Broken Bow Lake, Mountain Fork River, Oklahoma
Design Memorandum No. 4B, Appendix A-

SWDCO-OR (SWTED-DA 5 Dec 73) 1st Ind
SUBJECT: Broken Bow Lake, Mountain Fork River, Okla., Appendix A, Project Resource Management Plan, to DM No. 4B, Master Plan

DA, Southwestern Division, Corps of Engineers, 1114 Commerce Street, Dallas, Texas 75202 07 JUN 1974

TO: District Engineer, Tulsa, ATTN: SWTED-DA

1. Appendix A, Project Resource Management Plan, to DM No. 4B, Master Plan, Broken Bow Lake, is approved subject to the following comments or inclusions, whichever is appropriate.

a. It is recognized that the outline in ER 1130-2-400 provided that a brief description of parks be included in this appendix and that most of the land is outgranted; however, it would be more meaningful if problems, solutions, and methods used in the management of the resources of Broken Bow Lake were presented. Although some aspects of resource management are presented in this plan an expansion or inclusion of the following items would prove helpful in using this plan as a management document. All items listed below would not necessarily be included in any one paragraph but would be included throughout the plan with new sections being included as appropriate.

(1) Control of traffic.

(2) Overuse of areas.

(3) Overflow areas.

(4) Contract work versus project forces in light of limitation on personnel spaces.

(5) Number of cleanups required to keep facilities in a satisfactory manner, thereby minimizing visitor complaints.

(6) Management philosophies regarding grass cutting, such as how much to cut, what areas should be mowed, what areas could possibly be planted with wildflowers, and what areas should be left in natural state.

(7) Frequency of solid waste removal with regard to visitor use.

(8) Debris removal and disposal from lake area.

(9) Testing water supply systems in light of guidance contained in ER 1130-2-407.

(10) Rodent control, if any, for beavers, muskrats, groundhogs, and rats.

(11) Rehabilitation of eroded areas.

(12) Methods used to prevent erosion.

(13) Horticulture principles used such as pruning trees and shrubs.

(14) Control of livestock.

(15) Buoying and marking swimming beaches, haxardous areas, channel markers, and lake location markers.

(16) Use of land and water areas by adjoining landowners.

(17) Use of off-road vehicles.

(18) Management of historical or archaelogical sites, if applicable.

b. Paragraph 2. It is assumed that EM 1130-2-320 referenced in this paragraph was meant to be EM 1130-2-302, which is superseded by ER 1130-2-400.

c. Paragraph 5a. This subparagraph appears to be out of place as it only describes the physical features of the project area and does not relate specifically to "Land Acquisition".

d. Paragraph 13. The sentence beginning on line fifteen should be rewritten as follows: "The ranger's land activities include, but are not limited to, inspection of leases, licenses, and other minor outgrants assigned by the District Office, permits, building construction on outgrants, and recreation facilities."

e. Paragraph 14.

(1) Paragraph 14a. This paragraph should be expanded to include a discussion of training received by Corps personnel with citation authority, local Magistrate instructions, and the effect of the citation program on resource management, etc.

(2) Paragraph 14d. The most current legislation regarding pollution control should be cited; i.e., the Federal Water Pollution Control Act Amendments of 1972, PL 92-500.

SWDCO-OR (SWTED-DA 5 Dec 73) 1st Ind
SUBJECT: Broken Bow Lake, Mountain Fork River, Okla., Appendix A, Project Resource Management Plan, to DM No. 4B, Master Plan

f. Paragraph 20. It should also be stated that Corps personnel involved in the use of herbicides or pesticides will be trained in accordance with SWD guidelines and certified by the Division Engineer.

g. A visitation chart showing the annual attendance since impoundment and the projected attendance should be included. This should be related to the resource management program.

h. Although some reference is made to ER's and other criteria, additional references should be included in this plan. These references would be of particular importance to personnel using this management plan as the user would know where additional guidance could be found. For example, in discussing ranger activities, a reference could be made to SWDR 1130-2-7 when a particular aspect of his duties is involved.

i. All existing equipment and structures should be altered or revised as necessary to comply with applicable provisions of the "Occupational Safety and Health Act, Part 1910 and Part 1926," as funds become available. Also, any new equipment should be specified to comply with the provisions of this act.

2. This appendix should be reviewed and updated annually. A page should be inserted at the end of this plan showing the date the appendix was reviewed and the signature of the reviewer. Minor pen and ink changes can be approved by the District. This plan should be completely re-evaluated and submitted for approval every five years from the date of this indorsement.

FOR THE DIVISION ENGINEER:

GEORGE W. STAPLES
Chief, Construction-Operations Division

wd all incl

CF:
HQDA (DAEN-CWO-R) w 2 cy incl

DEPARTMENT OF THE ARMY
TULSA DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 61
TULSA, OKLAHOMA 74102

SWTED-DA

5 December 1973

SUBJECT: Broken Bow Lake, Mountain Fork River, Okla., Appendix A, Project Resource Management Plan, to DM No. 4B, Master Plan

Division Engineer, Southwestern

Subject appendix (Incl 1) is submitted for review and approval in accordance with ER 1130-2-400.

FOR THE DISTRICT ENGINEER:

W. C. TOMSEN
LTC, CE
Deputy District Engineer

1 Incl (7 cys)
as

30 copies prepared

BROKEN BOW LAKE
MOUNTAIN FORK RIVER, OKLAHOMA

APPENDIX A
PROJECT RESOURCE MANAGEMENT PLAN
TO
DESIGN MEMORANDUM NO. 4B
MASTER PLAN

DEPARTMENT OF THE ARMY
TULSA DISTRICT CORPS OF ENGINEERS
OKLAHOMA
DECEMBER 1973

BROKEN BOW LAKE
MOUNTAIN FORK RIVER, OKLAHOMA

APPENDIX A
PROJECT RESOURCE MANAGEMENT PLAN
TO
DESIGN MEMORANDUM NO. 4B
MASTER PLAN

TABLE OF CONTENTS

BROKEN BOW LAKE
MOUNTAIN FORK RIVER, OKLAHOMA

APPENDIX A
PROJECT RESOURCE MANAGEMENT PLAN
TO
DESIGN MEMORANDUM NO. 4B
MASTER PLAN

1. Purpose. - This appendix is prepared as a guide for resource development, maintenance, protection, and use of all project land and water areas, including public use and project lands under outgrant for special purposes.

2. Authorization. - The Project Resource Management Plan is authorized by ER 1130-2-400, dated 20 May 1971, subject: Project Operation, Recreation-Resource Management of Civil Works Water Resource Projects. General considerations covering resource management and public use are contained in the following directives: EM 1130-2-320, Project Operations, Planning and Administration of Project Lands and Waters; ER 405-2-835, Real Estate, Management and Utilization of Civil Works Lands; and supplemented by letters and memoranda from the Chief of Engineers and the Division Engineer.

3. Project purpose and authorization. - The Broken Bow Dam and Lake was authorized for construction by the Flood Control Act approved 3 July 1958 (Public Law 85-500, 85th Congress, 2d Session, S. 3910) as a modification of the Millwood Reservoir authorized by the Flood Control Act approved 24 July 1946 (Public Law 526, 79th Congress, Chapter 596, 2d Session, H.R. 6597). Construction of the Broken Bow Dam was initiated in 1961, and the project was placed in full operation for flood control and the generation of hydroelectric power in 1970. The project is designed and operated as a unit in the seven-reservoir system for flood control in the Little River watershed and for reduction of floodflows on the Red River. In addition, the lake and adjacent land constitute a valuable resource to be developed for recreation, fish and wildlife conservation, and other allied purposes. The reregulating dam is required to satisfy low flow requirements of the Public Health and the Fish and Wildlife Services and to stabilize river fluctuations caused by variable power releases.

4. Operational procedures. - Broken Bow Lake, which controls the runoff from a drainage area of 754 square miles, is located on Mountain Fork River in McCurtain County, Oklahoma, about 20.3 miles upstream from the mouth of the river. The power pool, with a top elevation of 599.5, has a maximum width of about 3-1/2 miles and

extends upstream in a northerly direction a distance of about 21 miles, with small arms reaching up valleys of the minor tributaries. The pool covers a surface area of 14,200 acres, has a shoreline length of 180 miles, and has a storage capacity of 918,800 acre-feet. The flood control pool, at top elevation 627.5, provides additional storage of 450,000 acre-feet and a surface area of 18,000 acres. The ideal elevation for recreation at Broken Bow Lake is 599.5, the normal power pool elevation. The lake is subject to great variations of inflows ranging from very high flows estimated to be in excess of 90,000 c.f.s. to flows near zero during drought periods. During low flows, which are prevalent from July to November, and with the release of water for hydroelectric power, the pool frequently drops and remains below elevation 599.5.

5. Land acquisition.

a. General. - Broken Bow Lake is located on the southern edge of the Kiamichi Mountains. The terrain within and surrounding the project is mountainous, consisting of narrow valleys and sharp to rolling circuitous ridges bounded by steep to moderately steep slopes. The oak-pine forest type covers most of the project lands. Throughout most of this forest type the pine is found in a mixture of various oaks and hickories, but in some places rather extensive pure stands of pine are found. The more common trees are loblolly pine, cypress, nuttal oak, red oak, pecan, sycamore, maple, green ash, hackberry, water oak, cherry, black oak, hickory, elm, black gum, red gum, and white oak. Big bluestem is the common grass, particularly on the drier portions.

b. Fee lands. - The project includes an area of 28,107 acres acquired in fee and 676 acres of flowage easement with a usable land area of 13,907 fee acres when the lake is at normal power pool. In general, the fee taking line is a blocked perimeter encompassing elevation 632.0, including freeboard allowance or limits of backwater effects, whichever is higher. The backwater effects were determined from an envelope curve of backwater effects of the 50-year flood after 50 years of sedimentation. Generally, the fee taking line is not closer than a minimum distance of 300 feet from the static full pool, elevation 627.5. Fee simple title was acquired to work areas, building areas, and public-use areas. Reservoir lands are purchased in fee title to the surface, with mineral interests subordinated to the right of the Government to flood. The reregulation dam, which is located on Mountain Fork River and about 8.7 miles downstream from the Broken Bow damsite, consists of 86.29 acres in fee for the damsite (including a public-use area), 550 acres of flowage easements (including 100 acres in Beavers Bend State Park), and 27 acres perpetual easement for the access road.

c. Utilization. - Under current mangement proposals, all acquired lands are necessary for project operations, public use, and wildlife management. About 5,400 acres of the project area are licensed to the Oklahoma Department of Wildlife Conservation for wildlife management purposes, 3,875 acres are leased for recreational use to the Oklahoma Tourism and Recreation Department, Division of State Parks, and 100 acres are used for project operations.

6. Public-use areas. - There are five developed and three proposed public-use areas at the project. Facilities constructed in the developed areas are those which are necessary for access, health and safety, and the establishment of park values for the life of the project. The present recreation areas have been developed in accordance with the approved Master Plan which is presently scheduled for revision. The facilities are designed primarily to serve the visitation demand of the population within a 100-mile radius to the project. Emphasis has been directed at day-use facilities to obtain maximum sustained benefits for the public. Maintenance of the two public-use areas, five primitive campsites, the project buildings and grounds, including the overlook structure, the embankment of the dam, the spillway and outlet structures, the spillway and outlet channel, the dikes and levees constructed in conjunction with the project, and the reregulation dam is performed by project personnel. Types of work include resurfacing of roads and parking areas; mowing around project structures, buildings, and public-use facilities; preventive maintenance; general upkeep; painting; and repairs and replacements caused by fair wear and tear or vandalism on project buildings, structures, and public-use facilities. Other activities include the maintenance of project-owned equipment, replacement of riprap on the embankment and outlet channel, cleanup of drift and debris along the 180 miles of shoreline, cleanup of the public-use areas, and the construction of erosion control structures and public-use facilities. Daily inspections are made of all public-use facilities, and all repairs are accomplished within a reasonable period of time.

a. Corps of Engineers.

(1) Damsite. - This park consists of several small but attractive areas in the vicinity of the dam which have been developed to provide public observation and usage points. An overlook and parking area have been constructed at the power intake structure, and a parking area to accommodate visitors, sightseers, and fishermen is being developed south of the powerhouse. On the right abutment of the dam there is an overlook shelter with a parking area, and located below the dike are waterborne toilets, a drinking fountain, and parking areas. Access to these points is from Oklahoma State Highway 259A. This area has attracted an average annual attendance of 194,900 persons during the 1969-1971 visitation period. The 1969

first year of record figure of 223,200 declined to 149,100 in 1970, then rose to 212,400 in 1971. Future visitation is not expected to exceed the 3-year average significantly.

(2) Holly Creek Cove. - This area is on the river section of the lake. It is a rather remote area situtated on the west shore and about 10 miles north of the dam. Only that portion lying north of Holly Creek and adjacent to Mountain Fork Creek is considered suitable for public-use development. Although the area is planned for future use, development of the public-use facilities within the area is not anticipated. Development of the area is dependent upon the capability and willingness of a non-Federal agency to cooperate in a cost-sharing agreement and to meet non-Federal requirements of the Federal Water Project Recreation Act (Public Law 89-72; 79 Stat 213).

(3) Egypt Creek. - The Egypt Creek area is situated on the east shore of the lake between Five Mile Hollow and Egypt Creek canyon. The area is accessible from U.S. Highway 70 over the main county road extending north out of Eagletown, Oklahoma. The area is extremely rugged and the tops of the ridges are well above the normal water level of the lake. A basic plan for the site has been designed, but future development of the public-use facilities within the area is not anticipated. Development of the area is dependent upon the capability and willingness of a non-Federal agency to cooperate in a cost-sharing agreement and to meet non-Federal requirements of the Federal Water Project Recreation Act (Public Law 89-72; Stat 213).

(4) Biggam Creek Cove. - This proposed public-use area is located on the east shore of the lake and about 3 miles northeast of the dam. Access will be from U.S. Highway 70 at Eagletown, Oklahoma, over the county road extending north and west to the forest road at Carnasaw Lookout. The area is easily adaptable to construction of public-use facilities and circulatory roads. However, future development of public-use facilities within the area is not anticipated. Development of the area is dependent upon the capability and willingness of a non-Federal agency to cooperate in a cost-sharing agreement with the Corps of Engineers and to meet non-Federal requirements of the Federal Water Project Recreation Act (Public Law 89-72; 79 Stat 213).

(5) Reregulation Dam Area. - This rather small and narrow recreation area is located along the right bank of the Mountain Fork River and extends downstream from the reregulation dam to the limits of Government-owned property. The area is moderately wooded, with gentle slopes to the water's edge. The plan of improvement of the area provides for bituminous surfacing of existing roads and the construction of vault-type frame toilets,

concrete picnic tables, fireplaces, refuse containers, hiking trail, and a water supply. Visitation to the area has been sporadic and has not justified monitoring.

b. Oklahoma Tourism and Recreation Department.

(1) Stevens Gap. - The Stevens Gap area is situated on the west shore of the lake between Stevens Gap Creek and Carson Creek, and is accessible by an access road off U.S. Highway 259. The site is rather steep and heavily wooded and provides unusually good settings for development. Recreational facilities include bituminous and gravel surfaced roads and parking areas, concrete boat ramps, concrete picnic tables, fireplaces, refuse containers, individual campsites, frame vault-type toilets, and a fishing pier. A concession provides covered boat storage slips, rental boats, marine repair, refreshments, and other services to the general public. Additional facilities will be developed in accordance with a general plan submitted to and approved by the District Engineer. This is the most heavily used area on the lake. It has an average annual attendance figure of 284,800 persons for the 1969-1971 visitation period. The visitation, which rose in succeeding years from 107,100 in 1969 to 444,900 in 1971, is expected to continue to increase in the future.

(2) Carson Creek. - This area is located along the west shore of the lake on a peninsula formed by the confluence of Cedar Creek and Carson Creek with the main body of the lake. The heavily wooded site is accessible over a bituminous surfaced road off U.S. Highway 259. Existing facilities consist of bituminous surfaced roads, concrete boat ramps, concrete picnic tables, fireplaces, refuse containers, and individual campsites. During the 1969-1971 visitation period, the park received an average annual attendance of 64,900 persons. The 1969 figure of 47,100 persons rose in 1970 to 96,600, then declined to 66,900 in 1971. With additional improvements to the area, the future visitation can be expected to increase.

(3) Riverbend Park. - This area, densely wooded with pines and hardwoods, is in an oxbow of the river along the base of Rattlesnake Bluff just below the dam. The initial development, which was accomplished by the Corps of Engineers, included vault-type toilets, fireplaces, picnic tables, and trash containers. The Oklahoma Tourism and Recreation Department has added a youth camp for groups, with a camper capacity of 160. Upstream of the powerhouse on the north bank of the river the Department has also built and operates a swimming pool, with lifeguards, changehouses, and snackbar. During 1969, the first year of record, this park attracted 163,500 persons. The attendance rose in succeeding years to a figure of 318,600 in 1971, and it is expected to continue to increase.

7. Maintenance facilities. - Maintenance facilities and equipment for the Broken Bow project are located in the shop and storage areas at the administration and maintenance building. The project does not have separate buildings designated as a sign shop, paint shop, or carpentry shop. These functions, as such, are accomplished in a space set aside within a one-story, prefabricated metal, 24- by 60-foot, warehouse building. New signs, whether wood signs used for directional or informational purposes or metal signs used for traffic control, are purchased through the Millwood Resident Office from the District central sign shop at Eufaula Lake. The mechanic shop is a space set apart within the administration and maintenance building. The shop is used for inspection, adjustment, and repair of vehicles and equipment used in the maintenance and operation of the project. Shop spaces, tools, and other equipment are adequate for the needs of the project. Vehicles and equipment required to maintain the project include:

Nomenclature	No.
Truck, 2-ton, 4x2, flatbed-dump, with winch	1
Boat, pontoon, 27 feet long, outboard motor	1
Boat, outboard, 15 feet long	1
Farm tractor, JD-300	2
Pickup, 4x2, D68A	1
Pickup, 4x2, C69	2
Pickup, 4x2, D72	1
Pickup, 4x2, D66A	1
Pickup, 4x4, C69	1

8. Storage facilities.

a. Maintenance and construction supplies. - Project storage facilities consist of the administration and maintenance building, two prefabricated metal buildings, and the equipment yard. The administration and maintenance building houses the handtools, parts and/or other items considered to require additional security. Supplies which may be adversely affected by the weather are stored in a 24- by 60-foot, prefabricated metal warehouse, while those items which are large, bulky, and can withstand the effects of weather are stored openly in the equipment yard. The other prefabricated metal building, a 12- by 12-foot structure, is used solely for the storage of flammable or toxic materials.

b. Vehicles and equipment. - Vehicles and equipment used for the maintenance of the project are stored in the equipment yard and within the administration and maintenance building. The equipment yard is enclosed by a 6-foot chain link fence with a 3-strand barbed wire climb barrier on top. The vehicles are further

secured by removing keys, locking the doors, and storing the keys in a locked metal storage case within the project building.

9. Office and administrative facilities. - The project office is an integral part of the maintenance building, a one-story, 44- by 60-foot, masonry structure, which is located a short distance upstream from the right abutment of the dam. Adequate space is provided for the Park Manager to maintain records and to supervise and direct project activities. Included also are spaces for maps, cabinets, and files to accommodate project publications, reference materials, and office supplies.

10. Staffing and organization. - A Park Manager, appointed by the District Engineer and under the direction of the Millwood Resident Engineer, is in responsible charge of the project operations and maintenance program. The present organization is as follows:

Title	Grade	No.
OPERATION, CONSTRUCTION, AND MAINTENANCE		
Park Manager	GS-09	1
Ranger Technician	GS-04	1
Laborer	WG-03	2
Laborer (Temporary)	WG-02	2
POWERHOUSE		
Powerplant Superintendent	GS-11	1
Powerplant Superintendent	GS-10	1
Clerk-Typist	GS-04	1
Powerplant Operator A	WB-00	1
Powerplant Electrician A	WB-00	1
Powerplant Electrician Trainee IV	WB-00	2
Powerplant Senior Mechanic	WB-00	1
Powerplant Trainee II	WB-00	2
Powerplant Trainee I	WB-00	2
Janitor	WG-02	1

Additional personnel required:

Title	Grade	No.
Reservoir Ranger Technician (Temporary)	GS-04	1
Reservoir Construction and Maintenance Worker	WG-05	2
Laborer (Temporary)	WG-02	1

The temporary ranger is necessary to supplement the regular ranger. He would patrol the lake area for detection of encroachment, vandalism,

theft, safety hazards, pollution, fires, timber cutting, and any unauthorized use of public property. Reservoir construction and maintenance workers would perform a variety of manual labor and semiskilled duties in the maintenance and construction of recreation facilities. The temporary laborer would assist the maintenance crew during the peak recreation season by performing a combination of unskilled tasks.

11. User fee areas. - None of the Corps of Engineers public-use areas at the Broken Bow Lake are to be designated as user fee areas.

12. Cooperative activities.

a. Biological management. - The Oklahoma Department of Wildlife Conservation has 5,300 acres of the project land and water under license for wildlife management purposes. Some management tools to be employed are select crown cover removal, understory planting and cutting, construction and improvement of dirt, gravel, and hard-surfaced access roads, and construction of fire lanes, picnic areas, camping areas, and boat ramps. Some of the species to be managed are elk, deer, rabbit, squirrel, and wild turkey. The management objectives are:

(1) To provide wildlife-based recreational facilities for the public and more hunting and recreation man-days.

(2) Increase the populations and types of species managed.

(3) Improve the land and water access to the management areas.

b. Reforestation. - The Forestry Division, Department of Agriculture, State of Oklahoma, in cooperation with the U.S. Forest Service, is to implement a plan for the environmental improvement of project lands by establishing and promoting vegetation suitable for recreation use, wildlife habitat, and shoreline and soil stabilization. The objectives of the 5-year plan will be attained by mechanical aeration and fertilization of the soil, establishing sod-forming grasses, block plantings that are composed of various species of trees that are native to the area, individual plantings of ball and burlapped trees, landscaping near selected structures and signs, and the utilization of barriers to control pedestrian and vehicular traffic. State Forestry Division personnel are responsible for the maintenance of all vegetation established through this program for a period of 5 years from the date of each site planting.

c. Fire control. - Every effort is made to control grass and forest fires that may occur on public lands and to cooperate with local firefighting organizations to suppress fires which may start on lands adjacent to or on project lands. Fireguards are made by plowing fire lanes at certain key areas, not only for prevention of fires, but to help keep any fires that may start from getting out of control. Project personnel have at their disposal fire control equipment, including water tanks, hand pumps, water pails, shovels, fire rakes, axes, mattocks, and burlap bags. A detailed firefighting and fire prevention plan is presented in Appendix C, Fire Protection Plan.

13. Ranger activities. - Ranger activities are designed to protect and preserve the Government land in its natural condition and to serve the visiting public. The ranger's attitude, efficiency, appearance, and willingness to be helpful demonstrate an efficient operation that is equitable to all of the public. The ranger protects the project areas and the public property over which he is assigned and obtains compliance with all rules and regulations concerning the use of the project land and water. The ranger assures that the needs of the visitors to the project are satisfied, as far as practicable, and inspects facilities provided in the recreation areas to assure that the facilities are maintained in good condition. The ranger corrects, when possible, any unsatisfactory condition or problem he encounters on the project. He carries in his possession, when on patrol, brochures, maps, and information pamphlets relative to the project. The ranger's land activities include but are not limited to inspection of leases, licenses, and permits or concession contracts including private buildings, building construction by private or commercial leases, and recreation facilities. He also patrols the project lands for the purpose of detecting encroachments, unauthorized use, construction, vandalism, fire detection, pollution problems, and theft. He also gathers data for many recreation reports. The water activities include patrolling the lake area to enforce rules and regulations; promoting water safety by furnishing safety regulations; advising as to hazards of the lake; and giving information concerning State and Federal regulations relating to water safety laws and fishing and hunting.

14. Law enforcement.

a. General. - The Park Manager, trained in the basic principles of law enforcement, issues citations to persons violating provisions contained in Section 234 of the Flood Control Act of 1970 (Public Law 71-611) and policy established in ER 190-2-4. The citation directs the appearance of the violator before a U.S. Magistrate and may require the payment of a fine. Enforcement of civil and criminal laws at the project is the responsibility of

duly constituted officers of Federal, State, and local governmental agencies. The Corps of Engineers, through the Park Manager and field employees, cooperates fully with the law enforcement officers of the State of Oklahoma who are responsible for the enforcement of laws relative to civil actions, game and fish conservation, public health and sanitation, boating, and the prevention of pollution. Close coordination is maintained by the Resident Engineer and his staff with these law enforcement officials. Advance plans are made with them for joint action in controlling pollution, vandalism, and visitor harassment and to enforce boating regulations and fish and wildlife laws.

b. Waterway safety. - Zoning of the lake area to promote safe boating, swimming, and skiing is accomplished by the Corps of Engineers through buoying of designated beach areas and the installation of floating warning signs. Under provisions of the Oklahoma Boating Act, the Waterways Division of the Oklahoma State Highway Patrol has the responsibility of enforcing boating regulations. The Waterway Patrol also promotes safety and enforces zoning established by the Corps of Engineers.

c. Public health. - The development and use of the project land is planned for the public interest, and the utmost consideration is given to the maintenance of high standards of public health and safety. All applicable laws, rules, and regulations of the Oklahoma State Health Department apply to the facilities located on project land. Disposal of wastes, trash, and debris is not permitted on Government land except at State-approved, temporary, sanitary landfill sites. At these sites, open burning is not permitted. Also, the disposed materials must be covered with a layer of soil before the site will comply with State regulations.

d. Pollution control. - The control of pollution at the Broken Bow Lake area is the responsibility of agencies of the State of Oklahoma; however, Public Law 660, 84th Congress, approved 9 July 1956, requires that Federal agencies having jurisdiction over any property shall cooperate with other Federal and State agencies in the prevention and control of pollution of waters of the State. Accordingly, the project personnel cooperate with these agencies by reporting, through Millwood Resident Office, all incidents or probable causes of pollution.

15. Safety - Visitor and employee. - Public safety is promoted through lectures presented to schools, civic organizations, and other groups. Safety programs and demonstrations are presented on special occasions at various public-use areas located at the project. All facilities are maintained in good, safe condition at all times, and questionable health conditions are reported to State health agencies. Signs and buoys are displayed to warn visitors of hazards

or to call their attention to the need of safety in their activities. All employees are provided instructions in safety principles that will enable them to properly perform their work in a safe manner. Biweekly safety meetings for all employees serve as a time to review past records, to give additional instruction, and to establish policies and procedures for the future. Additional details of the safety program are included in Appendix E, Project Safety Plan.

16. Concessionaire activities. - The Oklahoma Tourism and Recreation Department, Division of State Parks, has the only concession at Broken Bow Lake. The concession, which is located at the Stevens Gap public-use area, offers rental boats and motors, rental boat storage, and other related services. In addition to normal lease requirements, the concession is inspected for the proper disposal of trash, rubbish, and other refuse; compliance of sanitary facilities with approved plans, both State and Federal; the maintenance of structures, slips, and operating equipment; and unauthorized developments or activities. When violations are noted, the concessionaire is notified in writing of the unsatisfactory condition and requested to correct the defect within a reasonable period of time.

17. Encroachment. - Encroachment or trespass of concern is not expected to occur on the Broken Bow project. The project personnel maintain surveillance of the public-owned lands, watching for unauthorized uses such as grazing and agricultural use without benefit of a lease; any type of right-of-way without benefit of an easement or license; dumping of refuse; construction on lands not outgranted; removal of borrow material; and encroachments. On suspect encroachment, a complete investigation is performed to determine whether an actual encroachment exists. Then, the violator is courteously informed by personal contact or in writing of his infringement on Government land. Items of obvious temporary type encroachment or trespass are resolved and corrected at field level. If efforts to remove the violation are not successful, or if the individual persists in his violation, the incident is referred to the District Office for appropriate action. On any encroachment where permanent type structures would be involved, the person encroaching would be notified of his infringement and the matter would be referred to the District Office for final decision.

18. In-service training program. - An informal program of employee development is carried out by the Park Manager. This program includes providing job-oriented instructions and the encouragement of employee self-development through participation in local courses given by educational and public service groups and the enrollment in U.S. Army correspondence courses. The Park Manager is also the instructor in a program of in-service training for Park Rangers.

The program is designed to expose the ranger to the basic requirements of the Park Manager position and at the same time make available additional information through reference material, correspondence courses, schools, and seminars in order that the employee may broaden his knowledge in the park management field at his discretion. The Powerplant Superintendent conducts a program of in-service training for powerplant trainees. Personnel in the program are trained for shift operators, electricians, and mechanical positions at other projects in the District. Training consists of assisting the shift operators, mechanics, and electricians in the performance of their duties and participating in a 4-year national correspondence course, "Training and Development for Hydroelectric Powerplant Personnel."

19. Visitor education and interpretation program. - At the present time, brochures, maps, copies of Title 36, and other District publications are furnished to the public at the project office or by project personnel. Tours of the project are conducted for groups such as the Boy Scouts. Upon request, project personnel speak and/or present illustrated programs about the natural features of the project, the purposes of the project, plans for the project, and the impact of the project on the local area.

20. Pest control program. - A regular surveillance and mosquito control program is not in force at the project. Suppressive practices employed during the summer months consist of spraying chemicals or pesticides in the areas managed by the Corps of Engineers. When chemicals or pesticides are employed, care is exercised to ensure that proper safety procedures are followed and the applications made in accordance with the recommendations of the manufacturer and the provisions of applicable State and Federal laws. Only those chemicals which are registered by the Federal Committee on Pest Control are used. Project personnel involved in the use of chemicals are required to attend a short course, "Safety and Pesticide Usage," presented by the District Office.

Broad Leaf Library
Yes

9

SWDCO-R (SWTED-DA 20 Oct 75) 1st Ind
SUBJECT: Broken Bow Lake, Mountain Fork River, Okla., Appendix B, Forest (Range) Management Plan, to DM No. 4B, Master Plan

DA, Southwestern Division, Corps of Engineers, Main Tower Building, 1200 Main Street, Dallas, TX 75202 19 NOV 1975

TO: District Engineer, Tulsa, ATTN: SWTOD

1. Appendix B, Forest (Range) Management Plan to Design Memorandum No. 4B for Broken Bow Lake is approved subject to the following comments or inclusions at subsequent revisions whichever is appropriate:

a. General. Since the plan is based on a forthcoming revision of the Master Plan, it should be modified as necessary to agree with the revised Master Plan when it is approved.

b. Paragraph 2-03a. The drought periods should be more thoroughly described, particularly in regard to usual duration, time of occurrence and effect on management activities.

c. Paragraph 2-04. The discussion should be expanded to more specifically describe the plant community, particularly the age classes represented, density, general condition and peculiar conditions or needs.

d. Paragraph 3-02, 3-03 and 3-04. The detailed instructions on care and maintenance of plants should be moved to the end of the section to avoid breaking the continuity of the discussion.

e. Paragraph 3-05. The description of the Reserve Forestland allocation should be more thoroughly described.

f. Paragraph 3-06. The discussions of management presented are largely objectives and should be revised to also include the practices that are planned for each allocation to accomplish the objectives. In addition, the order of implementation of the above practices should be established and presented.

g. Paragraph 3-06d(1). The word "lease" should read "license" in the first sentence.

h. Paragraph 3-06d(2). The first sentence should be reworded for clarification.

i. Exhibit A. Lands allocated to Reserved Forestland should be indicated on the map.

SWDCO-R (SWTED-DA 20 Oct 75) 1st Ind
SUBJECT: Broken Bow Lake, Mountain Fork River, Okla., Appendix B, Forest (Range) Management Plan, to DM No. 4B, Master Plan

2. This appendix should be reviewed and updated annually. Minor pen and ink changes can be approved by the District.

FOR THE DIVISION ENGINEER:

Willie J. Mayers

wd all incl

for GEORGE W. STAPLES
Chief, Construction-
Operations Division

CF: w/incl
HQDA (DAEN-CWO-R) 2 cys

WES

DEPARTMENT OF THE ARMY
TULSA DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 61
TULSA, OKLAHOMA 74102

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SWTED-DA

20 OCT 1975

SUBJECT: Broken Bow Lake, Mountain Fork River, Okla., Appendix B, Forest (Range) Management Plan, to DM No. 4B, Master Plan

Division Engineer, Southwestern
ATTN: SWDCO-OR

Subject appendix (Incl 1) is submitted for review and approval in accordance with ER 1130-2-400.

FOR THE DISTRICT ENGINEER:

B. J. Bishop

1 Incl (7 cys)
as

B. J. BISHOP
Chief, Operations Division

30 copies prepared

Broken Bow Lake
Mountain Fork River, Oklahoma

Appendix B
Forest (Range) Management Plan
To
Design Memorandum No. 4B
Master Plan

Department of the Army
Tulsa District Corps of Engineers
Oklahoma

APPENDIX B
FOREST (RANGE) MANAGEMENT PLAN
TO
DESIGN MEMORANDUM NO. 4B
BROKEN BOW LAKE
MOUNTAIN FORK RIVER, OKLAHOMA

TABLE OF CONTENTS

EXHIBIT INDEX

APPENDIX B
FOREST (RANGE) MANAGEMENT PLAN
TO DESIGN MEMORANDUM NO. 4B
BROKEN BOW LAKE
MOUNTAIN FORK RIVER, OKLAHOMA

SECTION I - INTRODUCTION

1-01. Purpose. The purpose of this appendix is to provide a plan for the administration and management of the project range and forest resources; protection of the Government's real estate from depreciation, exploitation and depletion; protection and/or improvement of the scenic, recreation and wildlife resources; continuation or initiation of a soil conservation program.

1-02. Authority. This range and forest management plan is prepared as required by ER 1130-2-400 and in accordance with Public Law 86-717, ER 405-1-830, ER 405-1-800, AR 420-74, TM 5-631 and the Operation and Maintenance Manual.

1-03. Management Responsibility.

a. The Corps of Engineers has the responsibility to provide management of the project resources, in a prudent manner in accordance with sound conservation practices.

b. It is the policy of the Corps of Engineers to encourage appropriate Federal, State, and local government agencies to assume the responsibility for management and development of project lands. The Corps in all cases retains the responsibility to coordinate the individual lease or license with the total development of the project lands. Also dependent upon the terms of the lease or license agreement the Corps has the responsibility to either prevent, detect, and correct encroachments or to ensure that contracting agencies deal effectively with encroachments.

c. On lands not under license or lease the Corps of Engineers has the total land management responsibility.

SECTION II - PROJECT DESCRIPTION

2-01. General. Broken Bow Lake, which is located on the southern edge of the Kiamichi Mountains in McCurtain County, Oklahoma, was authorized for construction by the Flood Control Act approved 3 July 1958 (Public Law 85-500, 85th Congress, 1st Session) as a modification of the Flood Control Act approved 24 July 1946. The damsite is situated at river mile 20.3 on the Mountain Fork River and approximately 9 miles northeast of Broken Bow, Oklahoma.

Principal structures include a rolled earthfill embankment that has a crest length of 3,650 feet and rises an average height of 225 feet above the streambed, and a concrete ogee-weir type spillway located in a natural saddle about 1.25 miles northwest of the right abutment of the dam. The spillway has a total length of 376 feet with a clear opening of 320 feet supporting eight 40-foot by 40-foot individually controlled tainter gates and contains a 4-foot by 4-foot sluice gate for low-flow releases and a 24-inch water supply pipeline. A highway bridge crosses the spillway and is a part of the right abutment access road.

Power facilities include a gated intake structure, a penstock and surge tank, a powerhouse, and a reregulation structure. The intake structure on the left abutment of the dam is connected to the powerhouse by a steel-lined tunnel 25 feet in diameter and 1,800 feet long. The tunnel extends across a horseshoe bend in the river to the powerhouse about 3 river miles downstream from the dam. The installed capacity of the powerplant is two 50,000 kilowatt generators. The reregulation dam is located about 4.7 miles downstream of the powerplant.

The project controls the runoff from a drainage area of 754 square miles. Its powerpool, at top elevation of 599.5 feet above sea level, has a storage capacity of 918,800 acre-feet, a surface area of 14,200 acres, and a shoreline length of 180 miles. Flood control pool has a total storage capacity of 1,368,800 acre-feet and a surface area of 18,000 acres at its top elevation of 627.5 feet MSL.

2-02. Soils. Soil associations which dominate and typify the moderately steep-sloped rolling circuitous ridged landscape include:

a. Goldston-Carnasaw-Social Association. Soils in this unit occur as a complex with sandstone fragments and moderately deep red clayey soils. They appear on moderately steep, dissected uplands and side slopes in mountain areas. Areas on smoother slopes, with fewer stones and deeper soils are well suited for management of improved pasture. With proper management, erosion will not present a major hazard.

b. Carnasaw-Goldston Association. These soils are variable in color and texture, moderately erosive, and occur on slopes that are steep with severe limitations for cultivated crops. These soils are suitable, with limitations, for management of wood crops or establishment and

management of improved pastures. Favorable production from pasturelands is possible, provided the fertility level is improved. Under proper management, this soil association does not present a major hazard.

c. Hector-Rock Outcrop Complex. This comprises a group of shallow-stony or shaly, moderately erodible soils of limited agricultural use. Supports native stands of woodland with slow growing trees of poor quality. An understory of native grasses can be maintained with proper woodland and grazing management or improved cultural practices.

d. Sherwood Zafra Complex (SME). The soils in this unit are variable and textured in color and have very severe limitations for cultivated crops. These soils are well suited and have moderate limitations for woodlands or the establishment and management of improved pastures. Favorable production from pasturelands requires fertility level improvements to meet productive needs.

e. Ceda-Rubble Complex. This unit occurs as mixed gravelly alluvial soil in areas of stones and boulders and occurs on streams in the mountain area of the county. The soil has severe limitations and is best managed for its permanent vegetation.

f. Pickens Shaly Silt Loam. This unit comprises a group of shallow stony or shaly soils of limited agricultural use. They are best suited for native stands of woodland. Trees grow slowly on them and are often of poor quality. An understory of native grasses is present under proper woodland grazing management.

2-03. Climate. The climate varies from semihumid to humid and precipitation greatly exceeds the evaporation and transpiration. In the summer, under the prevailing influence of southerly winds bringing moisture inland from the Gulf of Mexico, an atmosphere for thunderstorms exists. Occasionally westerly or northerly winds bring hotter and drier air. During the winter months winds can alternate between tropical and polar air masses causing sudden drops in temperature.

Mean annual temperature is 63 degrees and the average year has 94 days with a temperature above 90 degrees, and 64 days with a temperature below 32 degrees, while the frost-free period, has an average length of 220 days. The average date of the last killing frost in the spring is 26 March and of the first killing frost of the autumn is 6 November.

Precipitation is usually of the rain shower type with occasional general rains in the late fall and early spring. The average number of days of measurable rainfall is 62 days annually and the average yearly precipitation is 53.49 inches. Greatest precipitation occurs in April and May and the least in December and January. Snowfall is moderate, averaging about 3 inches annually, and rarely remains on the ground for more than a few days before melting.

AVERAGE MONTHLY TEMPERATURE

January	44.1 degrees F	July	82.3 degrees F
February	47.4 degrees F	August	82.3 degrees F
March	54.0 degrees F	September	75.7 degrees F
April	63.2 degrees F	October	65.3 degrees F
May	70.3 degrees F	November	52.6 degrees F
June	78.5 degrees F	December	45.5 degrees F

AVERAGE MONTHLY RAINFALL (Inches)

January	4.49	July	4.17
February	4.32	August	3.85
March	4.47	September	4.30
April	5.52	October	3.81
May	6.47	November	4.01
June	4.19	December	3.89
Total	53.49		

Possibility of vegetation-damaging conditions:

a. History of Droughts. Although abundant rainfall occurs in the project area, there are periods of drought usually in the summer season.

b. History of Hail Damage. Broken Bow Lake is not in the center of the heaviest occurrence for hail in Oklahoma, although hail is reported in the area on an average of two times per year.

c. History of Windstorms. The Broken Bow project is not in the center of major storm occurrence; thus windstorms of a violent nature are infrequent.

2-04. Vegetative Types. The area surrounding Broken Bow Lake supports one major vegetative type, which is the oak-pine forest type. The principal species of this forest type are shortleaf pine (Pinus echinata), loblolly pine (P. taeda), white oak (Quercus alba), black oak (Q. velutina), shumard oak (Q. shumardii), blackjack oak (Q. marilandica), post oak (Q. stellata), willow oak (Q. phellos), chinquapin oak (Q. muehlenbergii), black locust (Robinia pseudoacacia), American elm (Ulmus americana), sweetgum (Liquidambar styraciflua), sugar maple (Acer saccharum), red maple (A. rubrum), black hickory (Carya texana), basswood (Tilia americana), eastern redcedar (Juniperus virginiana), holly (Ilex opaca), and basswood (Tilia americana). Understory species include redbud (Cercis canadensis), dogwood (Cornus florida), St. Johnswort (Hypericum densiflorum), low blueberry (Vaccinium vascillans), mock orange (Philadelphus pubescens), early azalea (Rhododendron roseum), gooseberry (Grossularie spp.), bladdernut (Staphylea trifolia), spicebush (Lindera benzoin), wild grape (Vitis spp.), and poison ivy (Rhus radicans).

Grasses which are common to the area include big bluestem (Andropogon gerardi), little bluestem (Andropogon scoparius), switchgrass (Panicum virgatum), Indian grass (Sorghastrum nutans), side-oats grama (Bouteloua curtipendula), and Johnson grass (Sorghum halapense). Forbs common to the area include spiderwort (Tradescantia spp.), buttercups (Ranunculus spp.) wild violets (Viola spp.), fleabane (Elymus spp.), verbena (Verbena spp.), wild delphinium (Delphinium carolinianum), primrose (Oenorthera spp.) and bloodroot (Sanguinaria canadensis).

2-05. Land Use History.

a. Uses of Project Lands Before Acquisition. The area was originally allotted to members of the Choctaw Indian Tribe in tracts of 40 to 160 acres. The river bottomland was cleared and cultivated, being farmed mostly to cotton and corn, and then in later years for hay, corn, and tame pastures.

The hill land was covered with timber and most of the marketable trees were sold to and cut by timber companies. The land was then sold by the Indians or allowed to go for delinquent property taxes. Approximately 90 percent of the land was acquired by Dierks Forests, Inc., and placed in a timber management program of selective cutting and other timber stand improvement practices.

b. Uses of Project Land Since Acquisition.

(1) Wildlife Management. The Oklahoma Department of Wildlife Conservation has obtained a license for 5,420 acres of the project's land to be used for wildlife conservation and management.

The Wildlife Department's general plan for use of the land includes a small camping area of approximately 6 acres in size, a game refuge of about 1,170 acres, and a public hunting area of approximately 4,250 acres.

(2) Public Use. Approximately 3,875 acres are leased to the Oklahoma Tourism and Recreation Department, Division of State Parks, for public park purposes. Present development includes the Carson Creek, Stephens Gap, and River Bend Recreation Areas. Facilities that have been constructed are those which are necessary for access, health, safety, and enhancement of park values for the life of the project.

(3) Project Operations. Project operations and maintenance requires the use of 400 acres of land adjacent to the dam and appurtenant structures.

(4) Primitive and Proposed Public Use Areas. These areas comprise 545 acres of the project's lands. Of this total acreage, 185 acres are in the primitive or limited development areas.

2-06. Acreage Classification by Elevation.

Table I

ACREAGE CLASSIFICATION BY ELEVATION

Feature	Elevation (ft. MSL)	Area (Acres)
Acres above conservation pool	599.5	13,907
Acres above flood pool	627.5	
Acres subject to inundation (flowage easement)		676
Water acreage	599.5	14,200
Total land acres		28,107
Total acreage		28,783

2-07. Present Land Use Classification by Acres.

Table II

PRESENT LAND USE CLASSIFICATION BY ACRES

Area	Acreage
a. Project operations	400
b. Corps of Engineers' public use areas	545
1. Primitive public use areas - - 185 acres	
2. Proposed public use area - - - 360 acres	
c. Park management by others	3,875
1. State	
d. Commercial concessions	0
e. Nonprofit organizations	0
f. Club sites	0
g. Agriculture and grazing leases	0
h. Obligated for wildlife management	
1. Under license to state	5,429
2. "Acres for Wildlife" program	647
i. Nonleased areas	4,587

SECTION III - MANAGEMENT

3-01. Management Objectives. The objectives of the management program are to increase the value of all project lands for recreation and wildlife, and to return the existing forest to a healthy, natural condition. Although the forest will not be managed as commercial timberland, these goals will be attained by cultural practices which will affect plant growth, distribution, shape and condition. No attempt will be undertaken to regiment trees into mechanical conformity with spacing, size arrangement, or species. Vegetation, living or dead, will be removed from the forest areas for disease and/or insect pest control; fire hazard reduction; storm damage; construction of roads, trails, campgrounds, picnic grounds, and firebreaks; safety precautions such as the removal of dangerous dead limbs or trees; vista cutting; and to prevent encroachment of the forest on natural meadows and selected open areas.

3-02. Planting Practices.

a. Trees and Shrubs.

(1) Purchasing Specifications. All plants must conform to the rules of the "American Standards for Nursery Stock" as adopted by the American Association of Nurserymen. They should be free from noxious weeds, root rot, scales, borers, blight, and other insects and diseases.

Balled-and-burlapped plants must be fresh and show no sign of wilting at the time of delivery. They must have a well developed root system with proper balance between root and crown. The ball of soil must be firm and unbroken with the burlap intact and showing not sign of deterioration. The crown must be undamaged.

Bare-root trees and shrubs must be dormant and have a well developed root system with proper balance between root and crown. They must be adequately protected during transit to keep them from drying.

All plants must have been grown within a 300-mile radius of the planting site.

(2) Planting Season. The normal planting season is from 1 March to 1 May and from 1 October to when there is frost in the soil. The plants should not be shipped or planted when the temperature is below freezing. Planting operations should be suspended during exceptionally wet or dry, windy, periods. During exceptionally late seasons the spring planting period may be extended a few days (the bare-root stock must be dormant).

(3) Preplanting Care of Plants.

(a) Bare-Root Plants. Bare-root plants that are not planted the same day they are received from the nursery require special care to protect them against drying and overheating. They may be placed in cold storage or "heeled in."

The cold storage should be maintained at a temperature between 34 degrees F. and 38 degrees F., and humidity between 85 and 90 percent. The plants should not be planted if they show signs of shriveled and dry tops or roots, or if they show signs of growth or mold during storage.

"Heeling in" consists of digging a V-shaped trench about 12 inches deep and spreading the plants along the trench with the tops up and above ground. Then about half of the soil that was removed from the trench is placed over the roots and watered thoroughly. The job is finished by filling in the rest of the soil and firming. The "heeled in" area must be kept moist. If the plants need to be held for only a few days before planting, instead of "heeling in", they may be protected by spreading the plants in a cool place out of the sun and wind and covering the roots with a moist mulching material such as sawdust.

(b) Balled-and-Burlapped Plants. Balled-and-burlapped plants must be properly watered and protected from wind and mechanical damage until planted.

(4) Site Preparation. The work area should be mowed and cleared of any foreign material (boulders, abondoned equipment, fences, etc.) that may interfere with the layout of the planting site or future maintenance operations.

Additional preparation for seedling planting is necessary for proper survival and growth. The degree of preparation depends on the soil type, vegetation cover, and use. Areas with high erosion hazards and heavy use must be seeded to grass prior to planting the seedlings. When planting seedlings in grass, they can be planted in an 18-inch strip scalped to mineral soil. In order to get maximum growth, areas with low erosion hazards may be clean cultivated.

(5) Layout of Planting Site. Professional guidance is essential to interpret the planting design and supervise the placement of the plants. The individual must be familar with the characteristics of the plant materials and their intended function within the landscape.

(6) Planting Techniques for Machine-Planted Bare-Root Seedlings. In planting bare-root seedlings, the roots must be kept moist at all times. Small root hairs can dry out and die in a very few minutes.

Seedlings must be planted at the same depth (indicated by the root-shoot node) as they grew in the nursery. They must be planted tightly enough to resist a firm pull on the stem, and to remove air pockets from the soil.

(7) Planting Techniques for Balled-and-Burlapped and Hand-Planted Bare-Root Plants.

(a) Planting Operations. The hole should be dug sufficiently deep and wide to accommodate the full root system of the tree. The diameter should be at least 1 foot greater and the depth at least 6 inches or more than the mass of the root system. In especially poor soils, the size of the hole should be larger and deeper and the sides should be scarified to remove the glazed surface produced by the digging machine. If the soil that is removed from the hole is not suitable as backfill material, it must be discarded and replaced with good loam soil.

Enough soil should be placed and firmed in the bottom of the hole so that the planted depth of the shrub or tree will be close to the level at which it grew before. Trees that are set too deeply will not flourish and may even die within a few years. Balled-and-burlapped plants should be lifted and carried only by the ball. Lifting by the stem results in many of the small roots being sheared or separated from the soil.

After the balled-and-burlapped plant is set at the proper level in the hole, the twine holding the burlap must be removed and the burlap loosened to prevent ultimate strangulation. The backfill material is firmed by stepping on it as it is placed in the hole. A shallow basin should be constructed around the plant (with the soil removed from the hole) to hold water so that it will soak the soil around the roots.

Bare-root plants require special care in backfilling. The roots must be placed in their natural position. Since the roots of many plants grow downward at a slight angle from the horizontal, it is wise to build a mound of soil at the bottom of the hole. The root crown of the plant can then be set on the top of the mound so that the roots spread out normally over the cone and form close contact with the soil. The soil should be worked gradually around the roots and firmed. Some water may be added to settle the soil and help eliminate air pockets. The tree may be gently raised and lowered to help settle the soil and bring the roots in close contact with the soil.

(b) Pruning. The tops of transplanted deciduous trees must be pruned to compensate for the loss of roots which the tree always suffers no matter how carefully it is transplanted. The amount of pruning depends upon how much of the root system was lost during the move. As much as one-third to one-half of the branches may need to be removed.

Pruning should be confined to the lateral branches in order to maintain the natural shape of the tree. Twigs and buds along the branches and upper portion of the trunk should not be removed since they supply much needed food and, by providing shade, help to reduce scalding of the trunk and branches. To avoid excessive transpiration, plants should be pruned the same day they are planted.

(c) Staking. Most conifers and deciduous trees 6 feet or less in height do not need and should not have support stakes. However, trees having tops that are large in proportion to the root system may be an exception, and many of these can stand alone after thinning up to one-third of the branches or laterals to reduce crown weight and wind resistance. Trees not needing support may require stakes to protect them from maintenance and camping equipment. Three 2- by 2-inch stakes placed at equal distances around the edge of the root ball will suffice. They must be tall enough to be easily seen to prevent tripping and so vehicles will not hit them. Conifers with low limbs do not usually need protective stakes.

Well anchored roots are essential if newly planted trees are to grow with upright trunks. Roots may not grow fast enough to anchor the trees before the top has such dense foliage that the tree moves with the wind and breaks the new roots emerging from the root ball into the surrounding soil. Ties from the three short stakes suggested for protecting tree trunks will provide enough anchorage for the roots. The ties should usually be removed at the end of the first growing season. The stakes may be left to protect the trunk.

Some newly planted trees are not able to stand upright without some support. They should be supported as low on the tree as possible but high enough so that the tree will return to its normal form after deflection. It must be supported at just one level. Usually support stakes should be removed at the end of the first growing season. Thinning the tops will improve their ability to stand alone.

A 2- by 2-inch stake driven about 18 inches into the soil at an angle from the edge of the root ball so that it passes the trunk at the proper height will give adequate support to smaller trees. The trunk must be fastened to the stake in such a manner that the bark will not be injured. The tie material must have a broad surface to minimize rubbing and girdling, be strong enough to provide support, but flexible enough to allow some movement.

Larger trees can be supported by stakes driven vertically into the soil about 6 to 18 inches from the trunk. A wooden crossmember should be nailed to the stakes at the height where support is required. The tree can then be secured to the crossmember in the same manner as described in the preceding paragraph. When using either the single stake or double-stake support, place the supporting member on the windward side of the tree to minimize contact between the trunk and stake.

(d) Wrapping Tree Trunks. The trunk of a transplanted deciduous tree should be wrapped with a specially prepared waterproof paper to prevent sunscald and drying of the bark, and to reduce the possibility of infestation of borers. The wrapping should start 1 inch below the soil line and extend well up in the branches. It can be secured by cotton twine at the top, and then the twine run spirally to

the bottom in the opposite direction to the spiral of the paper and tied at the bottom. The twine should be loose enough to accommodate one season's growth. The wrapping may be removed at the end of the second season.

(e) Rodent Control. Rodent damage can be reduced considerably by mowing an area of about 100 yards around the plantings in late fall. This removes the protective cover so rodents will refrain from moving into the planting site except during extreme winter conditions when regular sources of food are covered by snow.

During winters of heavy snowfall most young trees are subject to damage by rodents such as field mice and rabbits. When planting trees in areas of heavy rodent populations, they may be protected by placing a quarter-inch wire mesh around the trunk. The wire mesh should extend up the trunk at least 12 inches above the normal depth of snow.

(f) Mulching. Mulching with weed-free straw, sand, sawdust, fine wood chips, or similar material is often used to help conserve moisture and to keep the area around newly planted trees free from weed. Some types, especially straw, may need to be worked partially into the soil to prevent it from blowing away. The mulching material should be placed approximately 1 foot away from the base and out to the drip line of the tree. Mulching depths vary from approximately 2 inches up dependent upon material types, their susceptibility to packing and restricting air flow to the soil beneath, and rodent nesting. In addition care should be taken when using relatively fresh (green) materials to prevent the loss of fertilizers and nutrients, to decomposition of the mulch material rather than supplying the trees. Due to its water absorbent qualities, care should be used when peat moss is employed as a mulch material.

(g) Fertilizing. Normally, dry commercial fertilizer should not be applied until new roots are formed. It is best to wait until the end of the first growing season before applying dry fertilizer. Most soils have sufficient available nutrients to supply the plant until the roots are well established. However, if a soil sample analysis shows that the soil is sevely deficient in an essential element, a dilute solution of a balanced chemical fertilizer should be added during the planting operation. In forest plantings, the proper amount of fertilizer may be broadcast over the area and incorporated into the soil by disking or rototilling before planting.

b. Grasses.

(1) Purchasing Specifications. All seeds must comply with the Federal Seed Laws. Samples of seed should be sent to a commercial seed testing laboratory to insure compliance within the law. A certificate as to the kind of seed and its origin must be furnished with each lot of seed tested.

(2) Planting Season. There are two general grass planting seasons: spring, 15 February to 15 March and fall, 15 August to 5 October. The planting seasons may be extended a few days when weather and soil conditions are favorable or when mulch material is used.

(3) Site Preparation. The amount of soil preparation necessary for a satisfactory seedbed depends upon the soil type and cover. Some soils may require little if any tillage while others may require plowing, rototilling, disking, harrowing, and firming with a cultipacker. The soil should be worked to reduce the amount of living weed seeds and roots, and to produce a friable and permeable soil to a depth of at least 2 inches. The soil surface should be firmed prior to planting. All tilling should be done as near the contour as practicable to minimize soil erosion.

(4) Seeding and Fertilizing. The grass seed should be drilled 1/4 to 1/2 inch below the surface after the seedbed is firmed with a roller or cultipacker. All drilling and rolling should be conducted on the contour. Broadcast seeding should be done only when the area is too rough or steep to drill. If the seeding mixture consists of seed with a wide variation in size, the smaller seeds will tend to settle out, resulting in uneven distribution; therefore, the small seeds should be drilled separate from the larger seeds. A denser groundcover can be obtained in heavy use areas by drilling 1/2 of the seeds in one direction and the remaining seed at right angles.

The amount of starter fertilizer required should be determined by a soil sample analysis. Normally, no more than 20 to 50 pounds of nitrogen per acre are needed to get the grass started. If soil tests indicate that large amounts of phosphoric acid, or potash, are needed the fertilizer should be applied and incorporated into the soil prior to drilling.

(5) Mulching. Mulching is often required on critical sites to conserve moisture and to retard soil erosion until the grass becomes established. The mulching material (grass hay or native praire hay) should be placed after seeding and fertilizing have been completed. This material must be free of noxious weed seeds and appreciable quantities of annual grasses or grain seed. The material should be applied in sufficient quantity to form a near continuous, unbroken cover of approximately 1 to 1-1/2 inches in depth. The mulching material must be partially incorporated into the soil with a mulch cutter. The mulch cutter should be adjusted so that it will stabilize the mulching material, but will not punch the seed too deeply into the soil. It should be done on the contour.

On slopes too steep for the mulch cutter, the mulching material can be stabilized by adding a dilute solution of asphalt as it leaves the blower chute of the mulching machine. Apply the asphalt at a rate (approximately 200 gallons per acre) necessary to provide sufficient sticky spots to hold the material in place but offering little resistance to penetration by light, air, or water.

(6) Vegetative Propagation. Bermuda Grass should be vegatively established in order to get strains that are winter hardy. The selected strain is usually planted by sprigging (planting stolons and rhizomes) with a mechanical planter. The sprigs should be planted the same day they are collected. If rapid cover is desired, they should be planted about 20 inches between rows and at a rate of 20 bushels per acre.

In restricted areas, it may be necessary to establish the Bermuda grass by plugging rather than sprigging. Plugging consists of planting small pieces of sod at uniform spacing (usually 12 to 18 inches). Before collecting the plugs, the sod should be mowed off close to the ground. The individual plugs should be planted so that the top of the sod will be slightly below the surface of the surrounding soil after firming.

3-03. Cultural Practices.

a. General. The term "cultural practices" includes all necessary practices needed to assure the continued vigor of planted and naturally occurring plants.

b. Landscape Plantings.

(1) Weed Control. During the establishment stage competition is very critical between desirable trees and weeds for water, light, and nutrients. Even when these elements are available in sufficient quantities to satisfy the needs of the tree as well as the weeds, the competition for space to grow may result in a deformed tree. Weeds also serve as habitat for insects and diseases which may eventually infest the trees, shrubs, and grasses. Futhermore, they may serve as cover for field mice and other rodents. Another problem caused by weeds results when mowing machine operators mow too close to the tree and frequently remove the bark and, often the tree itself.

The adverse effects of weeds can be overcome by hoeing or with the proper use of approved herbicides. Hoeing an area 2 feet out from the trunk removes the competition and aids in conserving moisture, increases aeration to the roots, removes all rodent cover, and increases the permeability of the soil. However, care must be taken to prevent injuring the roots.

Preemergent herbicides may be applied to the planting spot at the time of planting to kill the weed seeds as they germinate. Contact herbicides can be used to kill the weeds once they are established. Most herbicides will kill the tree as well as the weeds, so extreme care must be used in application. The manufacturer's recommendations should always be followed exactly when applying herbicides. Regardless of the method used, care must be taken to prevent mechanical and chemical damage to the plants.

Debarked trees are common in areas where tractor-drawn mowers are used. Most of these injuries can be prevented by using a handmower or small riding mower around the trees so that the larger equipment need not get too close.

(2) Rodent Control. In areas of large rodent populations, damage to the tender bark of young trees can be a serious problem. While rodent repellents give some protection, it is usually well worth the cost to place 1/4-inch wire mesh screening around the trunk of the more expensive plants to assure complete protection. The wire screen should extend at least 12 inches higher than the deepest snow.

Rodent damage can also be reduced considerably by mowing the grass and weeds in late fall. An area of about 100 yards around the planting will suffice. This removes the protective cover for rodents so they will not move into the planting site except during extreme winter conditions when regular sources of food are covered by snow.

(3) Watering. Natural precipitation cannot be relied upon to supply the trees and shrubs with sufficient moisture to carry them through the first season, so additional water is required. The plants require thorough watering every 2 weeks. Since plants absorb the water primarily through the growing tips of the roots, the water must reach the root zone to be effective. To get sufficient penetration it is usually necessary to maintain a berm of soil around the tree to form a shallow basin. The basin will hold the water in place until it can percolate into the soil. The depth of penetration can be checked with a soil auger or probe.

Natural precipitation will normally supply the necessary soil moisture after the first growing season, however, additional water may be required in extended dry periods.

(4) Fertilizing. Woodland trees thrive despite the absence of artificial feeding, but many of our shade and ornamental trees do not grow in such a favorable environment and thus must be fertilized. Compacted soils inhibit good soil aeration, and concrete or other impervious pavements often cover a considerable area that otherwise might be used by the roots as a source of nutrients and water. Heavy sod is a strong competitor with trees for water and food. The effect of undernourishment is usually evident in the gradual decline of the tree's vigor. This decline is hastened by the more serious effects of disease and insect attacks.

Besides the obvious effect of increasing a tree's rate of growth so that it will be effective at an earlier age, the increased vigor resulting from fertilizing will improve a tree's resistance to adverse conditions. Some pests can actually be repelled by a vigorous plant. For example, bark borers may drown in the abundant sap of a vigorous tree. For that reason, borer infestations are usually associated with slow growing trees. In the case of a fungus getting established in a mechanical injury to the bark, a vigorous tree may produce healing tissue faster than the fungus can continue normal development.

On drier sites, water rather than nutrients becomes the main limiting factor in plant growth. In such cases, watering will provide greater results than fertilizing alone. While deciding whether to fertilize trees, one should consider the availability of water, natural soil fertility, desired rate of growth, and adverse conditions affecting the trees.

The usually recommended rate of fertilizing for deciduous trees over 6 inches in diameter is 2 to 4 pounds of a complete fertilizer for each inch of diameter at breast height. A fertilizer with an analysis of 10-8-6 is commonly used. Deciduous trees less than 6 inches in diameter, and conifers, require only one-half this rate. In young trees where fast growth is desired, the larger rate is required. The smaller rate is sufficient in old trees where all that is needed is to maintain their vigor. The fertilizer should be distributed equally in holes 18 inches deep at a 2-foot spacing in an area under the outer two-thirds of the plant's crown. No fertilizer should be placed within 12 inches of the trunk. The area should be thoroughly watered immediately after fertilizing.

(5) Pruning. Large shade trees are pruned principally to preserve their health and to prevent damage to life and property. Broken, dead or diseased branches should be removed to prevent penetration of decay producing fungi. Overlapping branches are removed to prevent rubbing and eventual decay. Branches are removed to prevent the formation of a branch which would be susceptible to wind breakage. Dead, split and broken branches are a constant hazard to life and property. Their removal is probably the most important of all tree maintenance practices.

It is often desirable to spend more time on small trees to improve their appearance. Pruning for appearance should start as soon as the tree has adjusted to its new site. First remove the broken, dead, diseased, and overlapping branches. The first scaffold branch should be on the southwest side of the tree to shade the trunk. Each succeeding scaffold branch is located about one-third the way around the tree and about 20 inches above the preceding branch. By selecting branches with wide crotches, a well-balanced tree with strong branches resistant to wind damage and tree-climbing children can be produced.

Coniferous trees do not require periodic pruning to the extent desirable in deciduous species. The pruning is usually limited to removing dead and broken branches. It may be necessary to remove the lower branches to open vistas and access. Wounds with exposed heartwood should be protected with a tree wound dressing.

When removing a branch from a deciduous or coniferious tree, a clean cut should be made as flush as possible with the branch that is to remain. Dead, diseased, or broken branches should be cut back to a healthy crotch, so that healthy tissue surrounds the final cut. All branches that are too large to be supported by hand should be stub cut to prevent stripping the bark.

The final cut should be as near a vertical ellipse as possible in order to promote rapid healing. Round or heart-shaped cuts should be trimmed to an elliptical shape with a gouge, and protruding lips should be cut off in order to prevent die-back and water pockets. All wounds larger than 1 inch in diameter should be protected with an approved tree wound dressing.

The pruning of shrubs is often desirable in order to increase the bloom, to cause the shrub to conform to a desired form, or to remove old, injured, or abnormal growth.

Flowers on spring-blooming shrubs are usually borne on the vegetative growth formed the previous year, so in order to increase the quantity of bloom, pruning should be done immediately after the flowering period so the plant has an opportunity to form new growth. Late flowering shrubs produce flowers on the current season's growth, so they should be pruned in the dormant season in order to induce vigorous canes. The pruning may be accomplished by entirely removing one-third of the canes each year, thus allowing the young vigorous shoots more chance for development.

When the purpose of pruning is to remove injured, abnormal or otherwise undesirable growth, it should be performed in such a manner that the natural habit of the shrub will not be altered. Occasionally it is necessary to curb a shoot of special vigor in order that it may not destroy the symmetry of the shrub. Such work should not result in an artificial and clipped appearance. The promiscuous heading back of all types of shrubs to a definite outline should be avoided. Undesirable branches can be removed by cutting back to a lateral branch which is growing in the desired direction.

c. Forest Plantings.

(1) Thinning. Unless the density of the forest planting is reduced by natural mortality, thinning will be required to reduce the competition between trees and to break up the formal appearance by producing irregular groups of trees. Once the tree crowns grow together, they begin to compete for light, water, and nutrients, which will result in stunted growth. Removing some of the trees by transplanting or thinning will allow the remaining trees to continue their normal rate of growth. By careful selection of the trees to be removed, one can produce natural appearing groups of trees. The trees that must be removed can be used in landscaping new developments, so the operation may serve a triple function: reduce competition, produce a natural appearing stand of trees, and supply low cost nursery stock.

(2) Weed Control. Weed competition must be controlled until the trees are well established. The weeds within the planting rows are best controlled with herbicides. Preemergent herbicides applied to the planting strip prior to the emergence of the weeds is very effective. Mowing the grass between the planting strips will also reduce competition.

(3) Rodent Control. Rodent repellents may reduce the rodent damage to the seedlings; however, in winters of heavy snowfall when the rodents' normal food supply is covered by snow, they will frequently girdle the trees regardless of the chemical used. Heavy foil gathered around the stem has been found to be fairly effective in protecting the deciduous plants. Providing another source of food, such as alfalfa hay, may lure the rodents away from trees. Rabbit damage would be greatly reduced by allowing public hunting in the park.

(4) Pruning. Pruning may be required on some trees, such as silver maple, which commonly produce multiple sprouts. The pruning should be limited to selecting the best sprout and removing others. Pruning may also be needed on trees which produce multiple sprouts after the original stem is chewed off by rodents. Extensive pruning will be required in those areas where future developments are planned. The guidelines mentioned previously also apply to pruning trees in forest plantings.

(5) Wildlife Planting. Weed competition must be controlled until the trees and shrubs are well established. On medium to heavy soils, the recommended method of control is cultivating with disk, spring-tooth, or rototiller. Cultivation prevents weed competition and helps accumulate soil moisture. Since rabbits do not like to be far from cover, the clean surface will tend to reduce rabbit damage. Care must be taken to prevent mechanical injuries to the trunks or roots of trees and shrubs.

On light soils that tend to blow, it may be necessary to maintain grass or weeds between the rows. Within the rows, weeds can be controlled with preemergent herbicides while mowing can be utilized to reduce the competition between the rows.

3-04. Forest Insects and Diseases.

a. Protection of Forest from Pests.

(1) Borers. The chief borer enemies of trees are the flatheaded apple tree borer (Chrysobothris femorata) and the peach borer (Sanninoldea exitosa). Although these borers cannot be considered major forest pests, they could become serious pests in future landscape plantings where many flowering trees are used. Most borers are the larvae of moths or beetles which gain entrance through wounds and complete their development mostly in trees weakened from other causes. The peach borer attacks most trees of the genus Prunus while the apple tree borer attacks walnuts, hickories, cottonwoods, willows, oaks, elms, sycamores, hawthorns, redbuds, maples, persimmons, and dogwoods, besides trees of the genera Malus and Prunus. A preventive measure is to spray the trunk thoroughly from the ground line to the first limb at monthly intervals with a mixture of 1 gallon of B4-C emulsion with 55 gallons of water.

(2) Wilts. The oak wilt (Endoconidiophora fagacearum) is a virulent disease which brings about premature leaf fall on the oak and then death is caused by a fungus that is spread from tree to tree by insects. The first symptoms usually appear in July. The leaves first become dull or pale green, curl upward and become stiff. They turn yellow or bronze from the apex and margins inward.

(3) Anthracnose. The presence of the dogwood as an abundant understory tree species, makes the spot anthracnose disease (Elsinoe corn) one of considerable importance. The small, reddish brown spots on the leaves and the heavy distortion of flower bracts are symptoms of the disease, which ruins the floral display and weakens the tree. Fungicides are used to control the disease. These are applied just before the tree blooms and are repeated at 10-day intervals for three or four applications.

(4) Webworms. The fall webworm (Hyphantria curea) has two or more overlapping broods with webs that occur in the summer and fall. The species is responsible for heavy damage to the leaves of many broadleaf species of trees. Control involves the usage of pesticides in accordance with the prescribed instructions.

(5) Nectria Canker (Nectria spp.). This is one of the more serious canker diseases of hardwood forests. The cankers may be concentric or target-shaped with bark completely sloughed off exposing the underlying regular ridges of callous tissue in the wood. Control of the disease involves removal of diseased trees.

(6) Strumella Canker (Strumella corynedidea). The canker occurs on many species of oaks, with the red oak group being the most susceptible. The first noticeable symptom is a yellow or yellowish brown discoloration of the bark around the point of infection accompanied by a slight depression or raising of the tissue. The target type results from the formation of successive ridges of callous in opposition to the slow growth of the fungus. These ridges form concentric circles around the base of the dead branch where the infection centers. A slow decay of sapwood takes place beneath the bark. Infected trees and branches must be removed during early stages of the disease, before death, in order to protect the remaining stand.

(7) Root Rot (Fomes spp.). The fungus is widespread as a saprophyte, and is found in dead trees, stumps and cull logs of conifers and hardwoods. The disease attacks trees under stress, causing the crown to thin out before death. Small dirty white outgrowths (conks) occur on the underside of roots and in crotches of the root collar. Recommendations for control are conflicting, but vigorous stands of trees on suitable sites suffer little effects of the disease.

(8) Heart Rot (Polyporus hispidus). It causes a spongy white rot of the heartwood in ash and oak trees. The decayed heartwood is usually in the upper portion of the trunk. In the incipient stage the heartwood appears slightly bleached and in the advanced stage it is reduced to a soft spongy yellowish or whitish mass. Conks usually appear on the upper portion of the trunk, issuing from branch stubs, frost cracks, or other wounds.

(9) Heart Rot (Poria spiculosa). This causes white trunk rot and cankers around old branch stubs on oaks and hickories.

(10) Red-Headed Pine Sawfly (Neodiprion lacontei). The larvea of these sawflies are injurious defoliators of young pine trees. The larvae has a cream-colored body with several rows of black spots and a reddish-brown head. Control of sawfly larvae is not economically feasible.

(11) Pine Webworm (Tetralopha robustella). The brownish caterpillar, which is the larva of an adult moth, forms a mass of webbing and frass at the terminal shoot of the trees. Control involves the usage of pesticides as prescribed by instruction.

(12) Nantucket Pine Tip Moth (Rhyacionia frustrana). These moths are a serious threat to young pines. The adult female deposits her eggs on the tips of young trees. After the eggs are hatched, the tiny pale-brown larvae mine the buds or needles and curtail expanding growth.

(13) Bark Beetle (Scolytus spp.). The Scolytids are small cylindrical beetles, rarely over 5 or 8 mm. in length and are usually brownish or black in color. Both adults and larvae live beneath the bark of trees, mining on the surface of the wood but not entering it. The adults enter through the bark and excavate a characteristic gallery or group of galleries in which the eggs are laid. Trees can be killed either by the girdling action of larvae and beetles or by secondary pests (fungus) carried by the beetles.

(14) Two-lined Chestnut Borers (Agrilas bilineatus). The chestnut borer attacks chestnuts and oaks. The adult of this group is metallic colored, hard bodied and compactly built. The female deposits her eggs on the trunk and larger branches of the host tree. After hatching, the young larvae bore directly through the bark to the phloem. They tunnel transversely between the bark and wood, and promptly girdle the infested portion of the trunk or branch and may, if present in sufficient numbers, kill a large tree.

(15) Oak Leaf Miner (Baliosus). These beetles are wedge-shaped, reddish to dark brown and nearly 1/4-inch long. Their destructive acts involve the skeletonizing and mining of leaves.

(16) Dutch Elm Disease. This disease is caused by the fungus (Ceratocystus ulmi) which causes wilting, yellowing, dying, and dropping of leaves. An affected tree may die within weeks or decline gradually before it succumbs. Two insects, the smaller European elm bark beetle (Scolytus multistriatus) and the native elm bark beetle (Hydlurgopinus rufipes), are the primary sources of disease transmission. Control involves the removal of diseased trees.

(17) Littleleaf Disease. This disease affects mainly shortleaf pine, but is also found on loblolly pine. The yellowed, shortened, tuffed foliage is a result of a nitrogen deficiency which develops because large numbers of fine roots are killed by the parasitic root fungus (Phytophthora cinnamonia). The fungus is excessively damaging to tree roots only on soils with poor subsoil drainage. Infested pines should be removed.

(18) Needle Cast (Several fungi). This disease attacks conifers, (pines, spruces, firs, and cedars), causing partial but heavy defoliation of trees. Defoliation is rarely severe enough to kill except for the young seedlings. The most conspicuous symptom is a red or brown discoloration of the foliage in an irregular pattern. In most cases control measures would not be economically justifiable.

(19) Pine Needle Rust (Coleosporium spp.). Pine needle rusts are small orange-colored blisters filled with spores on the lower portion of the tree. Some rusts have an alternate stage on various composites, particularly asters and goldenrod. They do not present a serious enough problem to warrant control measures under forest conditions.

(20) Southern Pine Beetle. This insect (Dendroctonus frontalis) attacks mainly the middle and upper trunks of all species of pines. The tree does not have to be in a weakened condition to be attacked. Control measures consist of cutting the infested trees. Protection of a stand from fire reduces the susceptibility of attack (at the present time, this insect is not in this general area).

(21) Ips Engraver Beetle (Ips spp.). This insect attacks all pine species but usually those trees that have been weakened by fire, drought or other adverse growing conditions. Control measures are similar to those for the Southern Pine Beetle.

3-05. Management Types. To provide maximum public benefits and to conserve and utilize recreational resources, the project lands have been classified for public and operational use as follows: (See exhibit A.)

Project Operations. Land that has been allocated to provide for safe, efficient operation of the project and for those authorized purposes other than recreation and fish and wildlife management.

Recreation - Intensive Use. Land that has been allocated for use as developed public use areas and for intensive recreational activities by the visiting public.

Natural Areas. Land that has been allocated for the preservation of ecological, historical, archaeological or visual values.

Reserve Forestland. Land that has been allocated for implementation of management objectives not compatible with sustained yield based on established forest practices.

Wildlife Management. Land that has been allocated as habitat for fish and wildlife or for propagation of such species.

Recreation - Low Density Use. Land that has been allocated for low density recreational activities by the visiting public.

3-06. Individual Unit Work Plan:

a. Project Operations:

(1) General. The project operations area includes those lands necessary for the project building and grounds, the overlook, storage yard, the embankment of the dam, outlet channel, and dikes and levees constructed in conjunction with the project. The terrain of the 400-acre site is moderate to steeply sloping and supports a moderate growth of shortleaf pine, sweetgum, post oak, holly, white oak, and hickory.

(2) Management. Overall objectives include opening the existing stand of timber to stimulate the production of seed; providing or developing an intimate mixture of trees of all ages and sizes so there will be no continuous ceiling of foliage; renewing of vanishing game habitat; and, the maintenance of maximum productivity of the site.

b. Recreation - Intensive Use.

(1) General. Access and facilities for safe and healthful public use have been assured by the establishment of several public use areas around the lake. The State of Oklahoma has approximately 3,900 acres leased for park management purposes, which is divided into five separate park areas. The Corps of Engineers maintains two primitive camping areas and one small family camping and picnicking area, with two additional areas planned for the future.

(2) Specific Areas.

(a) Reregulation Dam Area. This small 20-acre recreation area is located along the west bank of the Mountain Fork River, approximately 3 miles downstream from the main dam and extends downstream from the reregulation dam to the limits of Government-owned property. The area is 50 percent wooded with elm, holly, willow oak, and white oak the predominant species. The area is accessible by gravel surfaced roads off State Highway 70. Facilities in the area include individual camping and picnic sites and sanitary facilities.

(b) Holly Creek Cove. This 180-acre area is located on the west shore of the lake between Holly Creek and Gar Creek. The area is developed for primitive camping only at this time, with no facilities other than chemical type toilets. The vegetative cover consists of shortleaf and loblolly pine, holly, St. Johnswort, redbud, dogwood, and white oak. Access into the area is provided by gravel roads off US Highway 259.

(c) Panther Creek. This small primitive camping area is located on the west bank of the Mountain Fork River and is accessible by an unimproved road off US Highway 259. The only facility in the area is a small boat launching ramp. Vegetative cover consists of a dense stand of white oak, shortleaf pine, holly, dogwood, redbud, St. Johnswort, and numerous wildflowers.

(d) Future Areas.

1 Egypt Creek. This 160-acre area is situated on the east shore of the lake between Five Mile Hollow and Egypt Creek. Access will be provided by county roads from US Highway 70. The area has extreme slopes and is densely forested with oaks and pines. A basic development plan has been prepared for the area; however, implementation will be dependent upon the willingness of a non-Federal agency to cooperate in a cost-sharing agreement.

2 Biggam Creek Core. This proposed 200-acre public use area is located on the east shore of the lake about 3 miles northeast of the dam. Access will be from US Highway 70 over county roads. The moderately sloped area is heavily forested with oak and pine. The basic development plan for the area will be implemented only upon cost-sharing agreement with a non-Federal agency.

(e) State Parks. The entire State lease area, which is collectively known as Beaver's Bend State Park, is divided into the following areas:

1 Carson Creek Area. This 537-acre area is located on the west shore of the lake on a peninsula formed by the confluence of Cedar Creek and Carson Creek, and is accessible by a bituminous surfaced road off US Highway 259. The moderate to steeply sloping area is approximately 50 percent wooded with shortleaf pine, loblolly pine, white oak, and dogwood being the predominant species. The area is developed with individual camping and picnic sites, trailer sanitary stations potable water, showers, launching ramps, restroom facilities, electrical hookups, and playground facilities.

2 Riverbend Park. This area is located within a horseshoe bend of the river just below the dam. The gently sloping area is 90 percent wooded with shortleaf pine, loblolly pine, white oak, red oak, sweetgum, black hickory, redbud, and dogwood. The largest white oak

tree in Oklahoma is located within the park near the entrance of the Big Oak Nature Trail. The tree is 107 feet tall and 21 feet in circumference. Recreational facilities in the area include individual and group campsites, potable water, a swimming pool, showers, trailer sanitary station, restroom facilities, and a playground. Access into the area is by bituminous surfaced road off Highway 259A.

3 Cedar Creek Area. The Cedar Creek area is zoned for public use, but is not developed at this time and is used only for a primitive camping area. An 18-hole golf course is being constructed in the area. The area is located on the north shore of Cedar Creek on the west side of the lake and is accessible by bituminous surfaced road off US Highway 259. The area is densely wooded with pines and hardwoods.

4 Beaver's Bend Area. This area is located directly south of the River Bend area and is accessible by Highway 259A. The gently sloping area is densely wooded with shortleaf pine, loblolly pine, white oak, willow oak, red oak, and dogwood. Facilities include individual and group camping and picnic sites, potable water, sanitary facilities, a small grocery store, and overnight lodging facilities in the form of housekeeping cabins.

5 Stephens Gap Area. These 736 acres are situated on the west shore of the lake between Stephens Gap Creek and Carson Creek, and are accessible by bituminous surfaced road off US Highway 259. The steeply sloping terrain supports a dense stand of shortleaf pine, loblolly pine, white oak, holly, dogwood, and red oak. The area is highly developed with modern camping and picnic areas with potable water, swimming beach, vault-type toilets, trailer sanitary stations, showers, and electrical hookups. Also available in the area is a fishing pier, playground facilities and a commercial marina with boat storage slips, rental boats, repair shop, snack bar, and other services.

c. Management. All construction, development and maintenance work performed by a lessee within a public park will be in accordance with an approved General Development Plan. A lease for public park and recreational purposes will preclude the cutting of timber to: (1) the extent necessary to provide for construction and development of each specific site for its planned use; (2) meeting requirements for access, safety, beauty, sunlight and air circulation; (3) opening vistas for scenic views; and (4) controlling destructive forest pest conditions. The lease will require the lessee to landscape all structures suitable for treatment in accordance with plans approved by the District Engineer. It will also require the lessee to protect the property from fire and soil erosion and to promptly repair or replace, to the satisfaction of the District Engineer, any property that is destroyed or damaged incident to the exercise of the privileges granted by the lease.

The areas developed by the Corps of Engineers will be managed in a manner which will maintain or improve aesthetic values and will develop a habitat to sustain optimum or increased wildlife populations. In public use areas all construction, development and maintenance activities will be subtly integrated into the landscape so that they will attract little attention to themselves. Thinning, harvesting or clearing of vegetative cover will be limited to the extent necessary for the development of each specific site for its planned use. No other vegetation, living or dead, will be removed unless there is sound justification such as: removal of diseased or insect infested trees; reduction of fire hazards; or, safety precautions.

Outside the immediate area of visitor concentration, management is to follow accepted conservation practices. Manipulation of the existing forest will include the removal of trees which are overtopping or otherwise interfering with more desirable species. Although competition is necessary to encourage trees to grow higher for sunlight, too much competition results in reduced growth. Also, if the canopy is dense enough to reduce light intensity below 20 percent of full sun, few species of grasses, forbs, and woody plants are tolerant enough to survive.

The selection of trees to be retained should be based on the basis of site adaptability, vigor, form, foliage, longevity and susceptibility to adverse conditions. Poorly formed and hollow trees, though they have no market value, contribute to wildlife habitat and should not be removed as long as they are not suppressing a tree of greater value.

Manmade openings, created to influence composition, growth and vigor, will blend in continuity of form, line, color and texture to the natural landscape.

Considering the abundance of natural vegetation within the Corps-managed primitive camping areas, no supplemental plantings are proposed at this time. Since introduction of supplemental plantings often gives an appearance of artificiality to an area, management and protection of existing trees and shrubs will be the best policy in a generally undeveloped primitive camping area.

d. Wildlife Management Area.

(1) General. This area, leased to the Oklahoma Department of Wildlife conservation, totals approximately 5,400 acres of the project lands. Its moderately steep to steeply sloping mountainous terrain is densely forested with pine and hardwoods. Predominant species include bald cypress, shortleaf pine, water oak, white oak, sweetgum, hickory, ash, sycamore, maple, hackberry, cherry, and elm.

(2) Management. The great management plan proposed by the state emphasizes the manipulation of the native vegetation by creating small forest openings and the initiation of a crown cover removal program. The measures are to be undertaken to create forest edge effects and increased understory vegetation which will produce a combination of food producing plants and resting area for all forest animals.

Management practices that are virtually eliminated from the area are: Cultivation for game food since the shallow soils are subject to severe erosion when disturbed; and the grazing of domestic livestock inasmuch as the carrying capacity (grass) is very low.

The habitat management practices will be coordinated to maintain the area in a semiwilderness state.

e. Reserved Forest Land.

(1) General. The remainder of the land around Broken Bow Lake could be placed in this category. The vegetative cover consists of an oak-pine forest with considerable amounts of good quality shortleaf pine and loblolly pine. Most of the land area adjacent to this land management type is owned by a major forest products company. The land is being harvested on a clear-cut rotation basis. Although the clear-cut areas are replanted to seedlings, erosion on extreme slopes is often a problem.

(2) Management. Although the pines and hardwoods on Government property are of commercial value, no provisions are being made to market the existing timber. It is felt that the natural vegetation around the lake is more valuable as a filtration strip between the commercial timberland and the lake.

Woodlands will be managed in a manner which will result in the improvement of aesthetic values and the development of a habitat to sustain optimum or increased wildlife populations. To promote or to preserve the natural forest conditions, there is no justification for using the cultural practices of thinning, pruning or release cutting for stand improvement as applied to commercial forest. Vegetation, living or dead will not be removed unless there is sound justification such as the removal of diseased or insect-infested trees, fire hazard reduction; safety precautionary measures where human life and/or property are menaced; prevention of encroachment of the forest on natural meadows; and, the provision of openings, if they do not exist, to promote the reproduction of food and low-growing cover for wild species loafing and nesting sites.

3-07. Archaeological Preservation.

a. General. There are 62 archaeological sites within the project area of Broken Bow Lake. Salvage activities resulting from construction of the project have provided data for a number of archaeological publications which give us a better understanding of human prehistory in southeast Oklahoma. The sites are generally in forested, valley regions near tributary creeks to the lake.

b. Management. Although these areas are located within the previously listed management areas, protection of these sites will be accomplished in accordance with Tulsa District Regulation 870-1-2, Cultural Resource Management Program, which sets forth guidelines for the preservation and protection of cultural resources.

In the implementation of the Forest and Range Management Plan, utmost caution will be used during any activity to avoid alteration or destruction of any archaeological site. Prior to any earthmoving activity, a reconnaissance will be made of the affected area to determine the impact, and if results are positive work will be curtailed. If during any activity, archaeological materials are encountered, the work will be stopped immediately. Surface materials will be collected, catalogued, and reported to the District Office, and the area will be protected from future disturbances.

Reports of any incidents of man-induced or natural adverse effects on cultural areas such as vandalism ("pot hunting"), or shoreline erosion, should be submitted to the Cultural Resources coordinator for the project, who will forward the information to the Environmental Resources Section, Tulsa District Office. No effort will be made to increase accessability into areas of known archaeological sites as this would only increase the incidence of both vandalism and nonprofessional examination.

SECTION IV - BUDGET AND PERSONNEL REQUIREMENTS

4-01. General. Since supplemental plantings are not proposed for Corps managed areas on the Broken Bow project, a formal budget for forest management on the project will not be submitted. Protection of the natural vegetation from exploitation by man is a primary duty for the park management staff at the project and does not require a separate budget. However, specific management practices mentioned in this text or correction of future forest management problems may be conducted through existent funding.

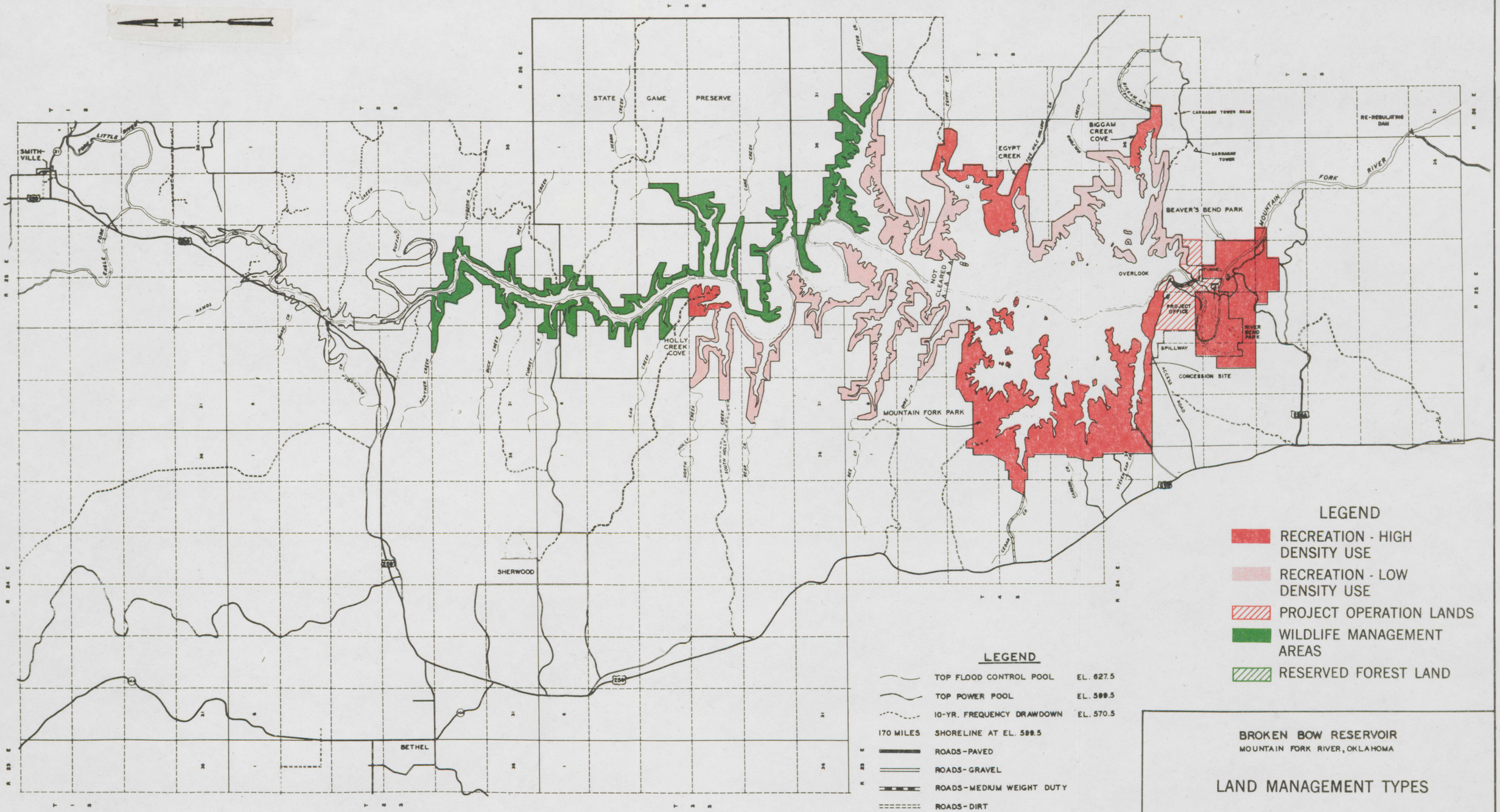
4-02. Ranger Activities. Resource Ranger activities are designed to protect and preserve the Government land in its natural condition and to serve the visiting public. If the project does not have a ranger on the staff, his duties are undertaken by the Park Manager and other personnel. Land activities include, but are not limited to, inspection of leases, licenses, and permits; construction by private individuals; and recreational facilities. Project personnel also patrol the project lands for the purpose of detecting encroachments, unauthorized use, construction, vandalism, fires, pollution problems, and theft. They promote good public relations by responding to inquiries relating to available recreation facilities and the history of the project. Personnel also distribute pamphlets, brochures, and maps pertaining to the project and gather data for many recreational reports. Water activities include patrolling the lake area to enforce rules and regulations; promoting water safety by furnishing safety regulations and advising as to the hazards of the lake; and giving information regarding State and Federal regulations relating to fishing and hunting.

SECTION V - DISPOSAL PLAN

5-01. General. Land management types which are to be leased shall be leased in accordance with the management prescription for individual areas. The execution of the lease shall be through the Real Estate Division.

EXHIBIT A

LAND MANAGEMENT TYPES



LEGEND

- TOP FLOOD CONTROL POOL EL. 627.5
- TOP POWER POOL EL. 599.5
- 10-YR. FREQUENCY DRAWDOWN EL. 570.5
- 170 MILES SHORELINE AT EL. 599.5
- ROADS-PAVED
- ROADS-GRAVEL
- ROADS-MEDIUM WEIGHT DUTY
- ROADS-DIRT
- PROPOSED ACCESS ROAD
- PRIORITY I-PUBLIC USE AREAS
- PRIORITY I-WILDLIFE CONSERVATION AREAS

LEGEND

- RECREATION - HIGH DENSITY USE
- RECREATION - LOW DENSITY USE
- PROJECT OPERATION LANDS
- WILDLIFE MANAGEMENT AREAS
- RESERVED FOREST LAND

BROKEN BOW RESERVOIR

MOUNTAIN FORK RIVER, OKLAHOMA

LAND MANAGEMENT TYPES

SCALE OF MILES
1/2 0 1

U.S. ARMY ENGINEER DISTRICT, TULSA, CORPS OF ENGINEERS 1975

9

SWDCO-R (SWTED-DA 9 Jun 75) 1st Ind
SUBJECT: Broken Bow Lake, Mountain Fork River, Okla., Appendix C, Fire Prevention Plan, to DM No. 4B, Master Plan

DA, Southwestern Division, Corps of Engineers, Main Tower Building, 1200 Main Street, Dallas, TX 75202 14 JUL 1975

TO: District Engineer, Tulsa, ATTN: SWTED-DA

1. Appendix C, Fire Protection Plan to Design Memorandum No. 4B for Broken Bow Lake, is approved subject to the following comments or inclusions, whichever is appropriate:

a. Paragraph 2-05. The paragraph should be expanded to give a recent history of fires experienced and acreage burned, by year.

b. Paragraph 3-02. Those individuals who would serve as fire boss, dispatcher, and crew boss should be definitely designated, by position, to facilitate training opportunities and to avoid confusion at the time of a fire.

c. Paragraph 3-03. Training for the crew boss should be listed.

d. Paragraph 3-04a. Discussion in paragraph 6-02b indicates mechanized equipment would be used to plow lines, yet list does not contain equipment with which line construction is practicable. The equipment which will be so used should be added to the list.

e. Paragraph 3-04b. Cooperative agreements with Federal, state, or local agencies should be listed and copies of the agreement should be furnished. If such agreements don't exist, any efforts toward this end should be discussed.

2. This appendix should be reviewed and updated annually. Minor pen and ink changes can be approved by the District. This plan should be completely reevaluated and submitted for approval every five years from the date of this indorsement.

FOR THE DIVISION ENGINEER:

Geo. W. Staples.

GEORGE W. STAPLES
Chief, Construction-
Operations Division

1 Incl
wd all cys

CF: w/incl
HQDA (DAEN-CWO-R) 2 cys

WES

DEPARTMENT OF THE ARMY
TULSA DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 61
TULSA, OKLAHOMA 74102

9

SWTED-DA

9 June 1975

SUBJECT: Broken Bow Lake, Mountain Fork River, Okla., Appendix C, Fire Prevention Plan, to DM No. 4B, Master Plan

Division Engineer, Southwestern
ATTN: SWDCO-OR

Subject appendix (Incl 1) is submitted for review and approval in accordance with ER 1130-2-400.

FOR THE DISTRICT ENGINEER:

B. J. Bishop

1 Incl (7 cys)
as

B. J. BISHOP
Chief, Operations Division

30 copies prepared

BROKEN BOW LAKE
MOUNTAIN FORK RIVER, OKLAHOMA

APPENDIX C
FIRE PREVENTION PLAN
TO
DESIGN MEMORANDUM NO. 4B
MASTER PLAN

DEPARTMENT OF THE ARMY
TULSA DISTRICT CORPS OF ENGINEERS
OKLAHOMA
JUNE 1975

BROKEN BOW LAKE
MOUNTAIN FORK RIVER, OKLAHOMA

APPENDIX C
FIRE PREVENTION PLAN
TO
DESIGN MEMORANDUM NO. 4B
MASTER PLAN

TABLE OF CONTENTS

TABLE OF CONTENTS (CON.)

TABLE INDEX

BROKEN BOW LAKE
MOUNTAIN FORK RIVER, OKLAHOMA

APPENDIX C
FIRE PREVENTION PLAN
TO
DESIGN MEMORANDUM NO. 4B
MASTER PLAN

I - INTRODUCTION

1-01. Purpose. - The purpose of this Fire Prevention Plan is to establish policies, equipment, specific action, and manning guides and to train personnel in the prevention, detection, and suppression of woodland and range fires on fee lands administered by the Corps of Engineers.

1-02. Authority. - This Fire Prevention Plan is prepared in accordance with the requirements of ER 1130-2-400, 28 May 1971, and changes 1, 2, and 3, dated 1 December 1971, 23 December 1971, and 23 December 1972, respectively.

1-03. Master Plan. - This appendix is a part of the Master Plan for the development and management for Broken Bow Lake, Mountain Fork River, Oklahoma.

II - PROJECT DESCRIPTION

2-01. General. - There are 13,907 acres of land subject to fire protection measures by the Corps of Engineers at Broken Bow Lake. The area is generally mountainous consisting of narrow valleys and sharp to rolling ridges bounded by steep to moderately steep slopes. The area is predominantly forest and woodland pasture.

2-02. Forest. - Forested areas surrounding the lake are characteristic of the oak-pine type. The principal species are: shortleaf pine, loblolly pine, white oak, blackjack oak, post oak, shumard oak, willow oak, black locust, black hickory, basswood, eastern red cedar, and sugar maple. Some of the more common herbs and shrubs are huckleberry, mock orange, early azalea, gooseberry, bladder nut, and spice bush.

2-03. Grasslands. - The grasslands are limited and mainly wood pasture with native grasses consisting of big bluestem, little bluestem, switchgrass, Indian grass, sideoats grama, and Johnson grass.

2-04. Fuel composition. - Most areas support a heavy tree cover. The understory consists of woody brush and sparse growth of native grasses. Vegetative litter accumulations are light to heavy. Wind and ground surface temperatures do not have a great effect upon the vegetative litter except during times of prolonged high temperatures and/or extended periods of little precipitation.

2-05. Fire hazard.

a. Fires in this region may be man-caused and also set from lightning in many instances. Lighted cigarettes thrown from vehicles and brush fires which escape control are the leading cause of fires, but not necessarily in this order.

b. The possibilities of fire are relatively high in the early spring before "green up" and in the late summer and early fall. However, fires may occur anytime in the year when the vegetation is dry.

2-06. Risk areas. - The public-use areas are the highest risk areas because of the large numbers of people who visit them. Outside the public-use areas, the risk varies in proportion with the number of people who come in contact with the site. The damage from wildfires on these areas is less significant than in a public-use area. The lands, nonetheless, are subject to tangible damages such as injury to young growth, soils, wildlife habitat, forage, and loss in recreational value. There is also a definite reduction in vitality of the remaining vegetation on the burned site; i.e.,

reduced vigor of many individual plants due to a reduction of food reserves; increased incidence of insect and disease infestation due to the susceptiveness of weakened plants and the ease of entrance through fire scars. Intangible or indirect losses include the deterioration of the site and the effects from runoff water soil erosion and streamflow.

III - ORGANIZATION AND TRAINING

3-01. General.

a. Considering the dispersed activities of the Corps personnel, it is likely that a fire on Corps land could do considerable damage before control equipment could arrive. It is necessary to maintain and equip a highly mobile well-trained organization.

b. The project fire organization will consist of the personnel attached to the office of the park manager. This consists of the park manager, park rangers, and the operation and maintenance workers.

c. A chart of the fire control organization is as follows:

DISPATCHER

FIRE BOSS

CREW BOSS LINE CREW

3-02. Personnel and duties.

a. Dispatcher. - The dispatcher may be a park ranger or other designee. His duties will include:

(1) The dispatchment of men and equipment efficiently and to provide communications with:

(a) Fire detectors (rangers, police, public, etc.)

(b) Initial attack forces

(c) Fire fighting ground command post

(d) Other facilities (city fire department, police, Corps projects, etc.)

(e) Centers for information (schools, towns, factories, etc.)

(f) Adjoining protection agencies (U.S. Forest Service, State Forestry Service)

(2) Assisting in the preparation and maintenance of a fire map showing existing roads, proposed roads, fire lanes, and

water replenishing stations. Each road's name, length, termination point, and time required to travel from one point (project office) to another point must be incorporated into the map.

b. Fire boss. - The fire boss may be the park manager, park ranger, or other designated individual. His duties are to assure prompt, effective fire control action and will include:

(1) Before arrival at fire.

(a) Obtain the best available information on the location of the fire, the forces and equipment being sent, and the current forecasted weather conditions.

(b) On larger fires, travel by a route that will provide a vantage point for sizing up the fire.

(2) On arrival at fire.

(a) Determine the probable spread of the fire.

(b) Notify the dispatcher of the adequacy of the resources assigned to the fire, give an estimate of the fire potential, and the additional resources required.

(c) Inventory and analyze possible environmental damage, both as a result of the fire and of possible fire control strategies.

(d) Prepare a plan of control.

(e) Organize resources according to the plan.

(f) Assign men and equipment on arrival.

(g) Direct and coordinate fire suppression.

(h) Keep dispatcher informed of progress.

(3) On-going fire.

(a) Determine stragety and tactical plan for control. Issue necessary orders to get manpower and equipment.

(b) Brief crew boss concerning the proposed plan of attack.

(c) Check welfare and safety of all personnel and make sure all equipment is secured from danger of fire.

(d) Maintain high level of performance.

c. Crew boss. - The crew boss will be selected by the fire boss from the qualified personnel available at the fire site. His duty is to direct field action to control the fire in accordance with the plan of the fire boss and to see that the work is safely accomplished. He has the latitude to make decisions within the limits of the plan given to him.

d. Line crew members. - The line crew will be selected from the available O&M workers. Their duties include the loading of fire tool boxes, extra backfire torch fuel; the fueling of backfire torches and chain saw, and the filling of water tanks and backpack tanks with water. Other activities are to safely and efficiently attack a fire as trained while utilizing the most appropriate equipment.

3-03. Fire control training. - Each project employee will receive fire control training commensurate with his duties within the fire organization. The resident engineer is responsible for all training. Training materials and assistance are readily available from the Oklahoma Division of Forestry and the U.S. Forest Service. Training materials available consist of films, slide programs, correspondence courses, and assorted literature. Assistance available consists of fire schools and individual presentations. The levels of training are as follows:

a. Fire boss. - A minimum of 12 hours of fire control training will be given annually. The following subjects will be presented.

Fire Preventions	1 hour
Fire Safety	2 hours
Fire Characteristics and Behavior	2 hours
Methods of Attack	2 hours
Use of Hand Tools	1 hour
Use of Power Equipment	4 hours

b. Dispatcher. - A minimum of 3 hours of fire control training will be given annually. The following subjects will be presented.

Emergency Operations	1 hour
Dispatching	1 hour
Communications	1 hour

c. Line crewmen. - A minimum of 5 hours of fire control training will be given annually. The following subjects will be presented.

Fire Safety	2 hours
Fire Characteristics and Behavior	1 hour
Method of Attack	1 hour
Use of Hand Tools	1 hour

Since many members of a fire control organization work alone much of the time, the ability to exercise initiative and assume responsibility and perform routine duties efficiently are qualities that will be developed.

3-04. Fire equipment.

a. Corps of Engineers. - Fire suppression tools and equipment available at the project office are as follows:

1 - Nozzle - Fog or straight stream
4 - Axes
4 - Shovels
4 - McLeod rakes
3 - 5-gallon backpack hand pumps

Additional equipment which is available for fire control is as follows:

2 - Radio-equipped, 1/2-ton, 4x2 pickups
1 - Base radio station - all times
1 - Hand radio - all times
2 - Hand radios - part time
1 - 4x4 1/2-ton pickup
2 - 4x2 1/2-ton pickups
1 - Flat-bed truck
1 - Float-type trailer
2 - 28' pontoon boats
1 - 15' outboard motorboat
1 - Trailer-mounted, 300-gallon spray tank, 35' 3/4" hose, 100-lb. capacity
Fire cashe hoes, rakes, shovels, etc.

b. Cooperating agencies. - In addition to the Corps of Engineers personnel, there are local municipal fire departments which may be called upon if the necessity arises. The fire departments, their capabilities, and limitations are as follows:

(1) The city of Broken Bow, Oklahoma, has one truck which makes rural runs. This service is available on a $100 fee basis.

(2) The city of Idabel, Oklahoma, has two trucks available for rural runs. This service is available on a $100 fee basis.

(3) The Broken Bow unit of forestry under the State Department of Agriculture, Forestry Division, is responsible for the detection and suppression of all wood fires. Detection units include three telephone and radio equipped towers (Carter Mt., Carnesaw and Hee Mt.). Suppression equipment includes two pumper trucks, three dozers with plows, hand tools, and approximately 12 personnel. The forestry unit and the Corps of Engineers personnel maintain a closely coordinated relationship for both fire fighting efforts and continuous training of personnel.

IV - FIRE PREVENTION ACTIVITIES

4-01. General. - The objective is to reduce the number of fires and acres burned to a minimum on Corps land. Major emphasis will be placed on prevention and presuppression through special attention to the following:

a. Public education.

(1) Maps, brochures, and other literature designed for issuance to the public will include information about fire prevention and a place and method for reporting fires.

(2) Fire danger warning signs will be erected at the main entrance to extensively used public-use areas. The signs will be adjusted daily to indicate the degree (low, moderate, high, or extreme) of fire danger.

(3) During seasons of high fire hazard, informal public appearances, radio broadcasts, and articles in local newspapers will be employed to promote and stress fire prevention.

(4) Rangers, covering daily a definite territory, by their mere presence and/or contact with the users of the project will have a deterrent effect in regard to carelessness with fire.

b. Project personnel. - It will be the responsibility of each supervisor to instruct the employees working immediately under his supervision to maintain an effort toward the prevention of fires at all times. Special attention will be given to the following points.

(1) Extinguish, before leaving, any warming fires that may be built in cold weather.

(2) Observance of all "No Smoking" signs when conditions make it necessary that they be posted.

(3) Proper disposal of matches and smoking materials.

(4) Exercise extra care during welding operations.

(5) Project employees will be instructed to be observant of fires on adjacent private property. These fires should be reported to the resident engineer who can take appropriate steps to notify the landowner or other agencies, or take appropriate action to protect Corps property if the rate and direction of spread indicates such danger exists. Cooperation in this manner will help win the support of local landowners.

4-02. Fire laws. - Permissible open burning will be in accordance with the Oklahoma Clean Air Act adopted 9 March 1969, amended 23 January 1972, which restricts or limits burning to:

a. Open fires purposely set for the instruction and training of fire fighting personnel when authorized by the appropriate Government entity.

b. Fires set for the elimination of a fire hazard which cannot be removed by any other means.

c. Fires set for the removal of dangerous or hazardous material where there is no other practical or lawful method of disposal.

d. Campfires or other fires used solely for recreational purposes.

e. Fires purposely set to forest and rangeland for a specific reason in the management of forests or game in accordance with practices recommended by the Oklahoma Department of Wildlife Conservation, the Oklahoma State Department of Agriculture, and the U.S. Forest Service.

f. The burning of trees, brush, grass, and other vegetable matter in the clearing of land and right-of-way maintenance operations, if (a) prevailing winds at the time of burning are away from any city or town, the ambient air of which may be affected by air contaminants from burning, (b) the burning is controlled so that a traffic hazard is not being created as a result of the air contaminants being emitted.

g. The burning of hydrocarbons which are spilled or lost as a result of pipeline breaks or other accidents involving the transportation of such material or which are generated as wastes as the result of oil exploration, development, refining, or processing operation, if the following conditions are met:

(1) The material cannot be practically recovered or otherwise lawfully disposed of in some other manner.

(2) The burning must not be conducted within a city or town or in such proximity thereto that the ambient air of such community or town may be affected by the air contaminants being emitted.

(3) The initial burning may begin only between 3 hours after sunrise and 3 hours before sunset, and additional fuel may not be intentionally added to the fire at times outside the limits stated above.

(4) The burning must be controlled so that a traffic hazard is not being created as the result of the air contaminants being emitted.

4-03. Burning control. - Presuppression activities.

a. Detection of fires. - During normal routine surveillance of the lake area, rangers will make use of all sight points along their routes for the purpose of obtaining the widest views possible to discover fires which may start at a distance from the patrol route.

b. Transportation system. - Trucks will be outfitted in advance with all tools and equipment needed by a fire fighting crew.

c. Fire breaks. - The breaks varying from 6 to 12 feet in width will be cleared down to mineral soil and will receive attention at least once, often two times a year to maintain their effectiveness. Where practical, fire breaks will be constructed at 1/8-mile intervals and at right angles to prevailing wind direction.

d. Tools, equipment, and supplies. - Acquisitions will be made prior to the fire season for all tools, equipment, and supplies likely to be needed in combating fire. They will be provided in such volume as to outfit a crew of the size likely to be available.

e. Personnel. - Fire fighting crews will be limited in size and have less than 10 men to a crew. Each man will have definite duties assigned to him. As a member of a permanent crew, these duties are essentially the same at each fire. The principle is that of fixing the responsibility for given portions of the work.

f. Risk areas. - An up-to-date fire occurrence map will be maintained to aid in detecting problem areas and for determining the probable number and size of fires which occur each year. Problem areas of long standing will bear close scrutiny in the planning processes.

g. Fireproofing. - Campgrounds and heavily used areas will be fireproofed by: Removal of litter and flammable material; construction of fire lanes around the area; providing fireplaces and grates; and felling dead snags in and adjacent to areas of heavy use.

V - FIRE FIGHTING SAFETY

5-01. General. - Since fire fighting is hazardous and is physically tiring, safety is of utmost importance at all times. Proper training in fire fighting techniques and safety factors is a joint responsibility of the fire boss and the Operations Division of the District Office.

a. Personnel.

(1) No worker will be assigned to fire duty if he is obviously overweight or underweight, or if he has a heart, a lung, or other internal defect.

(2) Employees, especially those over 45 years of age, will not be assigned from an appreciably long period of sedentary work directly to strenuous fire fighting, unless they are known to be in reasonably good physical condition.

(3) No fire crew member will be worked continuously for long periods of time without relief. If possible, fire line duties will be rotated to provide equal distribution of difficult work.

b. Clothing and equipment.

(1) Hardhats will be worn by fire fighters working on the fire line.

(2) Fire fighters will have durable, loose fitting, cuffless trousers. The loose fitting clothing affords more protection against burns caused by radiant heat. Long-sleeved shirts are mandatory to protect the arms from heat, sunburn, scratches, and insects.

(3) Gloves will be worn to protect hands and make handwork easier.

(4) All new hand tools will be inspected for defects before being placed in fire fighting service and all fire tools will be inspected at least semiannually to ensure their proper functioning and safe operation.

c. Training.

(1) Workers shall be instructed on area hazards and safe working practices before starting work.

(2) The fire fighters shall understand the crew boss's authority to issue instructions and shall follow such instructions at all times, particularly during emergencies.

(3) Safety in fire fighting shall be the topic of one regular safety meeting to be held before the fire season.

d. First aid.

(1) Firest aid kits will be inspected for proper materials and oxygen tanks checked for proper functioning and a full supply of oxygen.

(2) In the event of an accident requiring professional medical treatment, notify the nearest medical facility that an injured person is enroute, the type of injury involved, and method of transport of the person.

VI - FIRE SUPPRESSION

6-01. General.

a. Upon receiving a report of a fire in the reservoir area or immediately adjacent thereto, the dispatcher or other responsible member of the project personnel will immediately initiate action to direct a crew to the location of the fire.

b. The fire suppression crew, from two to six men in size and under the leadership of a fire boss, will be dispatched by motor vehicle or motorboat. The getaway time from receipt of the report of a fire should not exceed 10 minutes.

c. This crew will take the standard tools and equipment provided for fire fighting to the fire. This equipment is kept together at a designated point so as to be immediately available without the necessity of selection from a general supply storeroom.

d. Immediately upon arrival at a fire, the fire boss in charge will make an inspection of existing conditions and decide on the best method of attack. As soon thereafter as possible, he will determine if additional men will be needed, then a radio request may be made for assistance. In any event, the dispatcher will be kept informed by radio of the progress being made.

e. Upon request for further assistance from a crew at a going fire, the dispatcher at the area office will, as soon as possible, send additional men and equipment.

f. The fire boss will not abandon the fire until it has been completely suppressed, or until he is relieved by some other responsible member of the project fire protection organization.

6-02. Fire fighting tactics. - Fire fighting tactics will vary according to fuel, topography, wind, humidity, and availability of personnel and equipment. The following basic tactics are normally applicable.

a. Small fires (5 acres or less). - If the fuel is light and water is available from tankers or backpacks, the head of the fire will be attacked from inside the burn. On stronger fires, the attack will begin at the heel of the fire. Knock down the flank or one side, cross the head with a fire line, then knock down the opposite flank. The line 2 to 6 feet wide will be the shortest line possible avoiding sharp angles and crooks.

b. Large fires (over 5 acres).

(1) Power equipment. - Mechanical equipment will begin plowing a line from the unloading point near the point of

origin of the fire, along one or both flanks, to the advancing head of the fire. No attempt will be made to hold this line. At the head of the fire, a control line will be developed far enough ahead to permit backfiring to burn an area of 50 or more feet. Equipment will be held at the advance flanks until backfire lines have successfully held the fire.

TABLE 6-1

LIST OF FIRE TOOLS FOR USE WITH MECHANIZED EQUIPMENT

	Crew size		
	6 men	12 men	25 men
Axes, double or single bit	1	2	4
Hooks, brush	1	1	3
Saws, crosscut or power	1	1	1
Shovels, LHRP	1	2	6
Pumps, backpack	2	4	8
Rakes, fire	2	4	8
Torch	1	1	2
Hats, hard	6	12	25

(2) Crews with hand tools and small power equipment. - The fire locator, line cutters with axes, brush hooks, power saws; linemen with rakes, Pulaski hooks, hoes, mattocks; backfiring man; and line-holding crew with backpack pumps, rakes, and shovels follow each other in sequence ahead of the fire, beginning from an anchor point at the flank of the advancing fire head. The line cutting unit will clear an area 6 to 8 feet in width of brush, tall grass, logs, and other debris. The line raking unit develops a line about 2 feet in width. Each man will remove only a part of the material on the ground with one or two strokes of the rake and then move forward. The last man in the crew preceding the backfiring man thus reaches the mineral soil. The crew boss will stay just behind the backfiring man to inspect the line and to control the rate of line firing. The line-holding crew protects the backfire and controls spot fires. When the head fire is under control, the flanks will be controlled in the same way.

TABLE 6-2

LIST OF FIRE TOOLS FOR USE BY HANDLING CREW

	Crew size		
	6 men	12 men	25 men
Axes, double or single bit	1	2	4
Hooks, brush	1	2	4
Saws, crosscut or power	1	1	1
Shovels, LHRP	2	4	8
Rakes, fire	4	8	16
Swatters	4	8	16
Pumps, backpack	2	4	8
Hats, hard	6	12	25

c. Grass fuels. - In tall grass, the same procedures described in (2) above will be used. More lead time will be provided for a grass fire since its rate of spread is high. In low or sparse grass, backfiring may not become necessary. Swatters and water will be used on the fire.

d. Securing the area (mopping-up). - This work consists of going over the area systematically, felling and suppressing fire in all burning snags and putting out completely all smoldering fires. While the mopping-up work is in progress and until it is completed, a patrol will be maintained along the control line. The duties of the patrolman are to find and extinguish any fires which may start across the control line, to improve the fire line when needed, and to put out any burning material inside the fire area which threatens to spread fire.

6-03. Fire reports. - Individual fire reports will be prepared, giving all particulars related to the cause, location, damage, and effectiveness of control of all fires which occur at the project. Fire incident records will be kept to provide as sensitive an indicator as possible of increases or decreases in the number of fires, acreages burned, and geographical locations of fire origins.

VII - ANNUAL ESTIMATED BUDGET

7-01. General.

a. Average annual training cost

Number	Level	Hours training		Total cost
				$
1	Fire boss	12		108.00
1	Dispatcher	3		14.00
2	Fire line	5		43.00
			Cost in wages	165.00
			Instructor cost	200.00
			Total	356.00

b. Fire equipment and maintenance 100.00

c. Suppression cost 200.00

d. Total estimated annual cost 656.00

e. Estimated suppression cost per year per land acre 0.047

VIII - SUMMARY

8-01. Summary. - The fire control plan will serve as a guide for the protection of the project from forest and range fires. Coordination of fire prevention, detection, and suppression with local municipal fire departments and area residents will be the responsibility of the park manager or park ranger. Fire control training for each Corps employee assigned to the project fire organization will be conducted utilizing training materials and assistance from the Oklahoma Division of Forestry and the U.S. Forest Service. Training materials available from these agencies are films, slide programs, correspondence courses, and assorted literature. Powered equipment and hand tools for fire suppression are available and kept in readiness for immediate action. Radio communication will be utilized for increased mobility. Fire suppression activities will be handled primarily by the project fire organization, and local municipal fire crews or area residents, if needed. A continuing program of fire prevention will be conducted utilizing signs, posters, leaflets, and personal contacts with area residents and visitors. In addition, the news media will be used during known or suspected periods of high forest or range fire activity.

VIII - FACILITY LOAD AND OTHER DESIGN CRITERIA

8-01. Siting. - The existing facilities were placed and the proposed facilities will be placed in accordance with criteria contained in EM 1110-2-400, Recreational Planning and Design Criteria, dated 1 September 1971, and changes thereto. Where existing areas are improved or expanded the new facilities will be placed along existing roads where possible in order to keep the construction costs as low as possible.

8-02. Water system. - The criteria for selecting a water supply system for public use areas are contained in EM 1110-2-4201, dated 16 February 1970, and ER 1110-2-400, dated 7 July 1972. Bacteriological testing of water sources within the public use areas shall be tested in accordance with ER 1130-2-407. Water requirements by facility are shown in Table 8-1.

TABLE 8-1
WATER REQUIRED FOR A FACILITY WITHIN A RECREATION AREA

Facility	Demand (g.p.h.)
Hydrant - Picnic area	250
Hydrant - camp area	400
Waterborne toilet	148
with shower, add	178
with washhouse, add	150
Changehouse with shower, add	150

The demand period for Table 8-1 varies as follows:

Heavy use	- 12 hours per day
Light use	- 8 hours per day
Showers and washhouse	- 6 hours per day

8-03. Sewage collection and treatment system.

a. Existing. - Public recreation areas are operated by State and Corps agencies, each being responsible for disposal of sewage from their respective areas. In areas developed by the State, sewage is disposed of into total-retention lagoons located in the vicinity. Removal of sewage from Corps-operated public recreation areas having vault-type toilets is done by commercial contractors who deposit the sewage into a State-approved sewage treatment plant off the project lands. Sewage generated from Corps-operated waterborne facilities is treated in septic tanks with lateral field or sewage lagoons.

b. Proposed. - Both vault-type and waterborne facilities will be used in the proposed expansion and improvement of the existing facilities. All treatment facilities will be in accordance with criteria of Federal and State pollution control and health agencies. Treatment will be in septic tanks and total retention multi-celled oxidation ponds. Flows from the waterborne facilities will be based on data for public parks as presented in Public Health Service Publication No. 526, "Manual of Septic Tank Practice." Hours of daily, weekly, and monthly usage will be based on the estimates of peak conditions. Hydraulic loading will be based on that of the six warm months, and above flow data. Sewage inflow during the winter months is considered to be insignificant. BOD of waterborne toilet flows is assumed to be 0.003 lbs/1 gallon; 0.0017 lbs/gallon for shower and toilet buildings with a BOD reduction of 25 percent in septic tanks (references: Sewage and Sewage Treatment - Hardenberg; Water Quality Engineering - Eckenfelder; TM 5-814-3; and TM 5-184-8). Allowable ponds loading to be 30 lbs/acre/day at normal operating depth. Small aerators (compressed air units), operated intermittently by automatic timers and requiring a minimal electrical consumption, will be installed in proposed vault-type toilets. This will aid in the elimination of odors and help produce a more treatable sewage after it is pumped from the vaults. Where it is economically and environmentally feasible, consideration will be given to the implementation of land treatment for waste water. The sewage disposal systems will be coordinated with the Oklahoma State Department of Health and the Environmental Protection Agency during the preparation of contract plans and specification.

8-04. Roads. - The proposed recreation roads at Broken Bow Lake will be constructed in accordance with multiple letter SWDED-TG/SWED-F/SWED-E dated 16 September 1975, Subject: Criteria for Design of Recreation Roads, Civil Works Projects. The alignments and profiles will be determined following the guidance of ER 1110-2-400 and the above referenced multiple letter. The drainage structures on access roads will be sized to discharge a 10-year frequency runoff while those on the circulation roads will be sized to discharge a five-year frequency runoff. Roadway classifications for proposed roads are shown in Table 8-2.

TABLE 8-2
ROADWAY CLASSIFICATION

Use	Lanes	Maximum speed	Lane width (feet)	Shoulder width (feet)	Total roadway (lane + shoulders) (feet)
Access	2	45	10	3	26
Circulation Loops					
Two-way camp and Picnic	2	25	10	3	26
One-way camp	1	15	10	2	14
One-way picnic	1	15	10	2	14
Trailer sanitary station	1	--	10	2	14
Camp pull out	1	--	12		--
Picnic pull out	1	--	10		--

8-05. Parking areas. - The materials used in construction and maintenance of the roads are equally applicable to the parking areas adjoining these roads. The treatment of the paving section of the parking area is the same as the adjoining roadway. The depth of a car and trailer parking space is 40 feet. The width of a parking space will be 10 feet. Curbing will be used to control traffic flow in looping parking areas.

8-06. Boat ramp. - The design criteria established in SWDPL-R/ SWDED-T multiple-addressed letter, dated 15 December 1970, subject: Standard Plans, Boat Launching Ramp - SWD, will be followed. The maximum grade on the boat ramp will be 16 percent and the minimum will be 12 percent.

8-07. Picnic units. - There are no picnic units in the Corps areas and no additional picnicking facilities are proposed.

8-08. Camping unit. - An existing camp unit includes one car and trailer parking space, a fire ring, a trash receptacle, a cooker, and a table. Proposed camp units include one car and trailer parking space, a tent pad, a picnic table, a pedestal cooker, a lantern stand, a fire ring, a utility table, and a trash receptacle. Each of the camp units will be placed and constructed to minimize the effects on the terrain.

8-09. Swimming beaches. - Bacteriological sampling of lake water within the boundary of designated swimming areas shall be tested in accordance with SWDR 1130-2-9. Beaches and designated swimming areas are sized based upon EM 1110-2-400. It is assumed that 55 percent of the public use area visitors will use this facility. A turnover factor of 3 is used in the load calculation. The beach(sand and turf) area is sized assuming that 60 percent of the facility users are sunbathing while 30 percent of the facility users are in the water. The remaining 10 percent are elsewhere. Under ideal conditions, 50 square feet per person of sand or turf is desirable for sunbathing, and 30 square feet per person for swimming area inside a buoyed safety zone. The maximum grade on the beach will be 4 to 5 percent. The parking area will be separated from the beach and swimming area by a vegetation buffer.

8-10. Shelters, comfort stations, interpretative and nature centers, bathhouses, and other buildings. - The criteria for various shelters and other project buildings is given in EM 1110-2-400. In the event that the sanitary facilities are upgraded with Code 710 funds in accordance with the provisions contained in the current engineer circular, the structures will be in accordance with an architectural theme to be established based on the setting of the project. If the construction is performed under a cost-sharing agreement, approval of all parties involved will be required before the type of facilities to be constructed is determined.

8-11. Electrical distribution and security lighting. - Proposed electrical distribution lines will be placed underground wherever practical and especially within developed recreational areas, except where to do so would cause excessive damage to the ecology. Security lighting will be provided at all boat ramps, toilets, beaches, and other areas where security is considered necessary. These criteria were applied to the design of existing facilities also.

8-12. Site improvement. - When developing an area, one of the first items to be considered will be the removal of all noxious growth such as poison ivy and nettles that could be harmful to the users. Heavy weedy undergrowth immediately adjacent to the facilities which could harbor ticks or other insects and reptiles will be removed. Ponds that could be breeding grounds for mosquitoes will be drained and filled. Grading within a public-use area will be held to a minimum but sufficient grading will be done to properly drain surface water away from the facilities. Facilities will be placed to take advantage of existing trees and shrubs where they exist and where such placement is possible. Where trees have to be added for shade or aesthetic effect, a careful selection of indigenous or well adapted plant material will be used. Plants will be used that require a minimum of pruning, trimming, or spraying. Where necessary to restrict parking or traffic to designated areas, campsites, picnic sites, parking lots, and roadways will be delineated with natural materials that will blend with the terrain and not detract from the natural appearance of the area.

8-13. Signs. - All traffic control signs will be selected and placed as directed in the "Manual on Uniform Traffic Control Devices for Street and Highways." Area designation and information signs will be selected and placed as directed in the SWD Sign Handbook and in accordance with District policy.

8-14. Interpretive devices. - A pushbutton-operated tape player provides project information to the public at the Rockpile Mountain Overlook. A light graphics display of powerhouse operation is located at the powerhouse lobby along with other murals, displays, and 3-dimensional maps of the Little River Basin area. Ranger personnel provide tours during summer season. A theatre area is located at the east entrance of Beaver Lodge Nature Trail where movies, fireside talks, and aquatic walks are provided by Corps rangers on summer weekends. The Beaver Lodge Nature Trail is self-guiding by providing brochures with numbered information matching numbered posts along the trail. Visitors can identify tree specie, animals, and other trail features.

8-15. Waste disposal. - A contract for the pickup and disposal of all waste generated on the project is awarded annually but may be discontinued at any time if the service is unsatisfactory. Pickups are made at specified intervals or when requested by the project manager. Disposal is made at State-approved sanitary landfills off project lands.

8-16. Visitor safety controls and convenience features.

a. Protective fencing. - Protective fencing is provided in locations where dangerous situations exist and to prevent access or travel to certain areas or sites.

b. Barricades. - Barricades are provided in order to prevent public vehicular traffic into potential danger areas and to prevent public vehicular traffic into special management areas or to sites closed for construction, maintenance, or recovery from use.

c. Facilities for the handicapped and elderly. - Some of the existing recreation structures and facilities in the public use areas have been altered to accommodate the handicapped and the elderly. All proposed facilities will be designed to accommodate the elderly and handicapped. Toilet structures will have wide doorways and handrails. Paved ramps or walkways with moderate grade will be provided to toilets, courtesy docks and other similar facilities.

IX - RESOURCE USE OBJECTIVES

9-01. General. - Most of the existing recreational development is included in Hochatown and Beaver's Bend State Parks. Three small public use areas are managed by the Corps of Engineers as small access points to areas of the lake not served by the state park. One future area has been designated for the east shore of the lake for development should the State desire to enlarge the state park or should some other non-Federal body desire to develop recreational facilities under the cost-sharing program.

9-02. Resource use objectives.

a. Objective 1. - To provide opportunities for water-oriented activities, such as swimming, camping, boating, sightseeing, and hiking. Most of these facilities are located in the Broken Bow State Park. There has been a great demand for these facilities in the vicinity of Broken Bow Lake. The Oklahoma Tourism and Recreation Department has developed a five-year plan to realize the full potential of the resources within the state park. An excerpt from that plan is quoted below:

"A multidisciplinary program and design team was assembled by the Parks Director to initiate this planning task by reevaluating and enhancing the resource potential of the parks already in the State inventory. Planners and recreation specialists developed land use and facility plans in concert with the environmental capacities and constraints of the site as inventoried by staff members specializing in biology, wildlife, slope and soils, and vegetation. A staff architect and environmental designer developed guideline criteria for structures and other improvement strategies. In addition, a member of the staff concentrated solely on the recreational needs of the disadvantaged.

"Before this task, a data base did not exist in the Division of State Parks, thus requiring a complete canvassing of all sources of pertinent information on the sites being planned. Sources included Agricultural Stabilization and Conservation Service aerial photographs, Soil Conservation Service soil surveys, US Geological Survey Topographic Quadrangles, vegetation and wildlife agency publications, legislative research, and county property abstracts. Base mapping and field inventory were followed by a committee design proposal which was, in turn, reviewed by park personnel for critique. Seventeen public hearings (see public hearing section) were held in order that the public could offer critique and inputs to the 57 proposals. The plans were often significantly altered as a result of those hearings before being finalized for the Commission's adoption.

"Accompanying the Development Plan are guidelines regarding the methods for it's implementation. These assisting appendices include a design criteria and glossary which will be constantly expanded to explain the design and intent of all recreationally related items as they are introduced into the system and the detailed manner in which they are applied to the landscape.

"This is a general plan. It provides the basic elements, their priorities and costs, and a total configuration toward which each park must evolve. As an element is to be implemented, specific site plans are developed within the framework of the general plan which reflect the detailed sensitivities toward the physiographic and vegetative strategies of the particular location. General plans can be changed and the Commission has the authority to do so by resolution in response to new situations which come to light during the ongoing processes of evaluation."

b. Objective 2. - To manage and improve the fish and wildlife resources of Broken Bow Lake for optimum benefits. The Oklahoma Department of Wildlife Conservation has a license to 5,420 acres of project lands for wildlife management and conservation. The Department's planned use of the land includes a small camping area of approximately six acres, a game preserve of about 1,170 acres, and a public hunting area of approximately 4,250 acres. The remaining lands that have not been allocated for other purposes are managed by the Corps for fish and wildlife purposes.

c. Objective 3. - To establish a forest management program to increase the value of all project lands for recreation and wildlife, and to return the existing forest to a healthy, natural condition. Although the forest will not be managed as commercial timberland, these goals will be attained by cultural practices which will affect plant growth, distribution, shape and condition. No attempt will be undertaken to regiment trees into mechanical conformity with spacing, size arrangement, or species. Vegetation, living or dead, will be removed from the forest areas for disease and/or insect pest control; fire hazard reduction; storm damage; construction of roads, trails, campgrounds, picnic grounds, and firebreaks; safety precautions, such as the removal of dangerous dead limbs or trees; vista cutting; and to prevent encroachment of the forest on natural meadows and selected open areas.

X Project Resource Management Plan

10-01. Purpose. - The Project Resource Management Plan is prepared as a guide for resource development, maintenance, protection, and use of all project land and water areas, including public use and project lands under outgrant for special purposes.

10-02. Operational concepts and policies. - The project is designed and operated as a unit in the seven-reservoir system for flood control in the Little River watershed and for reduction of floodflows on the Red River. In addition, the lake and adjacent land constitute a valuable resource to be developed for recreation, fish and wildlife conservation, and other allied purposes. The Reregulating Dam is required to satisfy low flow requirements of the Public Health and the Fish and Wildlife Services and to stabilize river fluctuations caused by variable power releases. Most of the recreational facilities are managed as State Parks by the Oklahoma Tourism and Recreation Department. Three small primitive areas are managed by the Corps. Outside of the State Parks, the routine maintenance, general upkeep, and replacement caused by normal use or vandalism, and minor road repairs are performed by project personnel. Major repairs and major road repairs are accomplished by contract. Mowing and cleanup of the recreation areas are performed by contract and/or project personnel. The administration and management of the project is accomplished jointly through the district office and field personnel.

a. District Office. - District office personnel are concerned principally with the project's operation and management in accordance with purposes for which the project was authorized; the nature, location, construction codes, and requirements of development and improvements; coordination and reconciliation of activities relative to policies and regulations; coordination with representatives of other agencies and individuals; processing of lease, licenses, and permits not delegated to field personnel for issuance; and public relations.

b. Field Office. Field office personnel assigned to the project are concerned with direct operation, maintenance, and management of the project; supervision of all activities conducted on the impounded water and land over which the Government acquires fee title or lesser interests; and requirement of high standards of public health and safety.

10-03. Staffing and organization. - A Park Manager, appointed by the District Engineer and under the direction of the Little River Area Office is in responsible charge of the project operations and maintenance program. The present organization is as follows:

Title	Grade	No.
OPERATION, CONSTRUCTION, AND MAINTENANCE		
Park Manager	GS-09	1
Ranger Technician	GS-05	1
Construction-Maintenance Worker	WG-06	1
Laborer	WG-03	1
Laborer (temporary)	WG-02	4
POWERHOUSE		
Powerplant Superintendent	GS-11	1
Powerplant Superintendent	GS-10	1
Clerk-Typist	GS-04	1
Powerplant Operator A	WB-00	1
Powerplant Electrician A	WB-00	1
Powerplant Electrician Trainee IV	WB-00	2
Powerplant Senior Mechanic	WB-00	1
Powerplant Trainee II	WB-00	2
Powerplant Trainee I	WB-00	2
Janitor	WG-02	1
Additional personnel required:		
Reservoir Ranger Technician (temporary)	GS-04	5

The temporary rangers are necessary to supplement the regular ranger. They patrol the lake area for detection of encroachment, vandalism, theft, safety hazard, pollution, fires, timber cutting, and any unauthorized use of public property. Reservoir construction and maintenance workers perform a variety of manual labor and semiskilled duties in the maintenance and construction of recreation facilities. The temporary laborers assist the maintenance crew during the peak recreation season by performing a combination of unskilled tasks.

10-04. Management of public-use areas. - There are three public-use areas managed by the Corps of Engineers with a total of 446 acres. The Oklahoma Tourism and Recreation Department has a lease of 3,874 acres of public-owned land for State park purposes. The Department has developed two State parks in accordance with an approved General Development Plan.

10-05. Office and administrative facilities. - The project office is an integral part of the maintenance building, a one-story, 44- by 60-foot, masonry structure, which is located a short distance upstream from the right abutment of the dam. Adequate space is provided for the

Park Manager to maintain records and to supervise and direct project activities. Included also are spaces for maps, cabinets, and files to accommodate project publications, reference materials, and office supplies.

10-06. Vehicles and equipment. - Vehicles and equipment used for the maintenance of the project are stored in the equipment yard and within the administration and maintenance building. The equipment yard is enclosed by a 6-foot chain link fence with a 3-strand barbed wire climb barrier on top. The vehicles are further secured by removing keys, locking the doors, and storing the keys in a locked metal storage case within the project building.

10-07. Law enforcement. - The Park Rangers, trained in the basic principles of law enforcement, issue citations to persons violating provisions contained in Section 234 of the Flood Control Act of 1970 (Public Law 91-611) and policy established in ER 190-2-4. The citation may direct the appearance of the violator before a US Magistrate and require the payment of a fine. The enforcement of civil and criminal law is the responsibility of law officials of Federal, State, and local government agencies. The Oklahoma Department of Wildlife Conservation enforces the fish and wildlife laws and the Waterways Division of the Oklahoma Highway Patrol enforces the boating laws. Close coordination is maintained between the park manager and these law enforcement officials, and advance plans are made with them for a joint plan of action to control pollution, vandalism, and visitor harassment and to enforce boating regulations and fish and wildlife laws.

10-08. Safety. - Public safety will be promoted through lectures presented to schools, civic organizations, and other groups. Safety programs and demonstrations will be presented on special occasions on project lands. All facilities will be maintained in good, safe conditions at all times. Signs or buoys will be displayed to warn visitors of hazards or to call their attention to the need to observe the rules and regulations of safety in their activities. Zoning of the lake area to promote safe boating, swimming, and skiing has been and is being accomplished by the Corps of Engineers through buoying of designated beach areas and the construction and installation of floating information and warning signs. Skiing and speed boating are prohibited in restricted arms, embayments, swimming areas, and in the upper end of the lake which is reserved for fishing. Under the provisions of the Oklahoma State Boating Act, the Waterways Division of the Oklahoma State Highway Patrol has the responsibility of enforcing the provisions of the Act. Lake patrols enforce the State legislation, promote safety, and enforce zoning established by the Corps of Engineers. All Corps employees will be provided instructions in safety principles that enable them to perform their work in a safe manner. Periodic safety meetings for all employees

serve as a time to review past records, to give additional instruction, and to establish policies and procedures for the future.

10-09. Public health. - The development and use of the lake is planned for public interest, and the utmost consideration is given to the maintenance of high standards of public health and safety. The health and sanitation program will be developed in cooperation with the Environmental Protection Agency and the Oklahoma Department of Health. Disposal of wastes, trash, and debris is not permitted on Government land.

10-10. Pollution control. - The control of pollution in Broken Bow Lake is the responsibility of several agencies of the State of Oklahoma. However, Public Law 660, 84th Congress, approved 9 July 1956, requires that Federal agencies having jurisdiction over any property shall cooperate with other Federal and State agencies on the prevention and control of pollution of waters of the State. Accordingly, the Corps of Engineers cooperates with these responsible agencies. Executive Order No. 11752 on Prevention, Control, and Abatement of Air and Water Pollution at Federal Facilities, dated 17 December 1973, will be followed. All project personnel will maintain constant vigilance for sources of pollution to the reservoir and its stream tributaries. Guidance for this program is contained in ER 1165-2-116 and the project spill prevention, containment, and counter measures plan. Additional pollution control will be administered in accordance with ER 1130-2-400, ER 405-1-800, the Operations and Maintenance Manual, and Title 33 Code of Federal Regulations, parts 320 through 329.

10-11. Visitor interpretation and education. - Brochures, maps, copies of Title 36, and other publications are available at the project office or from project personnel. Tours of the project are conducted for any interested groups. Upon request of civic organizations, project personnel speak and/or present illustrated lectures concerning features of the project, the purpose of the project, plans for the project, and the predicted impact of the project on the local area.

10-12. Project resource management plan. - A complete and detailed project resource management plan was submitted as appendix A to the Master Plan by letter SWTED-DA, 5 December 1973, subject: Broken Bow Lake, Mountain Fork River, Okla., Appendix A, Project Resource Management Plan, to DM No. 4B, Master Plan.

XI FOREST MANAGEMENT PLAN

11-01. Management Objectives.- The objectives of the management program are to increase the value of all project lands for recreation and wildlife, and to return the existing forest to a healthy, natural condition. Although the forest will not be managed as commercial timberland, these goals will be attained by cultural practices which will affect plant growth, distribution shape and condition. No attempt will be undertaken to regiment trees into mechanical conformity with spacing, size arrangement, or species. Vegetation, living or dead, will be removed from the forest areas for disease and/or insect pest control; fire hazard reduction; storm damage; construction of roads, trails, campgrounds, picnic grounds, and firebreaks; safety precautions such as the removal of dangerous dead limbs or trees: vista cutting; wildlife management; and to prevent encroachment of the forest on natural meadows and selected open areas.

11-02. Management Types. - To provide maximum public benefits and to conserve and utilize recreational resources, the project lands have been classified as follows:

a. Project Operations. - Land allocated to provide for safe efficient operation of the project for purposes other than recreation and fish and wildlife management.

b. Operations: Recreation - Intensive Use. - Land allocated for developed public use areas and intensive recreational activities by the visiting public.

c. Operations: Recreation - Low Density Use. - Land that has been allocated for low density recreational activities by the visiting public with an interim use of grazing.

d. Operations: Wildlife Management. - Lands licensed to the Oklahoma Department of Wildlife Conservation for wildlife conservation.

11-03. Individual Unit Work Plans for each land classification.

a. Project Operations:

(1) General. The project operations area includes those lands necessary for the project building and grounds, the overlook, storage yard, the embankment of the dam, outlet channel, and dikes and levees constructed in conjunction with the project. The terrain of the 400-acre site is moderate to steeply sloping and supports a moderate growth of shortleaf pine, sweetgum, post oak, holly, white oak, and hickory.

(2) Management. - Overall objectives include opening the existing stand of timber to stimulate the production of seed; providing or developing an intimate mixture of trees of all ages and sizes so there will be no continuous ceiling of foliage; renewing of vanishing game habitat; and the maintenance of maximum productivity of the site.

b. Operations: Recreation - Intensive use.

(1) General. - Access and facilities for safe and healthful public use have been assured by the establishment of several public-use areas around the lake. The State of Oklahoma has approximately 3,900 acres leased for park management purposes, which are divided into two state parks. The Corps of Engineers maintains three primitive camping and picnicking areas, with one additional area planned for the future.

(2) Management. - All construction, development and maintenance work performed by a lessee within a public park is in accordance with an approved General Development Plan. A lease for public park and recreational purposes precludes the cutting of timber to: (1) the extent necessary to provide for construction and development of each specific site for its planned use; (2) meeting requirements for access, safety, beauty, sunlight and air circulation; (3) opening vistas for scenic views; and (4) controlling destructive forest pest conditions. The lease requires the lessee to landscape all structures suitable for treatment in accordance with plans approved by the District Engineer. It also requires the lessee to protect the property from fire and soil erosion and to promptly repair or replace, to the satisfaction of the District Engineer, any property that is destroyed or damaged incident to the exercise of the privileges by the lease. The areas developed by the Corps of Engineers are managed in a manner which maintains or improves aesthetic values and develops a habitat to sustain optimum or increased wildlife populations. In public-use areas all construction, development and maintenance activities are subtly integrated into the landscape so that they attract little attention to themselves. Thinning, harvesting or clearing of vegetative cover is limited to the extent necessary for the development of each specific site for its planned use. No other vegetation, living or dead, is removed unless there is sound justification such as: removal of diseased or insect infested trees; reduction of fire hazards; wildlife management; or safety precautions.

c. Operations: Recreation - Low density use. - Management of these lands follows accepted conservation practices. Manipulation of the existing forest includes the removal of trees which are overtopping or otherwise interfering with more desirable species. The selection of trees to be retained is based on site adaptability, vigor, form, foliage, longevity and susceptibility to adverse conditions.

Poorly formed and hollow trees, though they have no market value, contribute to wildlife habitat and should not be removed as long as they are not suppressing a tree of greater value. Manmade openings, created to improve wildlife habitat and to influence composition, growth and vigor, blend in continuity of form, line, color and texture to the natural landscape.

d. Wildlife management area.

(1) General. - This area, leased to the Oklahoma Department of Wildlife Conservation, totals approximately 5,420 acres of the project lands. Its moderately steep to steeply sloping mountainous terrain is densely forested with pine and hardwoods. Predominant species include bald cypress, shortleaf pine, water oak, white oak, sweetgum, hickory, ash, sycamore, maple, hackberry, cherry, and elm.

(2) Management. - The management plan implemented by the State emphasizes the manipulation of the native vegetation by creating small forest openings and the initiation of a crown cover removal program. The measures are undertaken to create forest edge effects and increased understory vegetation which produces a combination of food producing plants and resting area for all forest animals. Management practices that are virtually eliminated from the area are: Cultivation for game food since the shallow soils are subject to severe erosion when disturbed; and the grazing of domestic livestock inasmuch as the carrying capacity (grass) is very low. The habitat management practices are intended to maintain the area in a semiwilderness state.

11-04. Archeological preservation.

a. General. - There are 62 archeological sites within the project area of Broken Bow Lake. Salvage activities resulting from construction of the project have provided data for a number of archeological publications which give us a better understanding of human prehistory in southeast Oklahoma. The sites are generally in forested, valley regions near tributary creeks to the lake.

b. Management. - Although these areas are located within the previously listed management areas, protection of these sites will be accomplished in accordance with Tulsa District Regulation 870-1-2, Cultural Resource Management Program, which sets forth guidelines for the preservation and protection of cultural resources. In the implementation of the Forest and Range Management Plan, utmost caution will be used during any activity to avoid alteration or destruction of any archeologial site. Prior to any earthmoving activity, a reconnsaissance will be made of the affected area to determine the impact, and if results are positive, work will be curtailed. If during any activity, archeological materials are

encountered, the work will be stopped immediately. Surface materials will be collected, catalogued, and reported to the District Office, and the area will be protected from future disturbances. Reports of any incidents of man-induced or natural adverse effects on cultural areas such as vandalism ("pot hunting") or shoreline erosion should be submitted to the Cultural Resources coordinator for the project, who will forward the information to the Environmental Resources Branch, Tulsa District Office. No effort will be made to increase accessibility into areas of known archeological sites as this would only increase the incidence of both vandalism and nonprofessional examination.

11-05. Forest management plan. - A more complete forest management plan was submitted as appendix B to the Master Plan by letter SWTED-DA, 20 October 1975, subject: Broken Bow Lake, Mountain Fork River, Oklahoma, Appendix B, Forest (Range) Management Plan, to DM No. 4B, Master Plan.

XII - FIRE PROTECTION PLAN

12-01. General. - There are 13,907 acres of land subject to fire protection measures by the Corps of Engineers at Broken Bow Lake. The area is generally mountainous consisting of narrow valleys and sharp to rolling ridges bounded by steep to moderately steep slopes. The area is predominantly forest and woodland pasture. The public-use areas are the highest risk areas because of the large numbers of people who visit them. Outside the public-use areas, the risk varies in proportion with the number of people who come in contact with the site. The damage from wildfires on these areas is less significant than in a public-use area. The lands, nonetheless, are subject to tangible damages such as injury to young growth, soils, wildlife habitat, forage, and loss in recreational value.

12-02. Training. A training program for field personnel has been established that covers methods of fire prevention, safety, characteristics and behavior, methods of attack, use of handtools, and use of power equipment. Training materials available consists of films, slide programs, correspondence courses, and assorted literatures.

12-03. Equipment. - Project personnel have fire control equipment at their disposal consisting of hand pumps, water pails, shovels, fire rakes, axes, mattocks, and burlap bags. All tools and equipment shall be checked and serviced at regular intervals to assure serviceability.

12-04. Cooperating agencies. - In addition to the Corps of Engineers personnel, there are local municipal fire departments which may be called upon if the necessity arises. The fire departments, their capabilities, and limitation are as follows:

a. The city of Broken Bow, Oklahoma, has one truck which makes rural runs. This service is available on a $100 fee basis.

b. The city of Idabel, Oklahoma, has two trucks available for rural runs. This service is available on a $100 fee basis.

c. The Broken Bow unit of forestry under the State Department of Agriculture, Forestry Division, is responsible for the detection and suppression of all forest fires. Detection units include three telephone and radio equipped towers (Carter Mt., Carnesaw Mt., and Hee Mt.). Suppression equipment includes two pumper trucks, three dozers with plows, hand tools, and approximately 12 personnel. The forestry unit and the Corps of Engineers personnel maintain a closely coordinated relationship for both fire fighting efforts and continuous training of personnel.

12-05. Suppression and prevention. - A public information program has been initiated to aid in the detection and reporting of fires. News releases, signs, and other means will gain the support of the general public, and will give information on how and where to report fires. High fire danger periods are broadcast daily by regional radio stations. During these times Corps employees will periodically check high risk areas. The place and telephone number for reporting fires during nonduty hours will be posted at the project office. Provisions will be made for fire suppression during nonduty hours. The primary means of communication between the park manager or responsible project personnel and firefighting crews will be by radio. Hand carried radios will be of assistance on large fires and on those fires not accessible by vehicle-mounted radio. Signs with information about fire safety and reporting fires have been placed throughout the areas at places such as water wells, picnicking and camping sites and stenciled fire prevention slogans on refuse containers will assist in promoting fire prevention. All leases or contracts for use of project lands contain fire prevention and suppression clauses.

12-06. Fire Prevention Plan. - A detailed fire prevention plan was submitted as Appendix C to the Master Plan by SWTED-DA letter, 9 June 1975, subject: Broken Bow Lake, Mountain Fork River, Oklahoma, Appendix C, Fire Prevention Plan to DM No. 4B, Master Plan.

XIII - FISH AND WILDLIFE MANAGEMENT PLAN

13-01. Objectives. The objectives of this plan are to:

a. Develop and manage habitat and to provide public access for hunting and fishing in accordance with the needs and desires of the public.

b. Provide opportunities for the non-consumptive use of all natural resources.

c. Preserve and maintain, insofar as possible, the integrity of all natural ecosystems.

d. Integrate fish and wildlife management with that of other natural resources.

13-02. Agency Responsibilities.

a. General. Resident fish and wildlife belong to the State of Oklahoma regardless of land ownership. The Oklahoma Department of Wildlife Conservation has the authority and responsibility to preserve, manage, and regulate all resident fish and wildlife. Both the US Fish and Wildlife Service and the Oklahoma Department of Wildlife Conservation are responsible for the conservation and management of all migratory animals. The Corps' responsibility as a landowner is to restore, improve, and preserve fish and wildlife through wise land use and habitat development. Section 3 of the Fish and Wildlife Coordination Act makes provisions for the use of civil works projects for the conservation, maintenance, and management of fish and wildlife and their habitats. Land and water areas under the jurisdiction of the Department of the Army may be made available to the Oklahoma Department of Wildlife Conservation by license agreement under the terms of a General Plan approved jointly by the Secretary of the Army, the Secretary of the Interior, and the Director of the Oklahoma Department of Wildlife Conservation. Areas not managed through licenses or other formal agreements will be managed by the Corps through implementation of a fish and wildlife management plan. Implementation of the plan is subject to the primary purpose for which areas were zoned.

b. US Fish and Wildlife Service. The Service is responsible for providing technical advice and planning assistance to State and other Federal agencies to preserve and improve fish and wildlife resources.

c. Oklahoma Department of Wildlife Conservation. The conservation and management of fish and wildlife resources within the state is the responsibility of this agency. Within this scope of responsibility, the Department is striving to:

(1) Maintain acceptable levels of native and exotic species commensurate with their benefits to man.

(2) Provide for diversified recreational use of fish and wildlife.

(3) Insure the survival of fish and wildlife and provide people with an equal opportunity to utilize these resources.

(4) Publicize and encourage the conservation and appreciation of fish and wildlife and other natural resources.

(5) Encourage the scientific and educational use of fish and wildlife. Programs employed to achieve the above objectives are management of the lake fishery and management of certain perimeter lands. The Oklahoma Department of Wildlife Conservation has a license to approximately 5,420 acres of Broken Bow project lands zoned for fish and wildlife management. The license was granted for a period of 50 years beginning 1 April 1966.

d. Oklahoma Tourism and Recreation Department, Division of State Parks. The Oklahoma Tourism and Recreation Department has a 50-year lease on 3,875 acres of project lands. Lease period began 1 January 1967. Acres encompassed by this lease include Stephens Gap, Carson Creek, Cedar Creek, and River Bend public use areas. The Oklahoma Tourism and Recreation Department owns and operates the Beavers Bend State Park which is approximately 5,135 acres and is contiguous to project lands. Facilities available include paved roads, picnic tables, water supply systems, grills, restrooms and showers, refuse containers and rental cabins.

13-03. Fisheries Management. Fishery resource management at Broken Bow Lake is the responsibility of the Oklahoma Department of Wildlife Conservation. Agencies which have participated in planning studies and research of these resources are the Oklahoma Department of Wildlife Conservation, US Fish and Wildlife Service, and the Corps of Engineers. The Corps has actively participated in the planning and research work as well as cooperated with State and Federal agencies. To date, it appears that the Corps will also be active in fishery habitat management work at Broken Bow Lake. Pre-impoundment fishery surveys and studies have been conducted on the Mountain Fork watershed. These studies included species composition, distribution, age and growth determination, and estimation of populations and standing crops of fishes in the watershed. The major species to be managed are discussed below.

a. Warm-water species. Species most sought after are bass, crappie bluegill, green sunfish, and channel catfish. Soon after impoundment the fishery, particularly bass fishing, exhibited poor conditions and studies

pointed to an inadequate forage fish supply. Introductions of threadfin shad in 1971 and 1972 resulted in a marked improvement in bass fishing. Fishing for all species is good at the present time. Since 1969, the Oklahoma Department of Wildlife Conservation has been stocking the lake with channel catfish, blue catfish, largemouth bass, threadfin shad, walleye, and rainbow trout.

b. Cold-water species. - Broken Bow possesses a unique potential for establishment of a rainbow trout fishery in both the lake and downstream waters. Investigations for establishment of such a fishery are being conducted by the Oklahoma Department of Wildlife Conservation and experimental stockings of rainbow trout have been made with good survival and harvest results. Sufficient data are not available to project the ultimate future of the trout program at Broken Bow Lake; however, a substantial trout fishery has already been developed and the prospects look very good for a continued trout program of some type.

c. Downstream species (sport fishing). - About 18 miles of stream occurs from Broken Bow Dam to the river's confluence with Little River. Heaviest sport fishing activity occurs in the powerhouse fishing area and Beavers Bend State Park, downstream from the Reregulation Dam (4.7 miles downstream), Highway 70 bridge, and Bogleye Crossing. Principal sport fish are bass, crappie, sunfish, catfish, and trout.

& water

13-04. Wildlife management. - The Oklahoma Department of Wildlife Conservation currently has a license to manage 5,420 acres of project lands on Broken Bow Lake. These lands are located in the upper reaches of the project. A portion of the licensed area is in the McCurtain County Wilderness Area. This wilderness area was purchased by the State and set aside by the Oklahoma Legislature in 1918 as an inviolate sanctuary for wildlife and vegetation therein. The wilderness area bisects the upper end of Broken Bow Lake. The remaining project lands that are not presently used for project operations or public use will be managed for wildlife by the Corps. Habitat improvements by proper management will promote more abundant wildlife populations and will provide additional recreational opportunities for sportsmen, hikers, naturalists, and bird watchers. The natural beauty of the area will be preserved and enhanced by planting fields and pastures with flowering and fruit bearing plants such as multiflora rose and honeysuckle to provide food and cover for wildlife. Hunting is in accordance with Federal and State fish and wildlife regulations. Hunting will be permitted on all project lands except recreational areas and project operation areas. Areas not open to hunting will be posted accordingly. All species have been considered; however, emphasis has been placed on deer, turkey, squirrel, rabbits, quail, and songbirds. In addition, consideration will be given to the management and protection of songbirds and birds of prey, particularly golden and bald eagles.

13-05. Appendix D. - The fish and wildlife plan was submitted as appendix D to the Master Plan by letter SWTED-DA, 3 September 1976, subject: Broken Bow Lake, Mountain Fork River, Oklahoma, to DM No. 4B, Master Plan.

XIV - PROJECT SAFETY PLAN

14-01. Project Safety Plan.- A project safety plan was submitted as Appendix E to Design Memorandum No. 4B, Master Plan, by letter SWTED-DA, dated 16 December 1974, subject: "Broken Bow Lake, Mountain Fork River, Oklahoma, Appendix E. Project Safety Plan, to DM No. 4B, Master Plan."

14-02. General. - The Safety Plan identifies common recurring hazards or unsafe conditions in each major phase or area of project operations and recommends actions to eliminate or reduce the hazards. The plan covers construction, maintenance, public-use areas, visitor protection, equipment, and operation. Safety rules and regulations are presented to maintain acceptable safety standards throughout the project.

14-03. Project Safety Officer. - A project safety officer, appointed by the park manager enforces the provisions of the Project Safety Plan, the Safety Manual (EM 385-1-1), and the Tulsa District Safety Program (TDR 385-1-1).

14-04. Coordination. - Frequent and continuing coordination will be established with the Oklahoma Tourism and Recreation Department, Oklahoma Game and Fish Commission, Oklahoma Highway Patrol, and county and local police in the implementation of the Project Safety Plan.

XV - LAKESHORE MANAGEMENT

15-01. Lakeshore Management Plan. A lakeshore management plan was submitted as Appendix F to the Master Plan by SWTED-DA letter, dated 20 April 1976, subject: Broken Bow Lake, Mountain Fork River, Oklahoma, Appendix F, Lakeshore Management Plan, to Design Memorandum No. 4B.

15-02. Policy. - It is the policy of the Chief of Engineers to manage and protect the shorelines of all lakes under its jurisdiction to properly establish and maintain acceptable fish and wildlife habitat, aesthetic quality and natural environmental conditions and to promote the safe and healthful use of these shorelines for recreational purposes by all of the American people. Ready access to and exit from these shorelines by the general public shall be provided in accordance with Section 4, 1944 Flood Control Act, as amended, P. L. 87-874. It is the objective of the Corps to manage private exclusive use of public property to the degree necessary to provide maximum benefits to the general public. The Chief of Engineers has also established a policy that private exclusive use will not be permitted on new lakes or on lakes where no private facilities or uses exist as of the date of Regulation ER 1130-2-406.

15-03. Implementation of policy. - No private floating facilities will be permitted on Broken Bow Lake.

XVI - CULTURAL RESOURCE MANAGEMENT

16-01. Cultural resource management program. This is a program being developed by the Tulsa District relating to the preservation of historical and archeological data, as required by Executive Order 11593. The program provides for utmost caution to be used during any District-related activity to avoid alteration or destruction of any archeological or historical site, feature, or object. On operation and maintenance projects, rangers are directed to report any incidents of man-induced or natural adverse effects on cultural resources, such as vandalism ("pot hunting") or shoreline erosion.

16-02. Objectives. The field level of this program is primarily designed for identification of cultural sites and protection, preservation, and collection of materials from such sites, by designating specific program coordinators, on a project by project basis.

16-03. Responsibility. The Corps of Engineers has sole authority for the Cultural Resource Management Program. However, close coordination is maintained with agencies such as the Heritage Conservation and Recreation Service, the State Historic Preservation Officer, and the Advisory Council on Historic Preservation.

16-04. Archeological Survey. An archeological survey of Broken Bow Lake was conducted in 1961. Fifty-seven sites were recorded, and five of these were test excavated. However, this survey covered only project lands that were to be inundated. Approximately 13,900 acres above the top of the conservation pool remain to be surveyed. At the time the Master Plan was initiated, the cost estimate for a cultural resource survey of fee owned land was $40,000. The estimated cost of mitigation ($160,000) was derived by quadrupling the estimated cost of the survey. These figures were based on the cost of completed survey and mitigation work at other projects in the Tulsa District. Approximately 5,400 acres of project land are managed by the Oklahoma Department of Wildlife Conservation. The expenditure of civil works funds cannot be authorized to mitigate adverse impacts occurring as a result of management by another agency. Since all of the fee owned land has not been examined, a breakdown of mitigation costs directly affected by Corps activities cannot be provided at this time. When the cultural resources survey is completed, a more comprehensive cultural resources management plan can be developed. This plan will consider all possible techniques of site protection and preservation. Excavation will be accomplished only when it appears to be the best method of mitigation.

XVII - ESTIMATE OF COST

17-01. Estimate of cost. - The summary of the estimated costs based on December 1978 prices for the construction of the public use facilities proposed in areas outside the State parks is shown in table 17-1. An itemized cost estimate for the facilities in each public use area is shown in table 17-2. Since the construction of the proposed facilities will be dependent upon the willingness of the Oklahoma Recreation and Tourism Department or some other non-Federal public body to share in the construction costs and accept the responsibility for all operations and maintenance, any such public body would request that they be allowed to approve the type of facilities constructed. Therefore, standard drawings for facilities that are normally a part of the Master Plan are not included in this plan. The costs for all items are based upon the current construction costs (December 1978) of similar facilities being constructed in the Tulsa District. The non-Federal public body will pay at least 50 percent of all construction costs included in tables 17-1 and 17-2 and assume all operation and maintenance costs of the facilities for the life of the project.

17-02. Annual operation, maintenance, and replacement costs. The estimated annual operation, maintenance, and replacement costs for the proposed facilities is $160,000.

TABLE 17-1

Summary of Estimated Cost for Public use Development

Item	Cost $
Roads, paved	400,000
Roads, gravel (service)	500
Pave existing gravel roads	35,000
Parking	27,000
Boat ramps	65,000
Courtesy docks	14,000
Toilets, masonry vault	90,000
Toilets, waterborne w/showers	100,000
Trailer sanitary stations	16,000
Campsites	73,700
Upgrade existing campsites	15,000
Group shelters	39,000
Playground equipment	2,000
Water systems	48,000
Electrical systems	112,000
Sewer systems	30,000
Signs	4,500
Clearing & Cleanup	5,000
Subtotal	1,076,700
Contingencies 12%+	128,300
Subtotal	1,205,000
Engineering and Design	71,000
Supervision and Administration	60,000
Total	1,336,000

TABLE 17-2

Detailed Estimate of Cost for Public Use Development

Item	Cost $
Reregulation Dam (Dwg 93/14)	
Pave existing gravel roads	35,000
Roads, gravel (service)	500
Parking area	12,000
Boat ramp	15,000
Courtesy dock	7,000
Toilet, masonry vault	36,000
Trailer sanitary station	8,000
Campsites	3,700
Upgrade existing campsites	15,000
Group shelter	19,500
Playground equipment	1,000
Water system	16,000
Electrical system	12,000
Subtotal	180,700
Contingencies 12%±	21,300
TOTAL Reregulation Dam	202,000
Amphitheater Area (Dwg 93/13)	
Group shelter	19,500
Playground equipment	1,000
Subtotal	20,500
Contingencies 12%±	2,500
TOTAL Amphitheater Area	23,000

TABLE 17-2 (CON.)

Item	Cost $
Biggam Creek (Dwg 93/17-93/19)	
Roads, paved	400,000
Parking	15,000
Boat ramps	50,000
Courtesy docks	7,000
Toilets, waterborne w/showers	100,000
Toilets, masonry vault	54,000
Trailer sanitary station	8,000
Campsites	70,000
Water system	32,000
Electrical system	100,000
Sewer system	30,000
Signs	4,500
Clearing & cleanup	5,000
Subtotal	875,500
Contingencies 12%+	104,500
TOTAL	980,000

XVIII - CONCLUSION

18-01 Conclusion. - After considering all the factors affecting the recreational development, such as the nature of the shoreline, density of cover, accessibility, water depth, and visitor demands, the plan of development as presented herein presents the most efficient and economical plan to accommodate the public at Broken Bow Lake.

XIX - RECOMMENDATION

19-01 Recommendation. - I recommend that the updated master plan for Broken Bow Lake, Mountain Fork River, Oklahoma, be approved as presented herein.

ROBERT G. BENING
Colonel, CE
District Engineer

EXHIBITS

EXHIBIT A

CORRESPONDENCE

STATE OF OKLAHOMA

State Grant-In-Aid Clearinghouse

5500 N. WESTERN OKLAHOMA CITY, OKLAHOMA 73118 (405) 840-2811

January 23, 1979

Mr. Weldon M. Gamel
Chief, Engineering Division
Department of the Army
Corp of Engineers
Post Office Box 61
Tulsa, Oklahoma 74102

RE: 02A906 - Draft EIS, Broken Bow Lake Master Plan

Dear Mr. Gamel:

The environmental information for the above referenced project has been reviewed in accordance with OMB Circular A-95 and Section 102 (2) (C) of the National Environmental Policy Act by the state agencies charged with enforcing environmental standards in the State of Oklahoma.

The state agencies, comprising the Pollution Control Coordinating Board, have reviewed the proposed project and agree that no adverse environmental impact is anticipated. Therefore, the state clearinghouse requires no further review.

Sincerely,

Don N. Strain
Director

DNS:mt

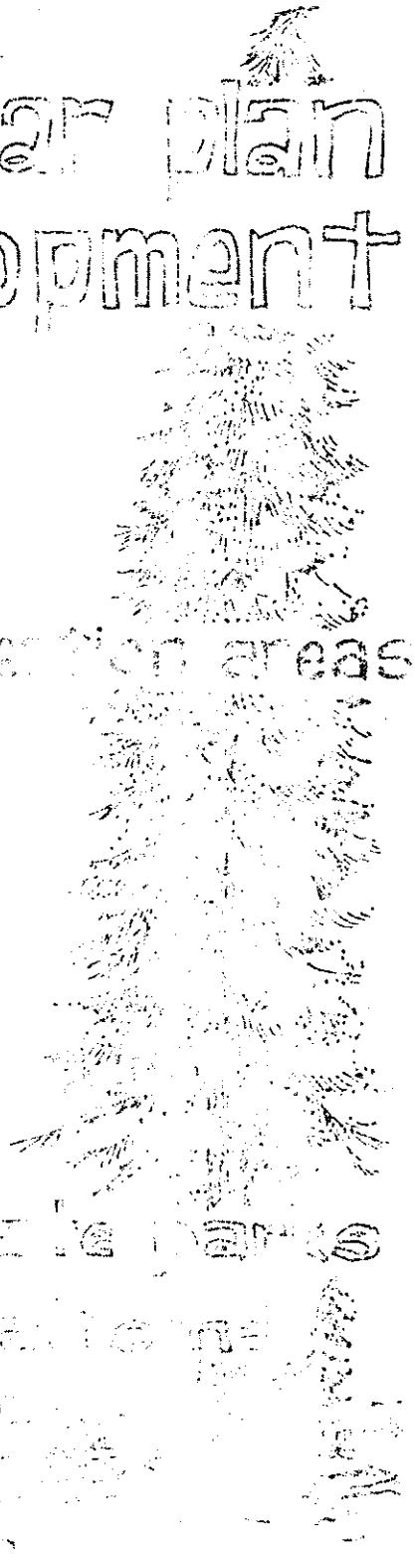
EXHIBIT B

THE FIVE YEAR PLAN FOR DEVELOPMENT

STATE PARKS AND RECREATION AREAS 1974

the five year plan for development

state parks and recreation areas
1974



division of state parks
state of oklahoma

department of tourism and recreation

BEAVERS BEND STATE PARK

● A vast two segment recreational complex which is the dominant park for southeastern Oklahoma. The lower Beavers Bend relies on a forested river valley picnicking/camping theme while the upper area (on Broken Bow Reservoir) caters to the picnicking/boating/camping/fishing theme of a large lake with a heavily timbered shoreline. The user base is of a multi-state influence with northeastern Texas providing a major influx.

● McCurtain County, Kiamichi region of Oklahoma ten miles north of Broken Bow and twenty one miles north of Idabel.

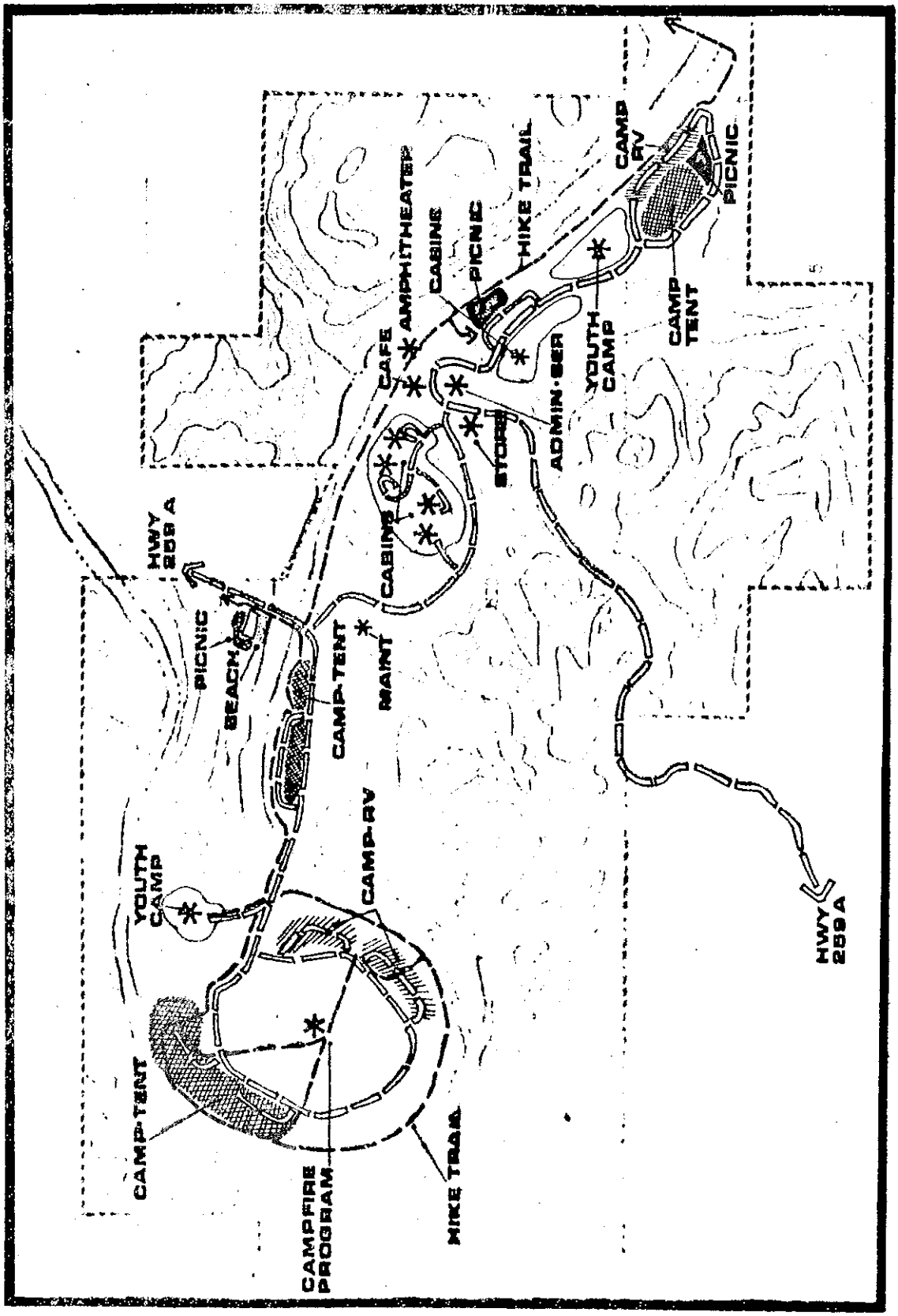
● Park is situated between the northern and southern sections of the Ouachita National Forest near the large McCurtain County Wilderness Area on Broken Bow Reservoir. Other proxemic recreational areas are the Pine Creek Reservoir (under development), Raymond Gary Recreational Area, Hugo Reservoir (under development), Clayton Lake, a potential trail system being studied throughout the Kiamichi Area, and the Glover River area which is under study.

FUNCTIONAL ABSTRACT (See Overall Maps)

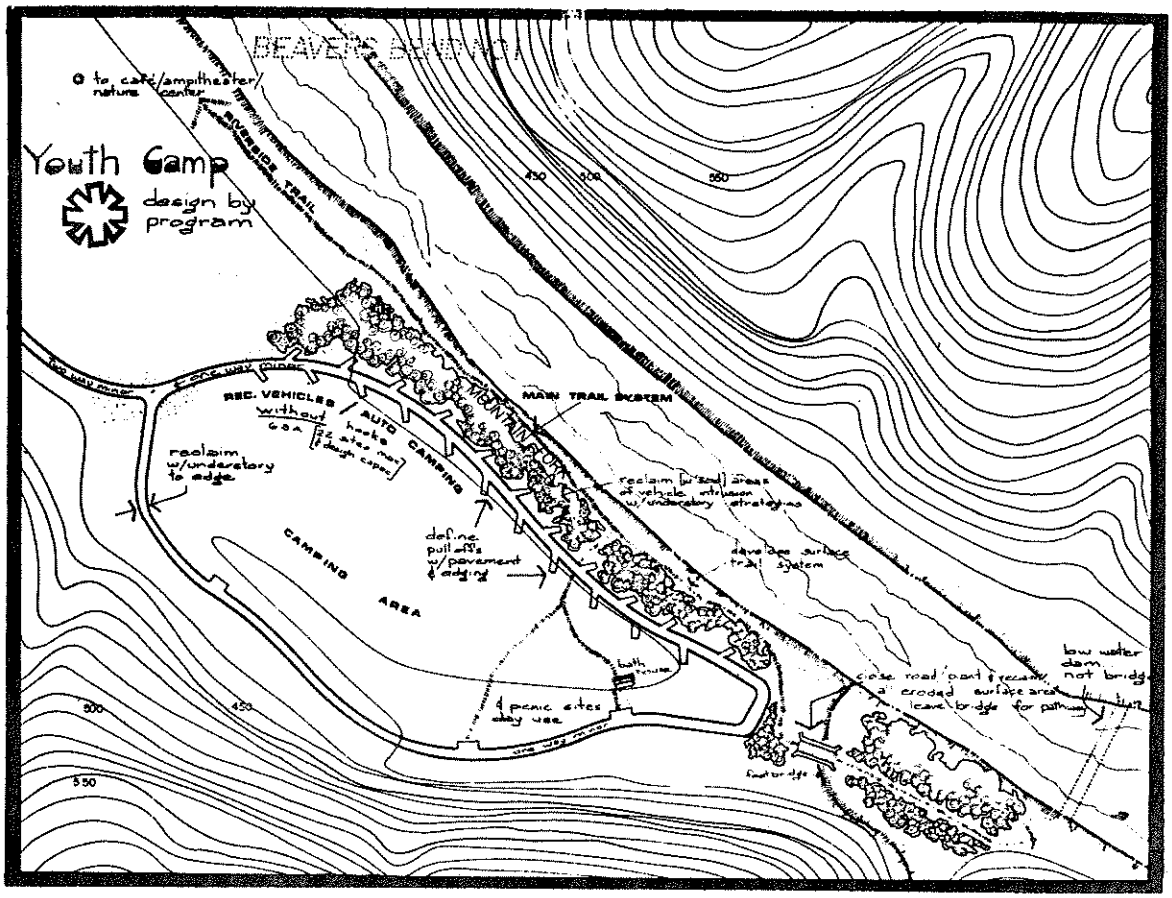
GENERAL PLAN (See Figures)

1. Youth Camp - End Area (Lower No.1) - Bathhouse on loop end with handicapped facilities and pull out - two small day use picnic areas with pull outs on upper road (4 sites each) - Close, and reclaim end road to dam, leave fishing/walking path to point, reclaim all eroded surfaces- pave, and define 22 R.V./Auto campsites (pull outs) without hook ups - reclaim entire terrace area adjacent to river - gravel trails as shown.

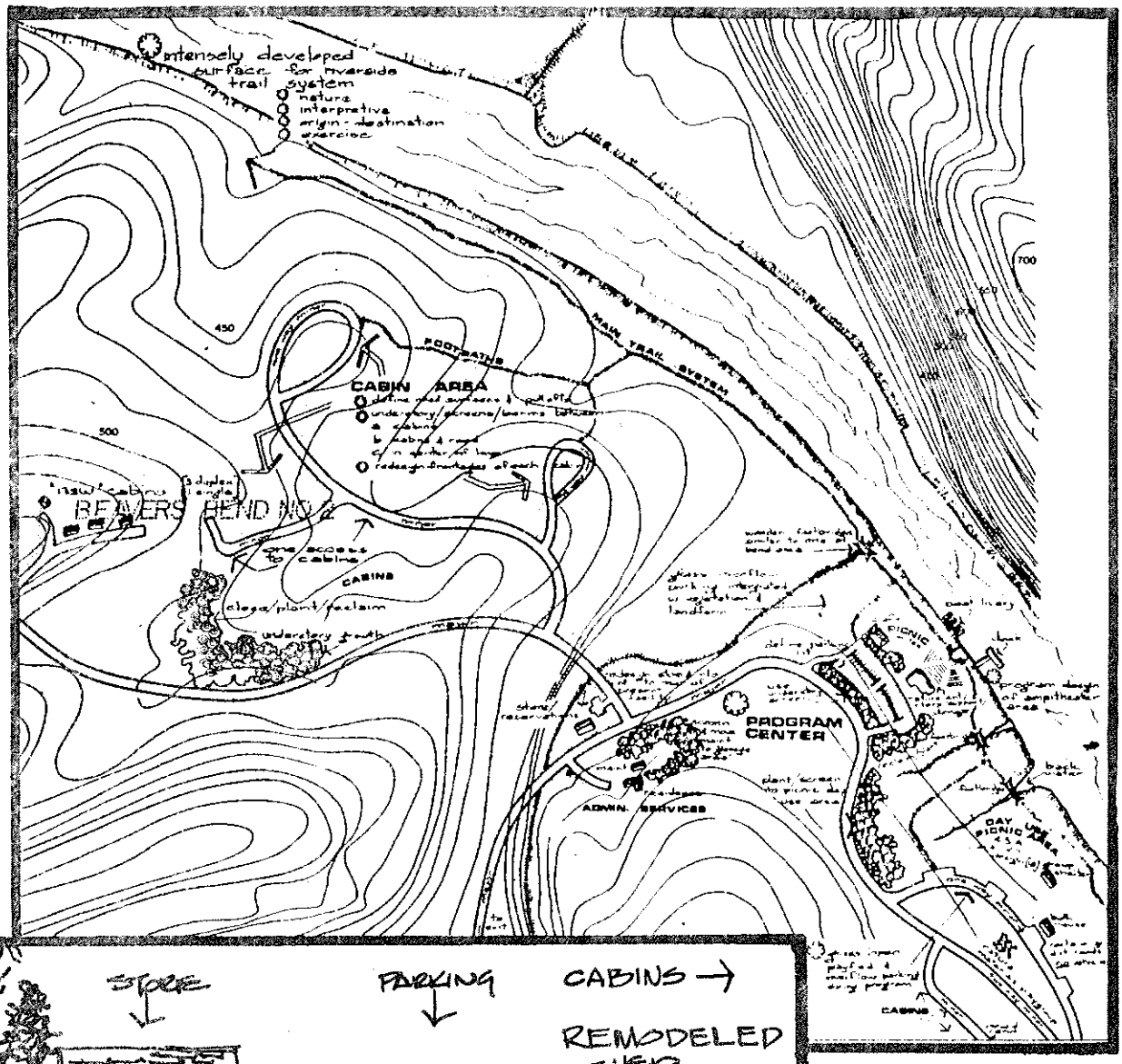
2. Central Area (Lower - No. 2) - Gravel trail system with footbridges (wooden as shown),lower priority is to begin asphalt surfaces on trails in most intensively developed areas - close and reclaim roads not indicated - lower cabin area reached by single entry - roads reclaimed to minimum clearance - define by pavement, all cabin pull outs and reestablish ground surfaces and intervening screens - rework cabin perimeters with stone and native shrub berms - develop overflow parking facilities northwest of cafe to be on a chat spine and grass parking surface with an absolute minimum loss of understory and overhead canopy - redesign store and administration area to prevent front entry on the congested corner (lower area entry in rear) - provide information graphics and reclaim to native shrubs the pull out in front of the present store. Screen ice machine (white) in maintenance area and define, edge and berm parking area in front of maintenance residence - remodel cafe to large windows and to take advantage of natural physiography, materials, and rustic coloration - breakup with median berms the open and unchanneled parking area - construct by design program an outdoor, natural materials amphitheater - define auto surface



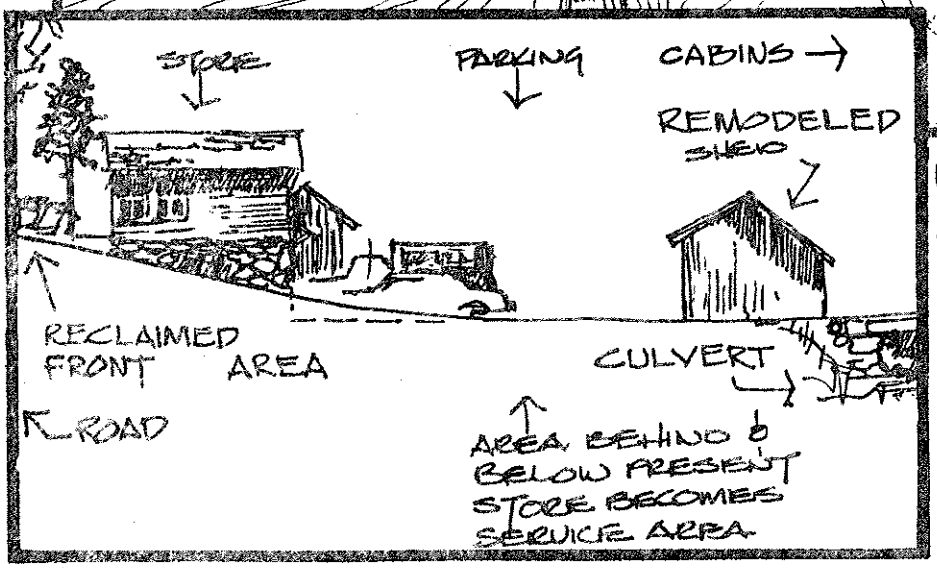
OVERALL MAP LOWER AREA



YOUTH CAMP - END AREA



CENTRAL AREA



SKETCH - STORE AREA

and parking in camping area - close all accesses to lower terrace reclaim 15-20 picnic sites-phase playgroup to natural materials play element- grassy open field becomes overflow parking for programs.

3. Swimming-Camping Area (Lower No.3) Breakup, delineate, channel,edge, and define swimming area parking lot. Recover surface with grasses and shade canopies - natural materials playgroup - graphics - 9 picnic sites - gravel access foot trails as shown - understory screening in side camping loop - reduce parking to two way minor width with parking for 12 tentsites along river - reclaim, screen, berm,terrace and reclaim parking area - no further motor vehicle access - new bath house - remove playgroup - information graphics point at junction below swimming area (pull out).

4. Bend Camping Area (Lower No. 4) - Reclaim edges and canopies to minimum widths - close all roads not indicated - develop two defined loops with R.V./Auto Camping pull outs(One loop with hook-ups (21) and one without (24) hook-ups) - gravel trail system as shown - natural materials fire ring in center of main loop - interpretive materials and graphics - northwest side of main bend loop develop 35 designated tentsites as shown - close road to top of dam and cut back loop in walk-in tent camping area - youth camp to be evaluated and designed by special program - this area has a capacity for major camping expansion if needed in the future.

PRIORITIES - COSTING (Lower Area)

A. AMPHITHEATER, OVERFLOW PARKING, and parking DELINEATION, BATHHOUSE in area 1, closing PLANTING, RECLAIMATION on all unnecessary motor vehicle accesses and eroded areas. GRAVEL TRAILS SYSTEM, FOOTBRIDGES (2)

$ 121,000.

B. REMODEL STORE AREA, GRAPHICS, BATHHOUSE in Area 3.

$ 68,000.

C. Cabin SITE LANDSCAPING, swimming area PARKING improvements and SHADE PLANTING, 2 PLAYGROUPS.

$ 67,000.

D. FIRE RING in bend area PAVEMENT of all pull outs and of foot trails in heavy use areas.

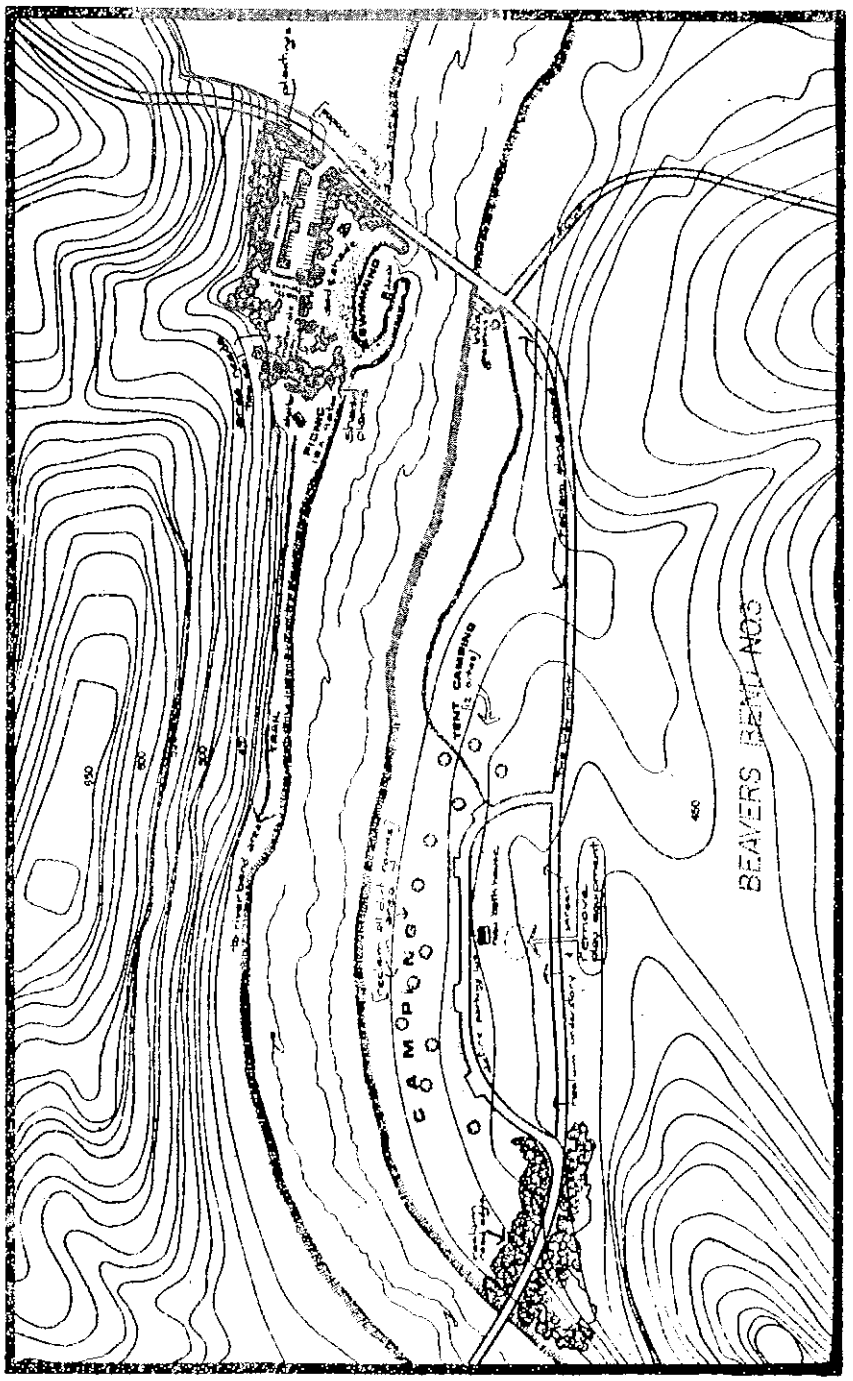
$ 168,000.

E. Complete RECLAMATION and PLANTING, complete delineation and surface PAVEMENT of auto pull outs,PAVE main TRAIL system in central intensive use areas.

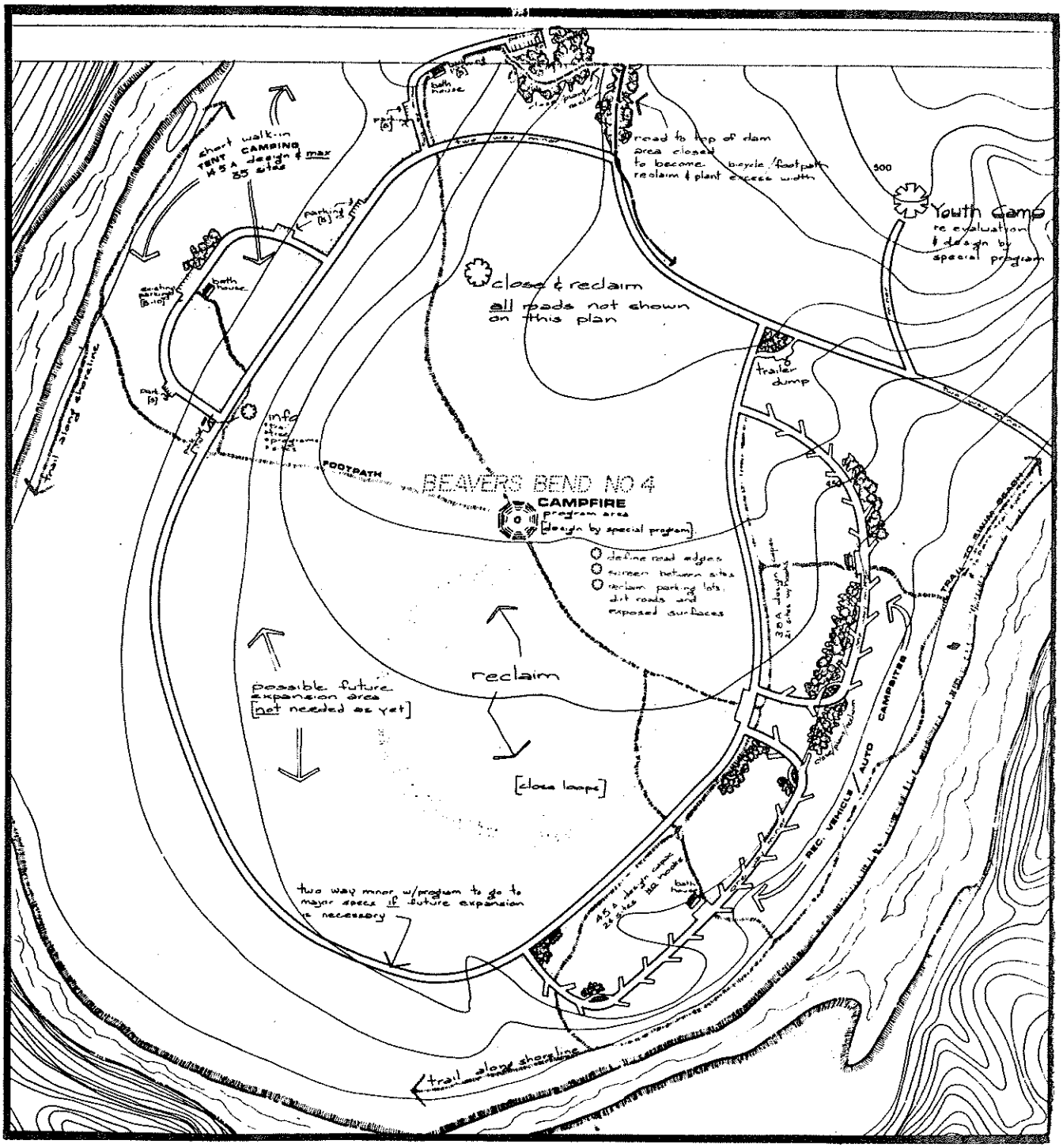
$ 34,000.

*Total $ 458,000.

* Total includes 25% contractor profit and 15% contingency factor.



SWIMMING - CAMPING AREA



BEND CAMPING AREA

FACILITIES CHARTS

Youth Camp/End Area Lower No 1)

	Acreage	Linear Footage	Capacity	Design	Existing
Picnic sites	2.5		12	8	
Tent Sites	6.5	1400*	22	22**	
Closed Roads		750			
Planting (Screening)	1.3***				

*This will serve as a multi-use camp area with designated sites without hook-ups.

**Based primarily on linear footage due to designated sites.

***Sodding areas harmed by vehicle intrusion.

Central Area (Lower - No.2)

	Acreage	Linear Footage	Capacity	Design	Existing
Picnic Sites	4.3		20	15	
Tent Sites	-	-	-	-	
R.V. Sites	-	-	-	-	
Reclaimed Areas	3*				

* Area has suffered from vehicle intrusion. Impossible to calculate linear footage, therefore, acreage is listed.

Swimming-Camping Area (Lower No. 3)

	Acreage	Linear Footage	Capacity	Design	Existing
Picnic Sites	2.6		13	11 sites +1 group shelter	0
Tent Sites	6.2*		25	12	12-15
Closed Roads		450			
Planting (Screening)	5.25**				

* We are designing at current use levels along the outer perimeter of the loop . Future expansion would take place in inner loop.
** Includes sodding and shading.

Bend Area (Lower No. 4)

	Acreage	Linear Footage	Capacity	Design	Existing
Picnic Sites	-	-	-	-	
Tent Sites	14.5		58	35	
R.V. Sites	8.1	2750	43	43*	
Tables					37 approx.
Closed Roads		3150			
Reclaimed Areas	3.65				
Planting (Screening)	.8				

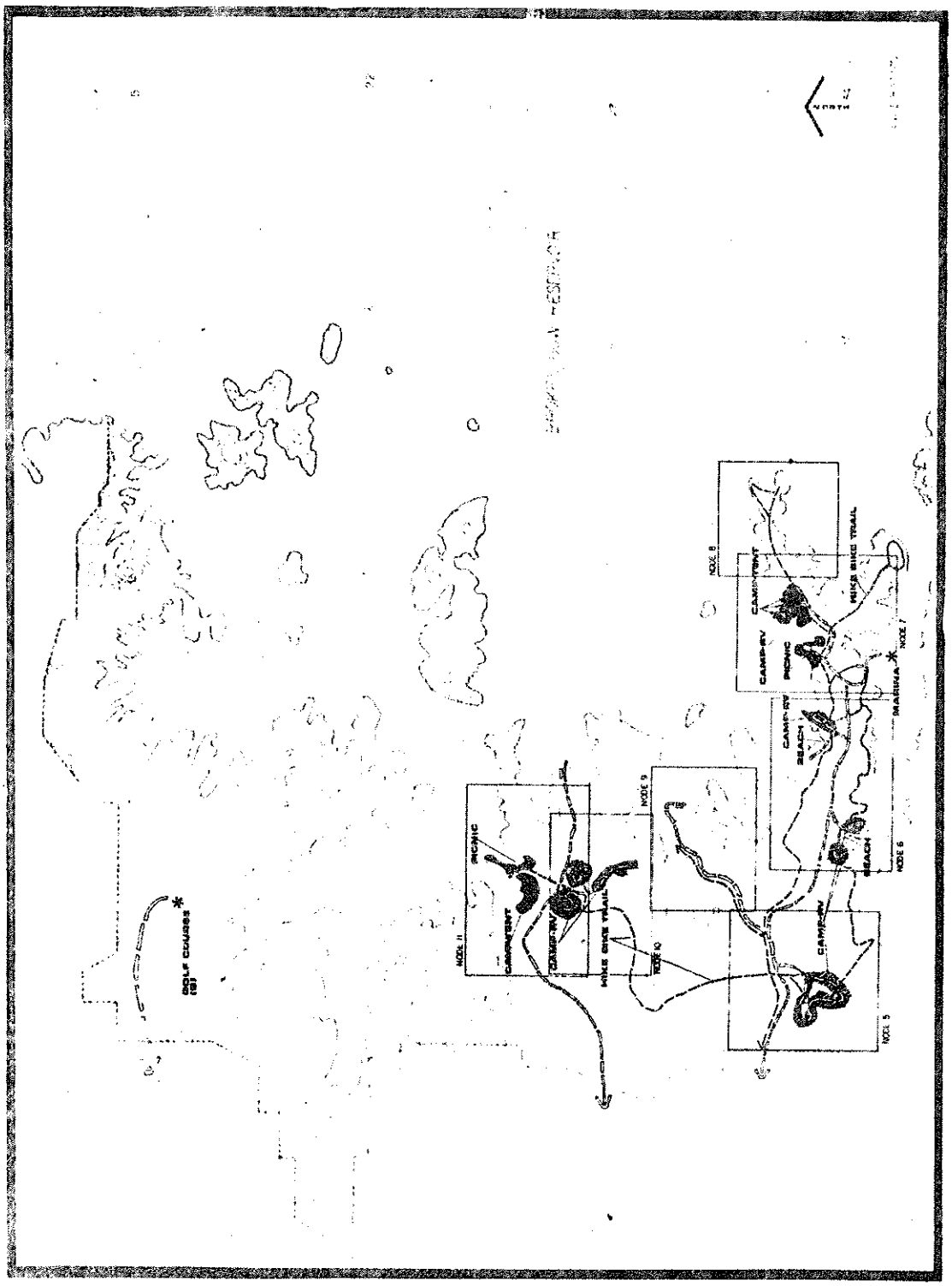
* In 2 loops -hook-ups only in one loop (21 hook ups).
** Capacity based on linear footage as well as acreage.

ADDITIONAL COMMENTS

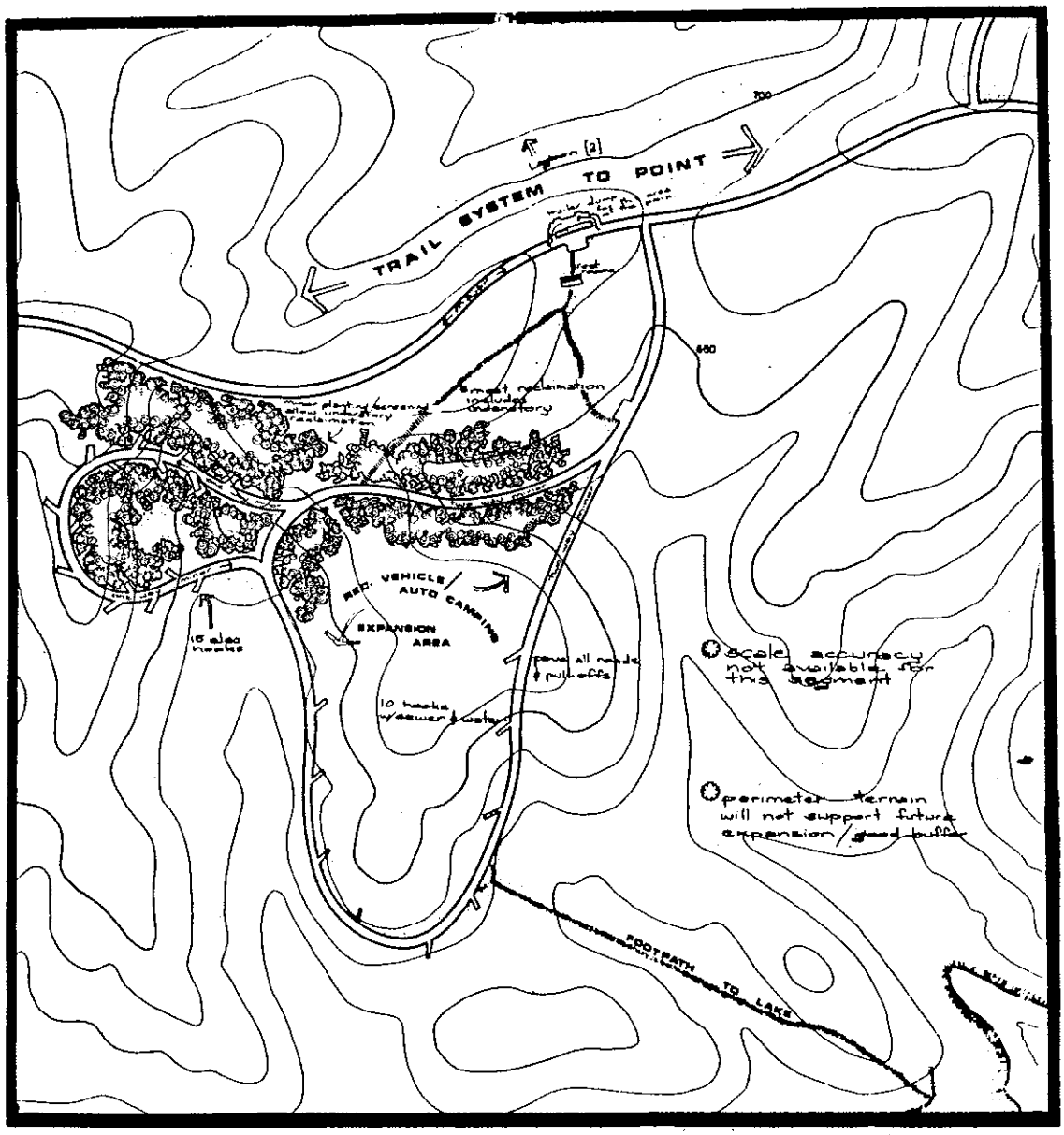
Lands outside the park are beginning to reflect a stripping out commercially and second home subdivisions which are clearly not in the interest of natural aesthetics. Either additional lands should be acquired to prevent continue deterioration or development rights or easements should be purchased. In either case, strong design criteria needs to be developed and administered with regard to the peripheral subdivision of land. This also applies to the upper area of the state park which follows.

5. Stevens Gap Base (Upper No. 5) - Leave existing hook-ups (10 w/sewer and water; 15 electrical only) -develop under story screens in non-use areas, keep road widths at minimum (clearance), construct pull out and trailer dump to serve Stevens Gap area and eventually Carson Creek when a cross road is developed (lower priority) -install visual graphics and develop gravel trails as shown within site and natural surface trails outside the site. Pave roads and gravel defined pull outs. (Note on crossroad, for management and channeling purposes the road to Carson Creek should be closed and access channeled through Stevens Gap. Trailer dump at Stevens Gap should be located so as to fall west of the junction of the access roads.)

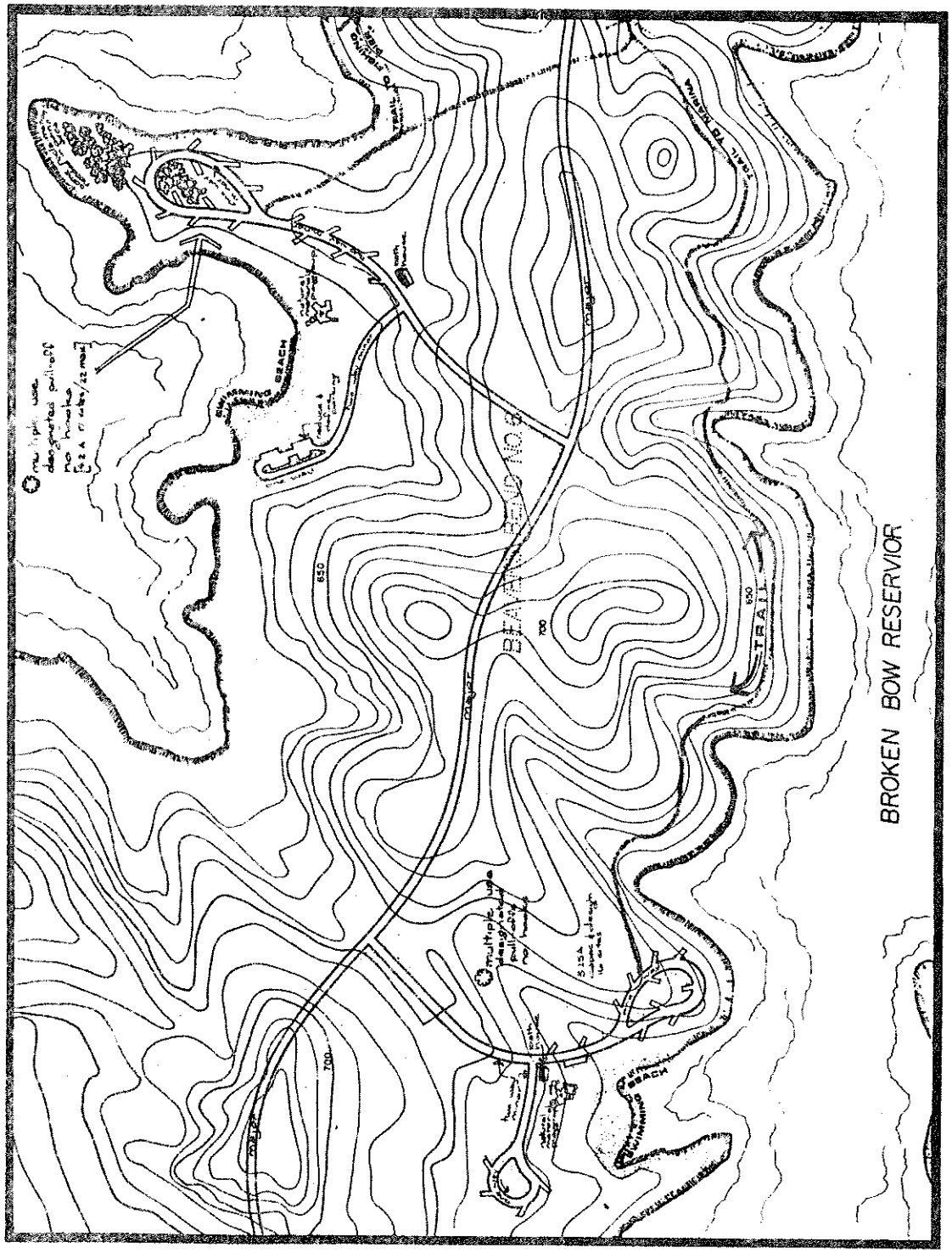
6. Stevens Gap Middle Area (Upper No. 6) Consists of two R.V./Auto camping areas with beaches. One on south side is 16 designated sites without hook-ups. One and two way minors paved with edged gravel pull outs, natural materials playgroup, understory in all non-use areas, small sand beach, sod and shade perimeter to road and playgroup. Develop northside area in the same manner (17 designated sites without hook-ups, with a capacity of 22 sites)- Break up and plant large parking area near beach, point area needs some planting and reclamation, develop trails as shown with pathways in camping areas being gravel, natural materials playgroup.



OVERALL MAP UPPER AREA



STEVENS GAP BASE



STEVENS GAP MIDDLE AREA

7. Stevens Gap Marina and Overflow Area (Upper No. 7) Marina needs edge planting and screening, modern rest facilities and either a well screened mobile home or a permanent state constructed residence (rented), berm and screen trailer storage area and put in permanent anchors (or hitches), intensively plant and screen all non-use areas. In view of the periodic parking shortages an area should be carefully designed for periodic overflow. This would be a gated grass surfaced series of very small clearings with minimum loss of overhead canopy and no loss of intervening vegetation. Natural surfaced trails outside of nodes as shown. The remaining two areas are for overflow purposes only - a gate is built at the junction of the roads as shown- breakup and plant parts of large launch area parking lot. Provide small modern restroom, 8 picnic sites and fishing pier - minimum clearance - Second loop is overflow camping (8 auto/R.V. and 7 short walk-in tent sites - small bath facilities and terminal parking area at base of loop (10 spaces). The balance of the point is completely closed to motor vehicles and is used for hiking, fishing, camping, and access by boat only. (Area No. 8) Close and reclaim all roads and parking areas as indicated - existing terminal parking on point should be reclaimed to a vista meadow and possible small natural materials fire ring. Absolute minimum amount of clearance and plant all unnecessary open areas to conifer.

8. Stevens Gap Auxiliary Ramp (Upper No. 9) Allow entire area to reclaim to road edge, remove all improvements except road (two way minor) ramp, and parking area - overflow only, gate at base of road.

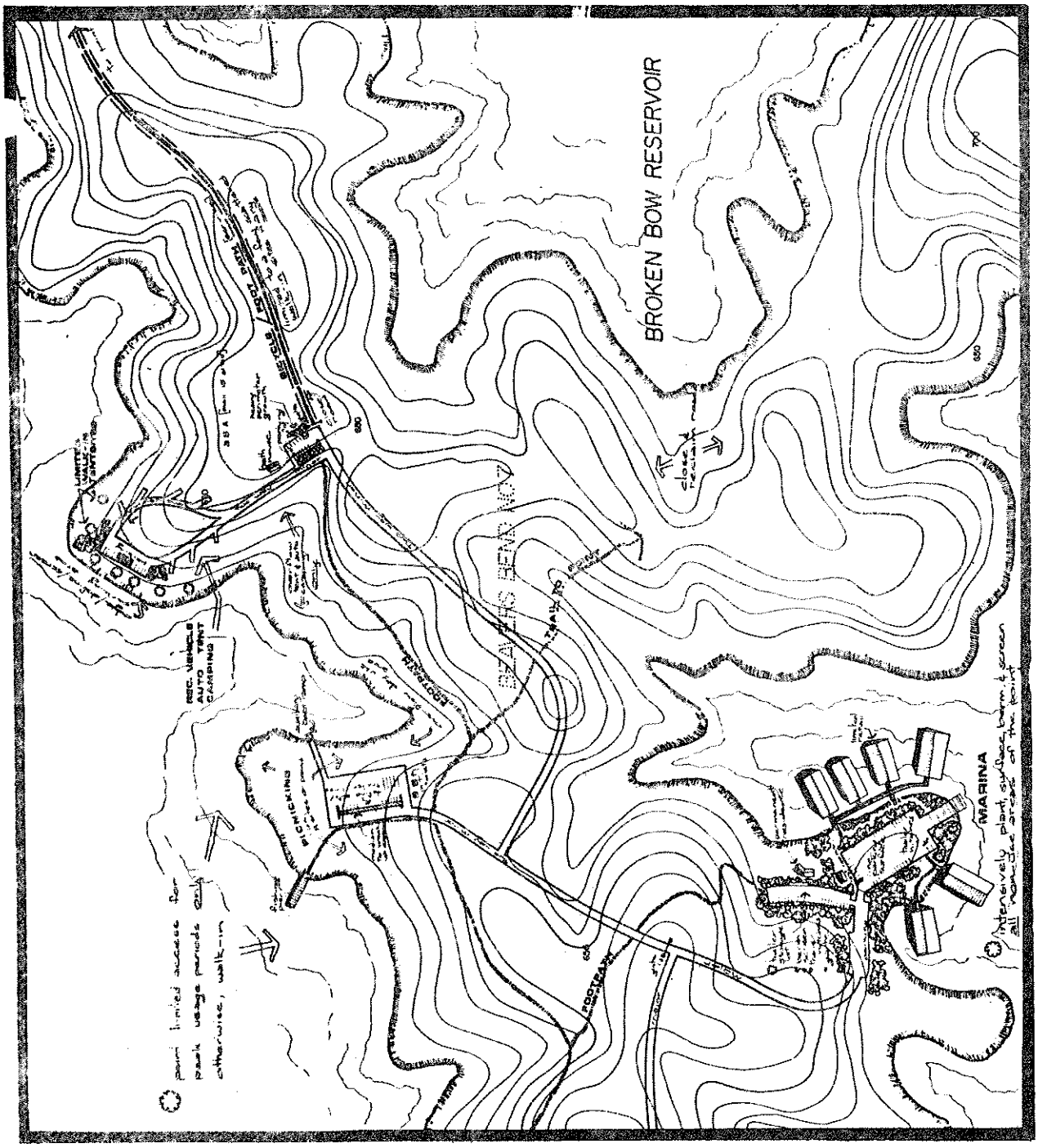
9. Carson Creek (Upper Nos. 10 & 11) Pave auto roads on central hook-up loops as indicated, close and reclaim all other access and prevent re incursion - (22 sites) - information graphics area west of first loop access - screen and reclaim all non-use areas - reclaim access road to southside ramp to provide designated camping pull outs witnout hook-ups- ramp becomes a gated auxiliary (peak period) launching facility - provide small dock for "arrival by boat" (14 sites) remove pit toilets (utilize modern bathhouse north of sites), remove playgroup - gate central east west spine and boat ramp to auxilary peak period usage only - no other development at point, maximum amount of reclamation and replanting - access to north side of Carson Creek Arm becomes principle launching facility with additional parking, 10 walk-in tentsites - 10 day use picnic sites on peninsula with fishing pier - small boat dock at ramp - modern bathhouse south of parking area. Access to Carson Creek should be from Stevens Gap on a new lower priority road with present road being phased out.

10. Cedar Creek No change over present golf course development except boat dock for course access from lake oriented uses. Further development within the period of the development plan is inappropriate.

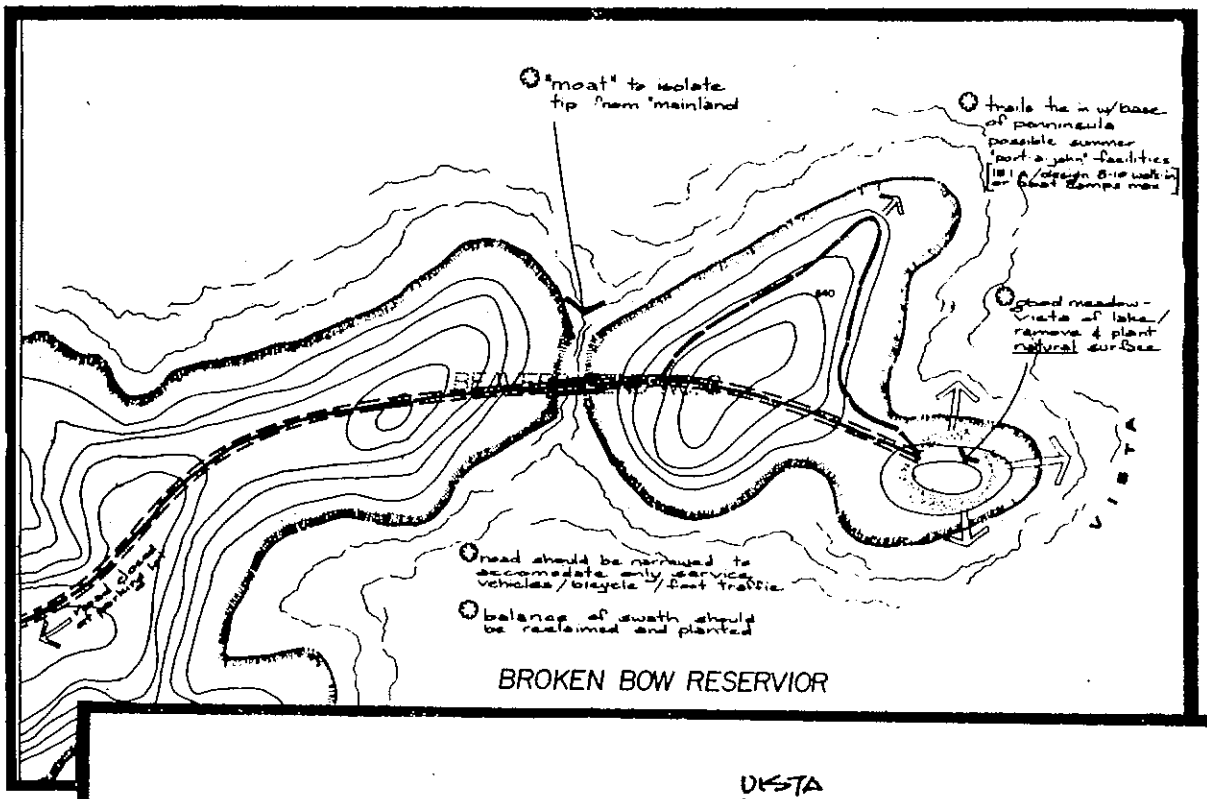
COSTING - PRIORITIES

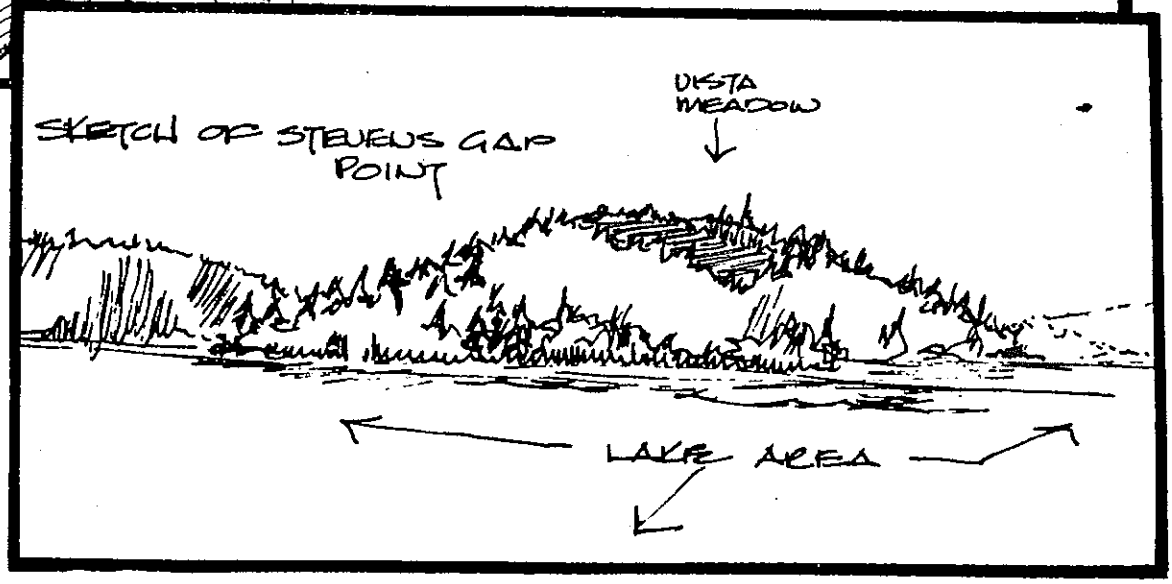
A. Closing, PLANTING, and RECLAMATION as shown on all upper Beavers Bend areas. TRAILER DUMP, GRAPHICS/INFORMATION PULL-OUT in Stevens Gap area, 5 TOILET FACILITIES, reclamation, SCREENING, and OVERFLOW/NATURAL SURFACE PARKING for Stevens Gap Marina.

$ 90,000.

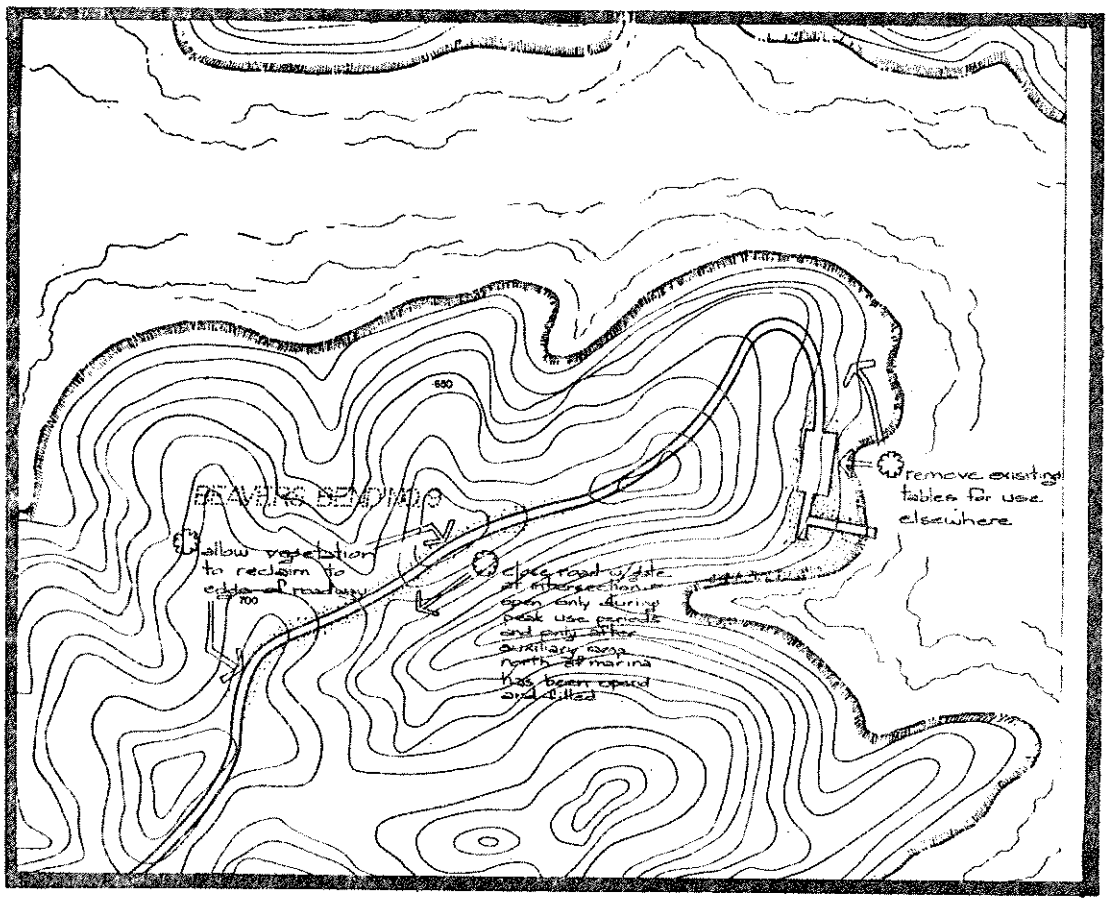


STEVENS GAP MARINA AND OVERFLOW AREA

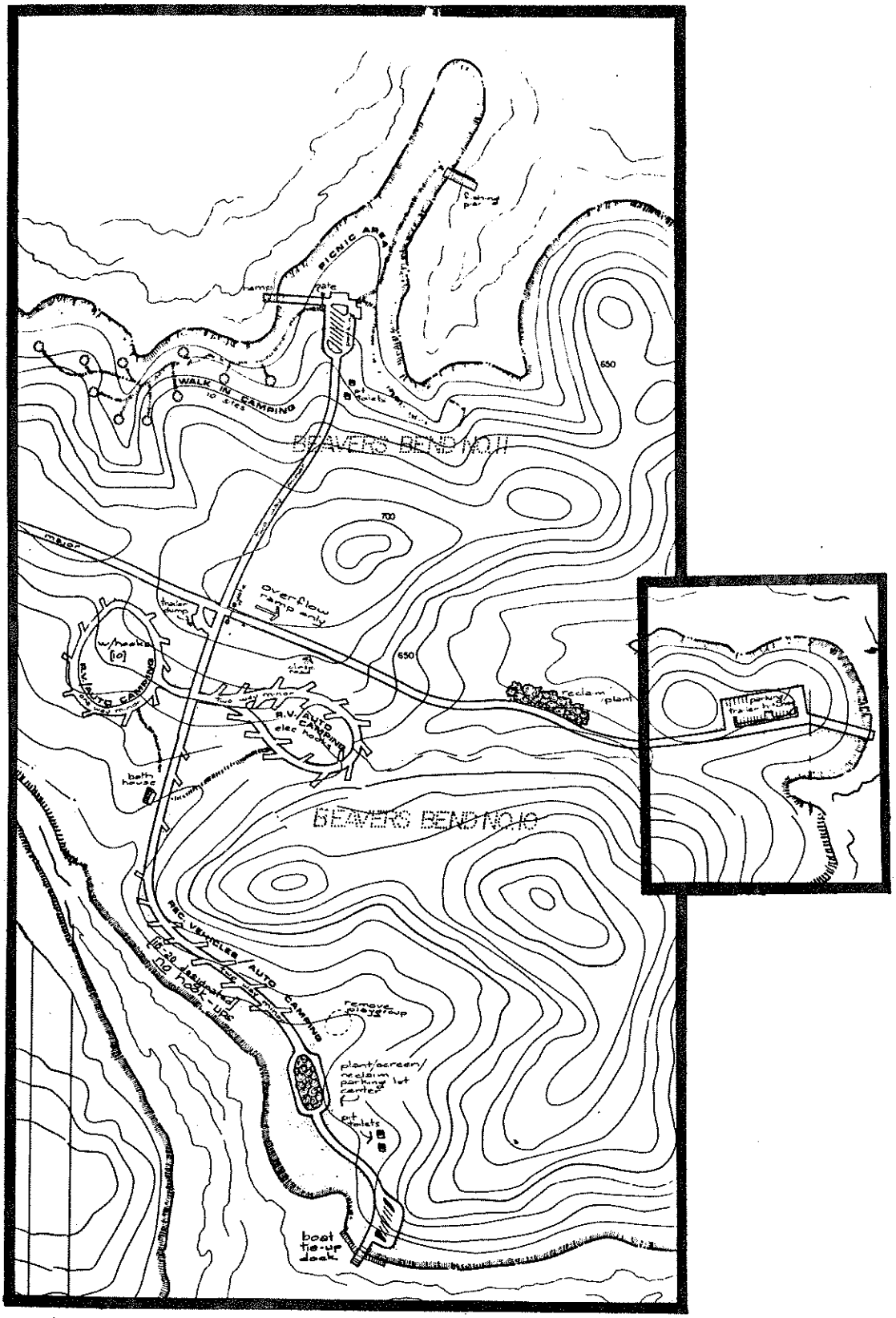




STEVENS GAP OVERFLOW AREA



STEVEN GAP AUXILIARY RAMP



CARSON CREEK

B. TWO NATURAL MATERIALS PLAYGROUPS (small) Stevens Gap Area No. 6, TRAIL elopment with gravel surfaces in areas of use BATHHOUSE (small) for north s..e beach in Stevens Gap Area No. 6 (replace pit toilets)

$ 31,000

C. Walk-in TENTSITES (10), RAMP DOCK and FISHING PIER and GATED NATURAL SURFACE OVERFLOW PARKING for launch area of Carson Creek area. GATE for central spine SMALL DOCK for south auxiliary ramp with GATE structure - INFORMATION pull out for Carson Creek Arm. PAVEMENT of all designated roads.

$142,000.

D. Terminus PARKING AREA and BATH FACILITY at end of motor access at Stevens Cap, development of overflow designated R.V./Auto campsites (8) and WALK-IN SITES (7) in Stevens Gap Area 7, SMALL FISHING PIER for auxiliary camp area of Stevens Gap No. 7 as well as 8 PICNIC SITES (same area) GATE for marina overflow.

$ 50,000.

E. BATHHOUSE southside beach - camping area No. 6 of Stevens Gap, CROSSOVER ROAD (PAVED) from Stevens Gap to Carson Creek (major) with closure of existing highway access BOAT DOCK for golf course at Cedar Creek. Pavement or gravel for all (edged) motor vehicle pull outs, PICNIC TABLES for all concrete patio pads in R.V. areas, continued PLANTING, SCREENING and reclamation of all areas not up to design standards. Remaining elements not noted.

$211,000.

*Total $ 524,000.

evens Gap Base (Upper No. 5)

	Acreage	Linear Footage	Capacity	Design
Picnic Sites	-	-	-	-
Tent Sites	-	-	-	-
R.V. Sites			*30	25
Closed Roads	-	-	-	-

* Due to lack of information on available maps, no accurate acreage or linear footage could be determined - The area now supports 19 sites. Scale accuracy was not available.

Stevens Gap Middle (Upper No. 6)

	Acreage	Linear Footage	Capacity	Design
Picnic Sites	-	-	-	-
Tent Sites	7.45		37	33
R.V. Sites	- -	-	-	-
Reclaimed Areas	1.3			

Trails 6000 ft. From Campground - Marina
" - Day Use Picnic Area

* Total includes 25% contractor profit and 15% contingency factor.

Stevens Gap Marina and Overflow Area (Upper No. 7)
(Areas 8 and 9 incl.)

	Acreage	Linear Footage	Capacity	Design
Picnic Sites	1.6		8	8
Tent Sites	18.8	-	75	25
R.V. Sites	-	-	-	-
Closed Roads		*14,600		
Reclaimed Areas	.6	6,500 ft	-	-
Planting (Screening)	**1	4,700 ft (along rd)	-	-

* Area to be opened during peak periods only.

** Primarily Screening in Marina area and around parking lots. This area will be treated primarily as day use and overflow, depending on management.

Stevens Gap Auxiliary Ramp (Upper No. 10)

	Acreage	Linear Footage	Capacity	Design
Picnic Sites	-	-	-	-
Multiple Use Sites			Significant*	17
Reclaimed Areas	1 (Pkng Lots)			
Planting (Screening)	2			

* Expansion could go to "Major" road past bathhouse

Carson Creek (Upper No 11)

	Acreage	Linear Footage	Capacity	Design
Picnic Sites	4.8		*	10
Tent Sites	3.7		13	10
R.V. Sites	4.0	1750 ft	24	24
Multiple Use	6.3		31	29
Closed Roads		**1000 400 paved		
Reclaimed Areas	.5 Ac			

* This picnic area will primarily serve day-use boaters with the only boat ramp in the area. Included is a very large parking lot and trailer hitch area. Therefore, a site capacity based on acreage would be invalid.

**Dirt road closing on point.

ADDITIONAL COMMENTS

The Upper Area of Beavers Bend State Park is relatively new with little loss of vegetation and ground cover thus far. However, auto access must be controlled and cut back to designated, paved corridors. The various clusters of development should be gated so that those not ordinarily necessary may be closed for recovery during non-peak hour periods. Overflow parking areas must be carefully designed grass surfaces to prevent any periodically used massive asphalt or gravel surfaces (often a chat or gravel base covered with bermuda will suffice). This park can potentially be pressured into an unaesthetic and environmentally unsound "overbuild." For management purposes access ways must be channeled through common areas rather than allowing each arm or peninsula to develop as a separate park in itself. As previously noted there is also an intensive danger of indiscriminant development of peripheral lands by the private sector.

SWDCO-R (SWTOD-O 3 Sep 76) 1st Ind .
SUBJECT: Broken Bow Lake, Mountain Fork River, Okla., Appendix D, Fish and Wildlife Management Plan, to DM No. 4B, Master Plan

DA, Southwestern Division, Corps of Engineers, Main Tower Building, 1200 Main Street, Dallas, TX 75202 14 DECEMBER 1976

TO: District Engineer, Tulsa, ATTN: SWTOD-O

1. Appendix D, Fish and Wildlife Management Plan to Design Memorandum No. 4B for Broken Bow Lake, is approved subject to the following comments:

a. Para 2-01, Page 2-1. The penultimate sentence should be clarified to show the small mouth bass is the most important sport fish species in the Mountain Fork River above Broken Bow Lake.

b. Para 2-03a, Page 2-1. Flathead catfish is listed as one of the species most sought after by fishermen. However, the species is not listed in paragraph 2-01 and it appears from the discussions that follow that management efforts are directed towards channel catfish. This statement should be checked and corrected if required.

c. Para 2-08c, Page 2-4. This statement implies that a firm commitment has been made for a 100 cfs minimum release to sustain the downstream fishing. Discussion with District personnel indicates that this is a target flow that has been agreed to and will be maintained consistent with primary project purposes.

d. Para 2-11b, Page 2-7. There are other published reports which should be listed in the bibliography such as the study conducted by Gary Earls, University of Oklahoma, through auspices of the Oklahoma Fish and Game Council. Also a pre-impoundment fisheries study by Finnel, Jenkins and Hall was conducted and published entitled "The Fishery Resources of the Little River System, McCurtain County, Oklahoma."

e. Para 2-12, Page 2-8. It is doubtful that the leopard darter is found in Broken Bow Lake. It has been recorded from the Mountain Fork River above Broken Bow Lake.

f. Para 3-11, Page 3-13.

(1) The red-cockaded woodpecker is listed in page 3-4 but is not listed under this paragraph. If present in the Broken Bow area, it should be listed as an endangered species.

(2) The ivory-billed woodpecker is extremely rare and possibly extinct. The discussion should point this out and that the presence of this species at Broken Bow Lake is quite unlikely.

(3) Broken Bow Lake is within the historic range of the red wolf but is not within its present known range.

SWDCO-R (SWTOD-O 3 Sep 76) 1st Ind 14 DECEMBER 1976
SUBJECT: Broken Bow Lake, Mountain Fork River, Okla., Appendix D, Fish and Wildlife Management Plan, to DM No. 4B, Master Plan

g. Para 4-01, Page 4-1. The discussion states that the 647 acres on state licensed lands designated as the "Acres for Wildlife Program" are now designated as "Public Recreation Areas." However, these are not shown on the map accompanying the Oklahoma Department of Wildlife Conservation management plan in Exhibit B.

h. Exhibit B. This is a General Management Plan, preliminary in nature, which was furnished by the State at the time the license was being processed. An updated detailed management plan should be obtained from the Oklahoma Department of Wildlife Conservation and included in Exhibit B.

i. Exhibit D. There is no legend explaining the letters WL on the Unit maps.

2, This appendix should be reviewed annually. A page should be inserted at the end of this plan showing the date the appendix was reviewed and the signatures of the reviewers. Minor pen and ink changes can be approved by the District.

FOR THE DIVISION ENGINEER:

wd all incl

A. P. HUTCHISON
Chief, Construction-
Operations Division

CF: w/incl
HQDA (DAEN-CWO-R) (dupe)

DEPARTMENT OF THE ARMY
TULSA DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 61
TULSA, OKLAHOMA 74102

3 SEP 1976

SWTOD-O

SUBJECT: Broken Bow Lake, Mountain Fork River, Okla., Appendix D, Fish and Wildlife Management Plan, to DM No. 4B, Master Plan

Division Engineer, Southwestern
ATTN: SWDCO-OR

Subject appendix (Incl 1) is submitted for review and approval in accordance with ER 1130-2-400.

FOR THE DISTRICT ENGINEER:

JAMES P. JONES
Chief, Operations Division

1 Incl (7 cys)
as

30 copies prepared

BROKEN BOW LAKE
MOUNTAIN FORK RIVER
OKLAHOMA

APPENDIX D
FISH AND WILDLIFE MANAGEMENT PLAN

TABLE OF CONTENTS

TABLE OF CONTENTS (cont'd)

TABLE OF CONTENTS (cont'd)

EXHIBIT INDEX

BROKEN BOW LAKE
MOUNTAIN FORK RIVER
OKLAHOMA

APPENDIX D
FISH AND WILDLIFE MANAGEMENT PLAN

TO

DESIGN MEMORANDUM NO. 4B
MASTER PLAN

Department of the Army
Tulsa District Corps of Engineers
Oklahoma

BROKEN BOW LAKE
MOUNTAIN FORK RIVER
OKLAHOMA

APPENDIX D
FISH AND WILDLIFE MANAGEMENT PLAN
TO
DESIGN MEMORANDUM NO. 4B
MASTER PLAN

I - INTRODUCTION

1-01 Purpose. This plan is for the management, improvement, and public use of the fish and wildlife resources of Broken Bow Lake.

1-02 Authority. This plan is prepared in accordance with the Fish and Wildlife Coordination Act of 1958 (PL 85-624) as amended, the Federal Water Project Recreation Act of 1965 (PL 89-72), AR 420-74, ER 1130-2-400, ER 1120-2-400, and ER 1105-2-129.

1-03 Objectives. The objectives of this plan are to:

a. Develop and manage habitat and to provide public access for hunting and fishing in accordance with the needs and desires of the public.

b. Provide opportunities for the non-consumptive use of all natural resources.

c. Preserve and maintain, insofar as possible, the integrity of all natural ecosystems.

d. Integrate fish and wildlife management with that of other natural resources.

1-04 Agency Responsibilities.

a. General. Resident fish and wildlife belong to the State of Oklahoma regardless of land ownership. The Oklahoma Department of Wildlife Conservation has the authority and responsibility to preserve, manage, and regulate all resident fish and wildlife. Both the US Fish and Wildlife Service and the Oklahoma Department of Wildlife Conservation are responsible for the conservation and management of all migratory animals. The Corps' responsibility as a landowner is to restore, improve, and preserve fish and wildlife through wise land use and habitat development.

Section 3 of the Fish and Wildlife Coordination Act makes provisions for the use of civil works projects for the conservation, maintenance, and management of fish and wildlife and their habitats. Land and water areas

under the jurisdiction of the Department of the Army may be made available to the Oklahoma Department of Wildlife Conservation by license agreement under the terms of a General Plan approved jointly by the Secretary of the Army, the Secretary of the Interior, and the Director of the Oklahoma Department of Wildlife Conservation. Areas not managed through licenses or other formal agreements will be managed by the Corps through implementation of a fish and wildlife management plan. Implementation of the plan is subject to the primary purpose for which areas were zoned.

b. US Fish and Wildlife Service. The Service is responsible for providing technical advice and planning assistance to State and other Federal agencies to preserve and improve fish and wildlife resources.

c. Oklahoma Department of Wildlife Conservation. The conservation and management of fish and wildlife resources within the state is the responsibility of this agency. Within this scope of responsibility, the Department is striving to:

(1) Maintain acceptable levels of native and exotic species commensurate with their benefits to man.

(2) Provide for diversified recreational use of fish and wildlife.

(3) Insure the survival of fish and wildlife and provide people with an equal opportunity to utilize these resources.

(4) Publicize and encourage the conservation and appreciation of fish and wildlife and other natural resources.

(5) Encourage the scientific and educational use of fish and wildlife. Programs employed to achieve the above objectives are management of the lake fishery and management of certain perimeter lands. The Oklahoma Department of Wildlife Conservation has a license to approximately 5,420 acres of Broken Bow project lands zoned for fish and wildlife management. The license was granted for a period of 50 years beginning 1 April 1966. A copy of the license is attached as Exhibit A and management plan as Exhibit B.

d. Oklahoma Tourism and Recreation Department, Division of State Parks. The Oklahoma Tourism and Recreation Department has a 50-year lease on 3,875.3 acres of project lands. Lease period began 1 January 1967. Acres encompassed by this lease include Stephens Gap, Carson Creek, Cedar Creek, and River Bend public use areas. The Oklahoma Tourism and Recreation Department owns and operates the Beavers Bend State Park which is approximately 5,135 acres and is contiguous to project lands. Facilities available include paved roads, picnic tables, water supply systems, grills, restrooms and showers, refuse containers and rental cabins.

II - AQUATIC

2-01 General. Broken Bow Lake has a surface area of 14,200 acres at pool elevation 599.5 feet msl and a shoreline of 180 miles. The damsite is located nine miles northwest of Broken Bow, Oklahoma, and one mile northwest of Beavers Bend State Park. This expanse of water provides a habitat for spotted bass, largemouth bass, white bass, crappie, channel catfish, green sunfish, gizzard shad, carp, carpsuckers, bullhead catfish, buffalo, and numerous species of minnows. Principal specie above the lake in the Mountain Fork River is the smallmouth bass.

The abundance of these species provides a source of recreational activity enjoyed by the public.

2-02 Fisheries Management. Fishery resource management at Broken Bow Lake is the responsibility of the Oklahoma Department of Wildlife Conservation. Agencies which have participated in planning studies and research of these resources are the Oklahoma Department of Wildlife Conservation, US Fish and Wildlife Service, and the Corps of Engineers. The Corps has actively participated in the planning and research work as well as cooperated with State and Federal agencies. To date, it appears that the Corps will also be active in fishery habitat management work at Broken Bow Lake. Pre-impoundment fishery surveys and studies have been conducted on the Mountain Fork watershed. These studies included species composition, distribution, age and growth determination, and estimation of populations and standing crops of fishes in the watershed. A list of these studies is provided in Section 2-11.

2-03 Major Species Being Managed.

a. Warm-water Species. Species most sought after are bass, crappie, bluegill, green sunfish, and flathead catfish. Soon after impoundment the fishery, particularly bass fishing, exhibited poor conditions and studies pointed to an inadequate forage fish food supply. Introductions of threadfin shad in 1971 and 1972 resulted in a marked improvement in the bass fishing. Fishing for all species is good at the present time.

b. Stocking Program. Over a period of several years the Oklahoma Department of Wildlife Conservation has stocked the following fish species in Broken Bow Lake.

Channel Catfish

Size	Number	Date Stocked
fry	210,000	August 1969
fry	299,000	August 1969
fingerling	37,251	November 1969
TOTAL	546,251	

Blue Catfish

Size	Number	Date Stocked
adult	50	March 1969
TOTAL	50	

Largemouth Bass

Size	Number	Date Stocked
fry	487,000	May 1969
fry	108,200	May 1969
fry	200,800	May 1969
fry	178,000	May 1969
TOTAL	974,000	

Threadfin Shad

Size	Number	Date Stocked
adult	9,000	April 1971
adult	9,500	April 1971
adult	6,000	April 1971
adult	2,350	May 1972
adult	6,847	May 1972
adult	8,882	May 1972
TOTAL	42,579	

Walleye

Size	Number	Date Stocked
fry	1,409,799	March 1970
fry	1,060,387	April 1970
fry	524,944	March 1971
fry	965,522	April 1971
fry	52,702	April 1971
fry	1,366,926	March 1972
fry	150,000	April 1972
fry	762,414	April 1974
fry	399,164	April 1974
TOTAL	6,691,858	

Rainbow Trout

Size	Number	Date Stocked
50/lb	36,532	June 1972
6-7/lb	8,912	January 1973
7/lb	9,520	January 1973
7/lb	10,222	February 1973
4/lb	1,600	March 1974
5/lb	4,350	March 1974
4/lb	4,000	April 1974
5/lb	5,402	April 1974
3/lb	4,000	April 1974
TOTAL	84,538	

c. Cold-water Species. Broken Bow Lake possesses a unique potential for establishment of a rainbow trout fishery in both the lake and downstream waters. Investigations for establishment of such a fishery are being conducted by the Oklahoma Department of Wildlife Conservation and experimental stockings of rainbow trout have been made with good survival and harvest results. Sufficient data is not available to project the ultimate future of the trout program at Broken Bow Lake, however, a substantial trout fishery has already been developed and the prospects look very good for a continued trout program of some type.

Some discussion has occurred as to the need for construction of a trout rearing hatchery below the Broken Bow Dam. The need for such a hatchery was looked into by personnel of the Oklahoma Department of Wildlife Conservation with conclusions being that a hatchery could not be justified from a desirable cost-benefit ratio. In addition it was concluded that since sufficient numbers of trout are available from the Federal hatchery operations in Arkansas, free of charge that there is no real demand or need for such a facility in the forseeable future.

d. Downstream Species.

(1) Sportfishing. About 18 miles of stream occurs from Broken Bow dam to the river's confluence with Little River. Fishing is generally good provided adequate releases are made to maintain acceptable water quality. Heaviest sportfishing activity occurs in the powerhouse fishing area and Beavers Bend State Park, downstream from the reregulation dam (4.7 miles downstream), Highway 70 bridge and Bogleye Crossing. Principal sportfish are bass, crappie, sunfish, catfish, and trout.

2-04 Water Quality Effects on the Fishery

a. General. Quality of water entering Broken Bow Lake is high. Rainfall runoff is rapid from the steep wooded Ouachita Mountains. Low human population density, minimal agriculture and industry within the watershed further preserves water quality. One exception is the effect of clear cutting timber on contiguous lands held by the Weyerhaeuser Company. Soil erosion is accelerated by this practice creating short periods of high turbidity within the lake following heavy rains. This is particularly evident when viewed from an airplane. This problem can be minimized if clear cuts are reseeded to a suitable temporary cover to hold the soil. Siltation reduces fish spawning in the lake and adversely affects primary productivity.

b. Turbidity. Lake turbidity at present is due primarily to clear cutting practices on the watershed and to a lesser extent to shoreline erosion. Turbidity is temporary following heavy rains.

c. Pesticides. Pesticide residues in fish tissue from Broken Bow Lake are expected to be low since the drainage area has limited agricultural activities.

2-05 Lake Clearing. Broken Bow Lake site was cleared of timber and brush from Dyre Creek to the damsite. This area is the broadest expanse of water on the project. North of Dyre Creek the lake resembles a wide meandering river. The only clearings north of Dyre Creek are the small sized fish seining areas adjacent to Holly Creek.

2-06 Aquatic Plants. The normal water clarity, and average water depth precludes establishment of aquatic plants in the main body of Broken Bow Lake. Severe water level fluctuations also retard aquatic vegetational growth in the upper reaches of the lake as well as in tributary streams. Normal patrol activities will allow for monitoring of aquatic plant problems if they should occur and treatment will be implemented when warranted.

2-07 Commercial Fishing. Presently, commercial fishing is not allowed in Broken Bow Lake; however, in 1960 commercial fishing was allowed with an annual harvest value of $25,000.

2-08 Habitat Improvement and Maintenance. Fishery management within the lake is primarily the responsibility of the Oklahoma Department of Wildlife Conservation. However, Broken Bow project personnel will contribute toward management of the fishery resources by cooperating with the Oklahoma Department of Wildlife Conservation by providing personnel, equipment, materials, and publicity. The State will be encouraged to:

a. Introduce threadfin shad and Mississippi silversides to establish a desirable forage base.

b. Continue stocking Florida largemouth bass, walleye and blue catfish which are highly desirable predatory sportfish.

c. Introduce fingerling rainbow trout to evaluate a "put and take" trout fishery in the lake and downstream areas.

d. Develop a water level stabilization plan for sport fish species during spawning activities.

Activities to be accomplished by Corps programs to improve sportfish harvest are:

a. Provide lake contour maps to aid fishermen.

b. Construct 5 stake beds and 5 brush shelters to concentrate fish.

c. Modify existing fishing piers to facilitate bank fishing and to aid physically limited fishermen.

d. Construct fish shelters around the fishing piers and along shoreline areas.

e. Maintain a minimum release of water to provide 100 cubic feet per second flow at the Eagletown gauge to sustain fish in the downstream area.

2-09 Water Level Fluctuation. Water level fluctuation is common at Broken Bow Lake; however, fluctuations are not considered extreme. Despite the limited fluctuation potential, adverse effects to the fishery does exist. First, spawning success of game fish is threatened due to dewatering of nests, and, secondly, primary productivity of the lake is reduced. Every effort will be made to stabilize water levels during mid-April through May insofar as compatible with weather conditions and other project purposes.

2-10 Fisherman Access. State, county, and Federal highways occur in the vicinity of Broken Bow Lake. Highway 259 and 259A, as well as county and project roads and logging trails, provide access to the project office, powerhouse, and tailwater as well as the entire right shore of the lake. Highway 70 east of the town of Broken Bow provides further access to the reregulation dam and lower Mountain Fork River. County roads and logging trails provide access to the left shore. This access at present is primitive and subject to temporary washouts. Access by water is adequate.

The long-range prospects including implementation of the project master plan for public use and accelerated clear cutting practices of the Weyerhaeuser Company should increase land access to the project.

2-11 Creel Census and Research Activities. Broken Bow Lake is included in a state-wide creel survey to be conducted by the Oklahoma Department of Wildlife Conservation. This agency will also periodically conduct studies on the lake to determine the status of the fish population and related parameters. Currently, evaluation is being made of the suitability of the lake and tailwaters for establishment of a rainbow trout fishery.

a. A list of species present or expected in Broken Bow Lake is given below. Common and scientific names used in this list conform to thouse used in Special Publication 0.6 of the American Fisheries Society, 1970:

Spotted gar	Lepisosteus oculatus
Longnose gar	Lepisosteus osseus
Bowfin	Amia calva
Gizzard shad	Dorosoma cepedianum
Threadfin shad	Dorosoma petenensis
Goldeye	Hiodon alsoides
Mooneye	Hiodon tergisus
Goldfish	Carassius auratus
Carp	Cyprinus carpio
Golden shiner	Notemigonus crysoleucas

Bigeye shiner	Notropis boops
Ironcolor shiner	Notropis chalybaeus
Common shiner	Notropis cornutus
Ribbon shiner	Notropis fumeus
Kiamichi shiner	Notropis ortenburgeri
Redfin shiner	Notropis umbratilis
Blacktail shiner	Notropis venustus
Mimic shiner	Notropis volucellus
Steelcolor shiner	Notropis whipplei
Bluntnose minnow	Pimephales notatus
Bullhead minnow	Pimephales vigilax
River carpsucker	Carpiodes carpio
Creek chubsucker	Erimyzon oblongus
Smallmouth buffalo	Ictiobus bubalus
Bigmouth buffalo	Ictiobus cyprinellus
Black buffalo	Ictiobus niger
Spotted sucker	Minytrema melanops
River redhorse	Moxostoma carinatum
Golden redhorse	Moxostoma crythrurum
Blue catfish	Ictalurus furcatus
Black bullhead	Ictalurus melas
Yellow bullhead	Ictalurus natalis
Brown bullhead	Ictalurus nebulosus
Channel catfish	Ictalurus punctatus
Stonecat	Noturus flavus
Freckled madtom	Noturus nocturnus
Flathead catfish	Pylodictis olivaris
Blackstripe topminnow	Fundulus notatus
Starhead topminnow	Fundulus nottii
Mosquitofish	Gambusia affinis
Brook silversides	Labidesthes sicculus
White bass	Morone chrysops
Flier	Centrarchus macropterus
Green sunfish	Lepomis cyanellus
Orange spotted sunfish	Lepomis humilis
Bluegill	Lepomis macrochirus
Longear sunfish	Lepomis megalotis
Redear sunfish	Lepomis microlophus
Spotted sunfish	Lepomis punctatus
Smallmouth bass	Nicropterus dolomieui
Spotted bass	Micropterus punctulatus
Largemouth bass	Micropterus salmoides
White crappie	Pomoxis annularis
Black crappie	Pomoxis nigromaculatus
Mud darter	Etheostoma asprigene
Bluntnose darter	Etheostoma chlorosomum
Swamp darter	Etheostoma fusiforme
Slough darter	Etheostoma gracile

Johnny darter	Etheostoma nigrum
Goldstripe darter	Etheostoma parvipinne
Cypress darter	Etheostoma proeliare
Logperch	Percina caprodes
Leopard darter	Percina pantherina
Slenderhead darter	Percina phoxocephala
Walleye	Stizostedion vitreum vitreum
Freshwater drum	Aplodinotus grunniens
Rainbow trout	Salmo gardneri

b. A bibliograph of published and unpublished fisheries reports on the Mountain Fork River and Broken Bow Lake is given below. This list is taken from Oklahoma Fishery Research Laboratory, Bulletin No. 10, "Bibliography of Literature on Oklahoma Waters".

1959 Anonymous

Oklahoma Lake Size and Capacity (publication unknown)
Lists owner, surface area, capacity pool N.E. Reg. 2212

1960 Garlick, L. R.

River Basin Report, Broken Bow Reservoir, Mountain Fork River, Oklahoma, US Fish & Wildlife, Division of Fishery Report, 10 pp. OFRL, 7028.

1968 Collins, D., C. Bennett, R. Jarmon, M. Kernoodle, and D. Hicks

Fishery reconnaissance, F-15-R3, Job 3 Report. Data on lakes physical, chemical, and biological, gathered by large number of methods. N. E. Reg., unfiled S. E. Reg., 1,520

1969 Cook, Dick

Scenic Rivers. Outdoor Oklahoma, 25:2, p. 2-9. General information on scenic rivers program in Okla. OFRL, Journal

1970 Mauck, Paul E.

Broken Bow Investigation Report. Oklahoma Department of Wildlife Conservation, Unpublished

Lists species collected, methods used, overall condition and recommendations. SE. Red., Broken Bow Res. File

1971 Mauck, Paul E.

Broken Bow Reservoir (Dyre Creek) Cove Rotenone Investigation, ODWC, unpublished 9 pp.

Lists species collected, methods used, condition of fish, age and growth and percent by number and percent by weight by species. S.E. Reg. Broken Bow Res File

1971 Mauck, Paul E.

Threadfin Shad Critique - Spring, 1971, ODWC, Unpub. 4 pp. Lists methods used and number of threadfin stocked in Broken Bow Res. S. E. Reg., Broken Bow Res File

1972 Mauck, Paul E.

Summary of the collection of fish species from two coves in Broken Bow Res. ODWC, Unpub.

Lists species number and weight per acre. S.E. Reg. Broken Bow Res. File

Broken Bow is a relatively new lake; therefore, limited fisheries management or research has been conducted. The Oklahoma Department of Wildlife Conservation, Fisheries Division, has conducted several fisheries investigations as well as initial and subsequent fish stockings. During 1970 a total of 247 catchable fish were tagged and released in the lake as part of a Fishing Derby. This project was initiated to estimate percent of harvest occurring in Broken Bow Lake. A total of six tags were returned representing a minimum harvest of 2.4 percent. The state average rate of harvest for lakes over 10,000 acres in size was 5.1 percent.

2-12 Endangered Species. Presently the only endangered aquatic species believed to be present in Broken Bow Lake is the leopard darter (Percina pantherine).

2-13 Corps Cooperation.

a. General. Corps project personnel will assist State and Federal fish and wildlife agencies in carrying out all management practices outlined in this plan.

b. Pollution Control. To maintain and enhance the water quality of Broken Bow Lake, project and District personnel will diligently pursue enforcement of State and Federal pollution control laws. Sources of pollution not covered under Federal regulations will be reported by District office personnel to the Oklahoma Department of Pollution Control for appropriate action.

III - TERRESTRIAL

3-01 General. Habitat improvements will promote more abundant wildlife populations and will provide additional recreational opportunities for sportsmen, hikers, naturalists, and bird watchers. The natural beauty of the area will be preserved and enhanced by planting fields and pastures with flowering and fruit bearing plants such as multiflora rose and honeysuckle to provide food and cover for wildlife. Nature trails will be provided where feasible. Hunting is in accordance with Federal and state fish and wildlife regulations. Hunting will be permitted on all project lands except recreational areas and project operation areas. Areas not open to hunting will be posted accordingly.

3-02 Major Species to be Managed. All wildlife species have been considered in the preparation of this plan. Emphasis is, however, placed on deer, squirrel, rabbits, quail, and songbirds. In addition, consideration will be given to the management and protection of songbirds and birds of prey, particularly golden and bald eagles.

3-03 Forest Management Effects on Wildlife. A forest management plan identified as Appendix B to the Master Plan provides for a suitable environment for recreation activities through vegetative management. The overall objectives of the plan are as follows:

a. Establish trees, shrubs, and grasses suitable for recreation.

b. Improve existing vegetation through cultural practices to provide aesthetic, wildlife, watershed, and other recreation associated benefits.

c. Protect vegetation where and when necessary from insects, wildfires, disease, and damage from public use.

d. Provide a stabilized filtration strip around the lake to protect soil from wind and water erosion.

3-04 Adequacy of Lands Allocated to Wildlife. The Broken Bow Lake area supports one major vegetative type which contains both climax and subclimax species. The oak-hickory association is the climax vegetation, but it has been invaded by two species of pine to such an extent that the vegetation is classified as an oak-hickory-pine type.

Representative plants in this type are white oak, blackjack oak, post oak, shumard oak, southern red oak, black hickory, shagbark hickory, pignut hickory, shortleaf pine, loblolly pine, black locust, sweet gum, cypress, early azalea, river cane, greenbriar, poison ivy, wild grape, big bluestem, little bluestem, switchgrass, Indian grass, and broomsedge. As an overall

view of the vegetative types in the area, attached is a vegetative map of Oklahoma as Exhibit B, and Corps wildlife units as Exhibit D.

A partial list of wildlife inhabiting or seasonally using the area follows:

a. Amphibians

Tiger salamander	Ambystoma texanum
Hunter's spadefoot toad	Scophiopus hunteri
American toad	Bufo americanus
Tree frog	Hyla versicolor
Cricket frog	Acris gryllus
Leopard frog	Rana pipiens
Bull frog	Rana catesbeiana

b. Reptiles

Map turtle	Graptemys geographicc
Mud turtle	Kinosternon subrubrum
Red ear turtle	Pseudemys scripta
Snapping turtle	Chelydra serdentino
Stinkpot	Sternothaerus carinatus
Three toed box turtle	Terrapene carolina
Ornate box turtle	Terrapene ornata
Pallid soft shell turtle	Trionyx spintferus
Carolina anole	Anolis carolinensis
Six lined racerunner	Cnemidophorus sexlineatus
Collared lizard	Crotaphytus collaris
Five-lined skink	Eumeces fascitus
Broad headed skink	E. laticeps
Ground skink	Lygosoma laterale
Fence lizard	Sceloporus undulatus
Copperhead	Agkistrodon contortrix
Cottonmouth	Agkistrodon piscivorous
Yellow bellied racer	Coluber constrictor
Timber rattlesnake	Crotalus horridus
Ringneck snake	Diadophis punctatus

Black rat snake	Elphe obsoleta
Hognose snake	Heterodon nasicus
Prairie king snake	Lampropeltis calligaster
Speckled king snake	Lampropeltis getulus
Coach whip	Masticophis flagellum
Water snake	Natrix erythrogaster, N. fasciata N. rhombifera and N. sipedon
Rough green snake	Opheodrys aestivus
Bull snake	Piguophis melanoleucus
Ground snake	Sonora episcopa
Flat-headed snake	Tantilla gracilis
Ribbon snake	Thamnophis proximus
Red-sided garter snake	Thamnophis sirtalis
Common garter snake	Thamnophis ordinatus
Rat snake	Elaphe guttata

c. Birds

Horned grebe	Podiceps auritus
Pie-billed grebe	Podilymbus podiceps
Anhinga	Anhinga anhinga
Olivaceous cormorant	Phalacrocorax olivaceus
Herring gull	Larus argentatus
Ringbilled gull	Larus delawarensis
Laughing gull	Larus atricilla
Green heron	Butorides virescens
Little blue heron	Florida caerulea
Cattle egret	Bubulcus ibis
Common egret	Casmerodius albus
Snowy egret	Leucophoyx thula
American bittern	Botaurus lentiginonus
Canada goose	Branta canadensis
White-fronted goose	Anser albifrons
Snow goose	Chen hyper borea
Mallard	Anas platyrhynchos
Gadwall	Anas strepera
Pintail	Anas acuta
Green winged teal	Anas carolinensis

Blue-wing teal	Anas discors
American widgeon	Mareca americana
Shoveler	Spatula clypeata
Wood duck	Aix sponsa
Red head	Aytha americana
Canvasback	Aythya valisineria
Common goldeneye	Bucephala clagula
Bufflehead	Bucephala albeala
Hooded merganser	Lophodytes cucullatus
Common merganser	Mergus merganser
Turkey vulture	Cathartes aura
Sharp-shinned hawk	Accipiter striatus
Goshawk	Accipiter gentilis
Red-tailed hawk	Buteo jamaicensis
Harlan's hawk	Buteo harlani
Red-shouldered hawk	Buteo lineatus
Broad-winged hawk	Buteo platypterus
Bald eagle	Haliaeetus leucocephalus
Marsh hawk	Circus cyaneus
Osprey	Pandion haliaetus
Sparrow hawk	Falco sparverius
Bobwhite quail	Colinus virginianus
Turkey	Meleagris gallapavo
Common gallinule	Callinula chloropus
American coot	Fulica americana
Killdeer	Charadrius vociferus
Common snipe	Capella gallinago
Spotted sandpiper	Actitis macularia
Morning dove	Zenaidura macroura
Yellow-billed cuckoo	Coccyzus americanus
Roadrunner	Geococcyx californianus
Barn owl	Tyto alba
Screech owl	Otus asio
Great horned owl	Bubo virginianus
Barred owl	Strix varia
Common nighthawk	Chordeiles minor
Whip-poor-will	Caprimulgus vociferus
Chimney swift	Chaetura pelagica
Ruby-throated hummingbird	Archilochus colubris
Belted kingfisher	Megaceryle alcyon
Yellow-shafted flicker	Colaptes auratus
Red-shafted flicker	Colaptes cafer
Pileated woodpecker	Dryocopus pileatus
Red-headed woodpecker	Melanerpes erythrocephalus
Red-bellied woodpecker	Centurus carolinus
Yellow-bellied sapsucker	Sphyrapicus varius
Hairy woodpecker	Dendrocopos villosus
Downey woodpecker	Dendrocopos pubescens
Red-cockaded woodpecker	Dendrocopos borealis

Eastern kingbird	Tyrannus tyrannus
Scissor-tailed flycatcher	Muscivora forfic
Eastern Phoebe	Sayornis phoebe
Acadian flycatcher	Empidonax virescens
Eastern wood pewee	Contopus virens
Horned lark	Eremophila alpestris
Bark swallow	Riparia riparia
Barn swallow	Hirunda erythrogaster
Cliff swallow	Petrochelidon pyrrhanota
Purple martin	Progne subis
Bluejay	Cyanocitta cristata
American crow	Corvus brachyrhynchos
Black capped chickadee	Parus carolinensis
Carolina chickadee	Parus carolinensis
Tufted titmouse	Parus bicolor
Brown creeper	Certhia familiaris
House wren	Troglodytes aedon
Bewick's wren	Thryomanes bewickii
Carolina wren	Thryothorus ludovicianus
Mockingbird	Mimus polyglottos
Brown thrasher	Toxostoma rufum
Robin	Turdus migratorius
Wood thrush	Hylocichla mustelina
Eastern bluebird	Sialia sialis
Blue-gray gnatcatcher	Polioptila caerulea
Ruby-crowned kinglet	Regulus calendula
Water pipit	Anthus spinoletta
Cedar waxwing	Bombycilla cedrorum
Loggerhead shrike	Lanius lodovicianus
Starling	Sturnus vulgaris
Whited-eyed vireo	Vireo griseus
Bell's vireo	Vireo bellii
Red-eyed vireo	Vireo olivaceus
Warbling vireo	Vireo gilvus
Prothonotary warbler	Protonotaria citrea
Parula warbler	Parula americana
Myrtle warbler	Dendroica cornata
Pine warbler	Dendroica pinus
Kirtland's warbler	Dendroica kirtlandii
Song sparrow	Melospiza melodia
Fox sparrow	Melospiza lincolnii
Yellowthroat	Geothlypis trichas
Yellow-breasted chat	Icteria virens
American red start	Setophaga ruticilla
House sparrow	Passer domesticus
Eastern meadowlark	Sturnella magna
Redwinged blackbird	Agelaius phoeniceus
Orchard oriole	Icterus spurius
Baltimore oriole	Icterus glabula
Boat-tailed grackle	Cassidix mexicanus

Common grackle	Quiscalus quiscula
Brewer's blackbird	Euphagus cyanocephalus
Rusty blackbird	Euphagus corolinus
Brown-headed cowbird	Molothrus ater
Summer tanager	Piranga rubra
Cardinal	Richmondena cardinalis
Blue grosbeak	Guiraca caerulea
Indigo bunting	Passerina cyanea
Painted bunting	Passerina ciris
Dickcissel	Spiza americana
American goldfinch	Spinus tristis
Vesper sparrow	Pooectes gramineus
Lark sparrow	Chondestes grammacus
Slate-colored junco	Junco hyemalis
Tree sparrow	Spizella aborea
Chipping sparrow	Spizella passerina
Field sparrow	Spizella pusilla

d. Mammals

Oppossum	Didelphis marsupialis
Short-tailed shrew	Blarina brevicauda
Coyote	Canis latrans
Beaver	Castor canadensis
Least shrew	Cryptotis parva
Armadillo	Dasypus novemcinctus
Plains pocket gopher	Geomys bursarius
Southern flying squirrel	Glaucomys volans
Red bat	Lasiurus borealis
Gray squirrel	Sciurus carolinensis
Fox squirrel	Sciurus niger
Bobcat	Lynx rufus
Striped skunk	Mephitis mephitis
Pine vole	Microtus pinetorum
House mouse	Mus musculus
Mink	Mustela vison
Eastern woodrat	Neotoma floridana
Evening bat	Nycticeius humeralis
Whitetail deer	Odocoileus virginianus
Rice rat	Oryzomys palustris
Cotton mouse	Peromyscus gossypinus
Hispid pocket mouse	Perognathus hispidus
White-footed mouse	Peromyscus leucopus
Deer mouse	Peromyscus maniculatus
Raccoon	Procyon lotor
Norway rat	Rattus novegicus
Black rat	Rattus rattus
Golden harvest mouse	Reithrodontomys fulvescens
Eastern harvest mouse	Reithrodontomys humulis

Eastern mole	Scalopus aquaticus
Hispid cotton rat	Sigmodon hispidus
Spotted skunk	Spilogale putorius
Swamp rabbit	Sylvilagus aquaticus
Cottontail rabbit	Sylvilagus floridanus
Gray fox	Urocyon cinereoargenteus
Red fox	Vulpes fulva
Big brown bat	Eptesicus fuscus
Black bear	Ursus americanus
Elk	Cervus canadensis
Eastern mountain lion	Felis concolor cougar

3-05 Food Plots and Habitat Improvements. Broken Bow Lake inundates about 14,200 acres of terrestrial wildlife habitat. Bottomlands flooded by the lake were the most productive within the project area. Remaining lands are mountainous with thin acidic soils that are easily eroded. Therefore, food plots are not recommended in this plan and fencing in most cases will not be required due to a lack of unauthorized agricultural or grazing uses. Burning vegetation to improve wildlife habitat quality will be used sparingly since lightning causes frequent fires in the area. Habitat improvements where needed will be provided for the following:

a. Whitetail deer. The whitetail deer occupies forest areas, groves, thickets, river bottoms, and similar habitats. It is less abundant in heavy timber than in second growth and cutover lands. Generally speaking, the whitetail deer reaches its highest densities in the developmental stages of ecological succession. This animal shows considerably more tolerance of man than any other wild ungulate. Primarily browsers, deer feed on herbs, forbs, lichens, mast, and berries. Suculent vegetation commonly fed upon by deer includes willow, sweet fern, oak, serviceberry, cherry, maple, dogwood, huckleberry, and blueberry. Habitat improvement should include developing and maintaining early stages in plant succession. Whitetail deer show a marked preference for alsike clover during spring and fall, and some open areas should be seeded with this legume.

b. Mourning doves. The planting of preferred food for dove will be performed by project personnel as well as contract plantings. These plantings will be small grains including wheat, rye, corn, browntop, millet, sorghum, proso, and sunflower. Little or no fertilizer will be applied since it is quite easy to produce more seed than will be consumed by dove. Plantings suitable for dove will also benefit several species of game and songbirds. Browntop millet, sorghum, domestic wheat, and rye will be broadcasted between rows of established tree plantings. Dove fields will be at least one acre but not more than 40 acres for hunter safety, maximum use, and success. Surviving winter populations tend to use the same area each year and concentrations remain longest in the best habitat. While a dove population cannot be held indefinitely, local attention to basic needs and habits can provide good hunting. Dove

produce at a high rate and live a short time, generally less than a year. Because of this, many dove can be taken by hunting without endangering the remaining population. Prescribed burning will be accomplished in open blackjack oak stands to improve wildlife habitat. Burning reduces heavy ground litter, exposes seed, retards development of woody undergrowth, and favors important herbaceous dove foods. Winter burns rather than summer burns are preferred since more seed is produced from herbaceous plants. Legumes may make up 70 percent or more of the ground cover on burned plots, but only trace amounts on unburned plots. Burning will not be performed on stream bottoms, slopes over 20 percent, and mast-producing hardwood areas.

c. Quail. The bobwhite quail inhabits brush lands, open wood lots, fence rows, and the edges of cultivated fields. Quail are birds of low mobility, and during their lifespan rarely range more than a mile from the place of hatching. It is a bird of light snow country because of its inability to withstand a combination of strong winds, intense cold, and deep snow. This game bird feeds primarily on seeds, fruits, and herbs. Insects are the primary food during the juvenile stage. Bobwhite quail, like other game animals, require several types of cover: travel, resting, roosting, feeding, and nesting. Well-drained ground with moderately open stand of tall grass and brush is preferred by quail for nesting sites. Natural thickets and other small areas of brushland, poorly adapted to agriculture, can be developed by planting food plots adjacent to this cover. In some areas, fertilization of the food plots may be necessary and specific requirements will be determined by soil sampling. Supplying the bobwhite quail with these requirements and food in various types are the best methods for improving quail populations.

d. Squirrel. Primary consideration will be given to the management of fox and gray squirrel. Squirrels sustain heavy hunting pressure and long seasons, thereby providing much outdoor recreation. Productive squirrel habitat contains a variety of mast-bearing hardwoods which supply needed foods and ample den cavities essential for escape, cover, winter shelter, and brood rearing. Accordingly, management practices will include the retention of existing den trees, fruit trees, shrubs, and vines used by squirrels for food and cover. Squirrels prefer a forest of mixed species containing trees of all age classes, and tend to avoid even-aged or single species stands. Mast-producing trees, such as oak, walnut, hickory, and beech, will be planted in areas devoid of these species. These trees require space for best mast production and are aided by release cutting and thinnings. Clear cutting is definitely harmful to the fox squirrel and will be avoided. Corn and other grains are good winter foods, and patches will be developed in areas which have a small food-producing capacity. In areas where squirrels are desired for viewing, squirrel nest boxes will be provided, and as an experiment, selected tree limbs will be girdled to induce decay and cavity formation.

e. Rabbits. The cottontail rabbit, the most widely distributed of all farm game animals, is found wherever suitable conditions occur. Cottontail rabbits use any thick vegetation during the summer months. With the approach of winter, however, rabbits move to dense thickets composed of shrubs or mixed shrubs and grasses, especially thickets that have an adequate number of satisfactory burrows. The cottontail feeds at some time or another upon almost any vegetation found in its environment. The diet includes leaves of annuals and perennials, whole plants, bark, fruits, and seeds. In some regions, the favored foods are the legumes, such as clovers and lespedeza. Rabbits often eat the bark of stems and twigs during winter, especially when snow is deep. Among some of the plants to be managed for the cottontail rabbit are smooth sumac, blackberries, and raspberries. By providing brush piles, brier patches, and covered fence rows, cottontail rabbits should increase in sufficient numbers to provide successful sport for hunters.

f. Wild turkey. Good turkey habitat contains stands of mixed hardwoods, relatively open understory, scattered clearing, well distributed water, and reasonable freedom from disturbances. Vegetative growth which produces mast is a primary winter food for turkey. Clearings produce the food (grass seed, insects, fruit, and forage) needed during the warm months and serve as breeding, nesting, and brooding areas. Turkeys need large trees like elm and cottonwood for roosting. Accordingly, habitat management must include retention of trees for mast crop and roosting, maintaining clear areas for plant species such as grasses, sumac, etc., and providing watering stations. Some grain sorghum can be planted in small plots to offset low yields of natural plant species.

3-06 Designation of Hunting Areas. Public hunting maps are printed each year for Broken Bow Lake. These maps show the areas available for hunting, with general hunting information on the reverse side. In addition, signs will be used in the field to designate approved hunting areas and areas closed to hunting.

3-07 Hunter Access. Sufficient access for the hunter is available at Broken Bow Lake. Most of the access points used by fishermen outlined in paragraph 2-10 are also used by hunters.

3-08 Soil Types. The predominant soils combination of the Broken Bow Lake area is the Hector-Pottsville Association. It is thinly developed on stony mountain sides over sandstones and shales. These soils are strongly acidic and therefore are well suited to oak, hickory and pine tree production. Mississippian rocks underlie the lake bed and attain their maximum thickness there. The Stanley Group, characteristic of southeastern Oklahoma, is divided into the Ten Mile Creek Formation and Chickasaw Shales. The Hector-Pottsville Association is in this latter group.

3-09 Vegetative Types.

a. Woody plants. A partial list of naturally occurring overstory vegetation in the Broken Bow Lake area is:

Shortleaf pine	Pinus echinata
Loblolly pine	Pinus taeda
Eastern redcedar	Juniperus virginiana
Black willow	Salix nigra
Shagbark hickory	Carya ovata
Mockernut hickory	Carya tomentosa
Red hickory	Carya ovalis
Black hickory	Carya texana
Pig nut hickory	Carya laciniosa
Northern red oak	Quercus borealis
Black oak	Quercus velutina
Southern red oak	Quercus falcata
Blackjack oak	Quercus marilandica
Willow oak	Quercus phellos
Water oak	Quercus nigra
Burr oak	Quercus macrocarpa
Smooth sumac	Rhus glabra
Winged sumac	Rhus copallina
Green ash	Fraxinus pennsylvanica
White ash	Fraxinus americana
Button bush	Cephalanthus occidentalis
Post oak	Quercus stellata
White oak	Quercus alba
Overcup oak	Quercus lyrata
Chinquapin oak	Quercus muehlenbergii
Sassafras	Sassafras albidum
Sweet gum	Liquidambar styraciflua
Cypress	Toxodium distichum
Sycamore	Platanus occidentalis
Hawthorn	Crataegus invisa
Honey locust	Glenditsia triacanthos

b. Forbs and Grasses

Pepper vine	Ampelopsis arborea
Virginia creeper	Parthenocissus quinquefolia
Supple jack	Berchemia scandens
Common greenbrier	Smilax rotundifolia
Poison ivy	Rhus radicans
Buck brush	Symphoricarpus orbiculatus
Partridgepea	Chamaecrista fasciculata
Wild indigo	Baptisa leucophaea
Fescue	Festuca arundinacea
Bermuda grass	Cynodon dactylon

Yellow foxtail	Setaria glauca
Johnsongrass	Sorghum halepense
Sandbur	Cenchrus pauciflorus
Texas panicum	Panicum texanum
Knotweed	Polygonum aviculare
Lambsquarters	Chenopodium album
Russian thistle	Salsola kali
Carpet weed	Mollugo verticillata
Burning nettle	Urtica urens
Wild mustard	Brassica kaber
Horsenettle	Solanum carolinense
Jimson weed	Datura stramonium
Velvetleaf	Abutilon theophrasti
Venice mallow	Hibiscus trionum
Cheeseweed mallow	Malva parviflora
Cocklebur	Xanthium pensylvanicum
Common ragweed	Ambrosia artemisiifdia
Giant ragweed	Ambrosia trifida
Common sowthistle	Sonchus oleraceus
Yellow nutsedge	Cyperus esculentus
Coffee weed	Cassia obtusifolia
Seabania	Seabania exaltata
Field horsetail	Equisetum arvense
Common arrowhead	Sagittaria latifolia
Creeping buttercup	Rununculus repens
Narrowleaf nettle	Vicia anyustifolia
Yellow woodsorrel	Oxalis stricta
Puncture vine	Tribulus terrestris
Woolley croton	Croton capitatus
St. Johnswort	Hypericum perforatum
Wild carrot	Daucus caroto
Verbena	Verbena bracteala
Hempnettle	Galeopsis tetrahit
Henlirt	Lamium amplerecaule
Healall	Prunella vulgaris
Yellow toadflas	Linaria vulgaris
Common mullein	Verbascum thapsus
Plantago	Plantago lanceolata
Catchweed	Galium aparine
Western yarrow	Achillea millefolium
Western ragweed	Ambrosia psilostachya
Spanish needles	Bidens bipinnata
Canada thistle	Cirsium arvense
Bull thistle	Cirsium vulgare
Annual fleabane	Erigeron annuus
White snakeroot	Eupatorium rugosum
Broomweed	Gutierrezia dracun-culoides
Bitter sneezeweed	Helenium amarum
Goldenrod	Salidago missouriensis
Dandelion	Taraxacum officinale

Baldwin's ironweed	Veronia baldwinii
Cheat	Bromus secalinus
Foxtail barley	Hordeum jubatum
Nimblewill	Muhlenbergia schreberi
Dallisgrass	Paspalum dilatatum
Knotgrass	Paspalum distichum
Reed canarygrass	Phalaris arundinacea
Bullsedge	Cerex lasiocarpa
Red vine	Brunnichia cirrhosa
Curly dock	Rumex csispus
Pokeweed	Phytolacca americana
Common chickweed	Stellaria media
Larkspur	Dephinium spp.
Giant cane	Arundinaria gigantea
Little barley	Hordeum pusillum
Bottle brush grass	Hystrix patula
Cordgrass	Spartina pectinata
Broadleaved broadgrass	Bymnopogon ambiguus
Ticklegrass	Agrostis hiemalis
Bearded shorhusk	Bachyelytrum erectum
Silver hairgrass	Aira caryophyllea
Wild oat	Avena fatus
Purpletop	Triodia flava
Broadleafed spikegrass	Uniola liatifolia
Big bluestem	Andropogon furcatus
Indiangrass	Sorghastrum nutans
Tall dropseed	Sporobolus asper
Wild oatgrass	Danthonia spicata
Koren lespedeza	Lespedeza stipulacea
River cane	Arundinaria gigantea

3-10 Types of Native Vegetation to be Planted for Wildlife. The following are native species that may be planted for food and cover for wildlife.

a. Squirrel. Overstory planting will include oaks, hickory, pecan, walnut, blackgum, hackberry, maple, elm, and mulberry. Understory planting will include dogwood.

b. Deer. Overstory planting will include oaks, blackgum, winged elm, and persimmon. Understory planting will include dogwood, greenbrier, red cedar, haws, sumac, and huckleberry.

c. Turkey. Overstory plantings will include oaks, blackgum, maple, elm, hackberry, and cottonwood. Understory planting will include dogwood, huckleberry, sumac, haw, red cedar, and cherry.

d. Songbirds and others. Overstory planting will include blackgum, hackberry, mulberry, and elm. Understory planting will include holly, haws, huckleberry, sunflowers, dogwood, honeysuckle, red cedar, and cherry.

e. Furbearers. Overstory planting will include oaks, hackberry, cottonwood, elm, black walnut, and hickory. Understory planting will include wild plums, persimmon, dogwood, haws, huckleberry, red cedar, cherry, honeysuckle, sumac, and clover.

3-11 Endangered Species. The following is a list of endangered species which may visit the Broken Bow project lands:

a. Birds

Eagle, Southern bald	*Haliaeetus leucocephalus leucocephalus*
Falcon, American peregrine	*Falco peregrinus anatum*
Woodpecker, ivory-billed	*Campephilus principalis*

b. Mammals

Bat, Indiana	*Myotis sodalis*
Wolf, red	*Canis rufus*

IV - SPECIFIC SHORT AND LONG RANGE PROGRAMS

4-01 General. The Oklahoma Department of Wildlife Conservation currently has a license to manage 5,420 acres of project lands on Broken Bow Lake. These lands are located in the upper reaches of the project. A portion of the state's area includes the McCurtain County Wilderness Area consisting of 14,087 acres. This area was purchased by the state and set aside by the Oklahoma Legislature in 1918 as an inviolate sanctuary for wildlife and vegetation therein. The wilderness area bisects the upper end of Broken Bow Lake. The Oklahoma Department of Wildlife Conservation has designated 647 acres of their licensed lands for use in the "Acres for Wildlife Program". This 647 acres are within areas now designated as "Public Recreation Areas". As such, the areas are designated as "no hunting" areas. Management of these areas will focus on deer, squirrel, rabbits and quail. Remaining project lands, 6,846 acres, including an estimated 223 acres in undeveloped but defined public use areas, will be managed by the Corps as outlined in paragraph 4-04 of this plan. The areas are shown on the attached map as Exhibit F.

4-02 Recreational Areas. There are three primitive camping areas operated by the Corps. These areas serve the needs for a varied form of recreational experience. At the present there are no plans to further develop the areas since further development would result in severe deterioration of the unique aesthetic value of the areas.

4-03 Islands. There are about 22 islands in the lake, depending upon water levels. Most of these are included in the lands leased to the Oklahoma Tourism and Recreation Department. However, 13 islands comprising about 339 acres occur outside the leased area and they appear when the lake level is between elevations 599.5 and 627.5 msl.

These islands are included in the appropriate wildlife management units contained in paragraph 4-04.

4-04 Wildlife Management Units. Broken Bow Lake lands not licensed or leased to other agencies are included in this plan. These lands total about 6,846 acres and have been divided into six wildlife management units which vary in size from 696 to 1,543 acres. Individual unit maps are attached as Exhibit F.

a. Unit No. 1 (about 1,271 acres). This acreage includes 151 acres in islands. These seven islands are evident when the lake is at elevation 599.6 msl. The topography, soils and vegetation on the islands are similar to the rest of the unit.

Access by either land and water is poor due to steep slopes and rocky terrain.

Topography of the unit varies from vertical to gentle slopes with similar conditions along shoreline areas, with the exception of the northern portion of the unit which contains more gently sloped shorelines in sections 26 and 27.

Soils are of the Hector-Pottsville Association. These soils are characteristicly thin and rocky.

Principal vegetation type consists of the oak-hickory-pine forest. The southern portion of the unit contains primarily pine and oak-hickory, with pine being less conspicuous in the northern part. A small patch of grasses, forbs, and shrubs occur on a steep north-facing slope near Biggum Creek mouth. This grassy site is believed to be the result of lightning caused fire. A very similar site exists on the east-facing slope of Walford Creek. These grass-forb-shrub areas total about 20 acres.

Unit lands are used for timber and wildlife production and public hunting. Biggum Creek Cove (approximately 200 acres), a proposed future public use area, is located in the extreme western part of the unit. An unimproved road permits ingress and limited public use into the area.

Wildlife commonly found in the area includes deer, squirrel, raccoon, fox, coyote, songbirds, shorebirds, and a few cottontails. Prior to lake construction, this area contained a good population of swamp rabbits and a moderate number of cottontails; however, swamp rabbits no longer exist in the area.

Constraints to intensive management of wildlife include a narrow strip of steep and rocky lands adjacent to the water, thin and infertile soils, a nearly closed canopy (dense woods), inadequate boundary markers, unimproved access roads and unauthorized hunting. To improve habitat conditions, the following management practices will include:

(1) Maintaining and promoting ground cover vegetation.

(2) Locate project boundary and mark boundary with signs.

(3) Selective removal of mono tree types where closed canopy exist.

(4) Plant small strip plots of grain crops and seed producing vegetation in areas where food type species are sparse.

(5) Place squirrel nesting boxes and birdhouses throughout the Biggum Creek Cove public use area.

b. Unit No. 2 (about 1,543 acres). This acreage includes four islands totalling nine acres (at elevation 599.5 feet msl) and one undeveloped public use area.

Access by land and water is adequate, although roads are unimproved. Shorelines are usually steep and rocky with some coves containing flooded dead timber. The only gentle sloped shoreline is in the eastern part of Section 22.

The topography is rugged and heavily forested.

Soils are of the Hector-Pottsville Association. Exposed rock is common and soils are scarce.

Principal vegetation type is the oak-hickory-pine forest.

Egypt Creek Cove, Five Mile Hollow, and the shoreline connecting the two coves, has been proposed for future development to accommodate intensive recreation. The Egypt Creek area contains about 132 acres. The entire area is undeveloped, but unimproved roads provide ingress to Five Mile Hollow and Egypt Creek coves.

Wildlife species common to the area include deer, squirrel, racoon, fox, coyote, songbirds, and cottontails.

Steep topography, poor soils, climax vegetation, unimproved roads, inadequate boundary marking and the long narrow strip of Federal lands all preclude intensive management of wildlife resources. Management practices for the unit will include:

(1) Maintaining and promoting ground cover vegetation.

(2) Locate project property line and sign appropriately.

(3) Selected clearing of mono vegetative types which inhibit the growth of understory vegetation.

(4) Plant small plots of Japanese honeysuckle and multiflora rose throughout Egypt Creek and Five Mile Hollow.

(5) Development of Egypt Creek and Five Mile Hollow should be held to a minimum and left in a natural condition.

c. Unit No. 3 (about 696 acres). Otter Creek channel is the dividing line between unit lands to the south and lands north of the channel that are licensed to the Oklahoma Department of Wildlife Conservation.

Access by land and water to the unit is adequate; however, the Otter Creek channel and coves contain considerable flooded dead timber and brush that retards boat access.

The topography is rolling to steep with similar conditions along shoreline areas except in the west one-half of Section 11, which has a gentle slope.

Soils are the thin rocky Hector-Pottsville Association.

Oak-hickory-pine woods are characteristics of the vegetative types in the area. Understory vegetation is sparse, due to the dense crown growth of dominant trees.

There are no developed or proposed public use areas in the unit.

Wildlife species common to the unit include deer, squirrel, fox, coyote, songbirds, and lesser numbers of raccoon, cottontails, quail, and waterfowl.

Problems associated with management of the unit include private inholding surrounded by Federal lands, rugged topography, poor soils, monotypic vegetation, and long narrow strips of project lands.

Management recommendations for the unit include:

(1) Maintaining and promoting ground cover vegetation.

(2) Locate project boundary line and sign accordingly.

(3) Plant small plots of Japanese honeysuckle and multiflora rose throughout the unit.

(4) Cooperate with State game rangers in controlling unauthorized hunting.

(5) Undertake a study to determine the need and feasibility of acquiring the private inholding.

d. Unit No. 4 (about 1,376 acres). This unit contains two islands totalling 137 acres. One island (four acres) occurs at lake elevation 627.5 feet msl, and another area of 133 acres becomes an island only when the lake level is 627.5 feet.

Access by land and water is adequate.

The topography is rolling to steep. North facing slopes are steep and rocky while south facing slopes are of moderate grades.

Soils are of the Hector-Pottsville Association, which are thin, infertile, and rocky.

Oak-hickory-pine predominates, with small amounts of native grasses on the south-facing slopes.

Unit lands are open to public hunting with principal land use being timber and wildlife production. There are no developed or proposed public use areas in the unit.

Wildlife species include deer and squirrel, songbirds, waterfowl, and fur animals.

Problems associated with management include steep slopes, poor soils, inadequate boundary markers, and narrow strips of land.

Management recommendations include:

(1) Maintaining and promoting ground cover vegetation.

(2) Locate project boundary line and sign accordingly.

(3) Selected clearing of vegetative types which inhibit the growth of understory vegetation.

e. Unit No. 5 (about 1,126 acres). This acreage includes one parcel of land that is an island of about 42 acres when the lake elevation is above 599.5 feet msl.

Access to the unit is adequate by land and water.

The topography of the unit varies from steep to rolling. North slopes are steep and rocky while south slopes are moderate grades. Ridges are steep and shorelines vary from moderate slopes to vertical outcrops. North Holly, South Holly, Bear and Rough Branch Creeks bisect the heavily wooded unit.

Soils are of the Hector-Pottsville Association and are characteristically thin and rocky.

Oak-hickory-pine forest covers the area forming a closed canopy condition and precludes growth of any significant understory vegetation.

Unit lands are used for timber and wildlife production. A small portion, about 266 acres, is used for primitive camping. The topography of this camping area is unique in that it contains several sites that are nearly flat. Timber and brush have been cleared along the east side of the Holly Creek public use area so that fish seining operations can be conducted for lake fisheries management.

Wildlife species inhabiting the area include deer, squirrel, fur bearers, waterfowl, and many non-game species.

Constraints to intensive management of wildlife on the unit include steep topography, poor soils, inadequate boundary marking, monotypic vegetation, and narrow strips of land.

Management recommendations include:

(1) Maintaining and promoting ground cover vegetation.

(2) Selected clearing of vegetative types which inhibit the growth of understory vegetation.

(3) Locate project boundary line and sign accordingly.

f. Unit No. 6 (about 834 acres). This unit is located at the northermost tip of the project.

Access by land is limited to one road. Additional access will be indirectly provided by private industry clear cutting timber on lands adjacent to the Federal property. Water access is restricted by rocks in the river channel and dead flooded timber in the tributary creek channels.

The terrain is steep, rocky and heavily wooded.

Soils are of the Hector-Pottsville Association. Characteristics of the soil mantle is thin and spotty.

Oak-hickory-pine association covers the landscape making understory plant growth sparse.

The Panther Creek primitive camping area is located near the southern boundary. This small site is equipped with refuse units, parking area, and unimproved roads.

Wildlife species inhabiting the unit include deer, squirrel, fur bearers, songbirds, predators, waterfowl, and a few turkey and elk. Black bear are occasionally seen in the area.

Problems associated with management of the unit include rugged terrain, thin and rocky soils, monotypic vegetation, limited access, inadequate boundary marking and a thin strip of land located between the boundary and the water.

Recommendations for management include:

(1) Maintaining and promoting ground cover vegetation.

(2) Preserve the environmental integrity of the area by limiting vehicular access.

(3) Remove selected vegetative types which inhibit the growth of understory vegetation.

(4) Plant small plots of Japanese honeysuckle or multiflora rose in open areas.

4-05 Corps Objectives for State Wildlife Licensed Areas. Areas under license to the Oklahoma Department of Wildlife Conservation for wildlife management and enhancement purposes will be periodically inspected for compliance with approved annual management plans. Assistance will be provided to State personnel to prevent, detect, and correct encroachments and assist in locating and delineating boundary lines by signs, fences, markings, etc. Periodic conferences will be held with local wildlife representatives to discuss their problem areas and objectives and Corps objectives.

4-06 Corps Objectives for State Parks and Other Lease Areas. Corps management objectives are to encourage and assist the leasing agencies with activities to maintain wildlife benefits without interference with the primary objectives of the lessee, as well as reviewing and coordinating development plans to establish a total effort - reaching the multi-purpose environmental goals. Lease areas will be inspected periodically to detect deviations from the approved plan for development and to detect and correct encroachments. Assistance in locating and delineating boundary lines will be provided to the lessee. Corps representatives will meet periodically with the representatives of the managing agencies to discuss their problems and objectives and Corps objectives for wildlife management.

4-07 Corps Objectives for Grazing Leases. Since most of the project lands are not suitable for grazing leases and the best use of the lands are of a scenic or recreational nature, the optimum land utilization benefits will be directed away from grazing and placed on protection of the natural resources.

V - PERSONNEL AND FUNDING REQUIREMENTS

5-01 General. Implementation of the total plan is subject to funding and personnel. Initial developments will consist of reviewing grazing practices and adjusting accordingly as recommended by SCS specialists, fencing management units where needed, followed by vegetation manipulation for cover, food, and restoration of specific areas by planting shrubs, hedges, and trees in areas where vegetation is sparse. The remainder of the plan will be implemented thereafter.

5-02 Personnel. The long-range goal is to have a full-time wildlife biologist from Millwood Lake to oversee the biological programs for Broken Bow Lake. The biologist would implement the development, operation and maintenance of the fish and wildlife management plans; in addition, he would be responsible for fish and wildlife activities on Broken Bow Lake and will assist the Oklahoma Department of Wildlife on management programs affecting the project.

5-03 Budget Requirements for Broken Bow Project Fish and Wildlife Programs.

a. Fisheries.

(1) Stabilize lake surface elevations during April and May each year (feasibility to be determined by CE, together with cost).

(2)	Provide lake contour maps for public use, including fishermen	$10,000
(3)	Modify 2 fishing piers, to assist bank and handicapped fishermen	3,000
(4)	Release of 50 cfs into River Bend area	0
(5)	Powerhouse fisherman berm location as shown on CE DWD 1720-C27-92/7, Dec 70	15,000
	Sub-Total	$28,000

b. Wildlife.

(1)	Installation of boundary line signs 3,600 signs at $10 each	$36,000

(2)	Food plot and vegetative plantings	$10,000
(3)	Designate lands at Public Hunting Area (administrative cost)	1,000
	Sub-Total	$47,000
	TOTAL	$78,400

VI - ECOLOGICAL RELATIONSHIPS AND IMPACTS

6-01 General. Broken Bow Lake construction resulted in changes in the aquatic and terrestrial ecosystems within the area of project influence. Riverine habitat within the lake site, as well as downstream for several miles, has undergone a marked impact. Downstream fishes and fishfood organisms are affected by reduced water temperatures from low level releases. Federal lands surrounding the lake have been altered at several locations to provide for public ingress and use. Intensive recreational use with its associated facilities have been confined to two primary sites. Other project lands remain in near natural condition.

Site factors such as topography, soils, precipitation and vegetation, coupled with project operation parameters, restrict the versatility and management of fish and wildlife resources and their habitats.

Aesthetic values at Broken Bow Lake are higher than at many Oklahoma lakes. Excessive development for recreational or other uses will have a continued adverse impact on both the aesthetic and environmental values of the area.

The basic objectives of this plan are:

a. Maintain the existing aesthetic, environmental, and fish and wildlife values.

b. Adequately plan public use areas and developments to provide high quality experience for the user.

c. Sustain and provide public use in locations and in volumes commensurate with maintaining these high quality recreational opportunities.

Implementation of this plan will help to preserve and maintain certain environmental aspects of the project area.

EXHIBIT A

STATE FISH AND WILDLIFE LICENSE

LICENSE NO. DA-34-066-CIVENG-67-202

DEPARTMENT OF THE ARMY

LICENSE

FOR FISH AND WILDLIFE MANAGEMENT PURPOSES

IN THE BROKEN BOW RESERVOIR, OKLAHOMA

THE SECRETARY OF THE ARMY, under authority of Section 4 of the Act of Congress approved 22 December 1944, as amended, (76 Stat. 1195; 16 U.S.C. 460d), hereby grants to Oklahoma Department of Wildlife Conservation, State of Oklahoma, hereafter referred to as the licensee, a license for a period of fifty (50) years commencing on 1 April 1966 and ending 31 March 2016 to use and occupy approximately 5,420.00 acres of land and water areas under the primary jurisdiction of the Department of the Army in the Broken Bow Reservoir Area, as shown in red on Exhibit "A", numbered 172-4B-93/26 and dated May 1963, attached hereto and made a part hereof, for fish and wildlife management purposes.

THIS LICENSE is granted subject to the following conditions:

1. That the licensee, in the exercise of the privileges hereby granted, shall conform to such rules and regulations as may be prescribed by the Secretary of the Army to govern the public use of the said project area, and with the provisions of Section 4 of the Act of Congress approved 22 December 1944, as amended, (76 Stat. 1195; 16 USC 460d).

2. That the licensee may construct upon said land such buildings, improvements, facilities, accommodations, fences, signs and other structures as may be necessary for the purposes of this license, and may plant seeds, shrubs, and trees, provided that all such structures shall be constructed and the landscaping accomplished in accordance with plans approved by the District Engineer, Corps of Engineers, U. S. Army Engineer District, in charge of the administration of the property.

EXHIBIT A

3. That the licensee shall administer and maintain the said property, for the purposes of this license, in accordance with the Master Plan for the said project area and with an Annual Management Program to be mutually agreed upon between the licensee and the said District Engineer, which may be amended from time to time as may be necessary. Such Annual Management Program shall include, but is not limited to, the following:

a. Plans for management and development activities to be undertaken by the licensee or jointly by the Corps of Engineers and the licensee, including any timber management necessary in furtherance of the wildlife program.

b. Budget of the licensee for carrying out the management and development activities.

c. Personnel to be used in the management of the area.

d. Plans for supervising, patrolling and policing the licensed areas, including the water areas.

4. That the licensee shall protect the property from fire, vandalism, and soil erosion, and may make and enforce such rules and regulations as are necessary, and within its legal authority, in exercising the privileges granted in this license, provided that such rules and regulations are not inconsistent with those prescribed by the Secretary of the Army to govern the public use of the area.

5. That the licensee, in exercising its Governmental or proprietary functions, may plant and harvest crops, either directly or by service contract or under sharecrop agreements with local farmers, to provide (a) food for wildlife; (b) necessary compensation to farmers under any sharecrop agreement; and (c) a reasonable surplus to allow for a poor crop season. This surplus production may be disposed of by the State and the proceeds from sales used to defray other costs of administering the fish and wildlife program at this project. However, lands will not be utilized by the State for the production of crops or for any other purpose solely to produce revenue to defray such costs. Lands within the licensed area available for lease for agricultural, grazing or other purposes, will be leased by the District Engineer. Monies collected by the State and not utilized to defray the costs of administering the fish and wildlife program at this project will be paid to the United States of America at the expiration of each five (5) year period of the term of the license. The first five (5) year period is to begin on the date of the execution of this license for and on behalf of the United States of America. The licensee will establish and maintain adequate records and accounts and render periodic statements of receipts and expenditures in furtherance of its management program, as may be required by said District Engineer.

PC
EXHIBIT A

6. That the licensee may take, trap, remove, stock or otherwise control all forms of fish and wildlife within the said area, and may place therein such additional forms of fish and wildlife as it may desire from time to time, and shall have the right to close the area or any parts thereof from time to time, to fishing, hunting, or trapping, provided that the closing of any area to such use for fishing, hunting or trapping shall be consistent with the State laws for the protection of fish and wildlife; also, the licensee shall enforce the fish and game laws and such orders and regulations as may be issued by the Oklahoma Department of Wildlife Conservation, State of Oklahoma, and/or its Director, which laws, orders and regulations are consistent with its State-wide program.

7. That the water areas of the project shall be open to public use generally for boating, swimming, bathing, fishing and other recreational purposes, and that ready access to and exit from such water areas along the shores of the project shall be maintained for general public use, when such use is determined by the Secretary of the Army not to be contrary to the public interest. However, no use of any area shall be permitted which is inconsistent with the State laws for the protection of fish and game.

8. That this license is subject to all existing and future easements, leases, licenses and permits heretofore granted or to be hereafter granted by the United States concerning said lands; provided, however, that upon appropriate notification by the licensee to said District Engineer, the United States, insofar as may be consistent with other uses and purposes of the project, will not enter into any new easements, leases, licenses or permits, or renewals thereof, which will in the opinion of the District Engineer, adversely affect the current operations of the licensee under the provisions of the license, or which will conflict with the definitely scheduled program of the licensee for the expansion of its activities under the provisions of this license.

9. That the licensee shall not discriminate against any person or persons because of race, creed, color or national origin in the conduct of its operations hereunder.

10. That no cuts or fills along the shore line shall be made by the licensee without the prior approval of the said District Engineer.

11. That within the limits of their respective legal powers, the parties to this license shall protect the project against pollution of its water.

12. That ingress to and egress from the project area shall be afforded the licensee over existing access roads, such interior roads as may be constructed, and at such additional places over Government-owned land as may be approved by said District Engineer. The licensee shall provide appropriate markings at its own expense.

EXHIBIT A

13. That the right is hereby expressly reserved to the United States, its officers, agents and employees, to enter upon the said land and water areas at any time and for any purpose necessary or convenient in connection with river and harbor and flood control work, and to remove therefrom timber or other material required or necessary for such work, to flood said premises when necessary, and/or to make any other use of said land as may be necessary in connection with public navigation and flood control, and the licensee shall have no claim for damages of any character on account thereof against the United States or any agent, officer or employee thereof.

14. That any property of the United States damaged or destroyed by the licensee incident to the exercise of the privileges herein granted shall be promptly repaired or replaced by the licensee to the satisfaction of the said District Engineer.

15. That the United States shall not be responsible for damages to property or injuries to persons which may arise from or be incident to the exercise of the privileges herein granted, or for damages to the property of the licensee, or for damages to the property or injuries to the person of the licensee's officers, agents, servants, or employees or others who may be on said premises at their invitation or the invitation of any one of them, arising from or incident to the flooding of said premises by the Government or flooding from any other cause, or arising from or incident to any other governmental activities on the said premises, and the licensee shall hold the United States harmless from any and all such claims.

16. That this license may be relinquished by the licensee at any time by giving to the Secretary of the Army, through the said District Engineer, at least thirty (30) days' notice in writing.

17. That this license may be revoked by the Secretary of the Army in the event the licensee violates any of the terms and conditions of this license and continues and persists therein for a period of thirty (30) days after notice thereof in writing by the said District Engineer.

18. That on or before the date of expiration of this license or its relinquishment by the licensee, the licensee shall vacate the said Government premises, remove all property of the licensee therefrom, and restore the premises to a condition satisfactory to the said District Engineer. If, however, this license is revoked, the licensee shall vacate the premises, remove said property therefrom, and restore the premises as aforesaid within such time as the Secretary of the Army may designate. In either event, if the licensee shall fail or neglect to remove said property and so restore the premises, then said property shall become the property of the United States without compensation therefor, and no claim for damages against the United States or its officers or agents shall be created by or made on account thereof.

EXHIBIT A

19. Upon approval of a general plan for fish and wildlife management, this license shall be amended to include Section 3 of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq) as the authority for the grant and any other amendments necessary to conform with the general plan.

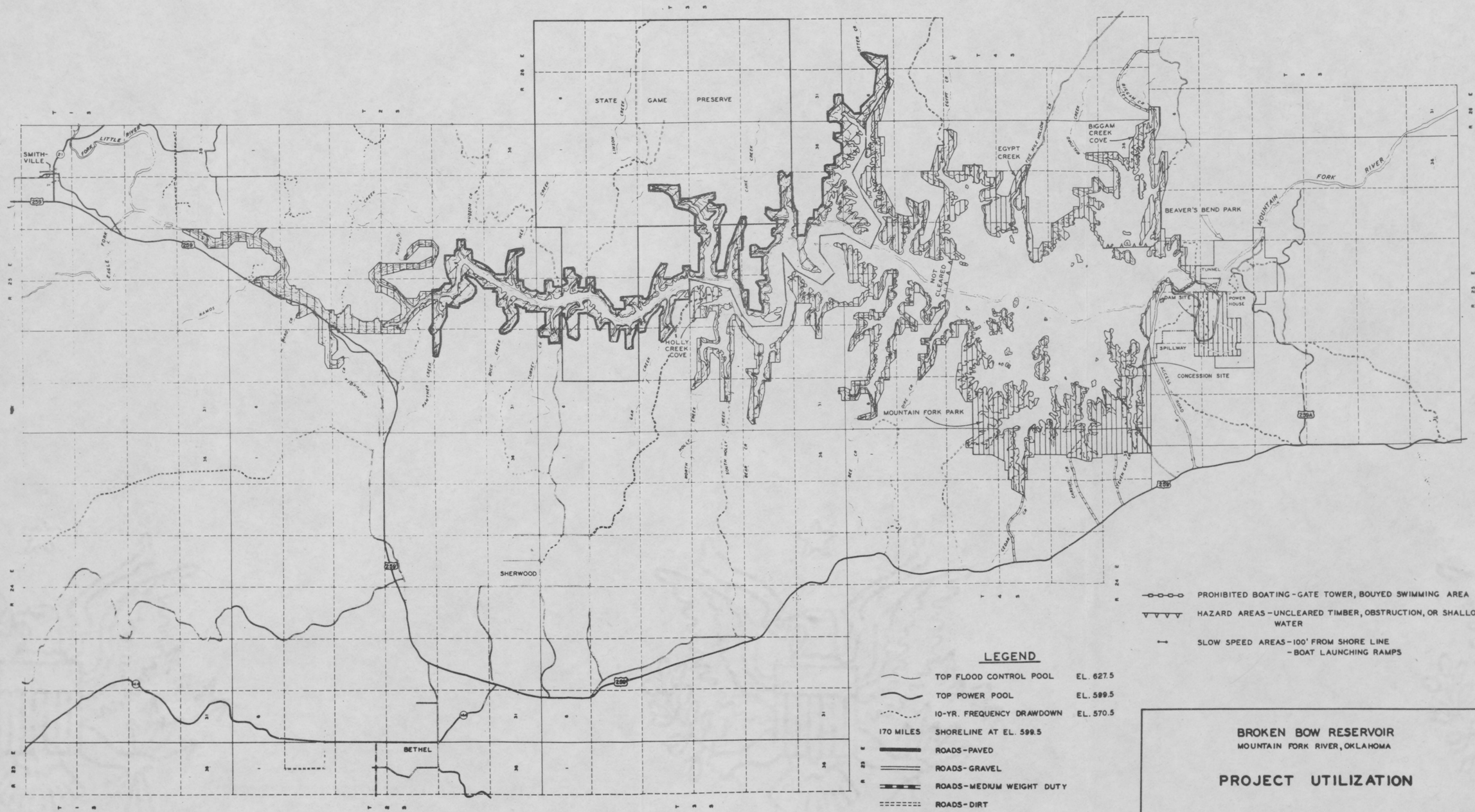
IN WITNESS WHEREOF I have hereunto set my hand this 24th day of June 1966, by direction of the Assistant Secretary of the Army.

Sherry B. Myers
Staff Asst (Real Property)
Mil Const and Real
Property OASA (I&L)

The above instrument, together with the provisions and conditions thereof, is hereby accepted this 12th day of July 19 66.

Wendell Bever, Director
Oklahoma Dept. Wildlife Conservation

EXHIBIT A



BROKEN BOW RESERVOIR

MOUNTAIN FORK RIVER, OKLAHOMA

PROJECT UTILIZATION

SCALE OF MILES
1/2 0 1

U.S. ARMY ENGINEER DISTRICT, TULSA, CORPS OF ENGINEERS MAY, 1963

172-48-93/26

PLATE (26)

EXHIBIT B

STATE WILDLIFE MANAGEMENT PLAN

GENERAL MANAGEMENT PROGRAM

BROKEN BOW RESERVOIR LANDS

LOCATION:

Broken Bow Reservoir, McCurtain County, Oklahoma

DESCRIPTION:

A. All lands and water within the original boundaries of the McCurtain County Wilderness Area and all inundated lands owned by the Corps of Engineers designated for wildlife management as shown on the attached map.

NOTE: Detailed description not available at the present time.

B. Game Type:

The area is within the oak-pine game type and is characterized by sharp breaking ridges ranging from 599 at power pool level to 1,800 feet above sea level. The two major geologic formations are the Stanley shale and Blaylock standstone of the Silurian Period. The proposed management area is covered with medium to heavy stands of pine and hardwood timber.

C. Game Species:

Principal game species to be managed are whitetail deer, wild turkey, squirrel and furbearers.

D. Land Suitability for Management:

1. Grazing:

Livestock grazing is not considered feasible as carrying capacity would be very low.

2. Farming:

The shallow soils in this type of terrain is subject to severe erosion when disturbed and cultivation for game foods is virtually eliminated as a management practice. The Department will recommend habitat improvement by using crown cover removal to encourage growth of shrubs and wild legumes. This approach has been used successfully by the Department in cooperation with both National and State Forest Services in similar type terrain.

EXHIBIT B

3. Hunting:

Public hunting will be permitted on all lands except within the original perimeter of the McCurtain Wilderness Area. Proposed public hunting is shown in green on map.

4. Refuge:

No hunting will be permitted on land and waters on areas shown in red on the attached map. These areas will be managed for game production for dispersal into the adjacent hunting areas.

E. Developments Planned:

1. Buildings:

A headquarters unit will be constructed on Corps Lands on the NE¼ pf SW¼ of Section 4, Township 3 South, Range 25 East. Unit will consist of a modern residence, equipment shed and well house.

2. Four camping areas are to be established at points shown on attached map.

3. Signs designating area and permissible activities to be erected.

4. Other Uses:

All of the lands acquired under license will be open to all recreational activities such as hiking, horseback riding, camping, fishing, water sports and studies of vegetation and formations. Hunting will be permitted during open seasons on all except those portions of area within the original boundaries of the McCurtain County Wilderness Area.

No private installations will be permitted on or along shoreline of licensed lands. This will insure that this part of the reservoir will remain in a semi-wilderness state for the enjoyment of the public.

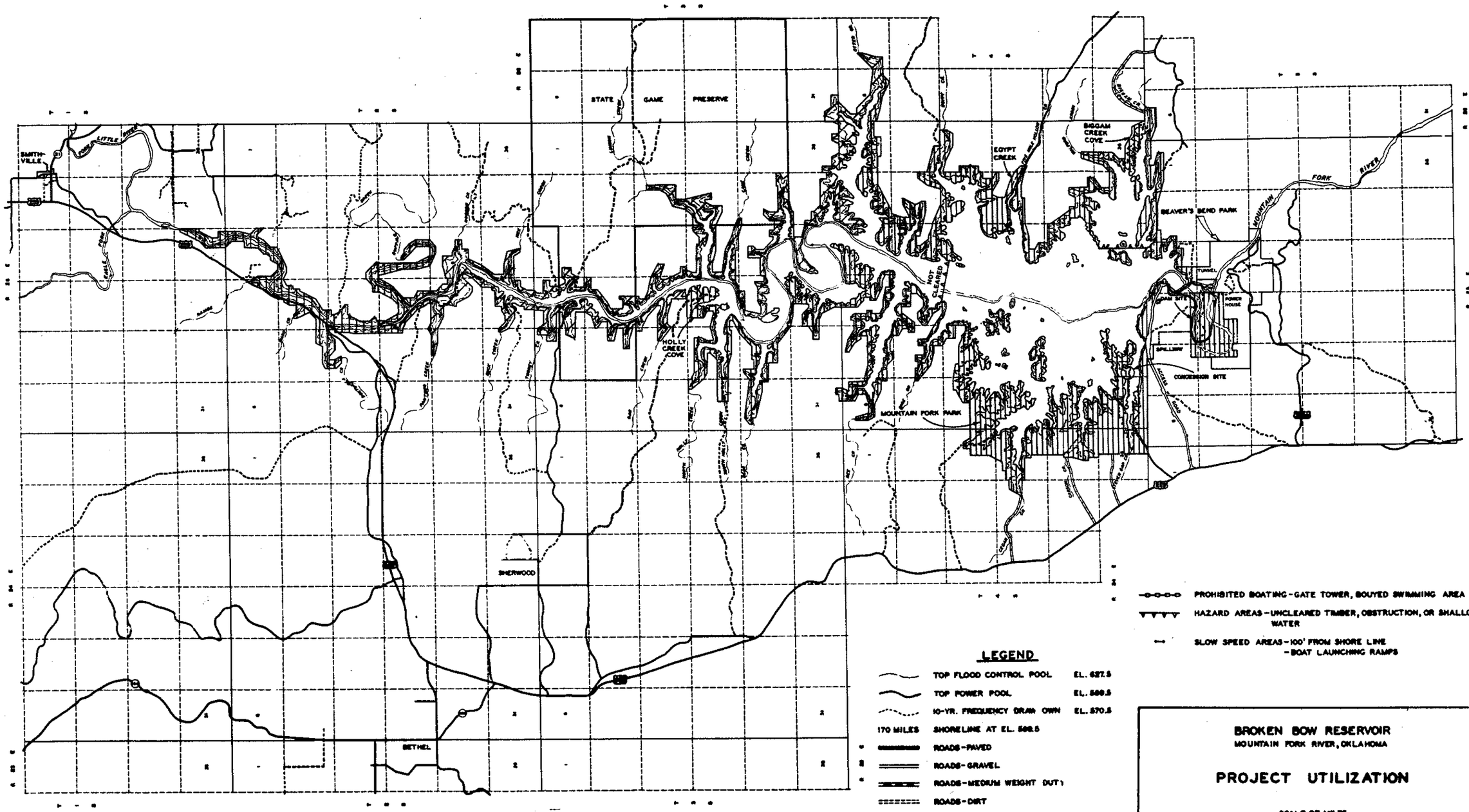
F. Estimated Costs:

Initial Developments:	$ 20,000.00
Annual Estimated Expenditures:	2,690.00

Submitted: Orville Curtis

Date: March 1, 1966

EXHIBIT B



BROKEN BOW RESERVOIR

MOUNTAIN FORK RIVER, OKLAHOMA

PROJECT UTILIZATION

SCALE OF MILES

0 1

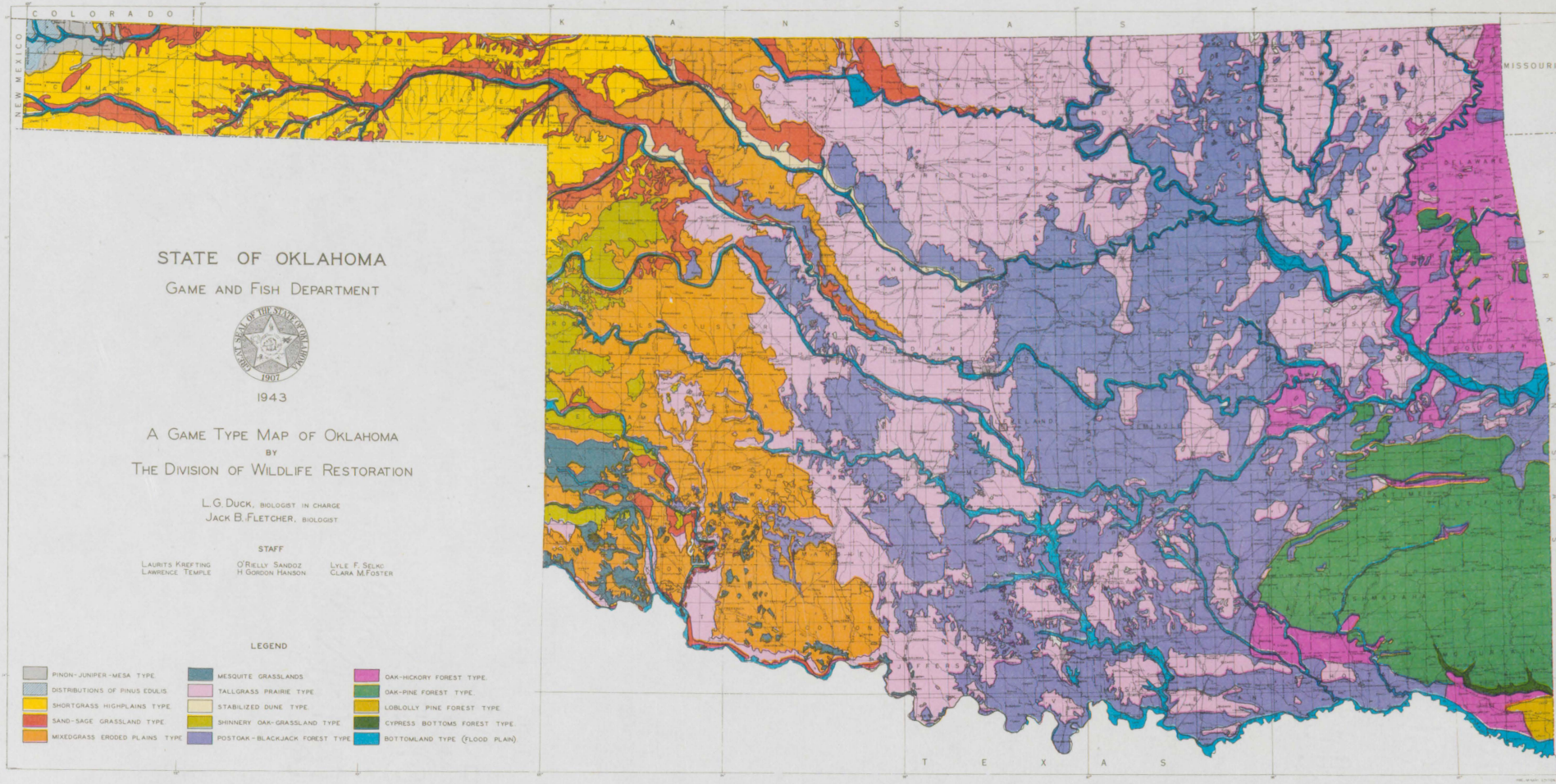
U.S. ARMY ENGINEER DISTRICT, TULSA, CORPS OF ENGINEERS MAY, 1963

172-4B-93/26

PLATE 28

EXHIBIT C

OKLAHOMA VEGETATIVE MAP



STATE OF OKLAHOMA

GAME AND FISH DEPARTMENT

1943

A GAME TYPE MAP OF OKLAHOMA

BY

THE DIVISION OF WILDLIFE RESTORATION

L. G. DUCK, BIOLOGIST IN CHARGE
JACK B. FLETCHER, BIOLOGIST

STAFF

LAURITS KREFTING — O'RIELLY SANDOZ — LYLE F. SELKC
LAWRENCE TEMPLE — H. GORDON HANSON — CLARA M. FOSTER

LEGEND

- PINON-JUNIPER-MESA TYPE.
- DISTRIBUTIONS OF PINUS EDULIS.
- SHORTGRASS HIGHPLAINS TYPE.
- SAND-SAGE GRASSLAND TYPE.
- MIXEDGRASS ERODED PLAINS TYPE.
- MESQUITE GRASSLANDS.
- TALLGRASS PRAIRIE TYPE.
- STABILIZED DUNE TYPE.
- SHINNERY OAK-GRASSLAND TYPE.
- POSTOAK-BLACKJACK FOREST TYPE.
- OAK-HICKORY FOREST TYPE.
- OAK-PINE FOREST TYPE.
- LOBLOLLY PINE FOREST TYPE.
- CYPRESS BOTTOMS FOREST TYPE.
- BOTTOMLAND TYPE (FLOOD PLAIN).

OKLAHOMA VEGETATION

The original map of Duck and Fletcher (1943) has been reprinted by the Oklahoma Biological Survey with the permission of the Department of Wildlife Conservation.

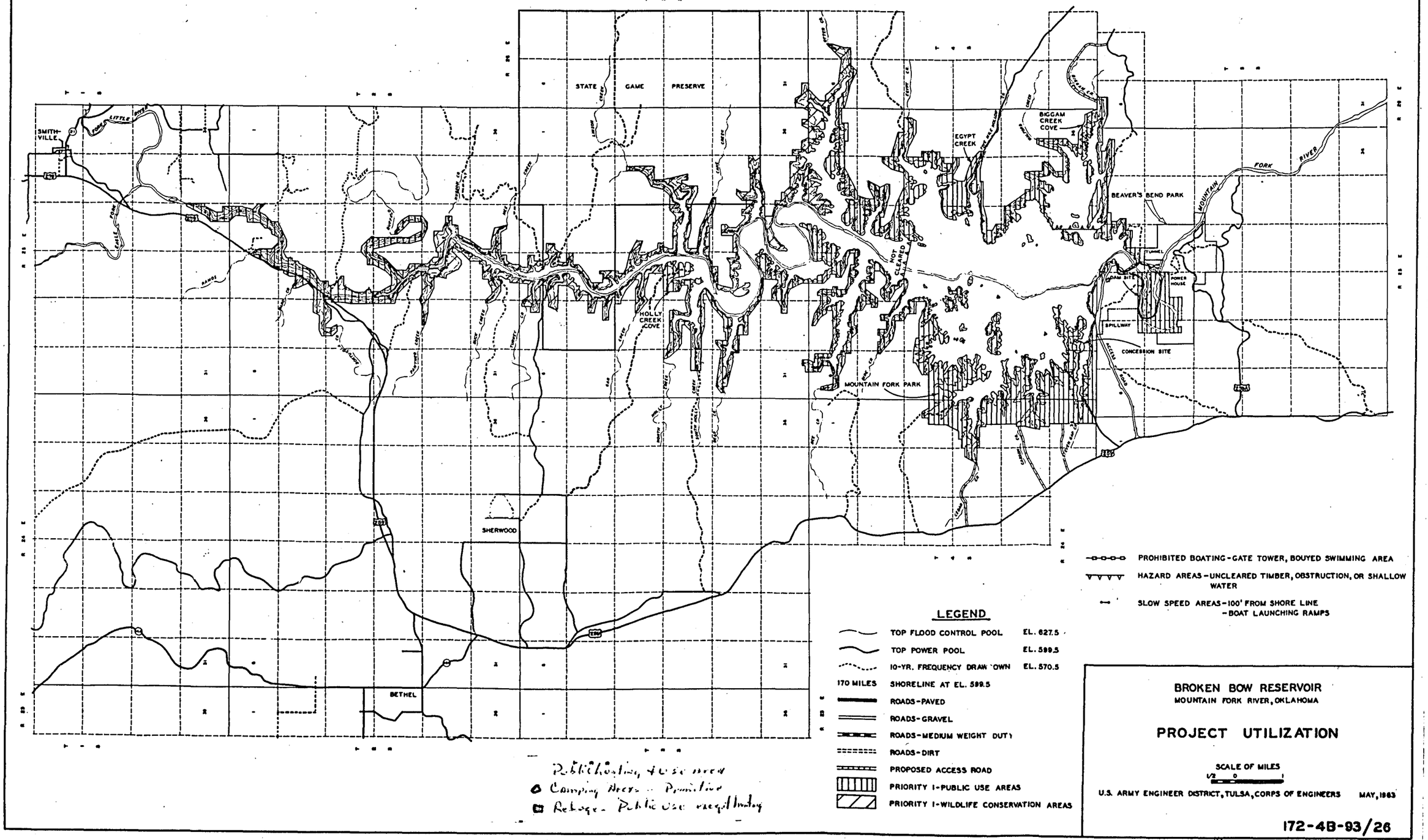
The state slopes southeastward from an elevation of 1518 m at Black Mesa in the Panhandle to 99 m on the Red River in the southeastern corner. Topography is generally flat to rolling, exceptions being the Wichita Mountains in the southwest, the Arbuckle Mountains in the south central section, and the Ouachita, Boston, and Ozark Mountains along the eastern border. Mean annual temperatures vary from 15°C at Woodward in the Northwest to 18°C at Idabel in the Southeast. The average frost-free period is about 200 days at Woodward and about 240 days in the Southeast. Average annual precipitation varies from 38 cm in the Panhandle and 65 cm in the Northwest to 115 cm in the Southeast, with well over 130 cm locally in the mountains along the eastern border. The western section has greater extremes of temperature and more variable precipitation than the central and eastern sections. Wind velocities and evaporation rates are much higher in western sections than in eastern sections.

The Pinon-Juniper represents an eastern extension of the Rocky Mountain flora and is found only in the Black Mesa region of the Panhandle. The short-grass plains occur in areas of relatively low rainfall and are composed of blue grama, buffalo grass and other xeric species. Along the major rivers of the northern half of the state, there are numerous sandy areas and stabilized dunes which support sand sage, oaks and various shrubs. The western edge of the state is characterized by a sandy region which is covered with sand sage and islands of a taxonomically complex group of oaks, called oak shinnery. Most of the central part of the state is either covered with blackjack post oak forest or was once tall-grass prairie. Since the prairie soils are very rich and suitable for farming, virtually all the prairie has been converted either to grazing or crops. The oak forests cover areas of abandoned farmland or represent areas topographically unsuited for farming. The Ozark region is mostly deciduous forest dominated by a variety of oaks and hickories. The Southeast corner of the state is dominated by shortleaf pine or a number of deciduous tree species. Bottomland forests are characterized by such species as willow, cottonwood, elm, ash, hackberry, and sycamore.

In general, the grasses and trees become taller and larger from west to east and there are a greater number of species in the eastern part of the state. Although the state is dominated by tall grass and blackjack-post oak forest, there are representative vegetation types of the Rocky Mountains, high plains prairies, tall-grass prairies, Ozark hardwoods and coastal plain forests.

Oklahoma Biological Survey

Paul G. Risser, Director



BROKEN BOW RESERVOIR
MOUNTAIN FORK RIVER, OKLAHOMA

PROJECT UTILIZATION

SCALE OF MILES
1/2 0 1

U.S. ARMY ENGINEER DISTRICT, TULSA, CORPS OF ENGINEERS MAY, 1963

172-4B-93/26

PLATE (26)

EXHIBIT D

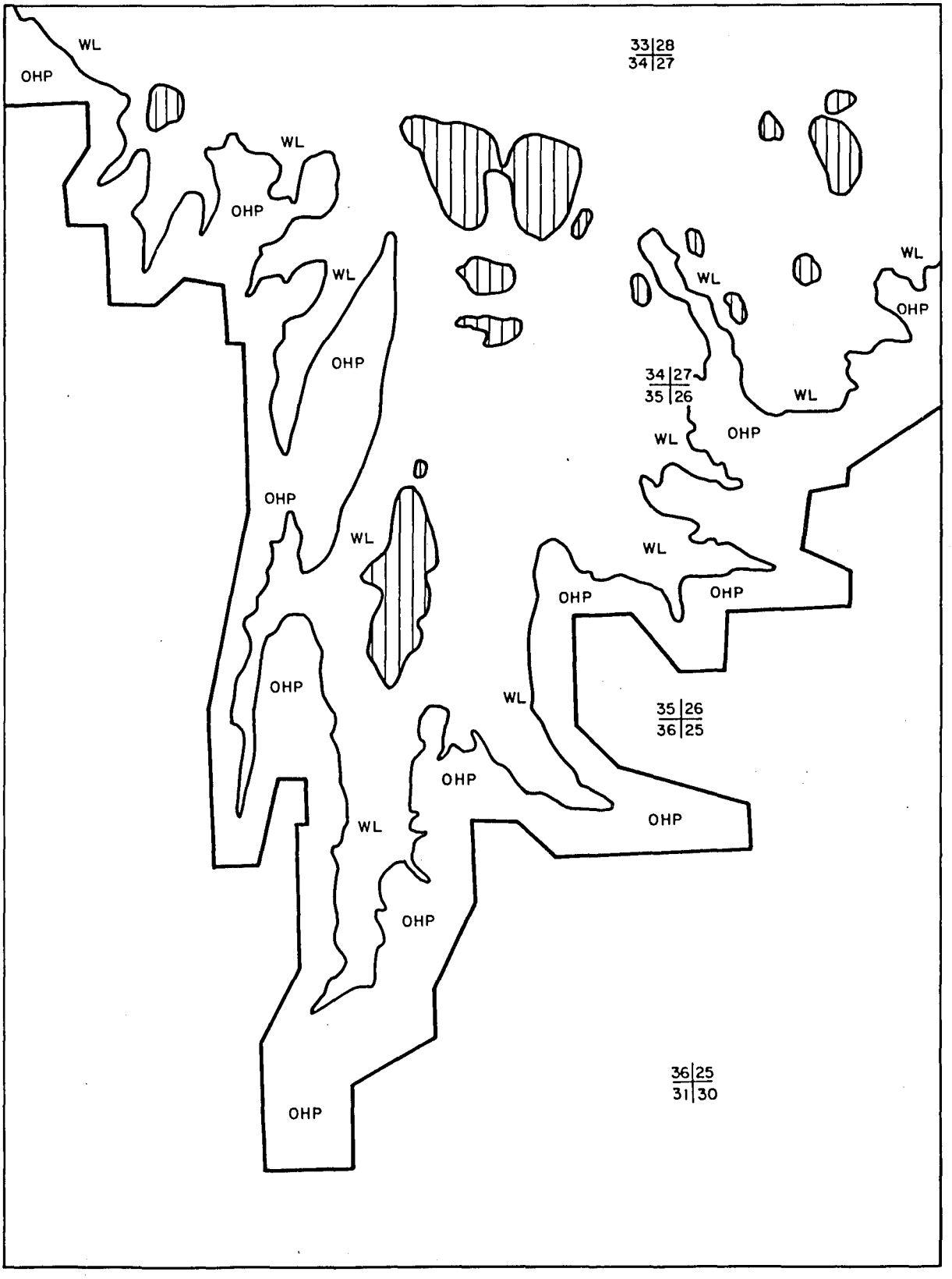
CORPS UNIT VEGETATIVE MAPS

BROKEN BOW LAKE
VEGETATIVE MANAGEMENT

TYPE

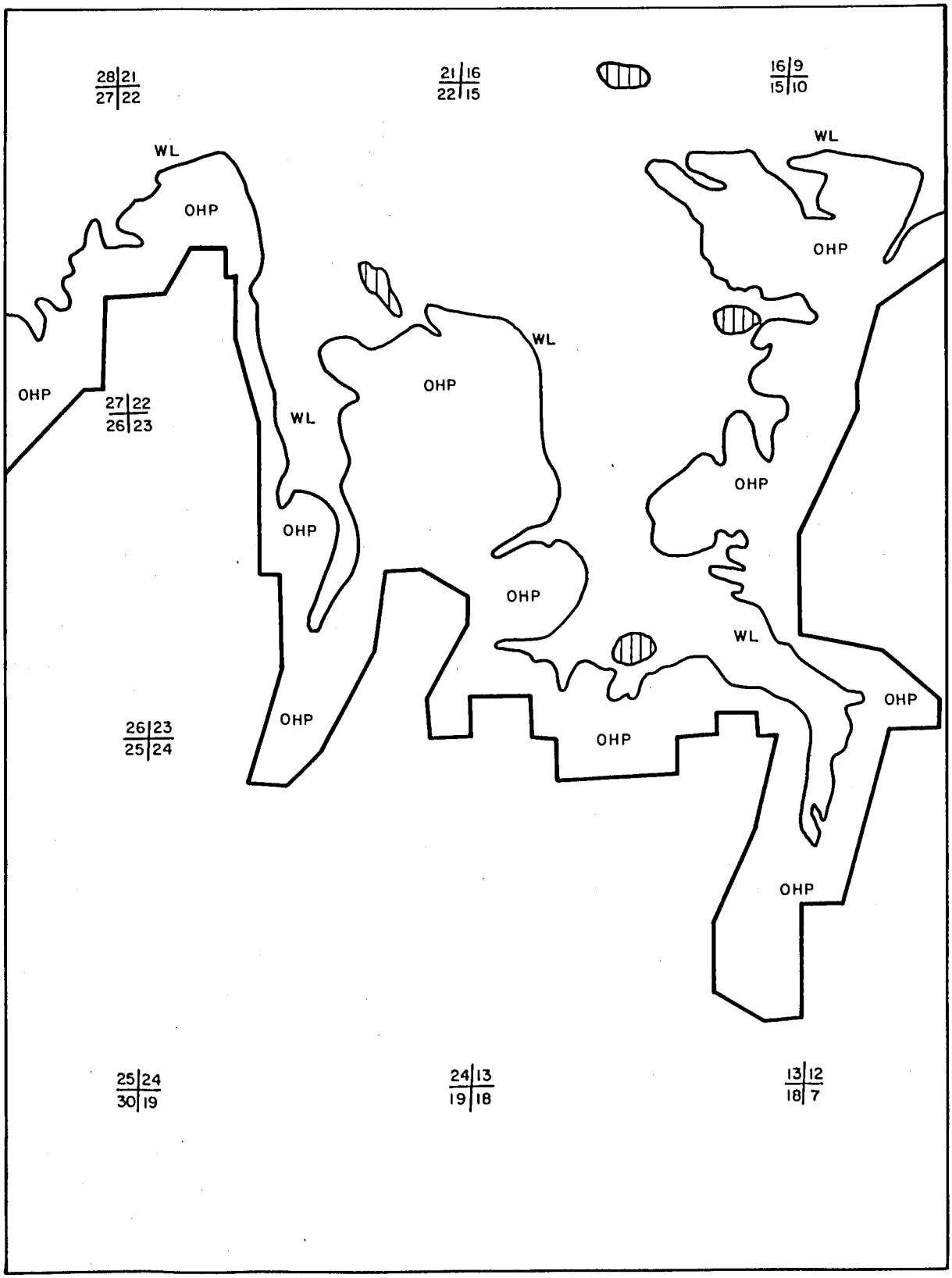
OAK-HICKORY-PINE 

EXHIBIT D



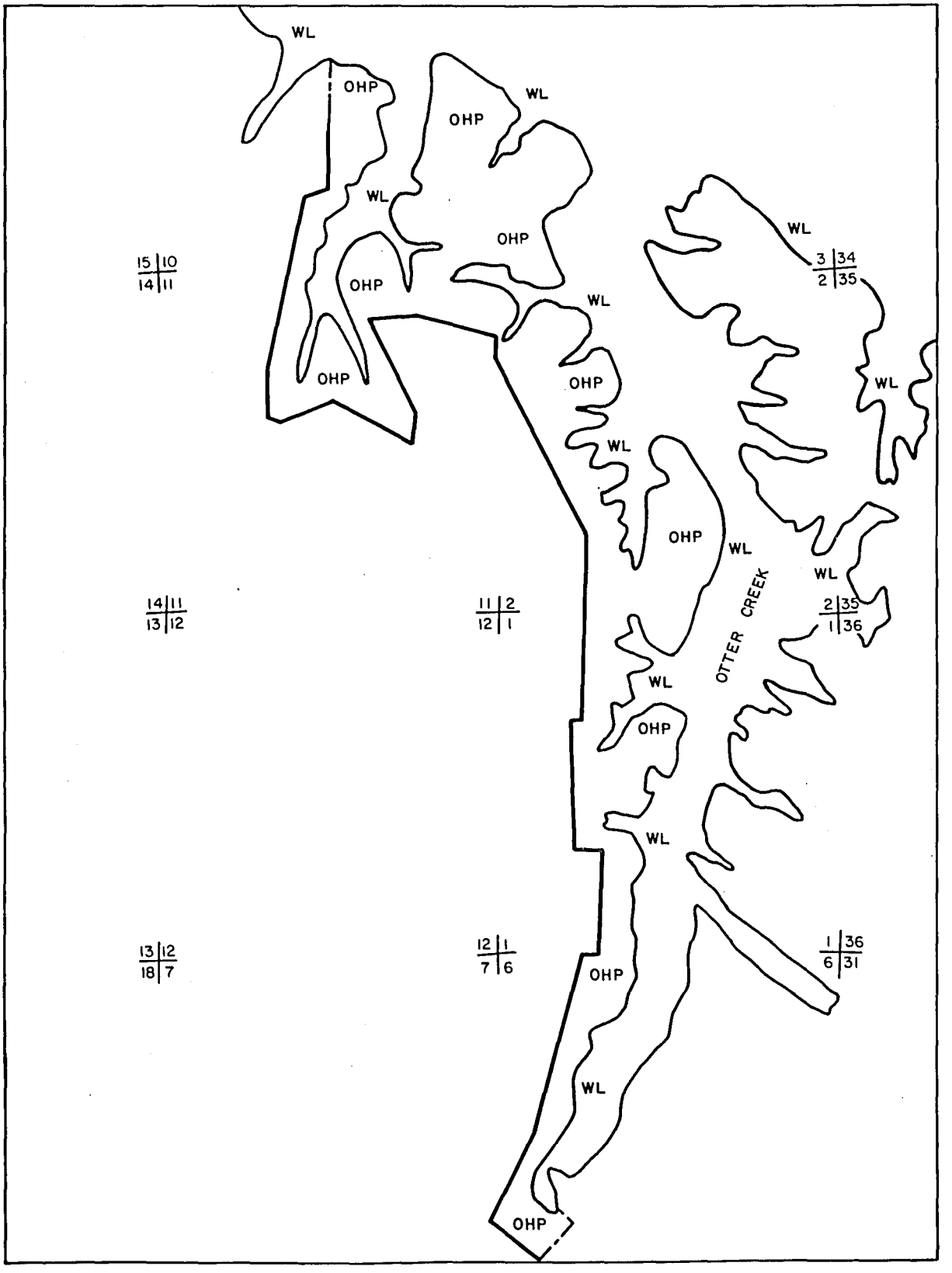
UNIT 1

EXHIBIT D



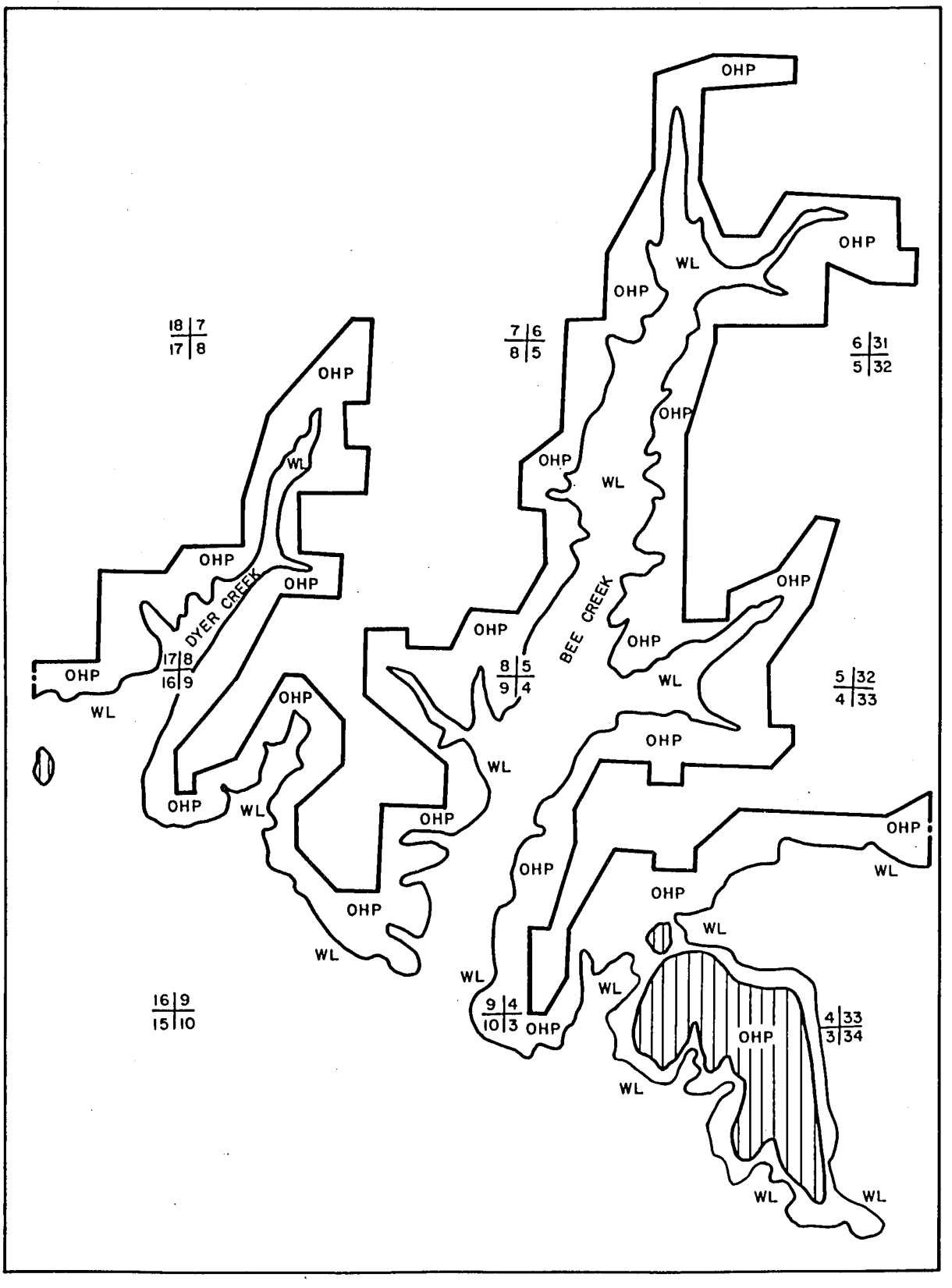
UNIT 2

EXHIBIT D



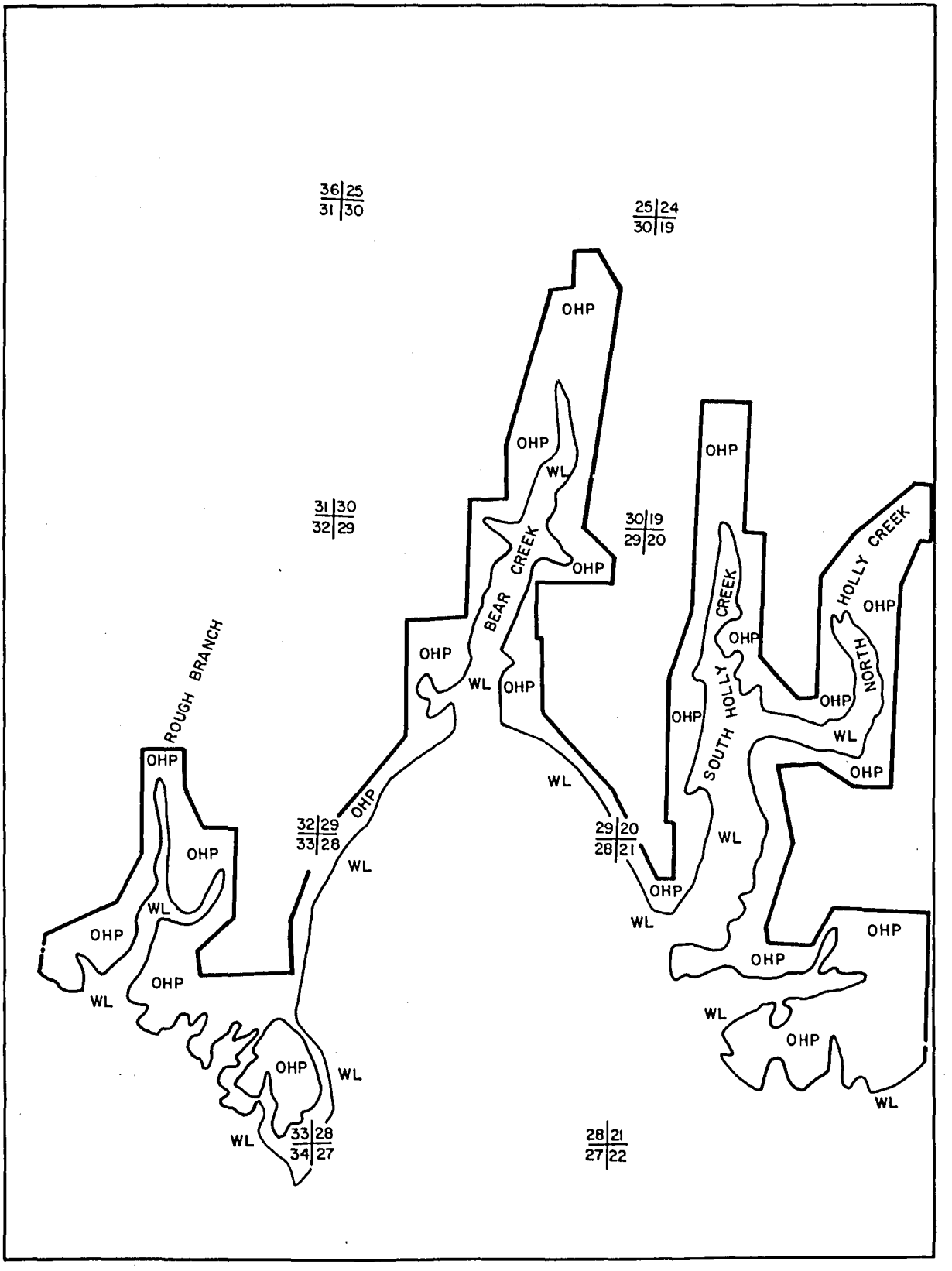
UNIT 3

EXHIBIT 1



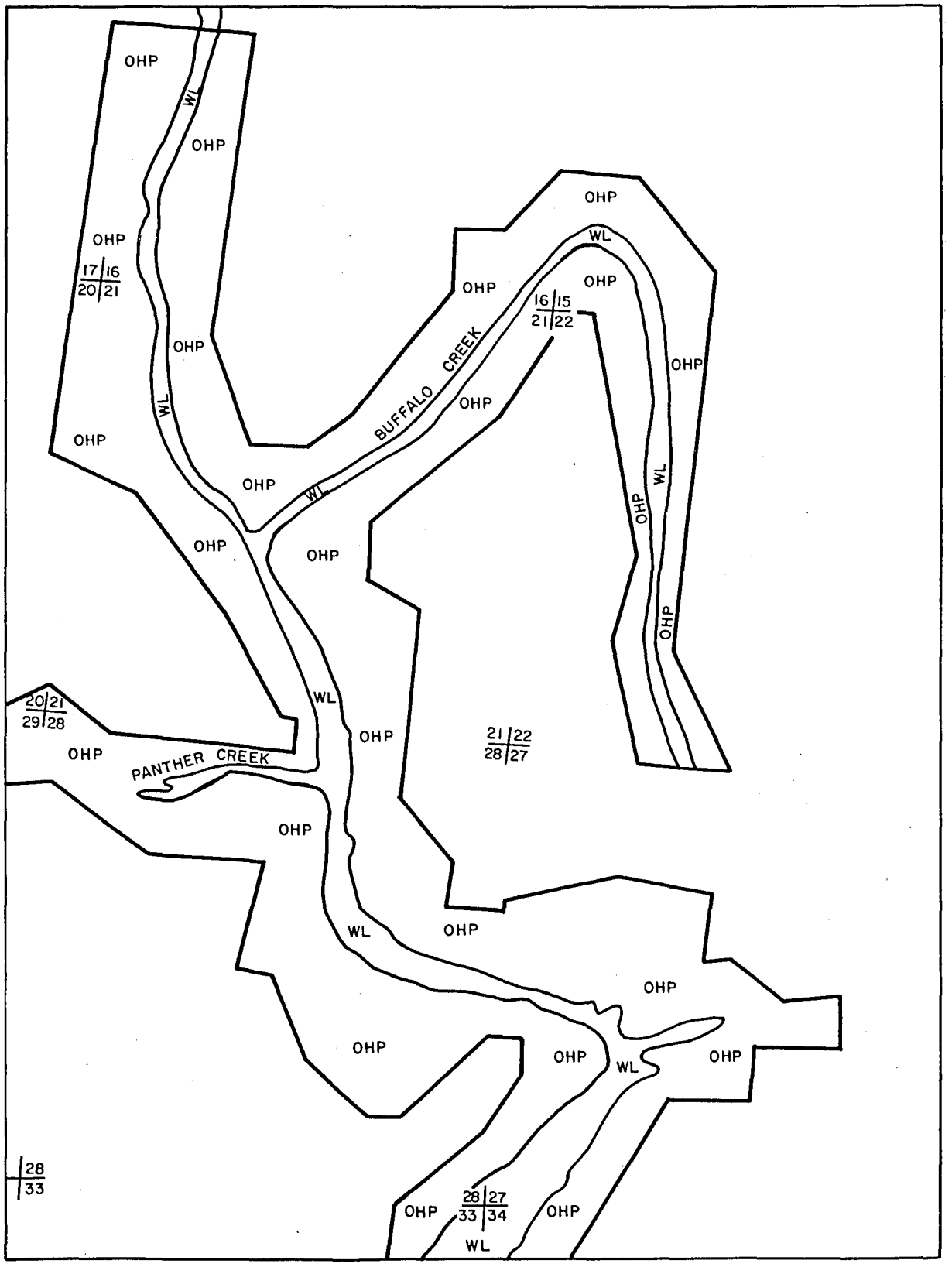
UNIT 4

EXHIBIT I



UNIT 5

EXHIBIT D



UNIT 6

EXHIBIT D

EXHIBIT E

MASTER RECREATION PLAN

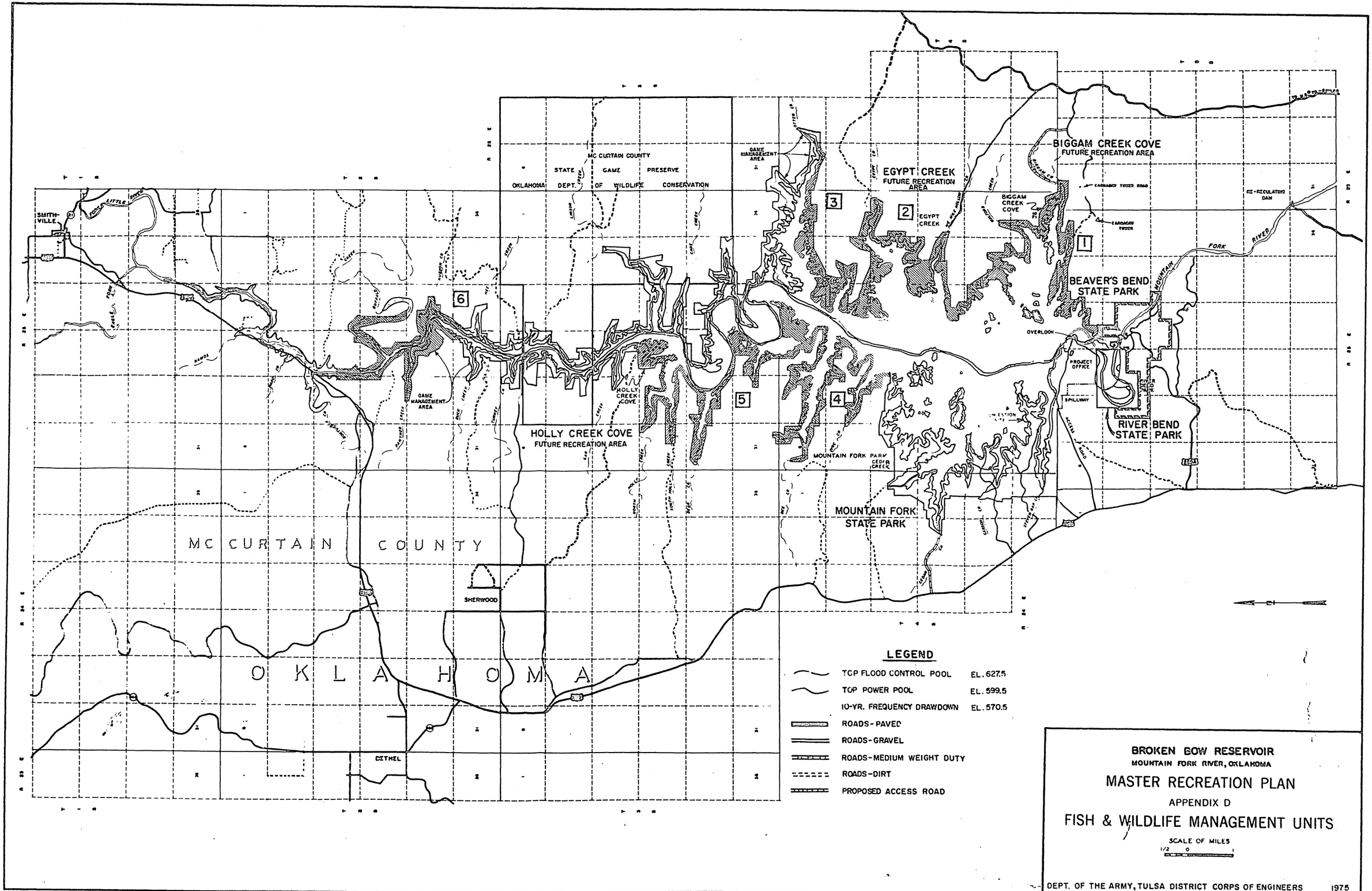
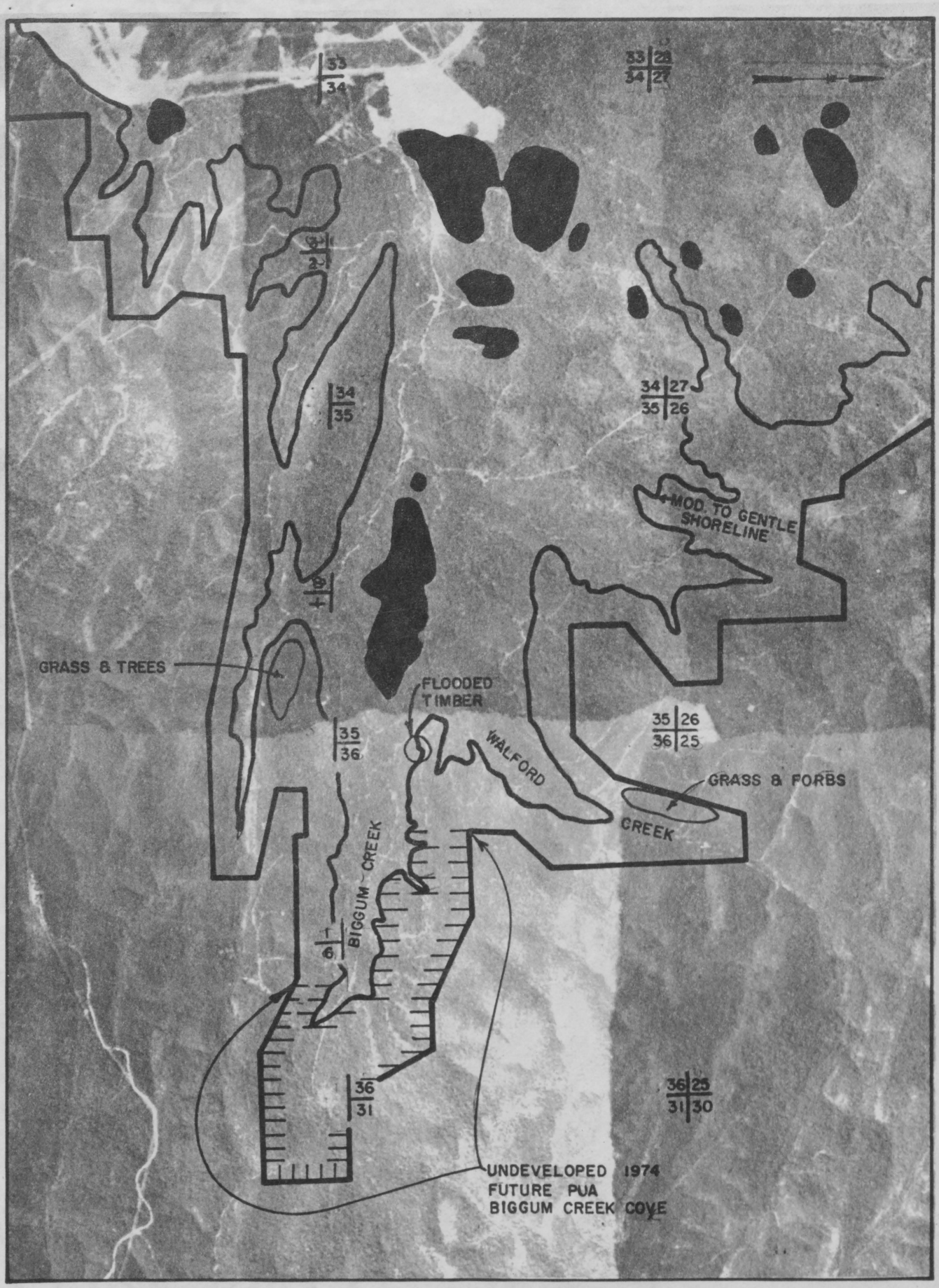

MC CURTAIN COUNTY
STATE GAME PRESERVE
OKLAHOMA DEPT. OF WILDLIFE CONSERVATION
GAME MANAGEMENT AREA
EGYPT CREEK
FUTURE RECREATION AREA
BIGGAM CREEK COVE
FUTURE RECREATION AREA
BIGGAM CREEK COVE
EGYPT CREEK
CARRIAGE TOWER ROAD
CARRIAGE TOWER
RE-REGULATING DAM
SMITHVILLE
LITTLE RIVER
MOUNTAIN FORK RIVER
BEAVER'S BEND STATE PARK
OVERLOOK
PROJECT OFFICE
SPILLWAY
RIVER BEND STATE PARK
GAME MANAGEMENT AREA
HOLLY CREEK COVE
HOLLY CREEK COVE
FUTURE RECREATION AREA
MOUNTAIN FORK PARK
CEDAR CREEK
MOUNTAIN FORK STATE PARK
1
2
3
4
5
6
MC CURTAIN COUNTY
SHERWOOD
OKLAHOMA
CYRIL
BETHEL
LEGEND
TCP FLOOD CONTROL POOL EL. 627.5
TCP POWER POOL EL. 599.5
10-YR. FREQUENCY DRAWDOWN EL. 570.5
ROADS-PAVED
ROADS-GRAVEL
ROADS-MEDIUM WEIGHT DUTY
ROADS-DIRT
PROPOSED ACCESS ROAD
BROKEN BOW RESERVOIR
MOUNTAIN FORK RIVER, OKLAHOMA
MASTER RECREATION PLAN
APPENDIX D
FISH & WILDLIFE MANAGEMENT UNITS
SCALE OF MILES
1/2 0 1
DEPT. OF THE ARMY, TULSA DISTRICT CORPS OF ENGINEERS 1975

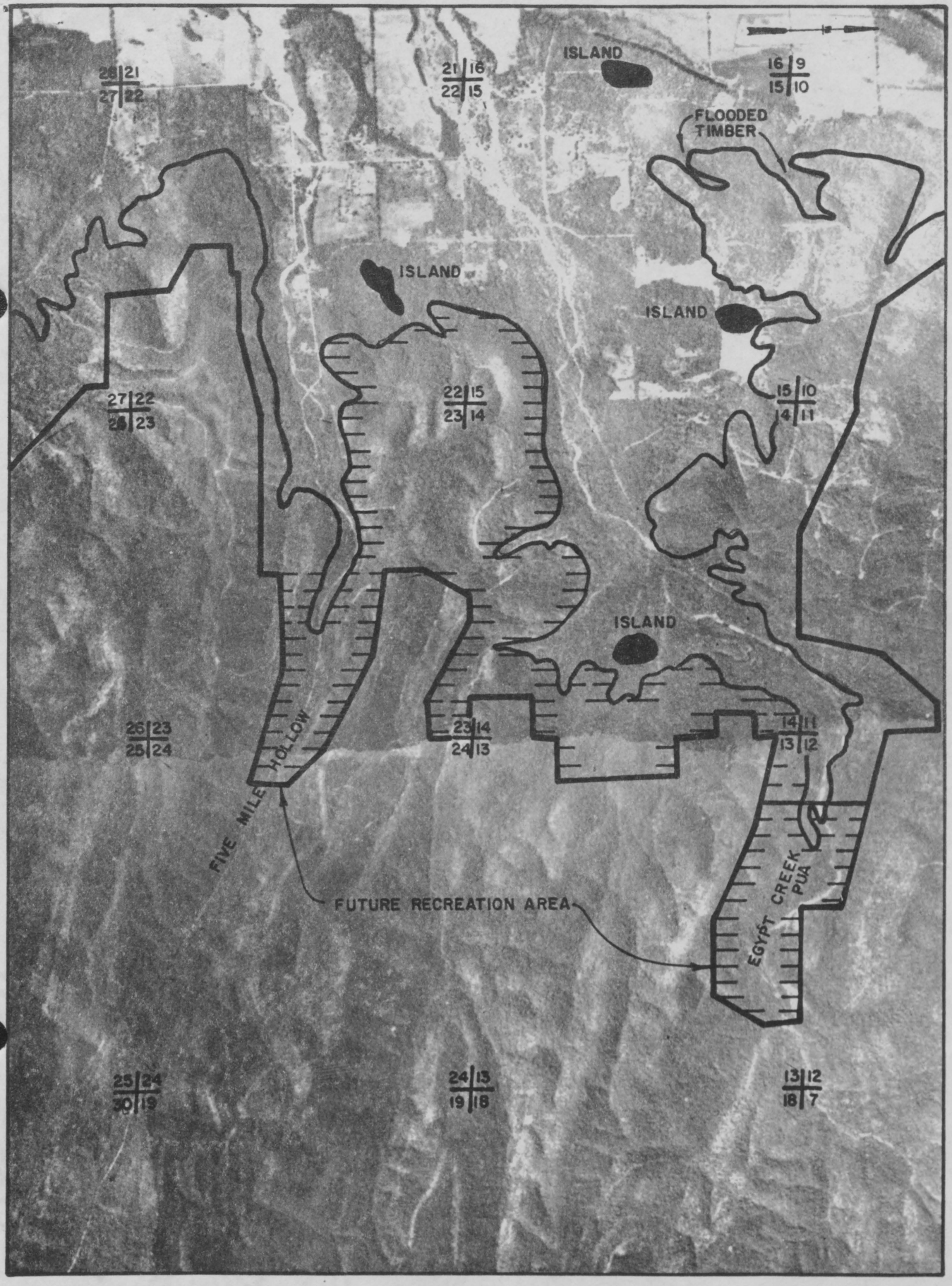
EXHIBIT F

CORPS WILDLIFE MANAGEMENT UNITS

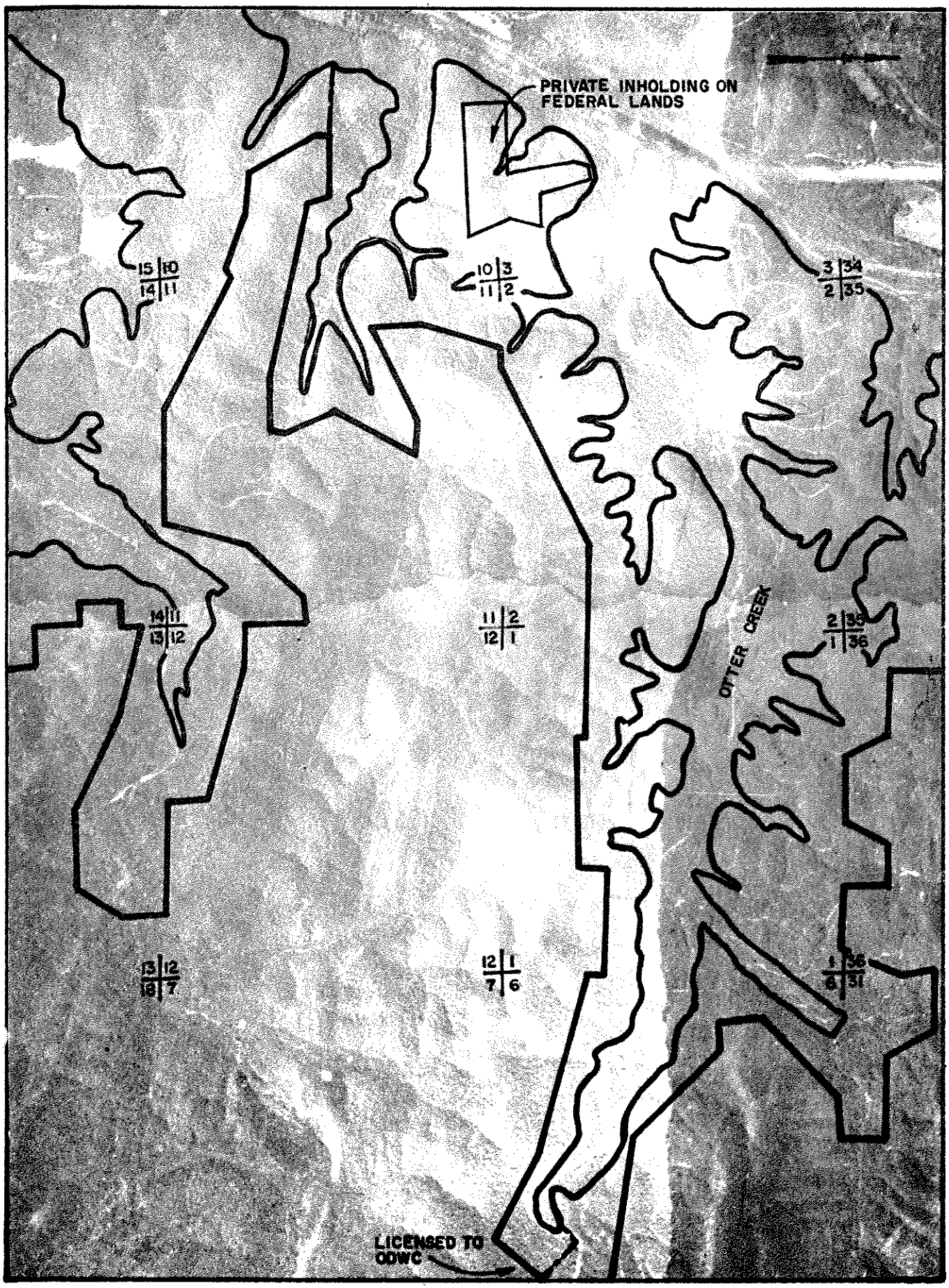


= ISLANDS

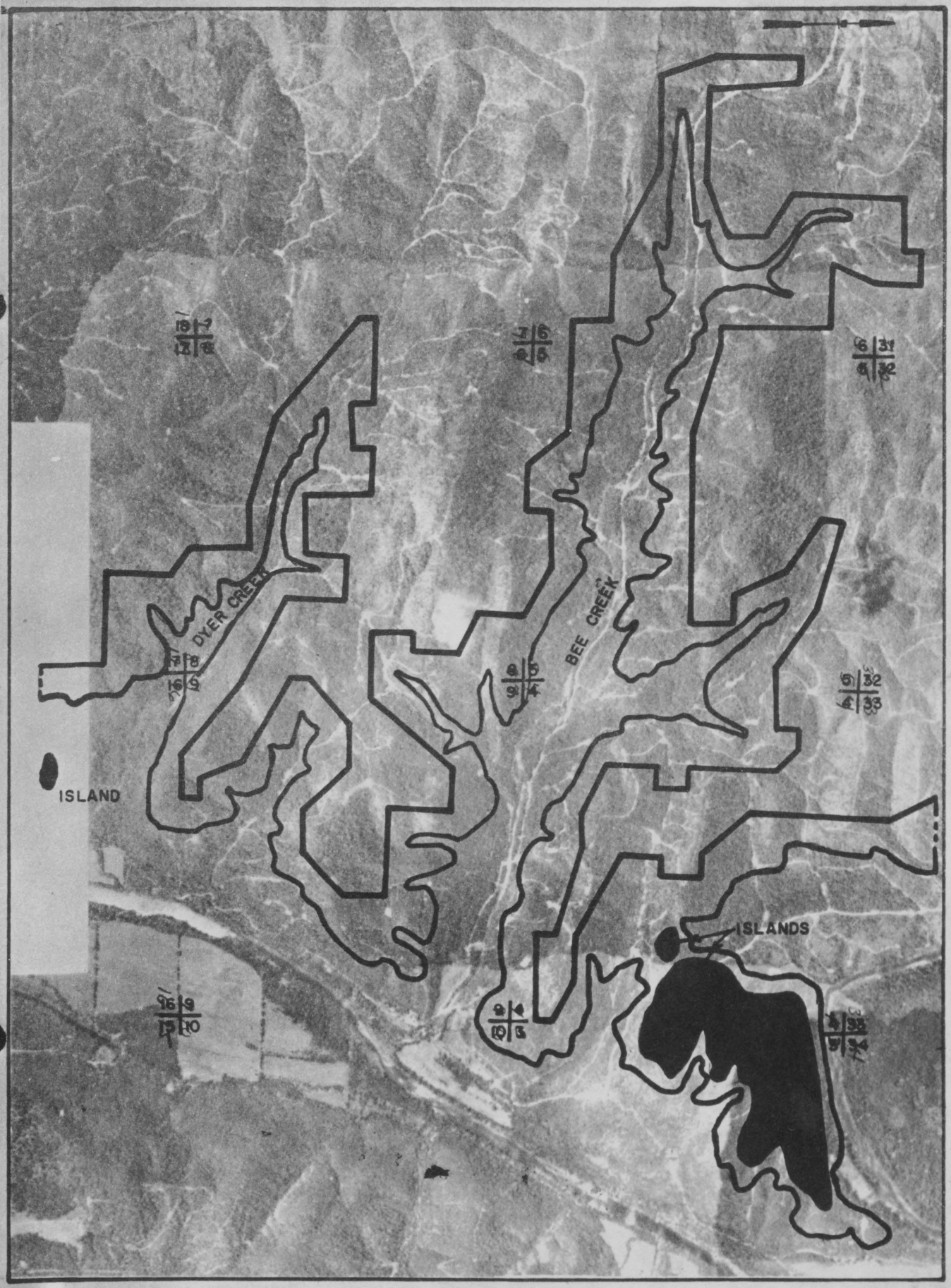
UNIT 1


ISLAND
FLOODED TIMBER
ISLAND
ISLAND
ISLAND
FIVE MILE HOLLOW
FUTURE RECREATION AREA
EGYPT CREEK PUA
28 21 / 27 22
21 16 / 22 15
16 9 / 15 10
27 22 / 26 23
22 15 / 23 14
15 10 / 14 11
26 23 / 25 24
23 14 / 24 13
14 11 / 13 12
25 24 / 30 19
24 13 / 19 18
13 12 / 18 7

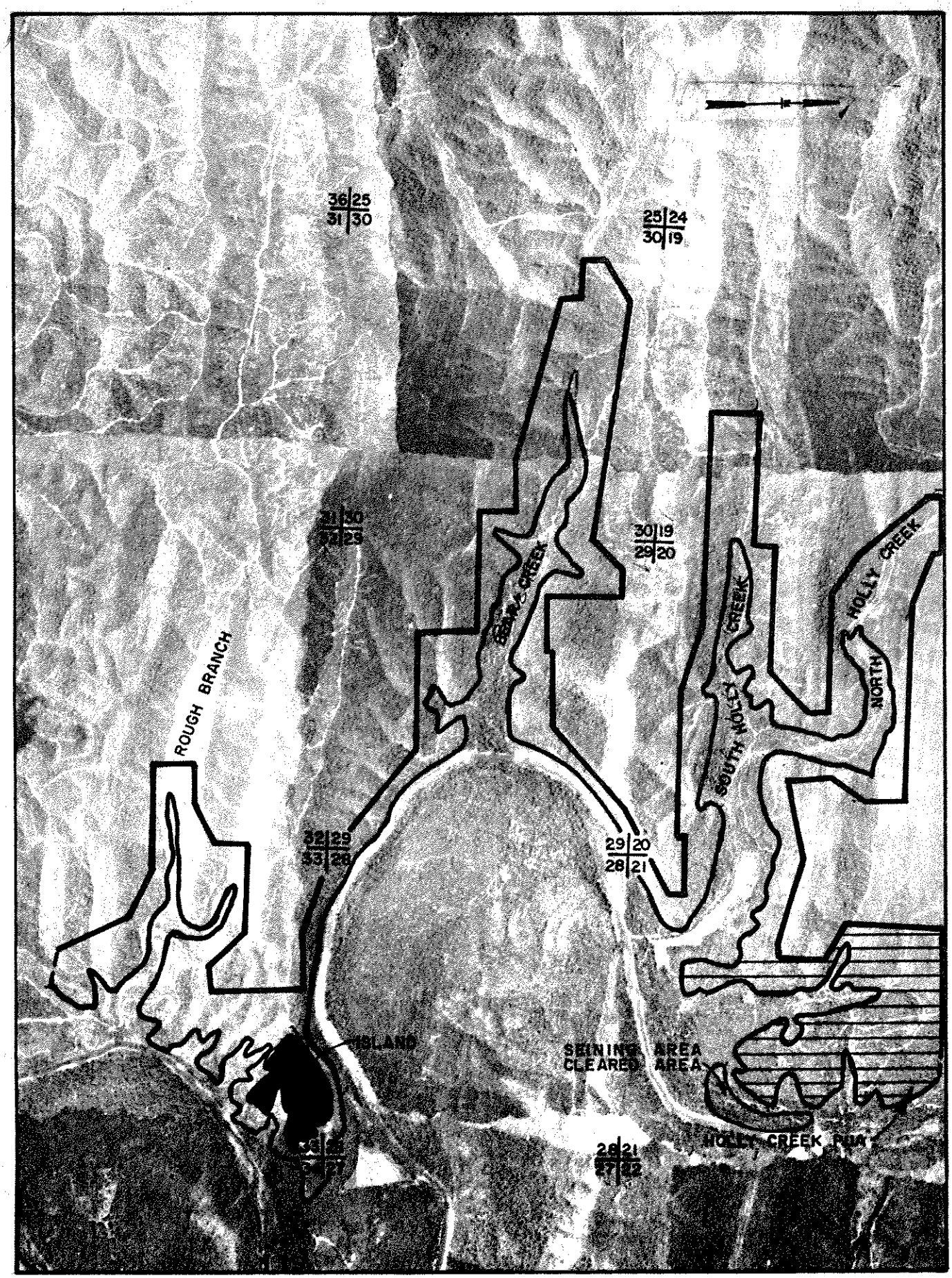
UNIT 2


PRIVATE INHOLDING ON FEDERAL LANDS
15 10 / 14 11
10 3 / 11 2
3 34 / 2 35
14 11 / 13 12
11 2 / 12 1
2 35 / 1 36
OTTER CREEK
13 12 / 18 7
12 1 / 7 6
1 36 / 6 31
LICENSED TO ODWC

UNIT 3



UNIT 4


36|25
31|30
25|24
30|19
31|30
32|29
30|19
29|20
ROUGH BRANCH
BEAR CREEK
SOUTH HOLLY CREEK
HOLLY CREEK
NORTH
32|29
33|28
29|20
28|21
ISLAND
SEINING AREA
CLEARED AREA
HOLLY CREEK PARK
35|36
2|1
26|21
27|22

UNIT 5


17 16
20 21
BUFFALO CREEK
16 15
21 22
UNDEVELOPED
PANTHER CREEK PUA
20 21
29 28
PANTHER CREEK
21 22
28 27
28
33
28 27
33 34

UNIT 6

SWDCO-RR (SWTOD-RM 6 Feb 81) 1st Ind
SUBJECT: Broken Bow Lake, Mountain Fork River, Oklahoma, Supplement 1 to Appendix E, Project Safety Plan to Design Memorandum 4B, Master Plan (Updated)

DA, Southwestern Division, Corps of Engineers, 1114 Commerce Street, Dallas, TX 75242 16 MAR 1981

TO: District Engineer, Tulsa, ATTN: SWTOD

Supplement 1 to Appendix E, SAB, is approved subject to the following comments:

Paragraph 8-04(e), Equipment Storage:

(1) The equipment list should include one base radio station and two vehicles equipped with radios.

(2) Two life rings and another portable radio should be provided when funds become available.

FOR THE DIVISION ENGINEER:

wd all incl

A. P. HUTCHISON
Chief, Construction-
Operations Division

CF: w/incl
HQDA(DAEN-CWO-R) 2 cys

DEPARTMENT OF THE ARMY
TULSA DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 61
TULSA, OKLAHOMA 74121

REPLY TO
ATTENTION OF:

SWTOD-RM

6 FEB 1981

SUBJECT: Broken Bow Lake, Mountain Fork River, Oklahoma, Supplement 1 to Appendix E, Project Safety Plan to Design Memorandum 4B, Master Plan (Updated)

Division Engineer, Southwestern
ATTN: SWDCO-RR

Subject supplement (Incl 1) is submitted for review and approval in accordance with ER 1130-2-400.

FOR THE DISTRICT ENGINEER:

Alan W. Steinmetz
for JAMES P. JONES
Chief, Operations Division

1 Incl (9 cys)
as

BROKEN BOW LAKE
MOUNTAIN FORK RIVER, OKLAHOMA

SUPPLEMENT 1
TO
APPENDIX E
PROJECT SAFETY PLAN
TO
DESIGN MEMORANDUM 4B
MASTER PLAN (UPDATED)

1. Purpose. The purposes of this supplement are to add the Boating Safety Plan section and the Submission, Approval, and Review section to appendix E.

2. Discussion. The boating safety plan was prepared in accordance with multiple letter SWDCO-RR; dated 24 Aug 1978, Subject: Boating Safety in SWD, Policy Statement. The plan was prepared by the Project Manager and approved by the District Office as a supplement to appendix E. The Submission, Approval, and Review section was prepared to provide the Project Manager a convenient method of recording the annual review and to provide the District Office a method for maintaining a record of minor pen and ink changes.

3. Substitutions and additions. Upon receipt of the approval indorsement for this supplement the attached pages shall be added to appendix E.

Insert
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8-1 through 8-6
9-1

FOR THE DISTRICT ENGINEER:

for JAMES P. JONES
Chief, Operations Division

TABLE OF CONTENTS (CONT)

VIII - BOATING SAFETY PLAN

IX - SUBMISSION, APPROVAL, AND REVIEW

VIII - BOATING SAFETY PLAN

8-01. Hazardous boating areas.

a. No wake boating areas

(1) Marina located at Stevens Creek Area.

(2) Boat ramps located at Stevens Gap Area and on Carson Creek.

b. No boating areas.

(1) Reregulation dam presents a hazard to boaters and swimmers upstream during power generation.

(2) The powerhouse outlet channel and the Mountain Fork River for one-half mile downstream, including the low water dam, are extremely hazardous during power releases. No boating, swimming or wading is allowed at the fishing area of the power outlet. Also, there is a buoy chain located upstream from the low water dam which includes a buoy telling boats to keep out.

(3) The spillway area is marked with a buoy chain telling boats to keep out. This area generally presents no danger except during infrequent spillway discharges.

(4) There are two swimming areas located on the lake. These areas are marked with buoy chains warning boats to keep out.

c. Potential boating hazards.

(1) From the Main Embankment to Sand Springs Bend (seven miles upstream) there are wide expanses of water unprotected from the wind. These areas may change from dead calm to extremely choppy water within the space of a few minutes. The wind from the southeast, east, northeast, north, or northwest poses the greatest hazard.

(2) The lake was cleared of timber only to a line drawn from Dyer Creek to Egypt Creek. All timber upstream from this line was left standing. When the lake level drops below normal many snags surface and subsurface in tributary creeks. These snags are a problem to the boating public.

(3) Upstream of the McCurtain County Wilderness Area the lake narrows and shallows rapidly. There is a narrow crooked channel following the old river channel beset by rock ledges, dead timber, and occasional floating logs.

(4) During flood periods many dead trees and logs are brought downstream from the watershed above the lake. In addition, logs that have been left on the shoreline by previous floods may be waterborne again. Any wind activity at such a time may shift these drifting logs to any portion or all portions of the lake, creating grave hazards to boating activity.

d. Hazard area map. A current project map showing all known boating hazards is maintained at the project office.

8-02. Hazard marking system.

a. General. All hazards listed in this plan, with the exception of some listed in paragraph "c" of section 8-01, currently are marked with a system utilizing either signs, buoys or both. Boat ramps and other appropriate areas are marked with "no wake" buoys or decals to reduce the speed of boats using these areas.

b. Signs. A standard information sign, similar to the ones shown on Drawing No. 7-214.0 of the SWD sign handbook, is placed at boat launching facilities advising boat operators to be aware of the effect their wake may have on others and requesting them to show courtesy to others. The following wording is suggested for use on this sign.

BE COURTEOUS
RESPECT THE RIGHTS OF OTHERS
REDUCE SPEED
WATCH YOUR WAKE

c. Buoys. The hazard marking system also consists of anchored buoys indicating "NO BOATING" where there is a danger to boats and their occupants or where swimming is allowed. No wake buoys are also placed where speed and/or a wake could endanger other boats anchored, tied to the bank, being launched, or removed to trailers.

d. Maintenance. Hazard area buoys which mark a boating hazard are checked frequently to insure that they are in the proper location to identify the hazard involved.

(1) Buoyed instructional signs as shown in the SWD sign handbook are maintained in appropriate places.

(2) Project personnel make regular patrols to identify hazards and maintain established buoys.

(3) A continual check for floating debris is conducted for water safety purposes.

e. Coordination. Coordination in placement of buoys is made with the US Coast Guard. This coordination consists mainly through consideration of suggested changes or revisions submitted by this agency.

8-03. Education and training.

a. Employee education.

(1) Employee awareness. Every employee will be familiar with the Motor Boat Operators Manual to acquaint him/her with safe operating principles of motorboats.

(2) Water safety posters. Posters are placed on shop bulletin boards to remind employees of safe boating practices.

(3) Accidents. Instructions for employees to follow in case of a boating accident or drowning are posted on shop bulletin boards. (See Chapter V.)

(4) First aid training. At least one employee in each work party of two or more shall be qualified to administer first aid. Minimum qualifications shall be a current certificate in first aid issued by the American Red Cross or the United States Bureau of Mines. First aid shall be the subject of at least four safety meetings each year to promote interest and to maintain first aid skills.

(5) First aid kits. First aid kits are installed in vehicles, boats, and shop.

(6) Weekly safety meetings. A weekly safety meeting for all employees is conducted covering topics related to current operations and activities. Minutes of these meetings are maintained at the project office. Additional instructions are contained in TDR 385-1-1.

b. Vistor education.

(1) General. Initial search and rescue efforts many times are unsuccessful in preventing a fatality. The key to preventing these types of accidents is to educate the public as to the dangers involved if safe boating practices are not followed. A concentrated effort should be put forth by the Corps in this area. Various groups are available to assist project personnel with the immense task of educating the public on boating and water safety. Among these groups are Red Cross Chapters, Coast Guard Auxilliary, Oklahoma Lake Patrol, and mass media news programs. As many people as possible should be reached by a boating safety program. Project personnel should cooperate with other groups involved in boating safety in order to provide not only a meaningful program but also to reach as many people as possible. Large numbers of people can be reached by use of mass media programs. In addition, project personnel should give individual presentations to civic, sportsmen, or school groups.

(2) Boat ramps.

(a) All ramps are adequately marked and signs and buoys in the vicinity of boat ramps are maintained properly at all times to insure safe boating.

(b) Posters and bulletins pertaining to water and boating safety are posted on park bulletin boards and shall be provided by the Corps of Engineers and displayed by concessionaires. Information provided will include directions for the visitor in case of emergency.

(c) Special emphasis is placed on Safe Boating Week with additional signs, posters, broadcasts, and articles.

(d) Radio and television broadcasts are used to inform and educate the public in water safety practices.

(e) Newspaper articles are used periodically to inform the public of water safety practices.

(f) Night programs, safety talks, movies, and slides are given by rangers during periods of high visitation.

8-04. Search and rescue missions.

a. General. It is the responsibility of the Oklahoma Lake Patrol to coordinate and conduct search and rescue operations. If a situation arises that necessitates a search and rescue operation, the Lake Patrol should be notified immediately. Until they arrive on the scene, Corps personnel should gather information on what happened and, if practical, initiate a search and rescue action. After the Lake Patrol arrives, all pertinent information should be given to them. Corps personnel should then assist the Lake Patrol in conducting an effective search and rescue operation.

b. Boating safety officer. The Project Manager will designate a park ranger as boating safety officer. This person's duties will include insuring that all personnel are familiar with procedures to follow in the event of an accident, familiarizing project personnel with equipment that they may have to operate, and coordinating efforts of all project personnel to effectively carry out this plan.

c. Training. Most water related accidents occur understandably during periods of peak usage. During such times project personnel are usually widely dispersed. Because of this dispersion, it is necessary that all project personnel be totally familiar with emergency procedures in the event of an accident. It will be the responsibility of the Boating Safety Officer to insure that personnel are adequately trained to carry out search and rescue operations. All personnel involved in this plan should receive first aid and cardio-pulmonary-resuscitation (CPR) training each year. Fast, positive action is the most important item for search and rescue operations involving water related accidents. Therefore, it is extremely critical that park rangers have a sufficient amount of training to enable them to respond correctly to this type of emergency.

d. Support organizations. Several support organizations are available to assist project personnel in search and rescue operations. Included among these organizations and agencies are the Oklahoma Highway Patrol (Lake Patrol Division), McCurtain County Sheriff's Department and the McCurtain County Civil Defense Director. The Corps will cooperate with these agencies as much as possible to insure good working relationships.

e. Equipment storage. First aid equipment is stored at the project office building. The equipment is checked and the motors started periodically to assure constant readiness of the boat. The following is a list of equipment available for search and rescue missions:

(1) 1-19' Deck Boat (Outboard - 175 H.P.)
1-28' Pontoon Work Barge (Outboard - 85 H.P.)
1-12' Aluminum Johnboat (Outboard - electric)

(2) 4 - Sets of deep water drags with suitable lengths of line.
2 - Sets of shallow water drags with suitable lengths of line.

(3) 1 - Motorola portable radio. (WUI 3821)

(4) 2 - Portable light stands and gasoline generator.

(5) 1 - pneumolator resuscitator capable of supplying oxygen to two victims simultaneously.

f. Action Plan.

(1) Go to scene of accident with boat, resuscitator, and drags.

(2) Make complete investigation of accident. The following information is needed.

(a) Name of victim.
(b) Age of victim.
(c) Address of victim.
(d) Occupation of victim.
(e) Names and addresses of witnesses (at least two).
(f) Have witnesses describe how the accident happened.
(g) Time of accident.
(h) Time body was recovered.

(3) Notify Tulsa District Office by telephoning one of the following in the order listed:

(a) Mr. James P. Jones, (918) 581-7343; home phone: (918) 252-7357.

(b) Mr. Van M. Thornton, (918) 581-7340; home pnone: (918) 252-2405.

g. Boating regulations and search and rescue agencies. Most of the responsibility for enforcing boating rules and regulations falls on the Oklahoma Lake Patrol and the Coast Guard. Recent changes in Title 36, Code of Federal Regulations, part 327.3, dealing with vessels, increases the responsibility of the Corps of Engineers for enforcing boating laws. All rangers should be familiar with both state and Federal boating laws along witn their applicability. The following is a list of search and rescue agencies and supporting organizations:

McCurtain County Sheriff (Paul Stuart)	(405) 286-3331
Oklahoma Waterway Patrol (Don Sands)	(405) 286-2043

McCurtain County Civil Defense Director (Mike Green)	(405) 286-3373
News Media	
Radio Station KBEL	(405) 286-3092
Broken Bow News	(405) 584-6210
McCurtain Gazette	(405) 286-3321

8-05. Courtesy boat patrol. During periods of peak visitation, the project utilizes a courtesy boat patrol. The boat patrol will be operated by a park ranger who is well trained in all matters pertaining to water and boating safety. This person will assist boaters, skiers, and swimmers; promote water safety; and help state agencies in the enforcement of boating laws.

8-06. Accident reporting.

a. Incident report. Incident reports (ENG Form 4337) will be sent to the Tulsa District Office and a copy will also be sent to the appropriate US Coast Guard District Headquarters as determined by the District Engineer.

b. Mishap report. A mishap report (ENG Form 3394) will be sent to the Safety Office for any public fatality, Government property damage of $250 or more resulting from accidents, or when the incident might result in questions from OCE or a Congressman.

IX - SUBMISSION, APPROVAL, AND REVIEW

9-01. Submission and approval. The original appendix E was submitted to Southwestern Division for approval on 16 December 1974 and was approved on 4 March 1975.

9-02. Review. The project manager shall review and update this plan annually. A copy of minor pen and ink changes shall be forwarded to Master Plan Section, Recreation-Resources Management Branch, for inclusion in the record copy. The project reviewer shall sign and date the log below upon completion of the annual review.

ANNUAL REVIEW LOG

Year	Signature	Title	Date
1982			
1983			
1984			
1985			
1986			
1987			
1988			
1989			
1990			
1991			

BROKEN BOW LAKE
MOUNTAIN FORK RIVER, OKLAHOMA

SUPPLEMENT 1
TO
APPENDIX E
PROJECT SAFETY PLAN
TO
DESIGN MEMORANDUM 4B
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FOR THE DISTRICT ENGINEER:

for JAMES P. JONES
Chief, Operations Division

DEPARTMENT OF THE ARMY
TULSA DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 61
TULSA, OKLAHOMA 74121

REPLY TO
ATTENTION OF:

SWTOD-RM

SUBJECT: Broken Bow Lake, Mountain Fork River, Oklahoma, Supplement 1 to Appendix E, Project Safety Plan to Design Memorandum 4B, Master Plan (Updated)

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ATTN: SWDCO-RR

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FOR THE DISTRICT ENGINEER:

Alan W. Steinmetz
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1 Incl (9 cys)
as

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(3) 1 - Motorola portable radio. (WUI 3821)

(4) 2 - Portable light stands and gasoline generator.

(5) 1 - pneumolator resuscitator capable of supplying oxygen to two victims simultaneously.

f. Action Plan.

(1) Go to scene of accident with boat, resuscitator, and drags.

(2) Make complete investigation of accident. The following information is needed.

(a) Name of victim.
(b) Age of victim.
(c) Address of victim.
(d) Occupation of victim.
(e) Names and addresses of witnesses (at least two).
(f) Have witnesses describe how the accident happened.
(g) Time of accident.
(h) Time body was recovered.

(3) Notify Tulsa District Office by telephoning one of the following in the order listed:

(a) Mr. James P. Jones, (918) 581-7343; home phone: (918) 252-7357.

(b) Mr. Van M. Thornton, (918) 581-7340; home phone: (918) 252-2405.

g. Boating regulations and search and rescue agencies. Most of the responsibility for enforcing boating rules and regulations falls on the Oklahoma Lake Patrol and the Coast Guard. Recent changes in Title 36, Code of Federal Regulations, part 327.3, dealing with vessels, increases the responsibility of the Corps of Engineers for enforcing boating laws. All rangers should be familiar with both state and Federal boating laws along with their applicability. The following is a list of search and rescue agencies and supporting organizations:

McCurtain County Sheriff (Paul Stuart)	(405) 286-3331
Oklahoma Waterway Patrol (Don Sands)	(405) 286-2043

McCurtain County Civil Defense Director (Mike Green)	(405) 286-3373
News Media	
Radio Station KBEL	(405) 286-3092
Broken Bow News	(405) 584-6210
McCurtain Gazette	(405) 286-3321

8-05. Courtesy boat patrol. During periods of peak visitation, the project utilizes a courtesy boat patrol. The boat patrol will be operated by a park ranger who is well trained in all matters pertaining to water and boating safety. This person will assist boaters, skiers, and swimmers; promote water safety; and help state agencies in the enforcement of boating laws.

8-06. Accident reporting.

a. Incident report. Incident reports (ENG Form 4337) will be sent to the Tulsa District Office and a copy will also be sent to the appropriate US Coast Guard District Headquarters as determined by the District Engineer.

b. Mishap report. A mishap report (ENG Form 3394) will be sent to the Safety Office for any public fatality, Government property damage of $250 or more resulting from accidents, or when the incident might result in questions from OCE or a Congressman.

IX - SUBMISSION, APPROVAL, AND REVIEW

9-01. Submission and approval. The original appendix E was submitted to Southwestern Division for approval on 16 December 1974 and was approved on 4 March 1975.

9-02. Review. The project manager shall review and update this plan annually. A copy of minor pen and ink changes shall be forwarded to Master Plan Section, Recreation-Resources Management Branch, for inclusion in the record copy. The project reviewer shall sign and date the log below upon completion of the annual review.

ANNUAL REVIEW LOG

Year	Signature	Title	Date
1982			
1983			
1984			
1985			
1986			
1987			
1988			
1989			
1990			
1991			

TABLE OF CONTENTS (CONT)

VIII - BOATING SAFETY PLAN

IX - SUBMISSION, APPROVAL, AND REVIEW

SWDCO-R (SWTED-DA 16 Dec 74) 1st Ind
SUBJECT: Broken Bow Lake, Mountain Fork River, Okla., Appendix E, Project Safety Plan to DM No. 4B, Master Plan

DA, Southwestern Division, Corps of Engineers, 1114 Commerce Street, Dallas, TX 75202 4 March 1975

TO: District Engineer, Tulsa, ATTN: SWTED-DA

1. Appendix E, Project Safety Plan to Design Memorandum No. 4B, Master Plan for Broken Bow Lake, is approved subject to the following comments or inclusions at subsequent revisions, whichever is appropriate.

a. Paragraph 2-01f. A discussion should be included on the safe storing, handling, and applying of chemicals and pesticides and the disposal of used containers in accordance with current regulations.

b. Paragraph 3-05. Suggest that the first sentence in this paragraph be clarified to indicate the District element responsible for periodic inspections to ascertain compliance with lease conditions and requirements. Such as "each concession at the project shall be inspected by a District Office Real Estate representative, not less than annually for compliance with lease requirements."

c. Paragraph 4-01. The discussion should mention the parameter(s) for which the water is tested.

d. Paragraph 7-02. The paragraph should be expanded to include requirements for formal first-aid and other life-saving training.

e. It is recognized that this plan provides the information as outlined in ER 1130-2-400; however, since swimming and boating accidents are of major concern, it would be more meaningful if the appendix presented additional information on water safety. The following are some items that should be covered in greater detail or included in this appendix.

(1) Establishing with the community a Water Safety Council. Such organizations as the Coast Guard Auxiliary, Power Squadron, Boy Scouts, Concessionaires, Red Cross, Community leaders, etc., are excellent groups for participating in this type of activity.

(2) The placement of buoys for restricting boats and identifying hazards should be coordinated with the state agency that administers the boating act. This coordination should be indicated in the appendix.

SWDCO-R (SWTED-DA 16 Dec 74) 1st Ind 4 March 1975
SUBJECT: Broken Bow Lake, Mountain Fork River, Okla., Appendix E, Project Safety Plan to DM No. 4B, Master Plan

(3) Procedures for patrolling and identifying hazards.

(4) Types of search, rescue and recovery equipment available.

(5) Procedures for checking and using the search, rescue and recovery equipment.

2. This appendix should be reviewed and updated annually. A page should be inserted at the end of this plan showing the date the appendix was reviewed and the signature of the reviewer. Minor pen and ink type changes can be approved by the District. This plan should be completely reevaluated and submitted for approval every five years from the date of this indorsement.

FOR THE DIVISION ENGINEER:

George W. Staples

wd all incls

GEORGE W. STAPLES
Chief, Construction-
Operations Division

CF: w/incl
HQDA (DAEN-CWO-R) 2 cys

DEPARTMENT OF THE ARMY
TULSA DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 61
TULSA, OKLAHOMA 74102

9

SWTED-DA

16 December 1974

SUBJECT: Broken Bow Lake, Mountain Fork River, Okla., Appendix E, Project Safety Plan, to DM No. 4B, Master Plan

Division Engineer, Southwestern
ATTN: SWDCO-OR

Subject appendix (Incl 1) is submitted for review and approval in accordance with ER 1130-2-400.

FOR THE DISTRICT ENGINEER:

WELDON M. GAMEL
Chief, Engineering Division

1 Incl (7 cys)
as

30 copies prepared

BROKEN BOW LAKE
MOUNTAIN FORK LAKE, OKLAHOMA

APPENDIX E
PROJECT SAFETY PLAN
TO
DESIGN MEMORANDUM NO. 4B
MASTER PLAN

DEPARTMENT OF THE ARMY
TULSA DISTRICT CORPS OF ENGINEERS
OKLAHOMA
DECEMBER 1974

BROKEN BOW LAKE
MOUNTAIN FORK RIVER, OKLAHOMA

APPENDIX E
PROJECT SAFETY PLAN
TO
DESIGN MEMORANDUM NO. 4B
MASTER PLAN

TABLE OF CONTENTS

TABLE OF CONTENTS (CONT)

TABLE OF CONTENTS (CONT)

BROKEN BOW LAKE
MOUNTAIN FORK RIVER, OKLAHOMA

APPENDIX E
PROJECT SAFETY PLAN
TO
DESIGN MEMORANDUM NO. 4B
MASTER PLAN

SECTION I - INTRODUCTION

1-01. Purpose. This Safety Plan identifies common recurring hazards or unsafe conditions in each major phase or area of project operation. The plan includes construction, maintenance, public-use areas, visitor protection, equipment, and operation. The safety rules and regulations contained herein will be implemented to maintain acceptable safety standards throughout the project.

1-02. Authority. This appendix is prepared in accordance with the requirements of ER 1130-2-400, dated 28 May 1971.

1-03. References.

a. AR 385 series.

b. ER 385 series.

c. ER 1130-2-321.

d. EM 385 series.

e. SWDR 385 series.

f. SWDR 1130-2-8.

1-04. Master Plan. This appendix is part of the Master Plan for the development and management of Broken Bow Lake.

1-05. Implementation. A project safety officer will be appointed by the resident engineer. The safety officer will develop plans and programs to implement and enforce the pertinent provisions of EM 385-1-1, this safety plan, and the fire protection plan (appendix C).

1-06. Coordination. Frequent and continuing coordination will be established with the Oklahoma Tourism and Recreation Department, Oklahoma Game and Fish Commission, Oklahoma Highway Patrol, and county and local police in the implementation and execution of this plan.

SECTION II - ADMINISTRATIVE FACILITIES

2-01. General.

a. Health and Welfare. No employee shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety.

(1) Employees with duty assignments on O&M projects will wear protective headgear when performing outside operation and maintenance work assignments. The protective headgear shall meet the requirements for class A or class B as defined by the American National Standards Institute. Hardhats will be furnished by the Government and worn by all employees and visitors in designated hardhat areas.

(2) Safety shoes shall be provided by the Government and worn by employees who are engaged in work which requires such protection.

(3) Scaling, grinding, cutting, or dressing of metals, stone, masonry materials, and other operations which produce dust or subject the eyes or head to flying particles shall require the use of goggles having safety lenses and screens for side protection, or face masks, shields, or helmets giving equal protection.

b. Housekeeping. All office and work areas shall be kept clean and any litter disposed of daily.

(1) Trash containers shall be emptied daily and refuse disposed of by approved means. All rags and waste soiled by combustible or flammable materials shall be placed in tightly closed metal containers and disposed of daily.

(2) All walkways and steps shall be kept free from mud, grease, or any other material or obstruction which would render them unsafe.

(3) Galleries shall be kept clear of materials that may hinder safe passage. Materials to control slipping hazards shall be used over slippery surfaces that cannot be avoided or cleared.

c. Electrical.

(1) All electrical outlets and extension cords shall be of the three-conductor type.

(2) Ground fault interrupters shall be used with portable electrical handtools and equipment.

(3) Interior and exterior lighting systems shall be inspected periodically to insure that all work areas and galleries are properly lighted when work is in progress.

d. Tools.

(1) All tools shall be stored in designated racks or compartments. Tools shall be color-coded so they can be easily returned to their correct storage area after use.

(2) All handtools shall be kept in good repair and used only for the purpose for which designed. Tools having defects that impair their strength or render them unsafe for use shall be removed from service.

(3) Power tools shall be inspected, tested, and determined to be in a safe operating condition prior to use. Continued periodic inspections shall be made to assure safe operating condition and proper maintenance.

(4) All electrical tools shall be grounded by use of a multiconductor cord having an identified grounding conductor and a multicontact polarized plug-in receptacle. Double insulated tools approved by the Underwriters Laboratory need not have a grounding wire.

(5) The use off all air-operated handtools shall be in accordance with requirements of the Safety Manual, EM 385-1-1.

e. Ladders.

(1) Ladders shall conform to the latest edition of the Safety Codes for portable wood ladders (USAS A 14.1) and portable metal ladders (USAS A 14.2).

(2) Metal ladders shall not be used for electrical work where they may contact electrical conductors.

(3) Where necessary, ladder rungs will be coated with nonskid materials to prevent loss of footing or grip.

(4) Ladder-climbing safety devices shall be inspected frequently to insure serviceability.

f. Storage.

(1) Flammable liquids shall be stored in approved-type safety containers which meet the requirements of the National Fire Protection Association. Smoking shall be prohibited in all areas where flammable, combustible, or similar hazardous materials are stored. "No Smoking" signs shall be posted in all prohibited areas.

(2) The use and storage of all compressed gas cylinders shall be in accordance with the requirements of the Safety Manual, EM 385-1-1.

(3) Government vehicles and equipment shall be parked or stored in predesignated areas to reduce congestion. Keys shall be removed at night and locked in the Administration and Maintenance Building.

(4) Supplies shall be stored in an orderly manner in designated areas to conserve space and provide easy access. Material in bags, containers, bundles, or stored in tiers shall be stacked, blocked, interlocked and limited in height so that they are stable and otherwise secured against sliding or collapse. Supplies and materials will not be stored in furnace rooms.

g. Welding and Cutting. All welding and cutting apparatus, equipment and operations shall be in accordance with standards and recommended practices of the American Welding Society, and the recommendations of the National Fire Protection Association. Each welding unit shall be equipped with a compatible fire extinguisher.

h. Poisonous and Harmful Substances. All dusts, mists, fumes, gases, or other atmospheric impurities in the areas where persons are employed shall be brought within safe limits by elimination, ventilation or filtration. Where these methods are impractical, appropriate protective equipment shall be provided.

i. Spray Painting. All spray painting shall be done in a well-ventilated area when possible. Hose mask or air line respirators shall be worn by workmen spraying in close quarters.

j. Ventilation. All rooms and work areas shall be provided with adequate ventilation for the number of occupants.

k. Vehicle Operation. Government vehicles shall be operated in accordance with the requirements of the Safety Manual, EM 385-1-1, and Tulsa District Safety Program, TDR 385-1-1.

l. Firefighting.

(1) A-B-C dry chemical fire extinguishers of the proper size, shall be located in all buildings in accordance with requirements of the Safety Manual, EM 385-1-1, and inspected monthly to see that they are properly charged in accordance with appendix L, EM 385-1-1.

(2) A fire safety plan listing assignments shall be posted in various work areas.

(3) A chart shall be posted listing emergency telephone numbers such as fire and police departments, ambulance service and the nearest hospital or doctor.

(4) During the fire season, all vehicles will be equipped with the standard firefighting equipment.

(5) Inspection and tests of all mobile fire apparatus shall be conducted weekly to assure it is in satisfactory operating condition.

m. Warning Signs.

(1) Signs shall be located near hazardous shop equipment to warn against potential hazards or unsafe practices.

(2) All obstructions or projections into a gallery shall be conspicuously marked.

n. Bulletin Board and Other Safety Information. Safety posters shall be posted in various shop work areas and on the bulletin boards.

o. Employee Refresher Operational Exercises. Periodic operational exercises for abnormal or unusual emergency situations, shall be conducted as required in ER 1130-2-321.

2-02. Dam and Powerhouse.

a. Inspections. Powerhouse safety equipment and procedures will be inspected and reviewed during the weekly plant inspection and scheduled safety meetings.

b. Safe Clearance Procedures. Procedures to safeguard those whose operating, construction or maintenance duties require them to be on, or near electrical equipment or lines, mechanical equipment, pressure systems and vessels and lines on equipment containing dangerous or hazardous materials shall be in accordance with procedures in ER 385-1-31.

c. Galleries.

(1) Obstructions or projections into galleries which are pointed, sharp, or any other shape which may cause lacerations, contusions, or abrasions shall be covered with resilient material.

(2) Adequate lighting and ventilation shall be maintained at all times to ensure safe passage through galleries.

(3) Any storage of flammable liquids in these areas is strictly forbidden.

SECTION III - PARK AND RECREATION FACILITIES

3-01. Camping and Picnic Areas.

a. Fireplaces. Fireplaces or pedestal charcoal grills shall be inspected periodically to insure that they are not a fire hazard. Areas around fireplaces shall be cleared of debris in order to prevent spread of fire. Grills shall be equipped with end flaps to control excessive draft from wind.

b. Trees. Dead limbs or trees, and weak growing trees that might be blown over in a heavy wind, shall be removed.

c. Tripping Hazards. The area around picnic tables shall be landscaped and graded to eliminate tripping or falling hazards, Access paths shall be bordered by natural vegetation.

3-02. Boat Ramps.

a. Signs and Buoys. All ramps shall be adequately marked and signs and buoys in the vicinity of boat ramps will be maintained properly at all times to insure safe boating and swimming for the using public.

b. Surface. Boat ramps shall be cleared of rocks, stones, debris, and/or any accumulation of algae that might render the ramp dangerous. Ground and riprap conditions around the ramp shall be maintained so that there are no dropoffs or sinkholes around the edges of the ramp.

3-03. Nature Trails. Nature trails shall be inspected periodically to insure that they are free of safety hazards, especially poisonous plants.

3-04. Weed Control.

a. General. Recreation and park areas will be kept free of weeds and poisonous plants, normally by mechanical cutting.

b. Poisonous Plants.

(1) Employees shall receive instructions in the recognition and identificaiton of poisonous plants and provided protective ointments and appropriate protective clothing.

(2) Employees will be given immunization treatments when deemed necessary by a physician and authorized by the reservoir manager or resident engineer.

(3) Poison ivy, poison oak, and poison sumac shall be controlled by using registered herbicides or other suitable methods of control as determined necessary.

c. Insecticides and Herbicides.

(1) When chemicals or pesticides are employed, care will be exercised to ensure that proper safety procedures are followed and that applications are made in accordance with the recommendations of the manufacturer and the provisions of applicable State and Federal law. Only those chemicals which are registered by the Federal Committee on Pest Control or otherwise controlled by Engineer Regulations may be used.

(2) All handling and use of pesticides, and herbicides shall be under the supervision of a certified pesticide applicator and coordinated with the District Office biologist.

3-05. Concessions. Each concession at the project shall be inspected not less than annually for compliance with lease requirements. In addition, the concession shall be inspected for proper disposal of solid wastes; compliance of sanitary facilities with approved plans, both State and Federal; the maintenance of structures, slips and operating equipment; and unauthorized developments or activities.

3-06. Private Floating Facilities. Private floating recreational facilities shall be inspected no less than annually to assure compliance with existing rules and regulations. If an inspection reveals conditions at or on any floating structure which makes it unsafe from a safety, navigation, or other standpoint, such conditions must be corrected immediately by the owner upon receipt of notification by Corps personnel. Household furnishings are not permitted in boathouses or on barges of any type, except houseboats.

SECTION IV - SANITATION

4-01. Water Supply. Water from wells or other sources provided for human consumption shall meet State and local requirements. The water supply for the administration and public-use areas shall be sampled monthly and the sample submitted to the State Board of Health for testing. If a sample is found to be unsafe, steps will be taken immediately to prevent human consumption until the cause of contamination has been eliminated. If the unsafe source is a Government well, the well shall be disinfected, pumped out, and resampled. If the unsafe source is a city or water district they shall be notified immediately of the unsafe condition.

4-02. Sewage Facilities.

a. Vault-Type Restrooms and Trailer Sanitary Stations. The vaults shall be periodically pumped out and the waste disposed of in a State-approved sewage system. Vaults shall be treated with a disinfectant and a deodorant to control odor problems after each pump out.

b. Cleaning of Restrooms. During the recreation season all restrooms shall be cleaned daily and treated with disinfectant twice weekly.

c. Oxidation Ponds. Oxidation ponds, tile fields, or sewage lagoons shall be inspected periodically to insure that they are functioning properly and do not constitute a health hazard.

4-03. Solid Waste Disposal. All solid waste shall be disposed of in private or public sanitary land fills operated in accordance with standards approved by the State Board of Health.

4-04. Insect Control.

a. Flies. An approved insecticide, such as Dibrom 8, shall be sprayed on trash container lids, around restrooms, and around campsites as necessary to control flies. The use of mechanical fly traps shall also be considered.

b. Mosquitoes. Measures shall be taken to control mosquitoes in the park areas by spraying insecticide or by draining breeding areas.

SECTION V - ACCESS

5-01. Roads.

a. General. Roads will be inspected and corrected for irregularities such as slides, settlement, rutting, potholes, washouts, damage to signs, guardrails, retaining walls, culverts, and other hazardous conditions.

b. Abandoned Roads. Nonpublic roads within the project area, not required for the operation of the project or public access, shall be closed by means of appropriate barricades with advance warning signs.

5-02. Parking Areas. Guard logs or barriers shall be set around parking areas, camping area turnouts, or picnic turnouts where there is danger of vehicles accidentally rolling out of control while unattended.

5-03. Traffic Control.

a. Signs. Vehicular traffic control signs and markers on roads within the project boundaries will conform with the American National Standards Institute, Standard D6.1, Manual on Uniform Traffic Control Devices for Streets and Highways.

b. Barriers. Large rocks, log barriers, cables, etc., used to restrict traffic to the roads and parking areas will be maintained so as to perform their safety function at all times.

c. Lake Warning Signs. Warning signs shall be maintained on all roads ending in the lake as shown in TDR 385-1-1.

d. Swimming and Launching Area Signs. Signs used at launching areas to keep swimmers, boats, and vehicles separated will be inspected frequently to insure their serviceability.

e. Off-Road Vehicles. Off-road recreational vehicles, motorcycles, and motorbikes shall be confined to the main throughfares and shall not be allowed to annoy or harass campers and picnickers. Motorized vehicles without mufflers shall not be permitted (see Title 36, CFR). Those operators who do not comply with Title 36 will be issued verbal or written warnings and, in aggravated cases, citations will be issued.

5-04. Pedestrian Control.

a. Walkways. Walks will be maintained free of obstacles and safety hazards to provide convenient and safe pedestrian access and circulation to parking areas, bath houses, restrooms, and other facilities.

b. Control. Physical or perceptual barriers which are used to control foot traffic shall be established and maintained so as to present no safety hazards.

SECTION VI - PUBLIC INFORMATION

6-01. Severe Weather Warning. Under severe weather conditions where there is a danger of flooding, the reservoir manager shall alert Government contractors, navigation interests, concessionaires, and other appropriate private interests in the area, furnishing latest reports of the flood situation and predicted progress of flood stages in the area.

6-02. Fireside Program. When time permits, night programs, safety talks, movies, and slides will be given by rangers during periods of high visitation.

6-03. Water Safety.

a. Buoys.

(1) Appropriate buoys shall be maintained to control various activities and the speed of watercraft at the boat ramps, concession boat dock areas, swimming areas and other sites. "NO WAKE" rather than 5 mph buoys will be utilized around boat ramps and concession areas.

(2) Hazard area buoys which mark a hazard to boating, skiing, fishing, etc, will be checked frequently to see that they are in the proper place and indicate the hazard involved.

(3) Buoyed instructional signs as shown in the SWD Sign Handbook shall be placed and maintained in appropriate areas.

b. Navigation Hazards. A continual check for floating debris will be made for water safety purposes. Cleanup measures will be taken where necessary.

c. Bulletin Boards. Posters and bulletins pertaining to water and boating safety shall be provided by the Corps of Engineers and displayed by concessionaires.

d. Safe Boating Week. Special emphasis shall be placed on Safe Boating Week with additional signs, posters, broadcasts, and articles.

e. Radio and Television. Radio and television broadcasts shall be used to inform and educate the public in water safety practices.

f. Newspapers. Newspaper articles shall be used periodically to inform the public of water safety practices.

6-04. Speaking Engagements. When time permits, rangers or other employees shall speak at service clubs, churches, schools, etc., to promote safety on the Corps controlled projects.

6-05. Terrain Hazards. Signs as shown in the SWD Sign Handbook shall be erected to warn of unusual dangers such as steep bluffs, falling rocks, and other hazards. These signs will be checked frequently to insure that they have not been destroyed, misplaced or defaced.

6-06. Location Signs. Location signs as shown in the SWD Sign Handbook shall be placed in the parks and maintained to inform visitors of areas of importance.

6-07. Hunting Areas. Designated "HUNTING" areas and "NO HUNTING" areas shall be posted during the proper season and coordinated with the State Game and Fish Commission as they inforce the hunting regulations.

6-08. Firearms. Regulations concerning the use of firearms on Government property shall be displayed prominently in areas open to the public.

6-09. Emergency Information. Emergency information shall be posted conspicuously in such places as the Resident Engineer decides necessary. This information shall contain the location of the nearest telephone and the addresses and telephone numbers of the nearest doctors, hospitals, police department, fire department, and Civil Defense Headquarters.

6-10. National Emergency. During a national emergency, the Corps of Engineers shall work closely with the Civil Defense and assist in issuing emergency information. The project shall have personnel trained in radiological monitoring, first aid, and shelter management. Key personnel will be familiar with the Tulsa District Emergency Preparedness Plan and the Project National Emergency Situation Plan.

SECTION VII - GENERAL

7-01. Crowd Control.

a. Patrols. Rangers shall patrol the public-use areas during the summer months. They shall maintain radio contact with officers of the county sheriff's office, and Oklahoma Highway Patrol.

b. Radio. Rangers shall use two-way radios as a means of communication to report on crowd control.

c. Local Law Enforcement Coordination. The local police, sheriff's office or Oklahoma Highway Patrol shall be the law enforcing body. In cases of civil disturbances, all incidents relating to proposed or actual civil disturbances or demonstrations shall be promptly relayed by telephone to the District Engineer and to the local law enforcement officials. A chronological log of events shall be maintained by the field installation or activity for record and a followup report shall be made on ENG Form 4337, Incident Report. The District Physical Security Officer or Deputy District Engineer shall relay the telephone report to the Provost Marshal, Southwestern Division.

7-02. Health, Safety, and Welfare.

a. Prework Planning. The resident engineer shall preplan all O&M activities and thoroughly review all unusual working conditions with each employee.

b. Weekly Safety Meetings. A weekly safety meeting for all employees shall be conducted covering topics related to current operations and activities. Minutes of these meeting shall be maintained at the project office. Additional instructions are contained in TDR 385-1-1.

c. First-Aid Kits. First-aid kits shall be installed in vehicles, boats, and shops.

d. Protective Footwear. Protective footwear such as rubber boots, protective covers, ice clamp-ons, safety shoes, etc., shall be worn by employees who are engaged in work which requires such protection.

e. Safety Equipment.

(1) All necessary safety equipment needed for various jobs shall be issued to employees as needed.

(2) All boats shall be equipped with safety equipment as required by the Motor Boat Operators Manual issued by the Corps of Engineers.

f. Vehicle Safety.

(1) All vehicles shall be equipped with seatbelts and have a reminder sign on dashboard.

(2) Mud and snow tires shall be installed on Government vehicles during the winter months.

g. Rollover Protection Systems. All heavy equipment shall have rollover protection systems installed as required by EM 385-1-1.

h. Operation.

(1) Operators of Government vehicles must have a valid Government Motor Vehicle Operator's Identification Card and a valid State driver's license.

(2) Operators of self-propelled floating plant, up to and including vessels 65 feet in length, will be qualified and licensed by the US Coast Guard or the District Engineer as required by ER 385-1-20.

(3) The operation of all floating plant will be in accordance with the requirements of EM 385-1-1.

i. Machinery or Equipment.

(1) Before any machinery or equipment is placed in use, it shall be inspected and tested by a competent mechanic and certified to be in safe operating condition. Any machinery or equipment found to be unsafe shall be deadlined and its use prohibited until unsafe conditions have been corrected.

(2) Machinery or equipment will not be operated in a manner that will endanger persons or property.

(3) All equipment, Government-owned, leased, or contractor-owned, must comply with the general safety requirements of EM 385-1-1.

7-03. Emergency Action. Emergency actions shown in Appendix C, Fire Prevention Plan, will be taken in case of fire.

SWDCO-R (SWTOD-R 26 May 76) 1st Ind
SUBJECT: Appendix F, Lakeshore Management Plan

DA, Southwestern Division, Corps of Engineers, Main Tower Building,
1200 Main Street, Dallas, TX 75202 17 JUN 1976

TO: District Engineer, Tulsa, ATTN: SWTOD-R

The statement of policy for the projects listed in basic letter is approved subject to the following comment:

While it is implied, the last paragraph should definitely state that no private facilities will be permitted on these lakes.

FOR THE DIVISION ENGINEER:

A. P. HUTCHISON
Chief, Construction-
Operations Division

wd all incl

CF: w/cy basic & incl
HQDA (DAEN-CWO-R)

DEPARTMENT OF THE ARMY
TULSA DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 61
TULSA, OKLAHOMA 74102

SWTOD-R

26 May 1976

SUBJECT: Appendix F, Lakeshore Management Plan

Division Engineer, Southwestern
ATTN: SWDCO-R

Subject Appendix (Incl 1) for the following projects

Broken Bow Lake
Canton Lake
Chouteau Lock and Dam
Elk City Lake
Fort Supply Lake
Gillham Lake
Great Salt Plains Lake
Hugo Lake
John Redmond Dam and Reservoir
Kaw Lake
Marion Lake
Newt Graham Lock & Dam
Oologah Lake
Pat Mayse Lake
Pine Creek Lake
Robert S. Kerr Lock & Dam & Reservoir
W. D. Mayo Lock & Dam
Dierks Lake

is submitted for review and approval in accordance with ER 1130-2-406.

FOR THE DISTRICT ENGINEER:

John C. Maples

JOHN C. MAPLES
Acting Chief, Operations Division

1 Incl (6 cy)
as

WES
(BROKEN BOW)

(APPENDIX F)

LAKESHORE MANAGEMENT

It is the policy of the Chief of Engineers to manage and protect the shorelines of all lakes under its jurisdiction to properly establish and maintain acceptable fish and wildlife habitat, aesthetic quality and natural environmental conditions and to promote the safe and healthful use of these shorelines for recreational purposes by all of the American people. Ready access to and exit from these shorelines by the general public shall be provided in accordance with Section 4, 1944 Flood Control Act, as amended, P. L. 87-874. It is the objective of the Corps to manage private exclusive use of public property to the degree necessary to provide maximum benefits to the general public.

The Chief of Engineers has also established a policy that private exclusive use will not be permitted on new lakes or on lakes where no private facilities or uses exist as of the date of Regulation ER 1130-2-406. No past commitments have been made which need to be honored. Therefore, no private floating facilities will be permitted on these lakes.

RES ENGR
PARK MGR.
RANGER
C & M FORMN
ADM OFFICER
PUR AGENT
CLK TYPIST
FILE

U.S. ARMY CORPS OF ENGINEERS
RECEIVED
JUL 6 1976
MILLWOOD RESO.