the District Resource Specialist in the District Office. Personnel of the U.S. Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife at Springfield, Illinois, will then be notified of the sightings.

(5). Diseases of Fish and Wildlife in the Carlyle Lake Vicinity. Project personnel will be alert for signs of fish or wildlife disease outbreaks. Sick or dead specimens will be delivered to the U.S. Department of Agriculture's Regional Diagnostic Laboratory at Centralia, Illinois. The District Resource Specialist will be immediately notified of die-off problems and he will in turn notify area biologists of the IDNR. The public will be notified of serious disease outbreaks through standard media outlets and procedures.

(6). Hunting and Hunter Control. Rules and regulations pertaining to public use and hunting management are prescribed by Administrative Orders authorized by the IDNR. The result of annual meetings between representatives of the Corps and Department of Natural Resources is the signing of a Memorandum of Understanding. At these meetings, viewpoints of a regulatory nature are exchanged and a format is developed for a safe, managed hunt program. Important safety items stressed by Corps representatives are included in the state's administrative orders and are enforced by the Department of Natural Resources law enforcement officers.

(7). Interrelationship Between Programs. Other programs, such as vector control, weed control and pest control will be discussed as an integral part of the OMP.

(8). Recreation Site Development. During the planning and development of recreation sites, consideration is given to wildlife through the prudent integration of proposed developments and natural vegetation. Mitigation measures are developed to lessen the impact on wildlife habitat.

(9). Short and Long-Range Plans. The OMP, will constitute the annual or short-range working program for Carlyle Lake. This program applies to all Corps managed land. Long-range plans which predicate the development of intensive recreation areas on wild lands will consequently alter the wildlife habitat development of these lands. When intensive recreation area development occurs, wildlife habitat development at these sites will be similar to the tree and shrub planting habitat maintenance program being pursued at the present recreation areas.

(10). Fish and Wildlife Management Organization and Responsibility. The Project Manager, through the Lake Resource Ranger, will prepare 1) Compartment Prescriptions, and 2) Annual Work Plans, in order to implement the lake fish and wildlife program. The Lake Resource Ranger is responsible for implementing and making recommendations for updating the OMP. Preparation of prescriptions, annual work plans, and the OMP five year update will be a coordinated District effort.

(11). Work Plans and Their Implementation. The Project Manager, with the assistance of the Lake Resource Ranger, prepares annual work plans and reappraises wildlife habitat conditions. These plans are used to implement the necessary on-the-ground work in compliance with OMP.

**SECTION XIV**  
**CONCLUSIONS AND**  
**RECOMMENDATIONS**

**SECTION XIV - CONCLUSIONS AND RECOMMENDATIONS**

**14-01 CONCLUSIONS**

Carlyle Lake became operational in 1967. Since that time, it has had a tremendous influence on the South Central Illinois region. Its authorized purposes have provided for flood control on the Kaskaskia and Mississippi Rivers, water supply, downstream navigation, fish and wildlife conservation, recreation, and area redevelopment.

The recreation areas and waters at Carlyle Lake provide quality public facilities. All lake resources will be continually monitored to ensure these resources are maintained at a high level of quality.

**14-02 RECOMMENDATIONS**

It is recommended that this updated plan be approved as a basis for further resource and public use management through 2007.