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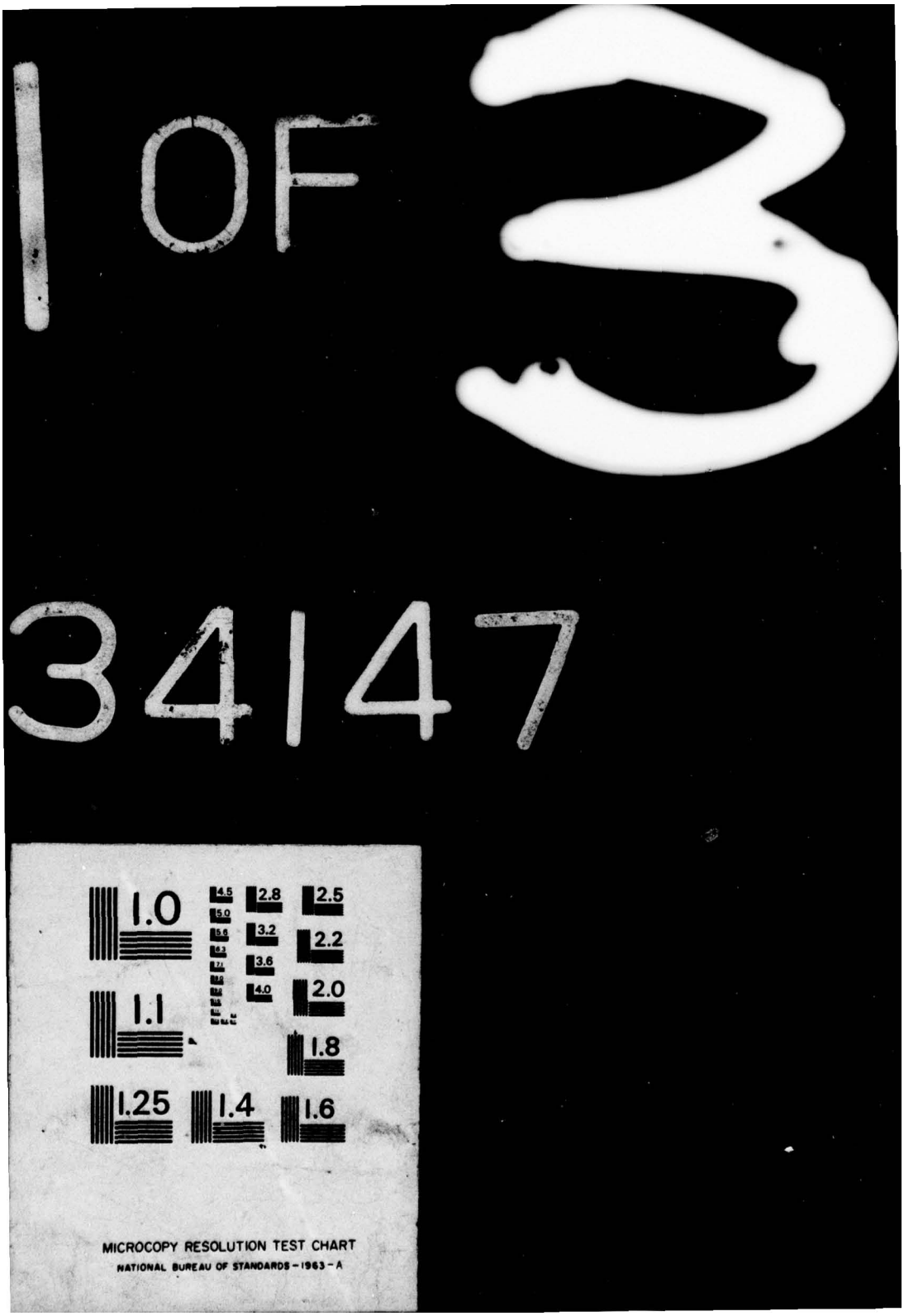
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Appendix D•Volume I

STUDY OF LAND USE FOR RECREATION AND FISH AND WILDLIFE ENHANCEMENT

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Case Studies D·1·1 to D·5·1

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May 1975

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The report describes legislative authorities, policy direction, and land use practives of the U.S. Army Corps of Engineers. It identifies problems and makes recommendations for improved management of project resources.

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APPENDIX D

Study of Land Use for Recreation and Fish and Wildlife Enhancement

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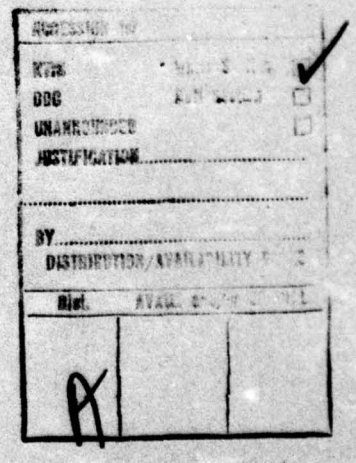

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INTRODUCTION

A. Background

Material contained in Appendix D represents the compilation of extensive research by Coastal Zone Resources Corporation (CZRC) as a significant element in the conduct of the overall study of Land Use for Recreation and Fish and Wildlife Enhancement. The major task, outlined in The Approved Work Program, was entitled "Inspect and Analyze a Representative Sample of Corps of Engineers Administered Lakes."

The selection of such a representative sample, from among 407 Water Resource Development Projects, (~~WRDPs~~) nation-wide, was based upon two sources of nation-wide data provided by the Office of the Chief of Engineers (OCE): computer print-out reports "A" through "H" as of 31 December 1973 generated by the Recreation-Resources Management System (RRMS 1973), and a computer listing of all active outgrantees on record with the Real Estate Directorate (RED) with a description of each outgrant instrument as of 31 March 1974.

B. Selection Factors

Major differences in the physical characteristics of WRDPs, range and complexity of recreation and fish and wildlife programs, and management practices were judged to be closely related to differences in 12 factors. Therefore, comparison of OCE data, tabulated according to these factors, aided the identification and selection of the WRDPs which would be studied in the field and which would provide the basis for the analysis of present conditions. Selection of the sample was a process of choosing WRDPs which not only were representative of the factors but which also provided ranges within factors. The 12 factors and the relationship of the 29 WRDPs studied to the factors were:

1. Geographic Location: A minimum of two WRDPs within the sample were located in each of nine engineer divisions that encompass all of the contiguous U. S., and 12 of the 16 water resource regions recognized by the U. S. Water Resources Council were represented in the sample. Such a geographic range of WRDPs was thought to provide a range of hydrological, economical, environmental, and social settings which would be useful in comparing different effects and impacts.

2. Concentration of Corps Activity: Five WRDPs were within the Ohio River Engineer Division which had the largest number of WRDPs (127); four were within the South Atlantic Engineer Division (33); four were within the Southwestern Engineer Division (70); three were within the North Central Engineer Division (52); three were within the North Pacific Engineer Division (27); and two WRDPs were in each of the remaining five engineer divisions (average 20).

3. Land Acquisition Policies: It was thought that the amount, configuration, and specified use of land acquired for authorized WRDP purposes had varied according to legislative or federal agency policy in effect at the time land acquisition was in process. WRDPs were, therefore, selected which would represent the historical evolution of policies affecting Corps reservoirs. For example, authorizations of the 29 WRDPs spanned 154 years of Corps activity (1880 to 1962).

4. Complexity of Shoreline Management: Two indices of shoreline management complexity were used. The first was total length of shoreline created by the WRDP, which ranged from 9 to 2,250 miles (mi) in the sample. The second was based on the number of permits, letters of authorization, or other instruments issued for piers, docks, and associated purposes, and this index ranged from 0 to 2,689.

5. Water surface Management: Two indices of water surface management difficulty were used. The first was total water surface, which ranged from 650 to 313,000 acres at normal pool elevation. The second index took into account whether an interstate body of water was created. The sample included 10 interstate water bodies.

6. Relation with Other Federal Agencies: The sample included: eight WRDPs where project lands and resources interacted with lands and resources administered by the U. S. Forest Service (USFS); six where Corps land and/or facilities were administered by the U. S. Fish and Wildlife Service (USF&WS), although one of those licensed to USF&WS was in fact managed by the U. S. Bureau of Land Management (BLM); and three where Corps land interacted with the interests of Indian tribes.

7. Relations with State Governments: This factor was applied by selecting those WRDPs showing the largest acreage outgranted to agencies of state governments. The sample included four WRDPs where the entire project area, except that reserved for project operation, had been outgranted to state agencies and 19 where varying portions of project area had been outgranted to state agencies.

8. Urban vs. Rural Setting: The number of miles separating a WRDP from the nearest Standard Metropolitan Statistical Area (SMSA) was thought to be an index of urban impact upon the project. Five of the sample WRDPs were within 5 miles (mi) of an SMSA, 14 were more than 5 but less than 50 mi of an SMSA, and the remaining 10 were more than 50 mi from an SMSA.

9. Size of Corps Management Responsibility: The number of acres held in fee simple by the Corps of Engineers (Corps) was the sole indicator of this factor. WRDPs in the sample ranged from 188 to 589,774 acres.

10. Recreation Visitor Usage: WRDPs reporting large 1973 attendance, number of Corps managed recreation areas, and number of commercial recreation outgrants were sought to enable comparison with WRDPs having smaller numbers to reflect possible differences in management problems. Included in the sample were WRDPs which reported 10,432,900 visits, had 47 Corps administered recreation areas, and had 24 commercial recreation outgrants directly issued by the Corps.

11. Interrelationships with All Other Project Purposes: The ability to compare recreation and fish and wildlife management approaches with other project uses and purposes was enhanced by representing, in the sample, all possible project purposes according to RRMS 1973 data.

12. Complexity of Real Estate Programs and Practices: The record of outgrants made for recreation and resource-related purposes (e.g., agriculture, grazing, private recreation, and quasi-public recreation) was examined and WRDPs with large numbers of outgrants covering a variety of uses and large acreages were included in the sample.

C. Case Study Survey

Subsequent to OCE approval of the selection factors and the 29 representative WRDPs, a detailed format for data collection and a schedule for field work were prepared.

The format for data collection was initially established by a 32 page document, the Preliminary Development Scenario, which was prepared on the basis of existing information, key information requirements, and the need for data cross-checking. The schedule for field work was a complex and ambitious one involving six to eight personnel (three to four teams), travel, and appointments for a 10 week period to inspect and analyze the WRDPs. As a test of effectiveness and efficiency, a one-week test field survey was undertaken. Due to type of information requested and received and the difficulty imposed by time constraints, revised scenarios and field schedules were prepared.

Each survey team consisted of a basic two-man crew; one member specializing in planning/administration and one specializing in fish and wildlife biology. When necessary, due to complexity or time constraints, additional personnel were added to the field team for a specific WRDP.

Before leaving for the field, each team was provided a package of existing data which characterized the WRDP to be visited. Data consisted of RRMS 1973 data, RED outgrant listing of active grants, project brochures, and maps.

For each WRDP, visits were made to the district, the state(s), and the WRDP site. Interviews were held with personnel at the district level in the Engineering, Operations, and Real Estate Divisions and their respective branches and/or sections. At the state level, interviews were held with personnel in the park and recreation, fish and wildlife, planning, and natural resource agencies. At the WRDP level, Corps personnel and, as applicable, field personnel representing state departments, federal agencies (USFS and USF&WS), local governments, and regional planning agencies were also interviewed.

D. Case Study Organization

Data and information gathered during the conduct of the field surveys were highly variable in scope and detail. Quantitative information on a range of topics originally outlined in the Development Scenario, such as water quality, private sector impacts, contribution to local tax bases, and effect on local community facilities and services was generally not available. Qualitative information concerning these and other factors was gathered when available. On the other hand, quantitative information was available for factors such as acreage outgranted, project area, visitation, area population, and Corps organization. Some of this quantitative information was, however, in conflict with information the field crews compiled from OCE sources before going into the field. Further, some of the information concerning a particular WRDP gathered from district, state, and local sources seemed to be in conflict. Upon returning from the field, frequent discussions with district personnel concerning particular

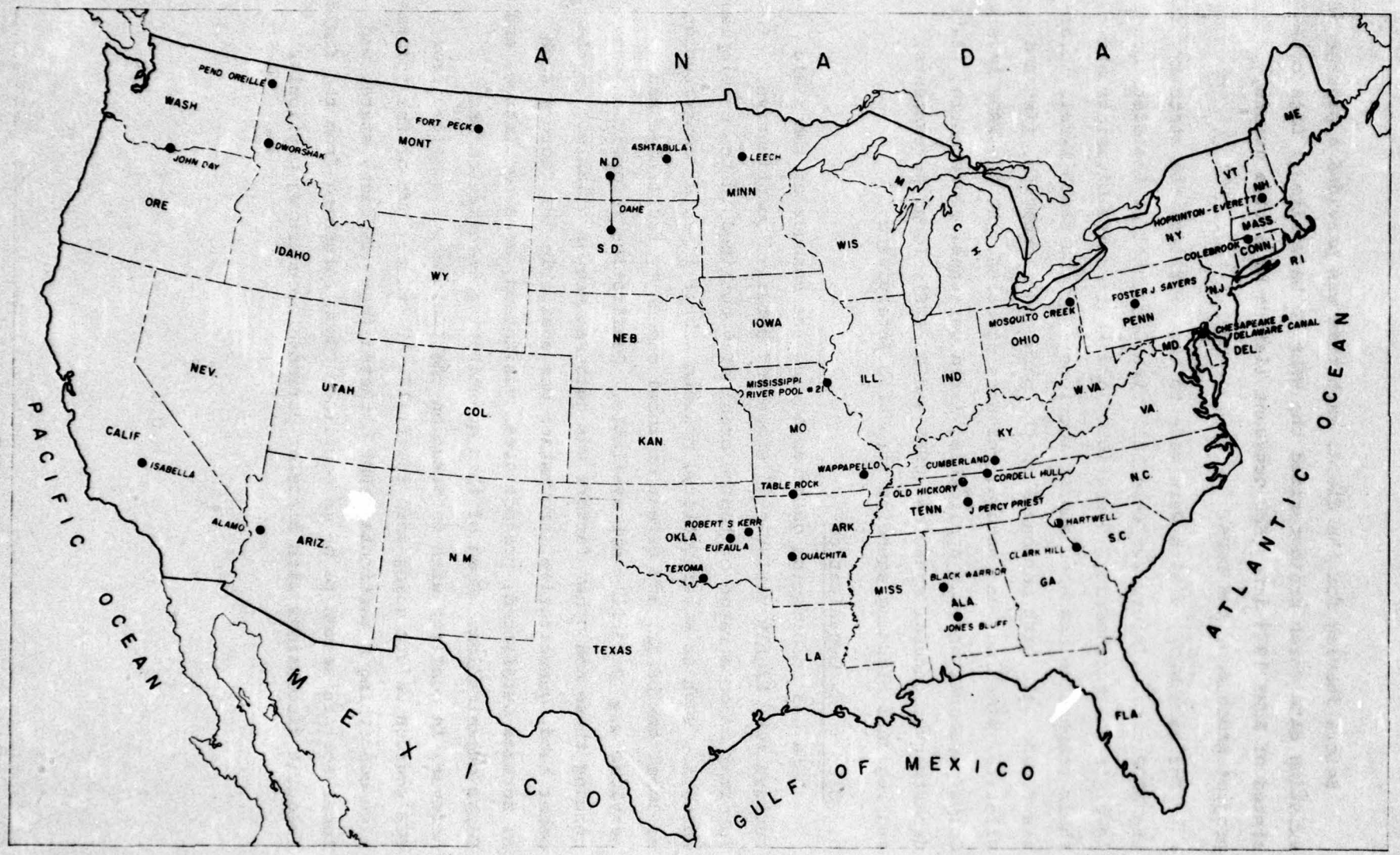

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Figure D.O.I. **Water Resource Development Projects Studied**

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COASTAL ZONE RESOURCES CORP. — WILMINGTON, NORTH CAROLINA

WRDPs where data was in conflict aided in clarifying some of the discrepancies.

Organization and textual presentation of the Case Studies were approached in an effort to enable discussion of quantitative and qualitative information, including discussions of the data gaps or conflicts, in such a way as to allow detailed consideration of each individual WRDP and comparison of data among the WRDPs. Three major topics were selected as the means of presentation.

1. Setting: Considered under this topic is the geographic and jurisdictional location of the WRDP and, where appropriate, population, proximity of major urban areas, key transportaton routes, travel distances, and the WRDPs proximity to other related projects. A map of the WRDP showing significant locational features is presented. Authorized purposes and legislative citations are provided. Significant features of the WRDP including drainage area, lake size at various pool levels, total project acreage, engineering and operational considerations, and topographical characteristics are presented. As a data summary tool, tabulated resource statistics are provided for each WRDP and the entries are comparable among the WRDPs.

2. Land use, recreation, and fish and wildlife considerations: A statement of the analytical unit for each WRDP provides background information concerning reservoir impact on the surrounding area, impact of the surrounding area on the reservoir, and general land use considerations. Discussions on ownership indicate the extent of Corps, other federal agencies, state government, local government, and private interests in land within and adjacent to the WRDP. Each identified WRDP resource is considered in terms of its characteristics, responsible agency and their extent of involvement, and overall management and utilization of the particular resource. Recreational opportunities, facilities, and usage at the WRDP are discussed in terms

of location, responsible agency, and contribution to recreational clientele. Lake resources, including fishery resources, water quality, and water utilization as well as wildlife resources, their existance and management, are also discussed. Other uses of land within and adjacent to the WRDP are considered including forestry, mineral extraction, and agriculture and grazing. Where appropriate, tabulated data on outgrants for various purposes are provided which include type of instrument, effective date and term, rental basis and annual rent, and non-Corps and Corps investments. The existance and utilization of resource use controls are discussed in terms of responsible agency and effectiveness. Corps organization at the district and field level is also discussed and depicted in an organization chart.

3. Key findings: Significant findings representing problem areas, data conflicts, resource management approaches, agency relationships, and viable program practices are discussed under several major categories. These categories include: (a) recreation, (b) fish and wildlife, (c) Corps and contiguous land use, (d) real estate programs and practices, and (e) Corps organization.

A fourth section lists all reference materials which were utilized in preparing each case study.[a]

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[a] Standard abbreviations are used: two-letters for states (U. S. Postal Service); Interstate highways (I 00), primary highways (U. S. 00), secondary and state roads (OK 00), and county roads (Butler KK, Shelton 00).

ANALYTICAL BASIS

A. Utility of OCE Data Base

Selection of the 29 sample WRDPs was based solely upon national data from OCE as compiled in RRMS and RED formats. Data were utilized from standard report forms as well as a few special computer runs for specific data rankings on a national scale.

The RRMS system is three years old and still undergoing development. RRMS data are developed in the district offices in compliance with formats and definitions contained in ER 1130-2-400. Data are entered on forms by district personnel (WRDP staff, Recreation-Resource Management staff, or Recreation Planning staff) and transmitted through the engineer divisions to OCE where the data are keypunched and entered in computer files. These files are updated annually.

The RED system also depends upon district level personnel to report changes in the status of outgrant instruments. Information, as directed by ER 18-2-3, is transmitted through the divisions to OCE, keypunched for entry in computer files; the data are updated on a quarterly basis.

After the 29 WRDPs were selected, a range of RRMS and RED data specific to each was compiled. In the field, the survey teams compared these RRMS and RED based profiles with master plans, real estate instrument files, and other records and reports at the district level. Notable discrepancies between RRMS and RED data and data available at the district level were found. Some of these discrepancies were small, involving differences of a few acres for a specific area within the WRDP, and could be the result of reporting data in different time periods (i.e., RRMS 1973 compared to a 1945 master plan). Other discrepancies, however, were significant in scale even though they were reported in similar time periods (i.e., RRMS 1973 compared to a 1973 master plan).

For example, reported fee simple acreage from RRMS 1973 for Ouachita (Case Study D.2) and Chesapeake and Delaware Canal (D.8) were 86,363 acres and 14,806 acres respectively, whereas 1973 reports from the districts reported 61,600 acres and 15,210 acres respectively. Discrepancies at Lake Texoma (D.29) were significant to wildlife management land: RRMS 1973 reporting 68,744 acres and a 1973 district survey reporting 52,675 acres. Total project acreage for John Day (D.13) ranged from 54,426 acres in RRMS 1973 to 76,600 acres in a district report. Similar differences in total outgrant acreage and acreage for specific outgrant purposes were found between RED data and that acquired in the field.

Because of these discrepancies, interpreting the national situation (or the present situation as expressed by the selected 29 WRDPs) solely on the basis of RRMS and RED data can yield misleading conclusions. Because the purposes of the two information systems are different and because district personnel have applied resource inventory and outgrant guidelines differently over time, totals derived from the two systems are not likely to match. In several instances, district discrepancies noted in the field would result in categorical totals (e.g., for outgrants) which exceeded reported total project area. Variations of district applied practices may be described by the following examples:

1. Inclusion of water surface in outgrant instruments: at Mosquito Creek (D.19), outgrant instruments include substantial areas of water surface; conversely, outgrants at Clark Hill (D.22) are restricted to lands above the minimum pool elevation.

2. Issuance of licenses and leases for the same land: at Lake Texoma (D.29), fish and wildlife licenses have been issued to state fish and wildlife agencies while leases for grazing or agriculture have been issued to private individuals for some of the same land.

The extreme cases are Old Hickory (D.17) and Alamo (D.24) where boundaries reported in outgrant instruments overlap and, therefore, acreage totals are greater than the entire project area.

3. Differing interpretation of intensive recreation areas: at Colebrook (D.5) and John Day (D.13), acreage classified as intensive recreation in RRMS 1973 is relatively small and reflects only that acreage on which recreational facilities are constructed. On the other hand, at Hopkinton-Everett (D.6), Eufaula (D.27), and the Robert S. Kerr (D.28), the entire acreage of the public use area is classed as an intensive recreation area.

4. Double counting of fish and wildlife land and extensive recreation land: Corps personnel, in following the guidelines of ER 1130-2-400, have the option to record land not classified as an intensive recreation area in an extensive recreation classification; this same land may be valuable for wildlife enhancement and may also be recorded within this latter classification. As an example, RRMS 1973 data for Hopkinton-Everett (D.6) indicate a 5,900 acre outgrant to the State of New Hampshire as 202 acres of intensive recreation land, 5,646 acres of extensive recreation land, and 5,900 acres of fish and wildlife land. Since the entire parcel is covered by a single real estate instrument, RED data show an outgrant for 5,900 acres for public park purposes.

B. Analytical Approach

Several permutations of the available quantitative data were undertaken in an effort to find distinctive features of WRDPs around which certain resource management problems and implications would gravitate.

It seemed a reasonable assumption, for instance, that there would be a direct relationship between the size of a WRDP and the complexity of resource oriented problems associated with it. However, ranking of the 29 WRDPs from smallest to largest with associated data did not sub-

stantiate such a relationship. Similarly, rankings according to total fee simple acreage, number of outgrants, acquisition period, shoreline miles, authorized purpose, proximity to SMSA, or total visitation did not establish a clear relationship between the feature and the problems.

1. Unusual Characteristics of Water Resource Development Projects

The several analytical manipulations revealed that there are unusual characteristics peculiar to WRDPs which place constraints on defining specific land uses and relationships between management programs. The majority of these physical characteristics stem from the variable water surface elevation, typical of most WRDPs, which directly affects the amount of land available for management. Water surface elevations in WRDPs that generate significant amounts of hydroelectric power may vary according to a daily cycle; water surface elevations in projects that are largely operated to control floods may show very large seasonal variations; water surface elevations in projects designed in conjunction with navigation locks may vary only 1 or 2 feet during the year; and all variations are subject to natural seasonal variations in the drainage area and river flows.

These different magnitudes and regimes of elevational variation make it difficult to generate standard sets of data upon which to base discussions of the present situation facing Corps managers. The adoption of the following terms facilitates meaningful description and discussion of Corps resource management problems and programs:

a. Land permanently inundated: Land lying below the lowest water elevation (sometimes called the conservation pool) is subject to permanent inundation, and as such, should support permanent aquatic benthic communities and associated fishery resources.

b. Land periodically inundated: Land lying between that which is permanently inundated and the elevation of the spillway, including

flood-prone areas, is subject to periodic inundation. The frequency with which these lands are inundated and exposed varies greatly, and their value for recreation and fish and wildlife enhancement varies with frequency, periodicity, and duration of inundation, as well as topography. On gentle slopes, extensive areas may be covered by only 2 to 5 feet of water and, depending on the time of year, these areas may be valuable as waterfowl habitat or fish nursery areas.

c. Land never inundated: Land lying above the elevation of the spillway which is not subject to inundation and can be utilized for a number of purposes.

d. Project operations land: These areas are characterized by land which is utilized by the managing agency for such project works as dams, locks, powerhouses, administrative buildings, and as safety zones on the tailraces or lake side of the dam.

e. Manageable resource land: the residual area derived by subtracting from the total reported project area for a WRDP: (1) the acreage inundated at normal pool elevation,[a] (2) the acreage for which the Corps has only easement or lesser interests, and (3) the acreage designated as necessary for project operations.

2. Applicability of the Manageable Resource Land Unit

The applicability and usefulness of the manageable resource land (MRL) unit in describing particular WRDPs may be seen in the following examples.

The Old Hickory Lake WRDP (D.17) has a total project land acreage of 34,184. However, (1) since 76% of the land is actually owned in fee

[a]Neither the term normal pool elevation nor an equivalent elevation is consistent through WRDPs.

simple, 24% of the land (under easement or other interests less than fee) is not subject to the same resource management approaches as land actually owned; (2) at normal pool elevation, 22,500 acres are inundated and are therefore subject to aquatic management rather than land management; and (3) there are 117 acres of project operations land. Thus, of the 34,184 total acres within the Old Hickory Lake WRDP, only 7,921 acres are actually subject to resource management.

Further, use of the MRL unit to compare among WRDPs represents a more accurate picture of management problems and approaches than total project land or any one of the 12 selection factors. Comparison of Old Hickory (D.17) and J. P. Priest (D.18) on the basis of total project land (34,184 and 33,662 acres, respectively) may lead to the conclusion that since the lakes are of comparable size, management considerations would be similar. Comparison of the MRL of the two WRDPs (7,921 acres and 18,889 acres, respectively) indicates that management considerations at the two WRDPs are significantly different.

There are, due to the use of different terms for elevation and the different use classifications applied to WRDP lands, some difficulties in using the MRL unit as a single standard for comparing all WRDPs.

In the case of Leech Lake (D.11) and Pend Oreille (D.12), the MRL unit cannot be calculated on the basis of existing data. This is because the lakes were natural lakes prior to Corps operations and Corps ownership patterns consist of isolated parcels of land with an easement acreage greater than that held in fee simple.

At the Hopkinton-Everett WRDP (D.6), the majority of MRL is subject to inundation: small areas may be inundated up to 30 days each year and many acres may be inundated for a similar period every 35 years. Even though subject to inundation, the MRL area is manageable for timber stands, wildlife habitat, and low density recreation.

Variable inundation, above the normal pool level, affects the MRL at other WRDPs differently according to frequency and amount of MRL inundated. Examples of WRDPs thusly affected are Wappapello (D.1), Dworshak (D.13), Alamo (D.24), and Isabella (D.25).

Approximately half of the fee simple acreage at the Chesapeake and Delaware Canal WRDP (D.8) is classified as project operations land because it is utilized for dredged material disposal. These lands, however, can be construed as manageable resource areas because current knowledge concerning dredged material disposal and its usefulness in creating artificial habitat is directly applicable to this WRDP.

C. WRDP Catagorization By An MRL Ratio

A weighted ranking significantly enhances the usefulness of the MRL unit: this ranking is represented by the ratio of MRL acreage to the number of shoreline miles held in fee simple and it is termed the MRL ratio. For instance, the MRLs for Hartwell (D.23) and Robert S. Kerr (D.28) are similar, 22,406 acres and 20,983 acres, respectively. Hartwell Reservoir, however, has 962 miles of shoreline in fee simple whereas Robert S. Kerr has 250 miles. By calculating the MRL ratio, it can be seen that the former has only 23 acres of MRL per shoreline mile while the latter has 84.

Although Hartwell has more problems in terms of site overuse, concessioner turnover, and contiguous development, the difference in MRL ratio alone does not establish a clear cause and effect relationship. The MRL ratio does, however, provide an extremely useful means of grouping WRDPs as the basis for discussing their characteristics and problems and for considering the alternative management approaches which would be applicable.

WRDPs represented in the case studies have a range in MRL ratios from 13 to 1,316. By sequentially listing the WRDPs according to MRL

ratio, the WRDPs fall naturally into low, medium, and high MRL ratio categories. To characterize these categories, Tables D.0.1 through D.0.3 present ranges of the MRL ratio and representative data categories for each WRDP. For reasons discussed previously, Leech Lake (D.11) and Pend Oreille (D.12) are not included in these tables.

The seven WRDPs in the low-ratio category represent a range in MRL ratio from 13 to 46 and the range in total project area from 1,411 acres to 101,383 acres (Table D.0.1). Four of the low-ratio WRDPs have a significant percentage (43% to 100%) of the fee simple acreage outgranted. Even with such a high percentage of acreage under outgrant terms, several low-ratio WRDPs have large numbers of recreation sites (four with 20 or more sites), most of which are Corps managed. Total Corps investment in recreation per WRDP ranges from $166,100 for 8 sites to $2,448,500 for 89 sites. Total non-Corps investment for the WRDPs, although underestimated because the data were not always available, is significant: at four of the low-ratio WRDPs the non-Corps investment totals more than $1,700,000.

The 15 WRDPs in the medium-ratio category represent a range in MRL ratio from 61 to 196, with total project areas from 10,018 acres to 477,883 acres (Table D.0.2). As in the case of the low-ratio WRDP, several have significant percentages of acreage outgranted. Six of the medium-ratio WRDPs have a total number of recreation sites greater than 20 and, again, most of these sites are under Corps management. Total Corps investment in recreation ranges from $86,000 for one site to $8,510,000 for 13 sites. Total non-Corps investment is also significant, but even though one WRDP has a non-Corps investment of over $10,000,000, most are below the $1,500,000 level.

The five WRDPs in the high-ratio category represent a range in MRL ratio from 235 to 1,316, with total project areas from 7,991 acres to

Table D.0.1. Low MRL Ratio WRDPs and Associated Characteristics.

WRDP (Case Study No.)	Total Project Acreage[a] A	Acres-Fee Simple[a] (% of A) B	Manageable Resource Land-Acres[a] C	Shoreline Miles-Fee Simple[a] (Actual) D	MRL Ratio as Acres/Shoreline Mile Fee Simple E	Acreage Outgranted[b] (% of B) F	Non-Corps Investment to 1974 ($)[b,c] G	Corps Rec Investment to 1974 ($)[d] H	Intensive Rec Acreage-Corps[e] I	Attendance-all Rec Areas: 1973 (No.)[f] J	Attendance-Corps Rec Areas: 1973 (No.)[f] K	% of J at Corps Rec Areas (% of Areas) L	Highest Use Category (% use)[g] M
Colebrook (22)	1,411	352 (25%)	173	13 (13)	13	0 (0%)	0	260,000	18	103,300 (2)	103,300 (2)	100% (100%)	Sight-seeing (73%)
Warrior (20)	9,374	923 (10%)	579	40 (300)	14	<1 (<1%)	N/A[h]	166,100	2,578	361,900 (8)	361,900 (8)	100% (100%)	Fishing (50%)
Table Rock (26)	60,694	57,749 (95%)	14,305	745 (745)	19	52,537 (91%)	1,854,289	2,226,400	1,691	1,948,100 (22)	1,585,500 (20)	81% (91%)	Fishing (50%)
Old Hickory (17)	34,189	25,838 (76%)	7,921	360 (440)	22	41,073[i] (100%)	1,781,568	1,120,000	224	3,260,000 (46)	2,354,600 (30)	72% (65%)	Fishing (40%)
Hartwell (23)	80,159	77,883 (97%)	22,406	962 (962)	23	33,506 (43%)	1,716,540	2,448,500	1,285	4,623,423 (89)	3,326,124 (79)	72% (89%)	Fishing (36%)
Ashtabula (10)	8,483	7,817 (92%)	2,367	78 (78)	30	1,574 (20%)	28,016	425,573	360	400,400 (7)	307,800 (6)	77% (86%)	Picnicking (65%)
Cumberland (16)	101,383	92,307 (91%)	45,213	988 (1,085)	46	44,253 (48%)	2,059,901	710,000	163	4,167,400 (36)	1,937,900 (19)	47% (53%)	Fishing (35%)
Totals	295,693	262,869 (89%)	92,964	3,186 (3,623)	29	157,709[i] (60%)	7,440,314	7,356,573	6,319	14,864,523 (210)	9,977,124 (164)	67% (78%)	
Average	42,242	37,553 (89%)	13,281	455 (518)	29	22,530 (60%)	1,240,052	1,050,939	902	2,123,503 (30)	1,425,303 (23)	67% (78%)	

Table D.0.1. (Continued)

[a]Appendix D, Case Studies, Resource Statistics Tables.

[b]Appendix D, Case Studies, Summary of Outgrant Tables.

[c]Total dollar figures are underestimates as some of the data were not available.

[d]Personal communication, November 1974. All respective Corps of Engineer Districts.

[e]RRMS. 1973. Respective NRDP data.

[f]RRMS. 1973. Detailed report D-4, total CY 1973 attendance at Corps projects with breakout of attendance occurring at Corps managed recreation areas and recreation areas managed by others. Office, Chief of Engineers. Washington, D. C.

[g]RRMS. 1973. Detailed report D-5, recreation patterns of use at Corps projects and percent activity of use. Office, Chief of Engineers. Washington, D. C.

[h]Not available.

[i]Reported outgranted acreage overlaps; totaled as acreage held in fee simple.

Table D.0.2. Mid-Ratio MRL Ratio WRDPs and Associated Characteristics.

WRDP (Case Study No.)	Total Project Acreage[a]	Acres-Fee Simple[a] (% of A)	Manageable Resource Land-Acres[a]	Shoreline Miles-Fee Simple[a] (Actual)	MRL Ratio as Acres/Shoreline Mile Fee Simple	Acreage Outgranted[b] (% of B)	Non-Corps Investment to 1974 ($)[b,c]	Corps Rec Investment to 1974 ($)[d]	Intensive Rec Acreage-Corps[e]	Attendance-all Rec Areas: 1973 (No.)[f]	Attendance-Corps Rec Areas: 1973 (No.)[f]	% of J at Corps Rec Areas (% of Areas)	Highest Use Category (% use)[g]
	A	B	C	D	E	F	G	H	I	J	K	L	M
Ouachita (2)	82,373	82,362 (100%)	42,231	690 (690)	61	4,276 (5%)	1,806,237	4,138,200	1,651	2,530,900 (19)	2,302,800 (18)	91% (95%)	Sightseeing (43%)
MRP-21 (9)	14,800	8,627 (58%)	7,667	121 (146)	63	6,968 (80%)	32,000	76,775	419	3,132,400 (23)	174,400 (3)	6% (13%)	Picnicking (58%)
Cordell Hull (15)	32,822	26,816 (82%)	20,260	310 (381)	65	6,833 (25%)	488,706	3,280,000	2,449	99,900 (9)	98,300 (8)	98% (89%)	Sightseeing (48%)
Oahe (4)	477,883	421,416 (88%)	158,376	2,250 (2,250)	70	80,545 (19%)	117,000	5,025,000	1,716	1,090,900 (40)	1,011,800 (37)	93% (93%)	Fishing (55%)
Mosquito Creek (19)	11,489	11,214 (98%)	3,200	44 (44)	73	11,006 (98%)	550,770	86,000	15	1,436,030 (3)	152,200 (1)	11% (33%)	Fishing (52%)
Clark Hill (22)	155,886	149,625 (95%)	81,401	1,060 (1,060)	77	44,614 (30%)	2,519,773	1,485,000	6,239	3,180,064 (66)	1,681,777 (49)	53% (74%)	Sightseeing (25%) Fishing (25%)
R. S. Kerr (28)	65,706	56,720 (86%)	20,983	250 (250)	84	23,453 (41%)	101,039	1,408,000	4,117	680,950 (12)	544,550 (9)	81% (75%)	Fishing (30%)
Eufaula (27)	183,859	153,967 (84%)	51,317	600 (600)	86	63,226 (41%)	488,944	2,609,900	5,054	3,047,000 (21)	2,135,730 (17)	70% (81%)	Sightseeing (60%)
J.P. Priest (18)	33,662	33,289 (99%)	18,889	213 (213)	87	5,937 (18%)	10,313,032	5,510,000	4,789	2,218,500 (23)	2,038,200 (21)	92% (91%)	Sightseeing (50%)

Table D.0.2. (Continued)

WRDP (Case Study No.)	Total Project Acreage[a]	Acres-Fee Simple[a] (% of A)	Manageable Resource Land-Acres[a]	Shoreline Miles-Fee Simple[a] (Actual)	WRL Ratio as Acres/Shoreline Mile Fee Simple	Acreage Out-Granted (% of B)	Non-Corps Investment to 1974 ($)[b,c]	Corps Rec Investment to 1974 ($)[d]	Intensive Rec Acreage-Corps[e]	Attendance-all Rec Areas: 1973 (No.)[f]	Attendance-Corps Rec Areas: 1973 (No.)[f]	% of J at Corps Rec Areas (% of Areas)	Highest Use Category (% use)[g]
	A	B	C	D	E	F	G	H	I	J	K	L	M
Jones Bluff (21)	24,588	5,401 (22%)	3,318	31 (368)	107	525 (10%)	N/A[h]	411,600	4,046	64,700 (16)	62,500 (15)	97% (94%)	Fishing (85%)
John Day (13)	76,600	41,419 (54%)	27,023	240 (240)	113	22,689 (55%)	143,679	8,510,000	560	1,121,158 (18)	917,798 (13)	82% (72%)	Sight-seeing (70%)
Texoma (29)	194,350	193,859 (100%)	77,859	580 (580)	134	128,114 (66%)	2,729,764	3,431,000	6,785	5,723,500 (43)	4,772,600 (41)	83% (98%)	Fishing (58%)
Hopkinton-Everett (6)	10,018	7,992 (80%)	6,740	40 (40)	169	6,754 (85%)	N/A	518,000	54	182,900 (6)	55,200 (3)	30% (50%)	Sight-seeing (43%)
Dworshak (14)	48,127	41,179 (86%)	29,923	175 (175)	171	7 (<1%)	N/A	2,630,000	300	230,600 (5)	230,600 (5)	100% (100%)	Sight-seeing (65%)
Wappapello (1)	44,396	44,144 (99%)	35,225	180 (180)	196	37,170 (84%)	1,317,000	662,500	920	1,709,033 (19)	1,526,695 (12)	89% (63%)	Sight-seeing (44%)
Total	1,456,559	1,278,030 (88%)	584,412	6,784 (7,217)	86	442,117 (35%)	20,607,944[c]	39,781,975	39,114	26,448,535 (323)	17,715,150 (252)	67% (78%)	
Average	97,104	85,202 (88%)	38,960	452 (481)	86	29,474 (35%)	1,717,329	2,652,132	2,608	1,763,235 (22)	1,181,010 (17)	67% (78%)	

Table D.0.2. (Continued)

[a]Appendix D, Case Studies, Resource Statistics Tables.

[b]Appendix D, Case Studies, Summary of Outgrant Tables.

[c]Total dollar figures are underestimates as some of the data were not available.

[d]Personal communication, November 1974. All respective Corps of Engineers Districts.

[e]RRMS. 1973. Respective WRDP data.

[f]RRMS. 1973. Detailed report D-4, total CY 1973 attendance at Corps projects with breakout of attendance occurring at Corps managed recreation areas and recreation areas managed by others. Office, Chief of Engineers. Washington, D. C.

[g]RRMS. 1973. Detailed report D-5, recreation use patterns of use at Corps projects and percent activity of use. Office, Chief of Engineers. Washington, D. C.

[h]Not available.

Table D.0.3. High MRL Ratio WRDPs and Associated Characteristics.

WRDP (Case Study No.)	Total Project Acreage[a] A	Acres-Fee Simple[a] (% of A) B	Manageable Resource Land-Acres[a] C	Shoreline Miles-Fee Simple[a] (Actual) D	MRL Ratio as Acres/Shoreline Mile Fee Simple E	Acreage Outgranted[b] (% of B) F	Non-Corps Investment to 1974 ($),[c] G	Corps Rec Investment[d] to 1974 ($) H	Intensive Rec Acreage-Corps[e] I	Attendance-all Rec Areas; 1973 (No.)[f] J	Attendance-Corps Rec Areas; 1973 (No.)[f] K	% of J at Corps Rec Areas (% of Areas) L	Highest Use Category (% use)[g] M
C & D Canal (8)	15,293	15,210 (99%)	7,519	26 (27)	235	7,109 (47%)	N/A[h]	197,319	0	160,200 (1)	160,200 (1)	100% (100%)	Sight-seeing (60%)
Pt. Peck (3)	610,085	589,774 (97%)	380,774	1,520 (1,520)	251	101,189 (17%)	60,000	1,325,000	860	691,100 (13)	569,400 (9)	82% (69%)	Sight-seeing (36%)
F. J. Sayers (7)	7,991	7,574 (95%)	5,350	20 (20)	268	7,351 (97%)	294,134	3,812,000	0	174,056 (1)	0 (0)	0% (0%)	Sight-seeing (69%)
Isabella (25)	16,000	15,200 (95%)	8,180	30 (30)	273	5,196 (34%)	194,420	1,300,600	200	761,790 (13)	761,790 (13)	100% (100%)	Fishing (77%)
Alamo (24)	22,856	22,856 (100%)	11,847	9 (9)	1,316	27,749[i] (100%)	330,900	463,000	0	42,000 (2)	0 (0)	0% (0%)	Fishing (29%) Camping (29%)
Totals	672,225	650,614 (97%)	413,670	1,605 (1,606)	208	143,701[i] (22%)	879,454[c]	7,097,919	1,060	1,829,146 (30)	1,491,390 (23)	82% (77%)	
Average	134,445	130,122 (97%)	82,734	321 (321)	208	28,740 (22%)	219,864	1,419,584	212	365,829 (6)	298,278 (5)	82% (77%)	

Table D.0.3 (Continued)

[a]Appendix D, Case Studies, Resource Statistics Tables.

[b]Appendix D, Case Studies, Summary of Outgrant Tables.

[c]Total dollar figures are underestimates as some of the data were not available.

[d]Personal communication, November 1974. All respective Corps of Engineer Districts.

[e]RRMS. 1973.. Respective WRDP data.

[f]RRMS. 1973. Detailed report D-4, total CY 1973 attendance at Corps projects with breakout of attendance occurring at Corps managed recreation areas and recreation areas managed by others. Office, Chief of Engineers. Washington, D. C.

[g]RRMS. 1973. Detailed report D-5, recreation use patterns of use at Corps projects and percent activity of use. Office, Chief of Engineers. Washington, D. C.

[h]Not available.

[i]Reported outgranted acreage overlaps; totalled as acreage held in fee simple.

610,085 acres (Table D.0.3). Significant percentages of acreage are also under outgrant terms, but three of the five high-ratio WRDPs have outgrant percentages less than 50%. In contrast to the larger acreage of the MRL unit, the total number of recreation sites at the high-ratio WRDP is significantly less than in either the medium or low-ratio WRDPs. Three of these WRDPs have two or less recreation sites, while two have 13 sites. Total Corps investment in recreation, however, is still high with three WRDPs registering over $1,300,000. Total non-Corps investment is lower at the high MRL ratio WRDPs; all are below $350,000.

Due to the inherent variety of WRDP characteristics, categorization according to low, medium, and high MRL ratio serves only as a conceptual tool. It cannot be concluded, for instance, that all high MRL ratio WRDPs have very large total project areas or that the converse is applicable to low MRL ratio WRDPs. Categorization according to MRL ratio does, however, provide a valid means by which WRDP differences can be associated with identified problems, management approaches, and WRDP impacts. Thus, it is within this context that the concept of the MRL ratio, manageable acres per shoreline mile, is meaningful in an analysis of the characteristics of WRDPs and Corps management response to the varied conditions represented by the WRDPs entrusted to its stewardship.

WATER RESOURCE
DEVELOPMENT PROJECT
CASE STUDIES

1. WAPPAPELLO DAM & RESERVOIR

Lower Mississippi River Valley Division

Memphis District

Missouri

I. SETTING

A. Location

The Wappapello Dam and Reservoir project is located on the St. Francis River in southeastern Missouri about 16 miles (mi) northeast of Poplar Bluff. The St. Francis rises in the Ozark highlands and flows into the Mississippi River at Helena, Arkansas just below Memphis, Tennessee.

The damsite and a small portion of the reservoir are located in Butler County and the main pool and its upper reaches lie primarily in Wayne County (Figure D.1.1). The project received its name from the settlement of Wappapello which is northeast of the damsite. Other small unincorporated villages that abut or are very near the project boundaries are: Shook, Kime, Silva, Patterson, Ladero, and Taskee. Only one incorporated municipality, Greeville, borders the project.

Lake Wappapello is located on U. S. 67 about halfway between St. Louis, MO, and Little Rock, AR. U. S. 67 passes through Silva, Greenville, and Taskee; MO 34 connects Silva and the northern part of the project with Cape Girardeau; and MO 172 connects Lake Wappapello State Park with U. S. 67. Other general project access is via county roads. Wayne D serves the east side of the project to Wappapello where it connects with Butler T leading to U. S. 60 east of Poplar Bluff, MO.

The closest significant population center is at the City of Poplar Bluff (1970 population: 16,653). The town of Sikeston, with a population of 14,699, is located about 35 mi to the east, and Cape Girardeau is located on the Mississippi River approximately 55 mi east-northeast of the reservoir.

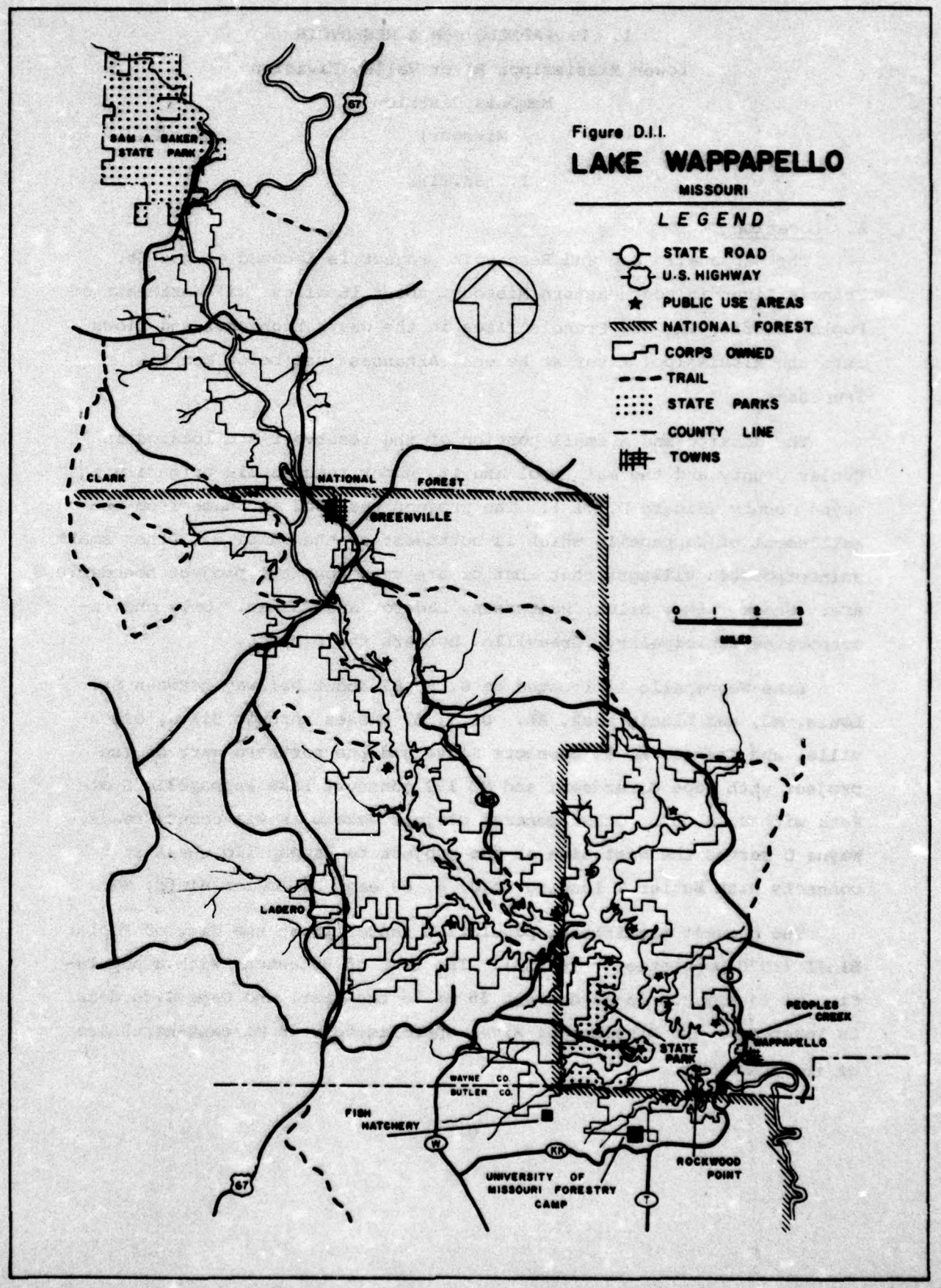
Figure D.I.I.
LAKE WAPPAPELLO
MISSOURI
LEGEND
STATE ROAD
U.S. HIGHWAY
PUBLIC USE AREAS
NATIONAL FOREST
CORPS OWNED
TRAIL
STATE PARKS
COUNTY LINE
TOWNS
SAM A. BAKER STATE PARK
67
CLARK
NATIONAL
FOREST
GREENVILLE
0 1 2 3
MILES
LADERO
PEOPLES CREEK
WAPPAPELLO
STATE PARK
WAYNE CO.
BUTLER CO.
FISH HATCHERY
W
KK
ROCKWOOD POINT
UNIVERSITY OF MISSOURI FORESTRY CAMP
67

B. Authorization and Purposes

The Wappapello Dam and Reservoir project was authorized by the Flood Control Act of 1936 (PL 74-738). The project was originally authorized for flood control.[a]

C. Features

The reservoir has an irregular shoreline composed of rolling to rugged topography. Portions of the surrounding lands support stands of hardwood forest including walnut and white oak which have a high commercial value. Much of the abutting forest is mixed hardwoods and conifers, and large sections of land are used for cultivation and grazing.

The winter pool at Wappapello Lake is maintained at: 355 feet above mean sea level (ft msl) from 15 December to 31 March; 357 ft msl from 1 April to 30 April; and 360 ft msl during the remainder of the year. The emergency spillway is a rolled earth structure 740 ft long and the gatehouse is an interesting visitor attraction. The spillway has been used only two times since the dam was constructed. During those periods the lake averaged 1 mi in width and extended as far as 40 mi up the St. Francis River. The maximum flood pool elevation is 395 ft msl.

At recreation pool elevation during the summer, the surface area of the lake is 8,400 acres. During the winter, at the conservation pool elevation, the water surface covers 4,100 acres. The size of the lake at crest elevation is 23,200 acres (Table D.1.1). Since the floods in 1945, the pool has been kept at a substantially lower level to allow

[a] The Secretary of the Army has been authorized, since 1944, to construct, maintain, and operate public park and recreational facilities at water resource development projects. 16 U.S.C. 460d. Since 1946, the Corps has been required, when consistent with a project's primary purposes, to make adequate provision for the conservation, maintenance, and management of wildlife resources. 16 U.S.C. 663(a).

Table D.1.1. Resource Statistics, Wappapello Dam and Reservoir.[a]

Date of Authorization		1936
Rights in Land Acquired Between		1937-1941
Date of Impoundment		1941
Date of Full Operation		June, 1941
Lake Size When Water Level is at:		
Spillway Elevation (395 ft msl)		23,200 acres
Normal Pool Elevation (360 ft msl)		8,400 acres
Normal Minimum Pool Elevation (355 ft msl)		4,100 acres
Minimum Design Elevation (355 ft msl)		4,100 acres
Water Fluctuation - Summer Recreation Season		3 feet
Shoreline at Normal Pool Elevation		180 miles
Held in Fee Simple by Corps		180 miles
Land Area Managed by Corps		
Total Land in Project		44,817 acres
Fee Title in U. S.	44,396 acres	
Easements	421 acres	
Project Operation Lands		350 acres
Manageable Resource Lands		35,646 acres[b]

[a] Personal communication, November 1974. Memphis District, Real Estate Division. Memphis, Tennessee.

[b] Total Project Land minus (Land Flooded at Normal Pool + Project Operations Land + Easements).

for more storage capacity. There have been no significant threats of spillage since that time.

II. LAND USE, RECREATION, AND FISH AND WILDLIFE CONSIDERATIONS

A. Analytical Unit

The analytical area is roughly delimited by highways and state-owned lands surrounding the lake: U. S. 67 and Wayne D to the east; Butler T, KK, and W and MO 172 to the south; U. S. 67, Butler FF, MO 34, and MO 143 to the west; and Sam A. Baker State Park to the north. Beyond the delineated analytical unit, land uses have little or no effect upon the project (Figure D.1.1).

B. Ownership

1. Corps

The Corps owns 44,396 acres at the Wappapello project, and holds 421 acres in flowage easements; 252 flowage acres are on USFS owned lands -- 111 acres in Butler County and 141 in Wayne County (Table D.1.1). The Corps property line configuration generally parallels the shoreline in a block pattern reaching into the tributary stream valleys.

2. Other Federal agencies

A number of parcels of the Clark National Forest lie contiguous to Corps property. This USFS property forms a checkerboard configuration of holdings in the project area. No USFS lands abut the lake shore (1).

3. State Government

The State of MO has holdings contiguous to Corps lands on the southwestern project boundary. A fish hatchery is located just north of Butler KK approximately 1.5 mi from the lake shore. To the east of this facility, the University of Missouri at Columbia owns and operates a 7,000 acre summer forestry training camp at the intersection of Butler KK and T.

C. Resource Management

1. Recreation

The Corps maintains seven recreation areas in the general vicinity of the damsite. Five of these are campgrounds and two are day-use areas. Only two areas were originally planned for camping. At People's Creek Recreation Area there are 52 campsites, a shower house, and 6 water faucets. At Redman Creek Recreation Area there are 21 campsites, a comfort station, and 1 hydrant. The only camper dump station at the Wappapello Project is located across Butler T from Redman Creek.

Although the Corps tries to maintain a policy of allowing only one camper per campsite (3), there were 98 camping parties recorded at People's Creek and 32 at Redman Creek on Memorial Day. The demand was so great during Memorial Day, July 4th, and Labor Day that day-use areas had to also be opened for campers. Additionally, an overflow areas was created just below the dam to help accommodate the large number of campers. Estimates indicate that an average of 60 camping units were located in the overflow area on holiday weekends.

The camping and day-use facilities which the Corps maintains at other areas on the lake are also heavily used. For instance, at Chaonia Campground on Memorial and Independence Day weekends there were 40 and 63 camping units recorded respectively yet there are only 16 campsites, 4 picnic tables, and 1 pit toilet. At the Greenville Bridge and Old Greenville Campgrounds, heavy use occurs on every weekend during the summer (3).

Lake Wappapello State Park is located on the large peninsula in the central-western part of the main pool. The land is outgranted to the State of MO, Department of Natural Resources, Division of Parks and Recreation (MDPR). Since incorporating the area in the state park

system, MDPR at an estimated cost of $500,000 has developed 150 campsites (11 with electrical hookups), hiking trails, a swimming beach, and 7 rental cabins and has upgraded the day-use area. The State has executed a third-party lease with a concessioner to construct and operate a 60-slip marina. The concessioner also manages the beach and cabins for MDPR (Table D.1.2).

During the period of 1 January to 31 August 1973, there were 24,872 campers recorded at the park. During the same period in 1974, there were 29,700 campers, an increase of 19%. Total day-use and camping visitation figures at Wappapello State Park indicate that 41,066 and 57,239 people visited the facility from January through August 1973 and 1974, respectively, an increase of 40%. The 1973 and 1974 figures are down from previous years primarily because of the flood conditions which existed in the park during these years. In the years when the park was not flooded, the campground has been very crowded. It was estimated that from 300-400 camping units have used the park during holiday weekends prior to the Corps' raising the normal pool elevation (4).

A designated campsite program was put into effect last year. The staff turns away campers when all sites are occupied. Excess campers are assisted by the staff in finding other public or private accomodations. If other accommodations cannot be found, campers are allowed to stay in a day-use area but they must leave prior to 8:00 a.m. the following morning. It is expected that camper visitation figures will drop substantially because of the campsite designation program (4).

Sam A. Baker State Park is situated in the extreme upper reaches of the project along the St. Francis River. The Missouri Department of Conservation (MDC) maintains a boat launching ramp and parking facilities on the river. The park was opened in 1928, some 13 years prior to the beginning of full operation at Lake Wappapello (4).

Table D.1.2. Outgrants for Fish and Wildlife and Recreation -- Public Parks, Wappapello Reservoir.[a]

Grantee	Instrument	Rental		Annual Rent Paid ($)	Acreage	Investment	
		Date	Term (yrs)			To 1974 ($)	Planned ($)
State of Missouri Dept. of Conservation	Lease[b]	1966	25	0	5	2,000	N/A[c]
State of Missouri Division of Parks & Rec.	License	1957	25	0	1,854	500,000	N/A
State of Missouri Dept. of Conservation	License	1966	25	0	4,200	N/A	N/A
Totals 3					6,059	502,000	

[a]Personal communication, November 1974. Memphis District, Real Estate Division, Memphis, Tennessee.

[b]Access area, used for camping.

[c]Not available.

The 4H Club, Boy Scouts, and Girl Scouts lease organization camp sites at the project. These all are well maintained. Each organization has made substantial investments in facilities such as lodges, cafeterias, cabins, beaches, and docks at their respective sites (2, 3) (Table D.1.3).

2. Lake Resources

The waters of Lake Wappapello tend to be muddy at times. The lake is shallow; the average depth is less than 10 ft. There has been no water over the emergency spillway since 1945.

Fishing below the dam at Wappapello is very good. Large fish feed on materials that wash through the dam gates into the receiving pool. There is an overabundance of carp and bufflo fish in the lake. MDC has proposed a winter drawdown of about 8-10 ft to seed the shoreline with a spring reflooding. This would cut down on carp and buffalo egg fertilization and would provide a protected nursery for game fishes. The proposal was made several years ago but execution was stopped at the last minute because the District feared resultant flooding in AR (5).

One of the mitigating circumstances involved in preventing the drawdown has to do with timber interests some 90 mi below the dam at Marked Tree, AR (in the lowest part of the St. Francis River floodplain). Some personnel of the MDC feel, "The timber interests rule supreme to the detriment of the entire project including the flooding of facilities of Lake Wappapello State Park." (5).

There are undoubtedly strong and legitimate pressures upon the district engineer to maximize retention within the lake to maximize use of floodplains downstream. The nature of the study did not permit a solicitation of views from downstream interests -- including AR state officials.

Table D.1.3. Outgrants for Recreation -- Quasi-Public, Wappapello Reservoir.[a]

Location	Grantee	Instrument	Rental			Current Annual Rent ($)	Acreage	Investment	
			Date	Term (yrs)	Basis			To 1974 ($)	Planned ($)
Paradise Point	Missouri 4H Clubs	Lease	1961	25	--	1	173.0	100,000	N/A[b]
Paradise Point	Cotton Boal Girl Scouts	Lease	1971	25	--	1	368.5	700,000	N/A
Moores Point	SE MO Council Boy Scouts of America	Lease	1966	10	--	1	82.0	10,000	N/A
Blue Spg.	Boy Scouts	Lease	1973	25	--	1	60.0	New	40,000
Totals	4					4	683.5	810,000	40,000+

[a]Personal communication, November 1974. Memphis District, Real Estate Division, Memphis, Tennessee.

[b]Not available.

3. Wildlife

An estimated 125 free duck blind permits were issued by the Corps in 1974 compared to 160 in 1973. Permit issuance was down because the number of ducks has decreased (3). Each of the blinds is numbered by the Corps and required to be placed no less than 200 yards from any other blind. The Corps stores blinds for owners during the summer (3).

MDC holds a license to manage lands below 362 ft msl. The normal pool elevation of the reservoir is 360 ft msl. According to MDC this leaves only 85 acres that are manageable (5) but the Corps outgrants 4200 acres to MDC (Table D.1.2). Nearly all the lands above the 362 ft mark are leased or licensed to agricultural, grazing, and recreational interests. MDC wants to stimulate higher standards for the use of these lands. They have recommended that the Corps stipulate more meaningful standards and criteria in the leases to agricultural and grazing interests (5). MDC peasonnel believe that much can be done to enhance wildlife resources if farmers were required to plant certain crops and set aside portions for wildlife food. They also believe that lake water quality could be protected and improved if better farming practices were followed (5, 6).

All six MDC interviewees indicated that the Memphis District tended to be "old line Corps" and "highly navigation engineering oriented." It was stated that since Wappapello was the only dam and reservoir project in the District it tended to have low priority. MDC personnel report that there is a negative attitude in the District toward wildlife enhancement. They said that the six other Corps Districts with projects in MO were very cooperative (5).

The cost to manage lands for wildlife enhancement is very high according to MDC. They suggest that the Corps provide all or portions of their income from leased lands to buy food for wildlife during bad crop years. The inability to share Corps' income from leased lands has hindered MDC's ability to do a good job at Wappapello (5, 6).

Night poaching of wildlife is a problem. Adequate policing of Corps lands by MDC is difficult because of the low amount of manpower available for patrol (5). Rustling and butchering of cattle on Corps lands leased for grazing is another problem. Lands have been posted and reward announcements have been made for the apprehension of rustlers (3). A consequence of poaching and rustling is land destruction. Corps land has been "torn up" by trucks and jeeps used by offenders (7).

4. Other Land Uses

Approximately 80% of the land in Wayne County is owned by the Federal Government. At present the Corps administers 389 outgrants consisting of approximately 51,000 acres at 12 different projects in MO for agricultural and grazing purposes (2). Of this amount 23,254 acres are outgranted to 101 lessees at the Wappapello project (Table D.1.4). Twenty-four leases are preferential and 77 are advertised. Preferential leases are held by the original owners and tenants. All other leases are advertised to run for 5-year terms. Beginning in 1977, all advertised leases will be let on a staggered basis to alleviate the cyclical work load of the Real Estate Division (2).

According to MDC, Corps land is in jeopardy because agricultural lessees are not required to use good land management practices (5). MDC completed an inhouse management study which indicated that a much better income and a higher public value could be received from these farmlands if they were managed properly (6, 8). In 1971 MDC began a special program with farmers who were leasing Corps lands at Wappapello to improve land management. With the help of the U. S. Soil Conservation Service and extension specialists from the University of Missouri and Wayne County, MDC held public hearings and training programs for the farmers. Six agricultural leases were selected to demonstrate good management. Only two farmers, however, responded positively to MDC help. According to MDC, the Corps did not strongly support the effort.

Teble D.1.4. Outgrants for Agriculture and Grazing, Residential, Rights-of-Way, Commercial Boats, and Miscellaneous Purposes, Wappapello Reservoir.[a]

Purpose	Grantee	Outgrants	Instrument	Rental		Annual Rent Paid ($)	Acreage	Investment	
				Date	Term (yrs)			To 1974 ($)	Planned ($)
Agriculture & Grazing	Summary	101	Lease	----	5	67,502	23,254.1	N/A[b]	N/A
Residential[c]	Summary	14	Lease	----	5	2,499	52.9	---	---
Rights-of-Way	Summary	63	Easement	----	50-Perpetual	699[d]	433.6	N/A	---
Commercial Boats	Summary	5	License	----	5	288	0	N/A	N/A
Miscellaneous	Summary	18	License	----	5-25	306	6,557.0	5,000	N/A
Totals		201				70,595	30,297.6	5,000	

[a]Personal communication, November 1974.. Memphis District, Real Estate Division, Memphis, Tennessee.

[b]Not available.

[c]Original owners of farms taken by the Corps and granted life tenancy.

[d]Term payment not included in total.

The Corps said that it could do no more than encourage voluntary outgrantee participation and the MDC concluded the project was a failure. The Corps said some degree of success was achieved (5, 6).

In 1956 a presidential memorandum restricting the planting of crops on federal lands was issued. In response U. S. Senator Thomas C. Hennings, on 21 August 1956, sent a letter to the Secretary of Defense indicating that Wayne County would suffer substantially from this ruling. Most of the good agricultural land in Wayne County is owned by the Corps (9). He indicated that 40% of the county's income was derived from the distribution of income received by the Corps from agricultural, grazing, and other leases. Wayne County was exempted from the ruling.

The Corps leases lands to local agricultural interests at low prices.[a] It is alleged that one of the purposes of leasing farmland at low rates is to assist in improving the economy and in alleviating the poverty situation of Wayne County. According to MDC, the holders of Corps outgrants at Wappapello are the well-to-do and the power structure of the county. Much acreage has been retired under the agricultural allotment program and is overgrown in weeds and scrub forest; subsidies for these lands are received by the grantees. In the words of MDC staff, "The public is taking a bad beating because of this situation." (2, 5, 9).

The Corps manages 20,172 acres of forestland at the project. Valuable stands of walnut and white oak abound. From time to time there has been substantial timber trespass. Magnificent walnut trees worth thousands of dollars have been taken. It is difficult to detect stealing because of the lack of manpower at the project site (2, 3).

Boundary encroachment and trespass are problems although the Corps owns 100% of the land surrounding the reservoir. This encroachment stems

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[a] There are 101 outgrants amounting to 23,254 acres with an income of $67,502; $67,502 ÷ 23,254 acres = $2.90 per acre per year.

from a desire by abutting private landholders to improve their vistas of the lake. Litigation in local courts has been slow and generally unsuccessful because of the lack of monumentation (2, 3).

At Cape Arrowhead a wide swath of trees has been cut on Corps property to provide a good view of an immense sign constructed to advertise a large subdivision. Action taken in the local courts was unsuccessful because the Corps was unable to prove encroachment; monumentation was inadequate (2).

Cape Arrowhead is the largest private development at Wappapello. Situated on the peninsula just north of the damsite, the 5,000 lot subdivision was started 5 years ago on about 5,000 acres. Prior to that time, the land was owned by five large landowners and a number of smaller ones. The Cape Arrowhead Corporation purchased and consolidated the tracts, redesigned the street pattern, and reportedly invested $4 million in improvements. The subdivision provides second and retirement homes for a market reaching as far north as Chicago. Until about a year ago the corporation advertised heavily. At this point, lot sales promotion has been almost completely dropped (7).

Cape Arrowhead presents a potential problem. If 5,000 lots were to be sold and developed, the residents, the county, and the Corps would have to face water and sewer problems. To date, 500 parcels have been sold. Where development has occurred there have been a mixture of residential building types consisting of mobile homes and permanent dwelling structures (ranging from the inexpensive to the very costly). The corporation maintains a marina license with the Corps and advertises a marina on the lake for use of property owners. The marina, however, has yet to be constructed. The Corps realizes that access to the lake from Cape Arrowhead will be a problem. Therefore, it may develop public access for the subdivision, through Possum Hollow which lies on the lakeshore to the north of Davis Point (7).

Beginning in 1958 the Corps sold some 58 1-acre cottage site lots on Cozart Point to private individuals for $200 to $427 per acre. The land was bought for about $3 an acre in 1937 and 1938. There are reports today that these lots could sell for about $2,000 each (2, 7).

On the Otter Creek Peninsula there are approximately 40 homes of low quality built on private land. These vacation-type structures are used in season mostly by hunters and fishermen. The lots in this area are sold by metes and bounds. To the south of Moore's Point and north of Butler KK is a new subdivision with a potential of accommodating about 100 homes. Street design is very poor; the gridiron pattern disregards the topography of the area (2, 7, 10).

At Rockwood Point there are 7 resorts, 50-60 private homes, and several marina concessions. A number of the resorts are the nicest to be found at Lake Wappapello. At the very tip of Rockwood Point is a Corps picnic and boat launching site. There are no signs on Butler T indicating that the facility exists, and there are no markers within the residential area that indicate where the facility is located. At the entrance there is a Corps public use area sign. It appears that public access through private development at Rockwood Point is being discouraged (Table D.1.5).

Commercial outgrants are made to 11 resorts and business establishments at Wappapello. The uses range from resort boat landings to marinas, which provide in several cases, boat and motor sales and services, slips, and winter storage. Marinas provide launching services and in all but one case are situated in the vicinity of Corps-owned public access points. All establishments appear to be well kept and clean (Table D.1.5).

The most heavily used area at Wappapello Lake is along Butler T and Wayne D between People's Creek Campground and Rockwood Point.

Table D.1.5. Outgrants for Recreation -- Commercial, Wappapello Reservoir.[a]

Grantee	Instrument	Rental			Annual Rent Paid ($)	Acreage	Investment		Turnovers
		Date	Term (yrs)	Basis			To 1974 ($)	Planned ($)	
B. Alsop	Lease	1973	5	Fixed	180	0.05	N/A[b]	N/A	0
J. Barrett	Lease	1974	10	Fixed	350	23.00	N/A	N/A	0
Chaonia Landing, Inc.	Lease	1960	25	Fixed + % gross	1,200	26.00	N/A	N/A	0
J. H. Avery	Lease	1968	10	Fixed	325	5.45	N/A	N/A	0
R. B. & G Loop	Lease	1968	10	Fixed	100	15.00	N/A	N/A	0
C. & F. Prock	Lease	1973	5	Fixed	135	5.00	N/A	N/A	0
R. S. & P. M. Russel	Lease	1974	20	Fixed	335	34.00	N/A	N/A	0
M. Dickenson	Lease	1974	5	Fixed	200	5.00	N/A	N/A	0
W. D. & M. Ward	Lease	1973	5	Fixed	100	5.00	N/A	N/A	0
G. H. & F. K. Yokel	Lease	1973	20	Fixed	285	3.00	N/A	N/A	0
W. D. Sabestian & H. L. William	Lease	1974	5	Fixed	200	8.00	N/A	N/A	0
Totals 11					4,010	129.50			

[a]Personal communication, November 1974. Memphis District, Real Estate Division, Memphis, Tennessee.

[b]Not available.

Along this strip there is a substantial amount of commercial development including restaurants, bars, bait and tackle shops, gift stores, motels, service stations, and motorboat sales and services facilities. Interspersed among these commercial establishments are five small subdivisions and a number of individual homes. Dwellings range from very expensive permanent structures to makeshift shacks and mobile homes of varying degrees of quality and size. Lots in the subdivisions north of the dam have not sold well. Street design is poor, the lots are unkempt, and road maintenance is needed. On several properties, discarded automobiles and large appliances have accumulated. In addition there are 15 resorts, several marinas, 7 Corps day-use and camping areas, a private airstrip, and 2 large capacity boat launching areas along this development strip.

In the settlements of Silva, Shook, Ledero, Taskee, and Wappapello, all bordering the analytical area, residential and commercial land uses prevail. Most of the commercial establishments are of the general merchandise type specializing in bait, tackle, boat sales and service, etc. Between Greenville Bridge and Taskee along U. S. 67 there are several bait and tackle shops, restaurants, and bars.

Of the 44,396 acres held in fee title by the Corps, 37,169 acres or 84% of its holdings are outgranted to state, quasi-public, or private interests at Wappapello. The largest outgrant grouping is agriculture and grazing. There are 101 leases totaling 23,254 acres in this category. This significant amount of acreage amounts to 63% of all outgrants. Capital investments made on outgranted Corps property are estimated to be $1,317,000 excluding commercial leases where figures were not available (2) (Table D.1.6).

5. Resource Use Controls

The Missouri Boating Commission (MBC) has the responsibility of buoy location, licensing of boats, and policing Wappapello Lake.

Table D.1.6. Summary of Outgrants, Wappapello Reservoir.

Purpose	Number	Annual Rent ($)	Acreage	Investment to 1974 ($)
Fish and Wildlife and Recreation -- Public Parks	3	0	6,059.0	502,000
Recreation -- Quasi-Public	4	4	683.5	810,00
Recreation -- Commercial	11	4,010	129.5	N/A
Agriculture and Grazing, Residential, Commercial Boats, and Miscellaneous Purposes	201	70,595	30,297.6	5,000
Totals	219	74,609	37,169.6[a]	1,317,000

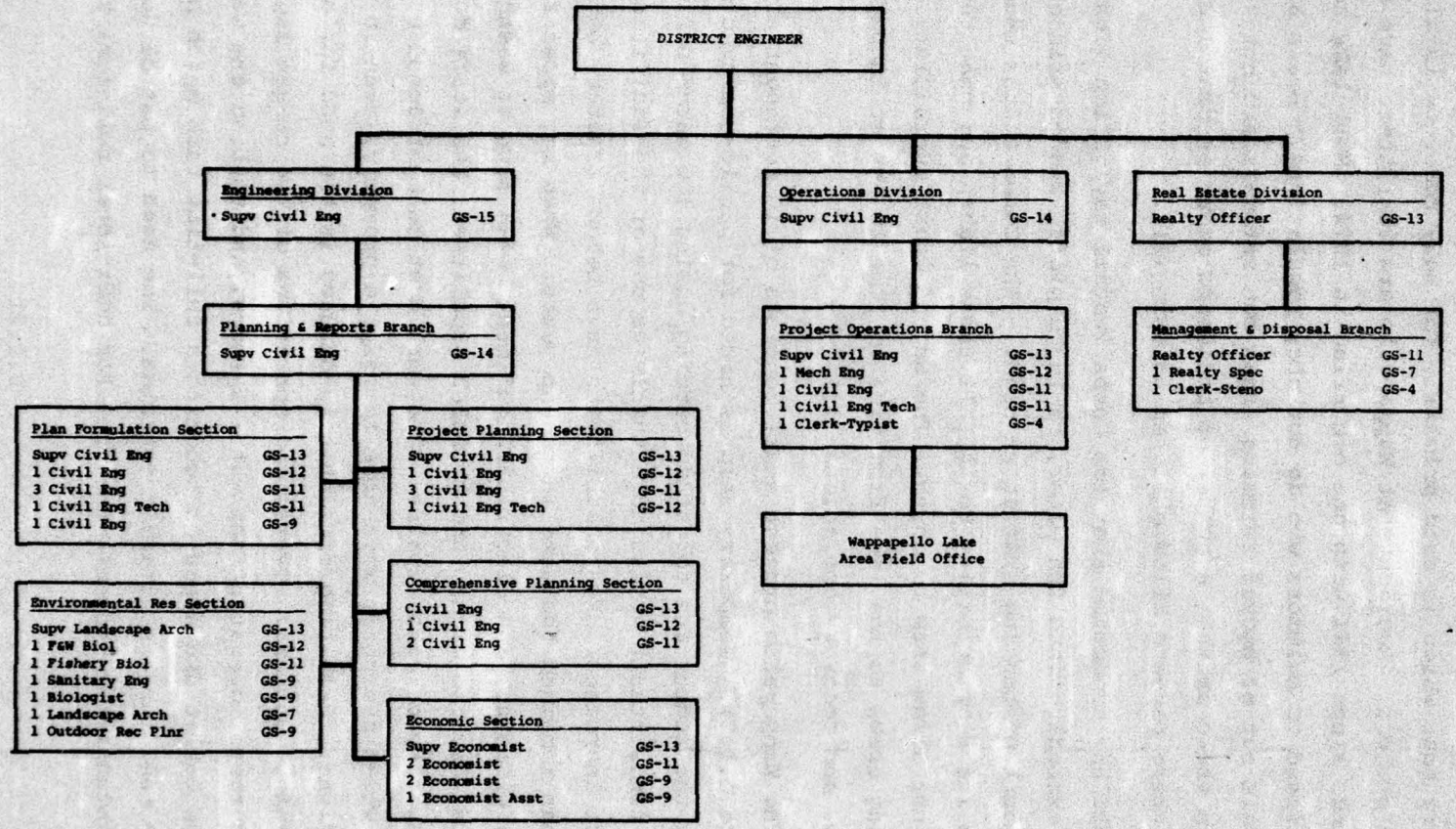
[a]Total acreage of outgrants exceeds manageable resource lands because a portion of lands outgranted for fish and wildlife purposes is under water.

Two men with patrol boats are assigned to the project. A rescue and recovery boat which is used primarily for body recovery is also assigned to the project. Accidents at Wappapello are low; there have been 43 drownings since 1941 with one occurring in 1974. Most lake accidents are related to swimmers who do not obey regulations. Boats are required to remain out of buoyed swimming areas but swimmers are not required to stay in these areas. A number of accidents occur at boat launching areas where parents allow children to swim (11).

MBC has suggested that the Corps install navigation lights on power lines extending into the water, on large piers, and on bridges because of the amount of boating traffic at night. The Corps states that it is not within its responsibility to install these lights and that regulations would not allow them to do so. The Second Coast Guard District sends boarding crews to the lake from time to time to assist in policing, rescue, and recovery operations (11).

The Wappapello project staff consists of 10 permanent employees (Figure D.1.2). Temporary help is hired for public use area management during the summer and for stump cutting during low water periods. The staff finds itself spread more thinly as use of the facilities at the project increases. Responsibilities have become greater, but the staff size has remained the same in recent years. When key apparatus such as pumps, plumbing, and electrical equipment break down at washhouses, toilets, day-use areas, and at other facilities, the staff does not have the capacity to make repairs. The work must be contracted out to local firms which are not always able to respond promptly, even in emergency situations. Resulting from this inadequacy is the need for additional maintenance workers. Overseeing operations of the sewage lagoons and septic tanks, operating the water systems, and testing the wells in the various public use areas is becoming a full-time task which has resulted in the need for a sanitary technician. The need to patrol Corps property more intensively presents the need for additional full-time rangers (3).

Figure D.1.2. Recreation-Resource Management Interrelationships - Memphis Engineer District.



III. KEY FINDINGS

A. Recreation

1. The influx of campers is so great on holiday weekends that Corps day-use areas are opened for camping. Facilities at sites which have been converted to accommodate campers are inadequate in both quality and quantity. At Redman Creek, for instance, there is only one water hydrant for 21 campsites. Despite overuse, the Corps public use areas are clean and well maintained.

2. To the south of the damsite, access to Corps public use areas must be gained through private residential subdivisions. Access to these areas is either marked poorly or not marked at all on Butler T, part of the major road access system encircling the project. Signs indicating that these areas are open to the public are obscurely situated.

3. Resort buildings and related facilities at Lake Wappapello are located some distance from the shore; they are clustered, in most cases, around Corps-owned access points (launching ramps). Corps policy indicates that free public access will be maintained at these points although the land is leased to resort operators. At some boat access points, private signs imply that the facilities are leased from the Corps for the exclusive use of resort patrons.

4. Lake Wappapello State Park is crowded and overused on weekends during the summer. Up to 400 camping parties have been counted at the 150 unit campground. Much of the park has been flooded for extensive periods during the past 2 years decreasing camping capacity. The Corps has maintained a high pool level to control flooding of timber lands on the floodplain along the St. Francis River some 90 mi south of the project near Marked Tree, AR. Pressures to manipulate lake levels to maximize recreation may conflict with legally recognized values downstream. There are no procedures to guide the district engineer in choosing management alternatives that will optimize values from all project resources.

5. MDPR has indicated a willingness to match Code 710 funds to improve and extend Lake Wappapello State Park. Although positive expressions of interest have been received from six other Corps districts which have projects in MO, the Memphis District had not responded at the time of this study. The Corps has made no capital investment at the park. All improvements have been paid for by the state and its concessioner.

B. Fish and Wildlife

1. Fish and wildlife management is the responsibility of the MDC, but the Corps has issued up to 160 free permits per year for duck blinds. The Corps regulates blind placement and provides storage space for blinds off season.

2. MDC believes that waterfowl hunting could be enhanced if the Corps required agricultural lessees to leave portions of their crops in the field for wildlife food. The MDC also suggests that the Corps set aside a portion of its 25% share of agricultural lease income to purchase grain for wildlife feeding during bad crop years.

3. Poaching is a problem. MDC is unable to police Corps-lease lands sufficiently because of the lack of funds and manpower.

4. Overpopulation of nongame fish is affecting the sports fishery. MDC recommended that the lake be drawn down 8-10 ft during the winter (January to March) so that the shoreline could be seeded and reflooded again in the spring. This would reduce the fertilization of trash fish eggs and create game fish nursery areas. The Corps states that the main purpose of the project is flood control and that it can not be responsible for flooding which might result from excessive winter releases. The MDC believes that timber interests in AR desires control of water releases to protect their lands from flooding. This dominance over water release policy is detrimental to the project according to the MDC. Pressures to manipulate lake levels to maximize sport fishing may conflict with

legally recognized values downstream. There are no procedures to guide the district engineer in choosing management alternatives that will optimize values from all project resources.

C. Corps and Contiguous Land Use

1. Of the 44,396 acres held in fee simple by the Corps 37,170 acres have been outgranted in leases, licenses, or easements. A total of 101 5-year leases have been granted for agricultural and grazing use, encompassing 23,254 acres of land.

2. Agricultural leases are not meeting their potential in crop production. Much land is lying fallow and is overgrown in weeds and proper land management and farming practices are not being followed. Allotments assigned before Corps acquisition have been continued because of the low income conditions in Wayne County. Most of the good agricultural land in Wayne is owned by the Corps.

3. MDC efforts to interest farmers in improving land management and productivity have been unsuccessful. The Corps indicates that there has been a degree of success but that it can do no more than encourage lessees to participate on a voluntary basis in a land and crop improvement program. Condition number 20 in Corps agricultural lease instruments indicates only that lessees "...will practice good farm management." The Real Estate Division has begun to develop standards for agricultural land management with the help of the MDC, U. S. Soil Conservation Service, and other local, state, and federal groups.

4. The exterior boundary of Clark National Forest is contiguous with Corps property. USFS holdings, acquired under the Weeks Act, form a checkerboard of public and private land and constitutes a partial buffer zone for the lake complex. All federal land is devoted to forest management and no USFS recreational facilities are operated in the Wappapello analytical unit.

5. MDC administers a state forest on the southwestern border of Corps property and operates a fish hatchery on state forest land approximately 1 mile from the lake near Butler KK. The University of Missouri owns and operates a 7,000 acre forestry training camp just to the north of Butler KK and T.

6. Two of the approximately eight subdivisions situated to the north and south of the damsite are clean and attractive. The others are comprised generally of structures ranging from shacks, prefabs, and mobile structures (homes and campers) to permanent "shells" and cinderblock residences. Trash and discarded appliances and automobiles are evident on the numerous vacant lots. A variety of land uses are evident adjacent to the road at the damsite. The poor mixture and unorderly development, generally substandard construction and condition of the buildings, and inadequate street and road design in residential developments detract from the aesthetic beauty of the project. Because of the rural and unsophisticated nature of local government in the vicinity of the project, there is little hope at this point that measures will be taken to apply land-use planning and controls in or contiguous to the analytical unit.

7. A very large and garish sign advertising Cape Arrowhead is located on a peninsula overlooking the lake. A broad swath of trees was cut on Corps property so the sign could be seen from the damsite and Wayne D. The Corps sued to recover damages in the Wayne County Court. Because monumentation was not complete and Corps property lines were not clearly defined, the owner was given the benefit of the doubt. No restitution for the timber loss and encroachment was required by the court. No further action has been taken by the Corps.

D. Real Estate Programs and Practices

1. The lack of sound land management and farming practices has resulted in the need to incorporate guidelines into Corps agricultural

lease instruments. At present only reference is made to practicing good farm management.

2. Timber trespass is a problem at the project. In the few cases where trespassers have been caught and prosecuted with the assistance of the Federal Bureau of Investigation (FBI), the local courts have tended to be tolerant in their decisions.

3. Rustling and butchering of cattle on lands outgranted from the Corps is a problem. The local ranchers association has offered rewards for information leading to conviction of rustlers.

4. All agricultural and grazing leases come due at the same time every 5 years. The Real Estate Division will begin a staggered leasing program in 1977 to alleviate the cyclical surge in workload.

5. Because project staff is insufficient in size, it is impossible to patrol Corps-managed property as often and as regularly as needed. As a result encroachment and timber stealing often go undetected for long periods of time.

E. Corps Organization

1. Although public use of Lake Wappapello has increased in recent years, the number of employees has not. The staff finds itself spread thinly and unable to perform its tasks adequately.

2. The MO state agencies, the local project staff, and the district staff indicated that Wappapello Lake was the least important and lowest priority project in the Memphis District. Wappapello is the only multi-purpose project in the District. The concensus is that emphasis is placed on the mainstream navigational projects of the Mississippi River.

3. There is a need for better coordination and cooperation in planning within the District. The Real Estate, Engineering, and Operations staffs all indicated that they should be included in project

planning. Personnel at the project also expressed a degree of dissatisfaction in that they were not kept fully aware of planning activities.

4. District staff personnel indicate that closer ties between Divisions should be developed and that consideration should be given to restructuring District offices so that interests in project planning and management can come under one entity or be totally merged for better cooperation and coordination. Currently timber management is a responsibility of Operations whereas administration of timber sales is a responsibility of the Real Estate Division and the hiring of foresters is a responsibility of the Engineering Division.

IV. REFERENCES

1. Personal communication, 16 October 1974. U. S. Forest Service, Clark National Forest District Office, Poplar Bluff, Missouri.
2. Personal communication, September - December 1974. Memphis District, Real Estate Division, Management and Disposal Branch, Memphis, Tennessee.
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4. Personal communication, September - December 1974. Missouri Department of Natural Resources, Division of Parks and Recreation, Jefferson City, Missouri.
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7. Personal communication, 23 September 1974. Memphis District, Engineering Division, Planning and Reports Branch, Memphis, Tennessee.
8. Missouri Department of Conservation. 11 November 1971. Inhouse memorandum on Corps agricultural outgrants. Wappapello Dam and Reservoir, Wappapello, Missouri.
9. Personal communication, 8 January 1975. Agricultural Stabilization and Conservation Service, Columbia, Missouri.
10. Personal communication, 23 September 1974. Memphis District, Operations Division, Memphis, Tennessee.
11. Personal communication, 12 September 1974. Missouri Boating Commission, Jefferson City, Missouri.

2. LAKE OUACHITA (BLAKELY MOUNTAIN)

Lower Mississippi Valley Division

Vicksburg District

Arkansas

I. SETTING

A. Location

Lake Ouachita is located on the Ouachita River in midwestern Arkansas. The dam and powerhouse (Blakely Mountain Dam) are situated 13 miles (mi) northwest of Hot Springs near Mountain Pine. The eastern portion of the reservoir and the damsite are situated in Garland County whereas the two branches of the upper end of the lake lie in Montgomery County (1, 2).

The lake is served on the south by state and county roads leading from U. S. 270. The Possum Kingdom Road (AR 298) provides access to the north shore and AR 27 serves the western lake boundaries. The eastern shore is accessible at two general locations (the damsite and at Ouachita State Park) via AR 227. The general configuration and location of the project are shown in Figure D.2.1.

B. Authorization and Purposes

The Blakely Mountain Dam and Reservoir project was authorized by the Flood Control Act of 1944 (PL 78-534) (3). Flood control and power were the primary purposes of the project.[a]

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[a] The Secretary of the Army has been authorized, since 1944, to construct, maintain, and operate public park and recreational facilities at water resource development projects. 16 U.S.C. 460d. Since 1946, the Army Corps of Engineers has been required, when consistent with a project's primary purposes, to make adequate provision for the conservation, maintenance, and management of wildlife resources. 16 U.S.C. 663(a).

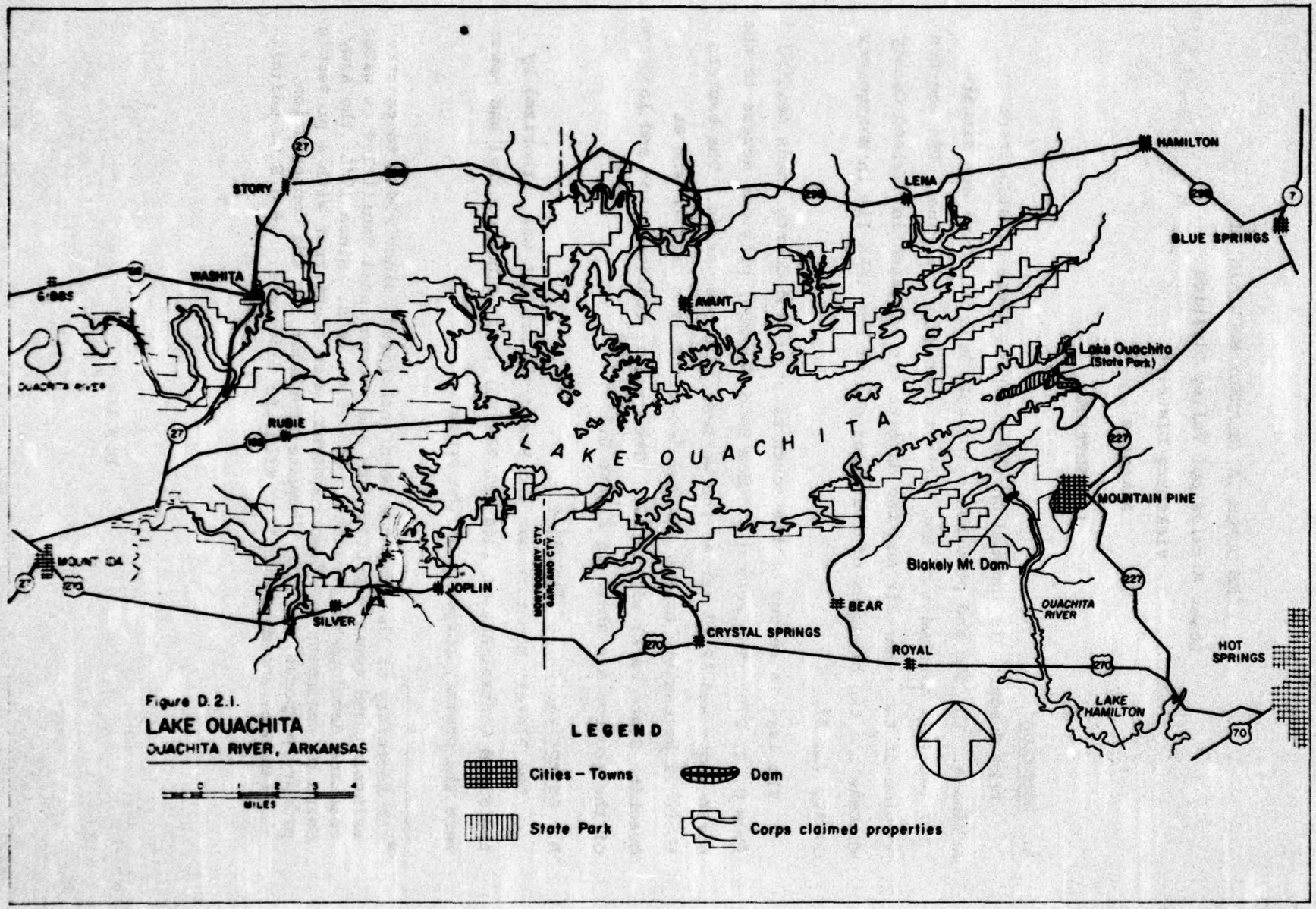


Figure D.2.1.

LAKE OUACHITA

OUACHITA RIVER, ARKANSAS

C. Features

The Ouachita River is a typical clear, cold mountain stream which had generally easterly flows within the lake basin. The drainage area above the dam is 1,105 square (sq) mi and the reservoir contains 864,900 acre-ft at the minimum power pool elevation of 535 feet above mean sea level (ft msl) (3).

The reservoir lies within the Ouachita Mountains and the topography of lands surrounding the lake ranges from hilly to rugged. Ridge elevations up to 1,250 ft msl are found along the southern shore whereas the northern shore is less rugged (1). Soils of the area are shallow and poor and are composed of gravelly and sandy clay loams generally underlain by shale. Litter depth in most areas is from 0.5 to 2 inches; quartz is common in many areas (2).

The watershed is mostly forested with a second growth mixture of pine-hardwoods. Shortleaf pine is the predominant species with a mixture of oaks, sweet gum, hickory, and dogwood. The lake lies within the administrative boundaries of the Ouachita National Forest (1, 2).

An operational plan has been developed to maximize the advantages derived from stream flow at the damsite. When pool elevation is between 535 and 578 ft msl, releases are made through the two, 75,000 kilowatt (kw) hydroelectric power units; flood releases are made rapidly but do not exceed 3,000 cubic feet per second (cfs) when outflow will contribute to a discharge in excess of 15,000 cfs at Malvern, AR. Flood releases (when the pool is over 578 ft msl) are regulated through three flood control gates which are separate from the power units. Lowering of the lake during October and November provides induced surcharge storage for approaching winter and spring storms; a gradual rise in pool elevation generally occurs from 1 December to the middle of June. Withdrawals for power generation gradually lower the pool from 15 June to October (2). Additional project features are shown in Table D.2.1.

Table D.2.1. Resource Statistics, Lake Ouachita.

Date of Authorization		1944[a]
Rights in Land Acquired Between		1948-1951[b]
Date of Impoundment		January, 1953[c]
Date of Full Operation		October, 1955[c]
Lake Size When Water is at:		
Spillway Elevation (592 ft msl)		48,330 acres[a]
Normal Pool Elevation (578 ft msl)		40,060 acres[a]
Normal Minimum Pool Elevation (535 ft msl)		20,860 acres[a]
Minimum Design Elevation		NA[d]
Water Fluctuation - Summer Recreation Season		8 feet[e]
Shoreline at Normal Pool Elevation		690 miles[c]
Held in Fee Simple by Corps		690 miles[c]
Land Area Managed by Corps		
Total Land in Project		82,373 acres[c]
Fee Title in U. S.	82,362 acres[c]	
Easements	11 acres[c]	
River Bed	0 acres[c]	
Project Operation Lands		71 acres[c]
Manageable Resource Lands		42,231 acres[f]

[a]Vicksburg District. 1963. Blakely Mountain Reservoir, Lake Ouachita, Ouachita River, Arkansas; master plan for reservoir development and management. Design memorandum no. 1A (July). Vicksburg, Mississippi.

[b]Personal communication, 21 November 1974. Vicksburg District, Real Estate Division, Management and Disposal Branch, Vicksburg, Mississippi.

[c]RRMS 1973.

[d]Not applicable.

[e]Personal communication, 22 November 1974. Vicksburg District, Operations Division, Vicksburg, Mississippi.

Table D.2.1. (Continued)

[f]Total project land minus (Land Flooded at Normal Pool Elevation + Project Operation Land + Easements) = 82,373 - (40,060 + 71 + 11).

II. LAND USE, RECREATION, AND FISH AND WILDLIFE CONSIDERATIONS

A. Analytical Unit

The lake influences both recreation and economic development in a large area, but the primary unit which influences the physical character of the lake consists of the immediate drainage area surrounding the lake. This band extends from the lake to approximately 0.5 mi (near Bear Mountain) to 7 mi near the Montgomery-Garland County line on the north side of the lake. The greatest impact probably occurs along the southern shore in and near the more populated areas such as Mount Ida and Hot Springs. A recent Corps analysis indicates that 70% of the visitors surveyed came from Garland, Saline, Spring, and Grant Counties and from the Town of Pine Bluff (approximately 75 mi southeast of the lake) (2). This somewhat elliptical primary-market band is approximately 95 by 45 mi at its widest point and includes the eastern two-thirds of the lake. According to the Lake Ouachita Jurisdictional Study (1), approximately 2.8 million people live within 150 mi of the lake.

Other nearby reservoirs which may influence the recreational usage of Lake Ouachita include Lakes Hamilton and Catherine on the Ouachita River near Hot Springs. These reservoirs are Arkansas Power and Light Company hydroelectric power developments and are heavily developed as homesites by private individuals (4). Lake Greeson and DeGray Lake, two other Corps reservoirs, lie approximately 30 mi southwest and 20 mi south respectively. The nationally famous Hot Springs National Park attracts numerous visitors to the general area. Many visitors to the park also utilize the facilities at Lake Ouachita (especially the camping areas) (5).

B. Ownership

1. Corps and Other Federal Agencies

The Corps and the USFS are currently involved in a jurisdictional dispute over approximately 20,489 acres (5). These lands are within the

project boundary (and adjoin the lake in several areas) and both the USFS and the Corps claim ownership and administrative responsibilities. The disputed acreage is composed of both lands acquired under the Weeks Law and lands withdrawn from the public domain (5) (Table D.2.2).

Only 10% of Corps land has been monumented (6), mostly at the dam and spillway areas (7). The Corps-claimed boundary includes a fairly narrow take line ranging from the maximum flood control pool elevation (592 ft msl) to about 1 mi at some of the lake peninsulas; about 2 sq mi of the Corps-owned land is at the dam and spillway area (8). The majority of lands surrounding Corps holdings on Lake Ouachita are within the Ouachita National Forest (1).

2. State, County, and Private

There are no significant state or county holdings within the project area and the Corps or USFS claims ownership to all lands adjoining the lake. However, Weyerhaeuser Company also claims ownership to a portion of the shoreline on the northeast side of the lake (7). Weyerhaeuser probably owns more land around the lake than any other single private landowner (4) but there are several other private holdings which lie fairly close (within about 50 yards) to the lake (7). Generally, the wooded nature of the shoreline renders most private holdings unnoticeable.

C. Resource Management

1. Recreation

a. Corps

There are currently 17 developed recreational sites at Lake Ouachita within the project boundary (5). These sites occupy approximately 2,005 acres and two new sites comprising 365 acres have been proposed (5). There are numerous minor sites currently used for

Table D.2.2. Land Ownership Data for Lake Ouachita.

Information	Source		
	RRMS 1973[a]	Jurisdictional Study[b]	Real Estate Division[c]
Acres fee property (Corps)	82,363	61,600	61,627.06
Project Lands (acres)			
Weeks Law	------[d]	4,762	---------
Withdrawn public domain	------	15,828	15,629.35
Under U. S. Forest Service permit	------	------	4,860.00[e]
Lands sold (acres)	------	------	45.59[f]
Flowage easement (acres)	11[g]	------	255.90[h]
Total project area (acres)	82,373	82,190	82,070.82

[a] RRMS.1973.

[b] Lake Ouachita Jurisdictional Study. 1973. U. S. Army Corps of Engineers (Vicksburg District) and U. S. Forest Service (Ouachita National Forest).

[c] Personal communication, September-November 1974. Vicksburg District, Real Estate Division, Management and Disposal Branch, Vicksburg, Mississippi

[d] Not obtained.

[e] 4,762 acres are Weeks Law lands.

[f] To Mountain School District.

[g] Perpetual access easements (Montgomery County).

[h] For borrow purposes; expired 1960.

recreation that are not yet developed (5, 7). Corps-developed sites generally provide areas for camping, boat launching, and picnicking as well as comfort facilities. Swimming areas and group picnic shelters are provided at several sites. A $1 camping fee is charged for summer camping at seven Corps sites (9). This fee is collected daily by park technicians; no charges are made for day usage of these sites. Comfort stations, visitor protection, tent or trailer spaces, refuse containers, and access roads are among the facilities and services provided by the Corps on fee areas. There are two non-fee areas which provide similar recreation facilities on the lake (9). Recreational sites are fairly well distributed over the entire lake area; however, the south shore of the lake has better access and thus contains more recreational sites than does the northern shore (5). Approximately $4,138,200 have been invested by the Corps in recreational facilities at Lake Ouachita (5).

Commercial concessioners lease 326.0 acres from the Corps at nine of the 17 developed recreational sites (Table D.2.3). Rental fees for major concessioners are based on a 1, 2, or 3% sliding scale dependent upon gross receipts plus a set basic fee. Minor concessioners are given the option of being charged a single flat fee or rental based upon a sliding scale plus a basic fee (10). All commercial leases are for 25 years and lessees are required to submit periodic reports concerning facility usage and gross receipts. Current lessees have first option to renew, and facility plans and alterations require prior Corps approval (10).

Facilities provided by commercial concessioners include housekeeping cabins and motel rooms (133 units), transient trailer spaces (548 authorized), boat docks and rentals (25), rental boats, boat slips (814), boat launching ramps, eating establishments (2), and grocery or general supply stores (5). Souvenirs and other gifts are sold at some

Table D.2.3. Outgrants for Recreation -- Commercial, Lake Ouachita.[a]

Location	Grantee	Instrument	Rental			Annual Rent Paid ($)	Acreage	Gross Fixed Assets		Turnovers
			Date Original Current	Term (yrs)	Basis			To ($) (Year specified by footnote)	Planned ($)	
Tompkins Bend	Shangri-La Resort, Inc.	Lease	1956	25	$100 + step % gross	2,218.64	13.4	305,719[b]	N/A[c]	0
Brady Mountain	The La Grange Corp.	Lease	1955	25	$100 + step % gross	2,407.27	58.0[d]	296,602[b]	N/A	0
Spillway Area	Paschall and Montgomery	Lease	1956 1972	25 --	$75 + step % gross	4,296.23	44.0[e]	65,240[f]	N/A	2
Little Fir	Buddy Clifton	Lease	1954 1966	25 --	$100 + step % gross	567.88	8.0[g]	25,839[f]	N/A	1
Joplin	Mountain Lake, Inc.	Lease	1956	25	$150 + step % gross[h]	3,171.77	115.5[i]	568,756[j]	N/A	0
Lena Landing	Francis P. Harris	Lease	1956	25	Fixed[k]	400.00	15.0	30,550[j]	N/A	0[l]

Table D.2.3 (Continued).

Location	Grantee	Instrument	Rental Date	Rental Term (yrs)	Rental Basis	Annual Rent Paid ($)	Acreage	Gross Fixed Assets To ($) (Year Specified by Footnote)	Gross Fixed Assets Planned ($)	Turnovers
			Original Current							
Irons Fork	Nooner and Nooner	Lease	1956 1968[m]	25 --	Fixed[m]	100.00[m]	18.5	10,500[b]	N/A	2[m]
Highway No. 27	Cescaline and Pellagrini	Lease	1956	25	$100 + step % gross	725.87	21.6	43,500[f]	N/A	1
Crystal Springs	Paschall and Paschall	Lease	1955 1954	25 25	$100 + step % gross $100 + step % gross	3,038.75	21.0	303,760[j]	N/A	2
Denby Point	Denby Point Resort, Inc.	Lease	1964	--		977.01	29.5	166,271[b]	N/A	2
Totals (current)	9[o]					17,803.42[o]	326.0[o]	1,806,237[o,p]		

[a] Vicksburg District. ND. Design memorandum no. 2, reevaluated and updated master plan for development and management of Lake Ouachita (draft), and Personal communication, September-November 1974. Vicksburg District, Engineering and Real Estate Divisions, Vicksburg, Mississippi.

Table D.2.3. (Continued).

[b] 1971 audit.

[c] Not available.

[d] Increased from 37.7 acres in 1972.

[e] Increased from 9.7 acres in 1972.

[f] 1970 audit.

[g] Increased from 1.8 acres in 1973.

[h] Increased from $50 plus percent of gross in 1960.

[i] Increased in 1960 and in 1972; originally 30 acres.

[j] 1972 audit.

[k] Originally $50 plus percent of gross; changed in 1972.

[l] Four partners since 1956.

[m] Terminated in 1974 due to abandonment.

[n] Originally $75 plus percent of gross; changed in 1972.

[o] Excluding terminated Nooner and Nooner lease.

[p] As of 1970-1972 audits.

of the commercial concessions, and nine of the sites contain private homes for the lessees (5).

Permits have been granted to the USFS for construction of a hiking trail, fence, and cattle guard (Table D.2.4). The Arkansas Game and Fish Commission (AGFC) has a license for a 5-acre site for fish and wildlife administrative purposes. The AGFC also has a permit from the USFS for the use of 5 acres of land on the northern side of the lake for a nursery pond (5, 10).

The Arkansas Department of Parks and Tourism (ADPT) has a license from the Corps (no monies are involved) for 370 acres on the eastern side of the lake for Ouachita State Park (10) (Table D.2.4). A marina and restaurant are operated at the park and picnicking, camping, and cabin facilities are provided. Fees are charged by the state for the usage of boats and motors; camping areas, and vacation cabins. The park offers a wide variety of naturalist programs including interpretative hikes, lake cruises, and talks (4).

The park was opened in 1955. It has been a very attractive and popular facility, being used quite heavily. Based on camping receipts and estimated day-usage, park visitation was 370,000 in 1971 and 380,000 in 1970. A more accurate counting system was applied in 1973 and visitation was estimated at 216,000 in 1973 and 118,896 through June for 1974 (11).

There are 60 campsites at the park. However, on weekends as many as 150 camping units have been allowed on the campgrounds. A new policy will be applied beginning next year allowing only one unit per site (11).

The state has appropriated $448,000 over two biennia to rehabilitate the campgrounds and "worn-out" park facilities. These

Table D.2.4. Outgrants for Fish and Wildlife and Recreation -- Public Parks, Lake Ouachita.[a]

Grantee	Instrument	Rental		Annual Rent Paid ($)	Acreage	Investment	
		Date	Term (yrs)			To 1974 ($)	Planned ($)
Arkansas Dept. of Parks and Tourism	License	1955	25	0	370	N/A[b]	N/A
Arkansas Game and Fish Commission	License	1956	25	0	5	N/A	N/A
U. S. Forest Service	Permit	1973	5	0	---[c]	N/A	N/A
U. S. Forest Service	Permit	1973	5	0	---[d]	N/A	N/A
Totals	4				375		

[a]Vicksburg District, Engineering Division. 1974. Compilaton of outgrants, and Personal communication, September-November 1974. Real Estate Division, Management and Disposal Branch, Vicksburg, Mississippi.

[b]Not available.

[c]Permit for hiking trail; no acreage specified.

[d]Permit for fence and cattle guard; no acreage specified.

funds will be expended over a 3 year period and will be matched by the Corps. Expenditures on improvements will amount to $797,000, including $327,000 from the Corps and $22,000 from the Arkansas State Highway Department. The state is planning to construct cabins, maintenance buildings, and a marina at the park without Corps participation. The State of AR and the Vicksburg District have developed a cost-sharing recreation development program for Ouachita State Park to be funded within the Code 710 program. The necessary contract is in Washington for review and approval (11).

A difficulty encountered at the state park has to do with the physiography of the area. The steep terrain and shallow soil is extremely susceptible to erosion. The park campgrounds are so heavily used that erosion is a continuous problem (11).

Four septic tanks and a drain field serve the park but these are inadequate and surfacing of sewage is common. The ADPT will convert to a tertiary treatment system as a part of the park rehabilitation program (11).

Approximately 697 acres at seven areas are leased from the Corps by various civic groups and educational foundations for recreational and educational purposes (Table D.2.5). Lease periods range from 10 to 25 years and rental fees are from $1 to $100 per year (5, 10).

During 1953 when impoundment began, an estimated 53,000 visits were made to the lake. By 1959, recreational days of use exceeded 2 million; during 1973 an estimated 2,855,700 recreational days of use were recorded at the lake. Heaviest recreational usage in 1973 occurred during June-August (47%), especially on holidays. Fishing and sightseeing were the two most popular activities (participated in by 40 and 43% respectively of all lake visitors); boating, swimming, and camping also accounted for a moderate amount of recreational

Table D.2.5. Outgrants for Recreation -- Quasi-Public, Lake Ouachita.[a]

Grantee	Instrument	Rental			Current Annual Rent ($)	Acreage	Investment	
		Date	Term (yrs)	Basis			To 1974 ($)	Planned ($)
Arkansas National Guard (Air)	License	1968	10[b]	----	0	20.0	N/A[c]	N/A
YMCA	Lease	1955	25	$25/term	1.00	28.0	N/A	N/A
Navy League of Hot Springs[d]	Lease	1960	25	$25/term	1.00	53.0	N/A	N/A
Ouachita Baptist College	Lease	1968	10[b]	$25/term	1.00	8.3	N/A	N/A
Hot Springs Boat Racing Club, Inc.	Lease	1968	10	$100/year	100.00	16.3	N/A	N/A
Ouachita Girl Scouts	Lease	1964	25	$25/term	1.00	196.2[e]	N/A	N/A
The Debereux Foundation	Lease	1967	25	$25/term	1.00	374.9	N/A	N/A
Totals	7				105.00	696.7		

[a] Vicksburg District, Engineering Division. 1974. Compilation of outgrants, and Personal communication, September-November 1974. Real Estate Division, Management and Disposal Branch, Vicksburg, Mississippi.

[b] Originally for 5 years; extended in 1973.

[c] Not available.

[d] Assigned to Arkansas-Louisiana conference of Seventh-day Adventists in 1966.

[e] Increased from 193 acres in 1968.

activity (5, 6). Other recreational activities included picnicking, hunting, and water skiing. No special fees are charged by the Corps for hunting on project lands around the lake (no hunting is allowed at the dam and recreational sites). An estimated 60-70% of all lake visitors live in AR. The majority of out-of-state visitors come from Texas, Oklahoma, Louisiana, Missouri, Tennessee, and Illinois (7).

Traffic counters, which are read monthly, are utilized to obtain counts of lake visitation. Twice per year for two days (Wednesday and Saturday), a detailed visitation survey is made at three locations on the lake. Incoming vehicles are stopped and the occupants are questioned about their recreational activities. From these surveys, estimates are made of load factors, usage activities, and the number of nonrecreational vehicles (service and construction vehicles) which enter recreational sites. Inferences from biannial survey data are utilized to obtain estimates of activities and monthly recreational days of use. Many of the traffic counters used in estimating visitation rates are some distance from Corps recreational sites and oftentimes dwellings or other facilities (e.g., concessions) are within the count area (5).

Although a large amount of federal funds have been invested in recreational facilities at Lake Ouachita, the majority of the people utilizing the lake are local (5, 7). In many instances, private land values around the lake have risen somewhat, probably at least partially as a result of lake formation. Additionally, the investment of federal monies at Lake Ouachita has significantly boosted local economies in the general lake area (5, 7).

Problems currently existing on some lands leased to commercial concessioners include (1) inequity in allowing facility

expansions, (2) landscape alteration without prior Corps approval, (3) removal of existing facilities and trash when leases are not renewed, (4) allowance of private home construction, (5) inadequate grounds maintenance, and (6) the allowance of relatively permanent mobile homes on sites designated for transient trailers (5). The more successful concessioners (mostly on the south side of the lake) may have been allowed more leeway in facility expansion than the generally less successful concessioners (mostly on the north side of the lake); however, this situation is partially due to the higher degree of recreational usage of the southern lake shore (5). Facility expansion and landscape alteration have occurred without prior Corps approval, but these have generally been controlled at the project level (5, 7).

Although transient trailer spaces are leased on a 30 day basis (from the concessioners), these leases are renewable and many mobile homes have become fairly fixed home sites for private individuals (5, 7). Also the Corps has allowed concessioners to construct their own private homes on land leased from the Corps (for protection of their commercial facilities) (5, 7).

Problems with some of the group lease areas are poor maintenance of facilities and grounds and the failure to remove improper or abandoned structures at group-leased areas (5). Possible reasons for these problems are (1) some of the group-leases are in remote areas, and (2) there are only a limited number of Corps personnel available for lease compliance inspections.

Overuse appeared to be a major problem at Ouachita State Park and at many Corps recreational sites (especially areas near Hot Springs on the southern lake shore). One of the main problems contributing to landscape damages is excessive vehicular traffic and the

lack of designated parking areas at many sites (7). Uncontrolled traffic results in vegetative destruction (especially in fragile areas) which enhances erosion problems and reduces aesthetic values (7). Many recreational areas have lost topsoil from erosion and much of the remaining soil is compacted from both vehicular and foot traffic. The exposed rocky subsoil and shaded understory make it difficult to establish grass cover at many of the overused recreation sites (5, 7).

The Corps has taken some steps to curb the results of overutilized recreational sites. Studies and recommendations have been made by an agronomist concerning the establishment and maintenance of vegetation and the Corps has designated camping and parking sites in some areas (5, 7).

b. U. S. Forest Service

The USFS has several recreational sites on holdings near the lake; however, none of these areas offer lake-based recreational facilities since they do not directly adjoin the lake. Most USFS sites offer camping, picnicking, and comfort station facilities. A $2 per night fee is charged for camping, and numerous USFS trails are located around the lake (7).

c. State, County, and Private

Other than the operation of Ouachita State Park and the commercial concessions, there are no significant recreational facilities provided by the state, county, or private individuals at Lake Ouachita (5). Although not specifically on the lake, a wide variety of private and public recreational facilities are available in the general lake area (5). Private timber company lands provide recreational opportunities and there are a number of commercial campgrounds in the Hot Springs area. Additional visitor accommodation is provided by numerous motels, cafes, and stores in the general area surrounding the lake (5).

2. Lake Resources

Water quality in Lake Ouachita was reported excellent (2, 7). Studies have indicated that release waters were sufficiently aerated to sustain downstream fishes (2); however, downstream fish kills have occurred during low release periods (12). Lake Ouachita is somewhat unique in that it has an oxygenated hypolimnion and possesses a wide diversity of available niches (13).

Several problems are apparent in the downstream fishery as a result of water flow manipulation (12). Flood pool releases tend to be very cold and consequently may be injurious to the stream fish population (12). Releases from the power pool are cut substantially or completely on weekends during the summer and at other low electricity demand intervals (12). During extended periods of nongeneration, fish kills may result (12). Weekend fish kills are significant but generally not severe because fish are able to retreat into the tributaries of the tailwaters for short periods (12).

Walleye exist naturally in the Ouachita River and did well in the lake for several years after impoundment. However, after lake waters cleared, walleye eggs and fry were heavily preyed upon by a variety of small fishes (13). Attempts are currently being made to restore the walleye fishery by stocking 2-inch fingerlings; these fish should be large enough to escape major sources of predation (12, 13). The Fisheries Division of the AGFL operates a subimpoundment (deep water dam with drawdown facilities) at the 5-acre site under permit from the USFS. Both walleye and striped bass are reared in this pond for release directly into Lake Ouachita in an effort to (1) restore the walleye fishery, (2) utilize the available forage, and (3) increase the sport fishery harvest (12).

The state is also trying to fully develop a rainbow trout sport fishery (13). Although Lake Ouachita maintains a trout fishery in the deeper waters, little or no reproduction occurs (13). Therefore, approximately 100,000 rainbow trout are stocked each year; however, studies have shown that a large number of these fishes are being consumed by predators such as largemouth bass and chain pickerel. To alleviate this problem, the state proposes to stock 9-inch trout provided by federal hatcheries (13). The AGFL will also be proposing to the Corps in the near future a "cage culture operation" for stocking. Cages (4 ft^3) will be utilized to raise catfish in the summer and to rear 8 to 9-inch trout to 12 inches before release in the winter (12). The Vicksburg District has given permission to try this on a trial basis at projects in its jurisdictional area (12). Efforts are also being made to establish a trout fishery in the tailwater area. Other game fish present in Lake Ouachita include spotted and white bass, flathead and channel catfish, black crappie, bluegill, longear, redear, warmouth, and green sunfish (2, 12).

The lake produces approximately 100 pounds of fish per acre but predator sport fish comprise only a small portion of the total fish population (12). An estimated 10-20 pounds of fish per acre per year are removed by sportsmen (12); 1,147,053 fishing activity occasions were recorded within the project area during 1973 (5). A primary reason for the relatively low fishery productivity is that lake waters are of high quality and lack needed nutrients (12). Effluent from domestic sources, which could supply nitrates and phosphates, is almost nil due to a lack of shoreline development. Without a nutrient source, nutrient levels within the reservoir are declining; additionally the lake is becoming more highly oxygenated (12).

3. Wildlife

Most wildlife species common to AR are found around Lake Ouachita. Mammals present within the project area include the cottontail rabbit, gray and fox squirrel, white-tailed deer, raccoon, and numerous small rodents. Game birds include the Turkey and Mourning Dove; numerous species of transient waterfowl utilize the lake as a rest area. Other birds utilizing the lake proper include the Great Blue Heron, Belted Kingfisher, and Wood Duck. The Bald Eagle, Osprey, Red-tailed Hawk, and Screech and Barred Owls are avian predators which may be found around the lake area. The Red-cockaded Woodpecker may also be found within the project area (2).

According to the Lake Ouachita Jurisdictional Study (1), a recent wildlife survey on USFS lands around the lake revealed that the area can support a much larger wildlife population. Low wildlife densities were attributed mainly to lack of edge habitat, cover, food diversity, and water on the dry ridges during the summer. There is currently no wildlife management program within the project area (5, 7). However, an excellent wildlife management practice may be to allow portions of the project area to exist naturally. Approximately 4,970 acres have been proposed as natural areas; these lands are viewed as wildlife areas and only limited or no development is contemplated (5). The Corps is currently developing a Fish and Wildlife Management appendix (scheduled for completion in June 1976) as a part of the Lake Ouachita Master Plan (5).

During 1973, 29,037 hunting activity occasions occurred within the project area (2). Additionally, studies have indicated that nonconsumptive resource uses, such as photography and nature study, are increasing approximately twice as fast as consumptive uses (2, 5).

4. Other Land Use

a. Forestry

Approximately 36,000 acres within the project area have been

proposed by the Corps as reserve forest lands. These lands will be primarily utilized to protect the watershed but will also serve to improve aesthetics and increase available wildlife habitat (2, 5). Some reserve forest lands will be available for low density recreation as well as for interim agricultural leasing (2) (2,682.7 acres of such lands are currently under agricultural lease).

Three main forest types are found in the project area: shortleaf pine, oak-hickory, and pine-oak (2). Lands surrounding the southern shore are generally northern slopes containing second growth hardwoods within a predominant pine stand. Hardwoods include blackjack, post, southern red, and white oak as well as dogwood and mockernut hickory. Greenbrier, French mulberry, strawberry bush, and huckleberry are also scattered throughout the project area. Oak-hickory bottomlands occupy the western portion of the upper reaches of the project area. Other tree species in this area include black and Shumards oak, river birch, sweet gum, and sycamore. Shortleaf pine, with a mixture of hardwoods along the creek bottoms, occupies the northern lake shore (2).

Although there is no current forest management plan, several sites were planted in pine near the spillway and dam area (7). The Corps plans to complete the Fire Protection and Forest Management appendices for the Lake Ouachita Master Plan by July 1975 (5).

Monoculture, clear cutting, pesticide spraying, and the killing of hardwoods on private timber company lands which are not under Corps control, could considerably reduce the aesthetic values currently provided by the natural lake environment (4). The ADPT is especially concerned over clear-cutting on Weyerhauser Company lands contiguous to Ouachita State Park (11). Additional clear-cutting for either subdivision development or for harvesting purposes is expected to occur. Park officials feel clear-cutting practices are not compatible with the use and aesthetic setting of the park (11).

b. Development

Weyerhauser Company has one parcel of land which is subdivided into 2,000, 0.5-acre lots (14); approximately five houses and a boat launching ramp have been built in the area to date. On the western end of the lake a few houses have been built relatively close (within about 50 yards) to the lake as part of the Lake View Estates development (7). At Mountain Harbor, a mobile home subdivision currently contains 20 units. All developments are subject to the Septic Tank System and Disposal Regulations of the State of Arkansas (14, 15, 16). The State Department of Pollution Control and Ecology is responsible for enforcement with review and comment provided by the Corps. None of the local units of government in the Ouachita area exercise their state-given right of zoning and subdivision regulation (17).

c. Agriculture

Forty-two areas comprising approximately 2,682.7 acres are leased by private individuals from the Corps (5, 10) (Table D.2.6). These areas are leased on an "interim basis" and revocable at will by the Corps; leased areas are primarily utilized for grazing and haying and most leases are currently for four years. Rentals per lease range from $5 to $690; acres per lease range from 1.0 to 461.3. Total rentals in 1974 for agricultural leases were $3,934.01. Many of the leased agricultural lands adjoin the water and are subject to various degrees of flooding. The Corps includes a farm management plan (concerning mowing, fertilization, and fencing) as a part of each lease (5, 10).

Agricultural lessees fall into two basic categories: preferential and non-preferential (10). Preferential lessees have the first option for renewal since they were former landowners or lessees before impoundment. Preferential leases (32) are negotiated based on appraised fair market lease value and any crops may be grown which are compatible

Table D.2.6. Outgrants for Agriculture, Rights-of-Way, and Miscellaneous Purposes, Lake Ouachita.[a]

Purpose	Grantee	Outgrants	Instrument	Rental		Annual Rent Paid ($)	Acreage	Investment	
				Date	Term (yrs)			To 1974 ($)	Planned ($)
Agriculture	Summary	42	Lease	1972-1973	4[b]	3,934.01	2,682.7	N/A[c]	N/A
Rights-of-Way	Summary	39	Easement	1954-1974	50-Indef.	35.21[d]	167.0	N/A	N/A
Miscellaneous[e]	Summary	2	Permit, Lease	1962-1971	5-Indef.	0	28.8	N/A	N/A
Totals		83				3,969.22	2,878.5		

[a]Vicksburg District, Engineering Division. 1974. Compilation of Outgrants, and Personal communication, September-November 1974. Vicksburg, District, Real Estate Division, Vicksburg, Mississippi.

[b]One, 3-year lease and two, 2-year and 9-month leases.

[c]Not available.

[d]Excluding rental of $125 from two easements extending indefinitely.

[e]Permit to USFS for administrative purposes; permit for civil defense shelter (powerhouse).

with the land. Non-preferential leases (10) are on a competitive bid basis and do not carry the right of first option for renewal; only non-price supported crops are permitted on non-preferential leases. Lease compliance inspections are made by both project and district personnel (10).

Problems currently existing on some agriculturally leased lands are (1) lack of effective fencing, (2) overgrazing, (3) lack of adequate clipping (mowing), and (4) grazing of unsuitable areas (especially woodlands and shoreline) (5). Insufficient personnel exist at the district and project levels to adequately enforce lease compliance and guidelines for determining land abuse are inadequate. Compliance with fencing requirements is made even more difficult by the current USFS-Corps jurisdictional dispute, the open grazing laws of Arkansas, the irregular (and in some cases uncertain) Corps boundary line, and the fact that the USFS does not require fencing of their grazing lands (5). Therefore, ownership of cattle and specific parcels of land is often difficult to determine in the field (5). The Corps currently does not have the authority to exchange lands with private individuals (which might alleviate some boundary problems) although Corps-USFS and private-USFS exchanges are allowed (5). Also, the Corps is currently not employing range suitability and optimum grazing rate data, even though range studies have been conducted around the lake by the USFS (5).

Although stipulations concerning fencing, fertilization, grazing, and mowing are generally part of the farm management section of a lease, lessees enact very few conservation practices or capital improvements on Corps-owned lands because (1) there is no assurance of sustained occupancy by nonpreferential lessees (since nonpreferential leases are renewed on a competitive bid basis), and (2) land improvements may result in higher rental fees for preferential lessees (since

rental fees for preferential leases are negotiated based upon appraised fair market lease values) (5). Effective fencing is especially needed in some areas to prevent cattle from entering recreational sites, group-leased areas, and fragile woodlands (5).

d. Easements

There are 39 easements on Corps lands at Lake Ouachita (Table D.2.6). These grants include telephone, power line, and highway rights-of-way. Rental fees range from 0 up to $360 and most easement periods extend until 2000. No fees are charged for some easements (such as to counties) and some easements extend indefinitely (5). A summary of outgrants at Lake Ouachita is presented in Table D.2.7.

Easements may reduce some of the present aesthetic benefits of the lake, although a few clearings may be beneficial as wildlife openings. Apparently only limited consideration has been given to right-of-way consolidation or thorough evaluation of alternative routes (5).

5. Resource Use Controls

The Lake Ouachita Field Office, which administers the nonpower-related resources of the lake, consists of a resource manager (GS-12), an assistant resource manager (GS-9), a park technician (GS-5), a park ranger (GS-5), and two clerk typists (GS-3, 5) (5). During the summer of 1974, there were 18 temporary (summer) park technicians (five additional temporary personnel were added for fee collection)(7). There are 16 permanent and two temporary operation and maintenance personnel. Two other district projects on tributaries of the Ouachita River (Lake Greeson and DeGray Lake) also have resource managers (7).

The resource manager is directly responsible to the Chief of the Recreation-Resource Management Branch of the Operations Division, Vicksburg District (7, 18) (Figure D.2.2). The Operations Division

Table D.2.7. Summary of Outgrants, Lake Ouachita.

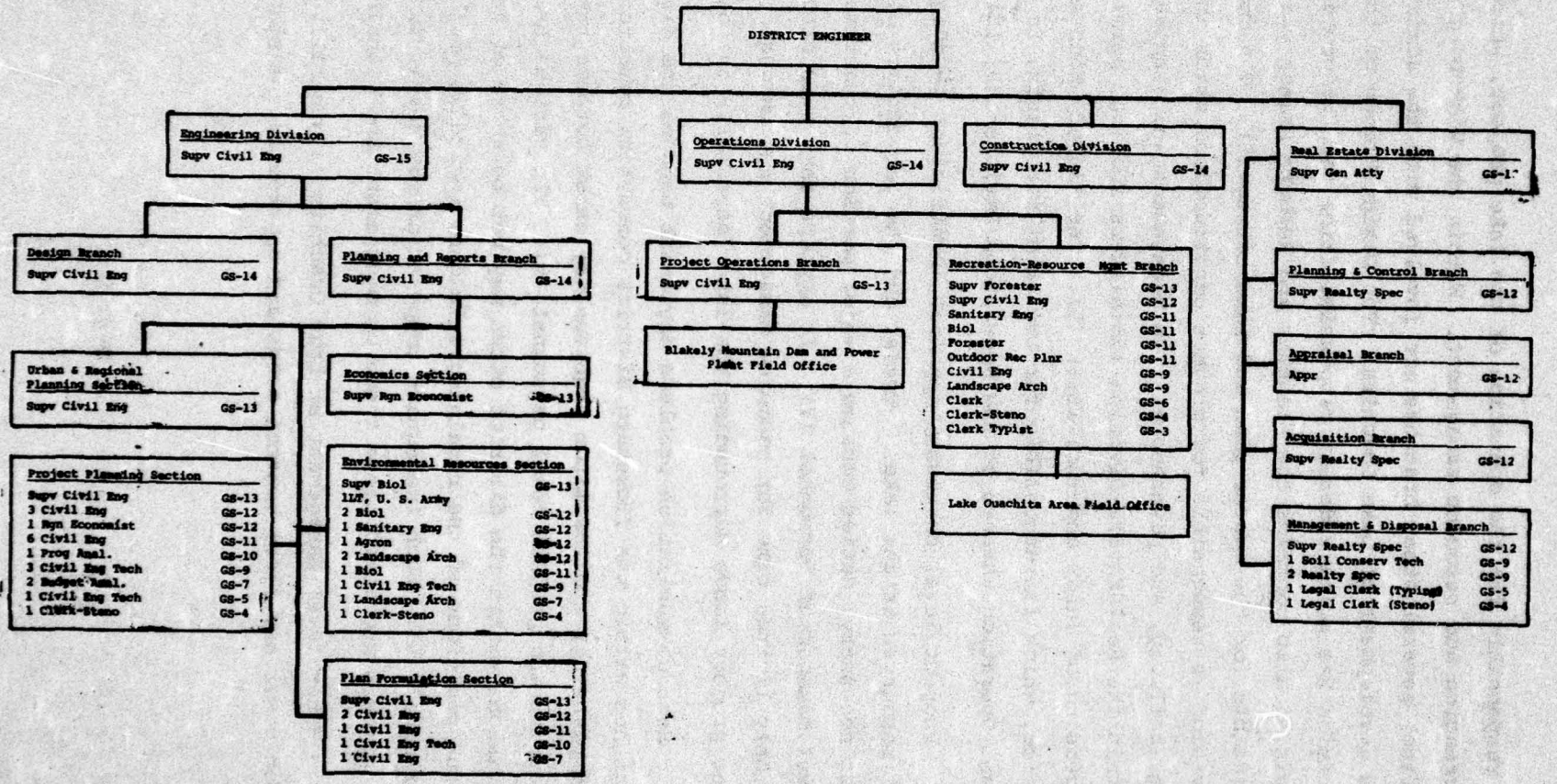
Purpose	Number	Annual Rent ($)	Acreage	Investment to 1974 ($)
Fish and Wildlife and Recreation -- Public Parks	4	0	375.0	N/A[a]
Recreation -- Quasi-Public	7	150.00	696.7	N/A
Recreation -- Commercial	9	17,803.42	326.0	1,806,237[b]
Agriculture, Rights-of-Way, and Miscellaneous Purposes	83	3,969.22	2,878.5	N/A
Totals	103	21,877.64	4,276.2[c]	1,806,237

[a]Not available.

[b]As of 1970-1972 audits.

[c]Manageable resource lands (from Table D.2.1.= 42,231 acres; difference in manageable resource acreage and total outgranted acreage is 37,954.8 acres. Approximately 1,756 of these 37,954.8 acres are currently designated as Corps recreation sites (RRMS 1973), and most of the remaining acreage is proposed reserve forest lands. Due to collateral land uses, total outgranted acreage is somewhat inflated (Recreation-Resource Management System (RRMS). 1973. 1973 annual report (Blakely Mountain Dam - Lake Ouachita). Office, Chief of Engineers, Washington, D. C., and Personal communication, September-November 1974. Vicksburg District, Engineering Division, Vicksburg, Mississippi).

Figure D.2.2. Recreation-Resource Management Interrelationships - Vicksburg Engineer District.



is responsible for the operation of the lake project, which includes recreation and resource management. Within the Vicksburg District office, several other branches are involved with the administration and development of Lake Ouachita. The Design Branch of the Engineering Division has primary design responsibilities for the project; this Division also contains the Planning and Reports Branch which is responsible for the master plan and lake zoning (5). The Construction Division is responsible for project construction, which includes the dam, spillway, and powerhouse. The Management and Disposal Branch within the Real Estate Division administers leasing, permitting, and licensing of lands and facilities (5). The Blakely Mountain power office, which is responsible for two satellite plants, is under the Plant Operations Branch of the Operations Division (5, 18).

Project level personnel appeared insufficient to adequately manage all resources at the lake. Travel and the performance of routine (but necessary) duties consume a major portion of the time of project level management personnel (7). It appears that this situation results in only limited time for resource management and inadequate control over project lands surrounding the lake (especially on the north side).

Some communication problems may exist between the divisions and branches within the Vicksburg District concerning resource management and planning; similar minor problems may exist between the Vicksburg District and project level personnel (5). The various branches and divisions within the district often may not be aware of activities or issue positions of the remaining echelons, including project level personnel (5). Such inadequate cooperation may result in a duplication of efforts and inefficient resource management and planning.

Water level management at Lake Ouachita is generally dependent upon power and flood control needs and apparently the state does not

have a significant input in planning water level fluctuations at the lake (5). The Fisheries Division AGFC has suggested that a drawdown of from 30 to 50 ft and the establishment of shoreline vegetation would benefit fishery resources (12).

There are currently no state or county zoning regulations in effect for lands around Lake Ouachita (17). This may present future problems by allowing uncontrollable growth of both industry and private homesites on private lands near the lake.

III. KEY FINDINGS

A. Recreation

1. Although a large amount of federal funds have been invested in recreational facilities at Lake Ouachita, the majority of the people utilizing the lake are local. In many instances, private land values around the lake have risen somewhat, probably at least partially as a result of lake formation. Additionally, the investment of federal monies at Lake Ouachita has significantly boosted local economies in the general lake area.

2. Many of the traffic counters used in estimating visitation rates are some distance from Corps recreational sites and oftentimes dwellings or other facilities (e.g., concessions) are within the count area.

3. Monoculture, clear cutting, pesticide spraying, and the killing of hardwoods on private timber company lands, which are not under Corps control, could considerably reduce the aesthetic values currently provided by the natural lake environment. The ADPT is especially concerned over clear-cutting on Weyerhauser Company lands contiguous to Ouachita State Park. Additional clear-cutting for either subdivision development or for harvesting purposes is expected to occur. Park officials feel clear-cutting practices are not compatible with the use and aesthetic setting of the park.

B. Fish and Wildlife

1. Water level management at Lake Ouachita is generally dependent upon power and flood control needs and apparently the state does not have an apparent significant input in planning water level fluctuations at the lake. The Fisheries Division of the AGFC has suggested that a drawdown of from 30 to 50 ft and establishment of shoreline vegetation would benefit fishery resources.

2. Several problems are apparent in the downstream fishery as a result of water flow manipulation. Flood pool releases tend to be very cold and consequently may be injurious to the stream fish population. Releases from the power pool are cut substantially or completely on weekends during the summer and at other low electricity demand intervals. During extended periods of nongeneration, fish kills may result. Weekend fish kills are significant but generally not severe because fish are able to retreat into the tributaries of the tailwaters for short periods.

C. Corps and Contiguous Land Use

The Corps and the USFS are currently involved in a jurisdictional dispute over approximately 20,489 acres. These lands are within the project boundary (and adjoin the lake in several areas) and both the USFS and the Corps claim ownership and administrative responsibilities. The disputed acreage is composed of both lands acquired under the Weeks Law and lands withdrawn from the public domain.

D. Real Estate Program and Practices

1. Problems currently existing on some lands leased to commercial concessioners include (1) inequity in allowing facility expansion, (2) landscape alteration without prior Corps approval, (3) removal of existing facilities and trash when leases are not renewed, (4) allowance of private home construction, (5) inadequate grounds maintenance, and (6) the allowance of relatively permanent mobile homes on sites designated for transient trailers. The more successful concessioners (mostly on the south side of the lake) may have been allowed more leeway in facility expansion than the generally less successful concessioners (mostly on the north side of the lake); however, this situation is partially due to the higher degree of recreational usage of the southern lake shore. Facility expansion and landscape alteration have occurred without prior Corps approval, but these have generally been

controlled at the project level.

Although transient trailer spaces are leased on a 30 day basis (from the concessioners), these leases are renewable and many mobile homes have become fairly fixed home sites for private individuals. Also, the Corps has also allowed concessioners to construct their own private homes on land leased from the Corps (for protection of their commercial facilities).

2. Problems currently existing on some agriculturally leased lands are (1) lack of effective fencing, (2) overgrazing, (3) lack of adequate clipping (mowing), and (4) grazing of unsuitable areas (especially woodlands and shoreline). Insufficient personnel exist at the district and project levels to adequately enforce lease compliance and guidelines for determining land abuse are inadequate. Compliance with fencing requirements is made even more difficult by the current USFS-Corps jurisdictional dispute, the open grazing laws of Arkansas, the irregular (and in some cases uncertain) Corps boundary line, and the fact that the USFS does not require fencing of their grazing lands. Therefore, ownership of cattle and specific parcels of land is often difficult to determine in the field. The Corps currently does not have the authority to exchange lands with private individuals (which might alleviate some boundary problems) although Corps-USFS and private-USFS exchanges are allowed. Also, the Corps is currently not employing range suitability and optimum grazing rate data, even though range studies have been conducted around the lake by the USFS.

Although stipulations concerning fencing, fertilization, grazing, and mowing are generally part of the farm management section of a lease, lessees enact very few conservation practices or capital improvements on Corps-owned lands because (1) there is no assurance of sustained occupancy by nonpreferential lessees (since nonpreferential leases are renewed on a competitive bid basis), and (2) land improvements may

result in higher rental fees for preferential lessees (since rental fees for preferential leases are negotiated based upon appraised fair market lease values). Effective fencing is especially needed in some areas to prevent cattle from entering recreational sites, group-leased areas, and fragile woodlands.

3. Problems with some of the group lease areas are poor maintenance of facilities and grounds and the failure to remove improper or abandoned structures at group-leased areas. Possible reasons for these problems are (1) some of the group-leases are in remote areas, and (2) there are only a limited number of Corps personnel available for lease compliance inspections.

4. Easements may reduce some of the present aesthetic benefits of the lake, although a few clearings may be beneficial as wildlife openings. Apparently only limited consideration has been given to right-of-way consolidation or thorough evaluation of alternative routes.

E. Corps Organization

1. Project level personnel are insufficient to adequately manage all resources at the lake. Travel and the performance of routine (but necessary) duties consume a major portion of the time of project level management personnel. It appears that this situation results in only limited time for resource management and inadequate control over project lands surrounding the lake (especially on the north side).

2. Some communication problems may exist between the divisions and branches within the Vicksburg District concerning resource management and planning; similar minor problems may exist between the Vicksburg District and project level personnel. The various branches and divisions within the district often may not be aware of activities or issue positions of the remaining echelons, including project level

personnel. Such inadequate cooperation may result in a duplication of efforts and inefficient resource management and planning.

F. Environmental Problems

1. Overuse appears to be a major problem at Ouachita State Park and at many Corps recreational sites (especially areas near Hot Springs on the southern lake shore). One of the main problems contributing to landscape damages is excessive vehicular traffic and the lack of designated parking areas at many sites. Uncontrolled traffic results in vegetative destruction (especially in fragile areas) which enhances erosion problems and reduces aesthetic values. Many recreational areas have lost topsoil from erosion and much of the remaining soil is compacted from both vehicular and foot traffic. The exposed rocky subsoil and shaded understory make it difficult to establish grass cover at many of the overused recreation sites.

The Corps has taken some steps to curb the results of over-utilized recreational sites. Studies and recommendations have been made by an agronomist concerning the establishment and maintenance of vegetation and the Corps has designated camping and parking sites in some areas.

2. There are currently no state or county zoning regulations in effect for lands around Lake Ouachita. This may present future problems by allowing uncontrollable growth of both industry and private homesites on private lands near the lake.

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8. Vicksburg District. 1973. Lake Ouachita (brochure). Vicksburg, Mississippi.

9. Personal communication, September-November 1974. Vicksburg District, Operations Division, Vicksburg, Mississippi.

10. Personal communication, September-November 1974. Vicksburg District, Real Estate Division, Management and Disposal Branch, Vicksburg, Mississippi.

11. Personal communication, 25 September 1974. Arkansas Department of Parks and Tourism, Little Rock, Arkansas.

12. Personal communication, September 1974. Arkansas Game and Fish Commission, Fisheries Division, Little Rock, Arkansas.

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STUDY OF LAND USE FOR RECREATION AND FISH AND WILDLIFE ENHANCEM--ETC(U)
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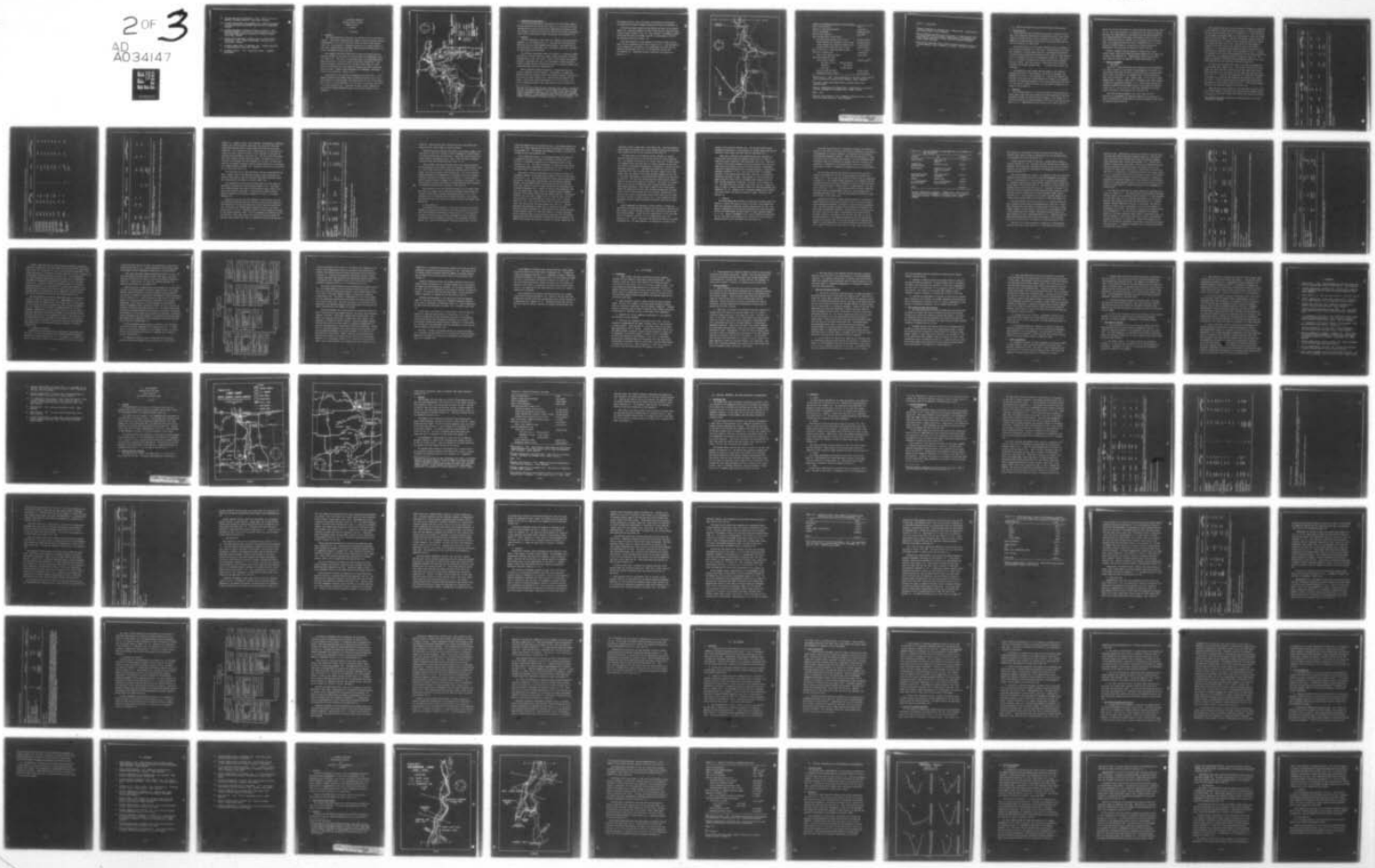

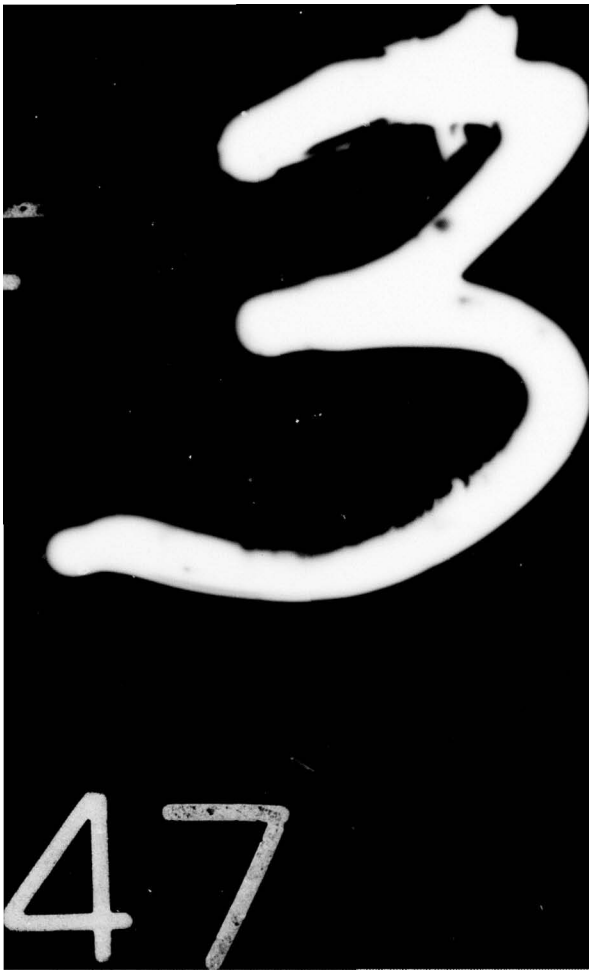
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3. FORT PECK RESERVOIR
Missouri River Division
Omaha District
Montana

I. SETTING

A. Location

Fort Peck Reservoir is located on the Missour River in northeastern Montana. The dam and powerhouse are located in Valley and McCone Counties approximately 1,771.5 river miles (mi) above the mouth of the Missouri River (1). The reservoir is bordered by Phillips and Valley Counties to the north, Fergus County to the west, Petrolume and Garfield Counties to south, and McCone County to the east.

The reservoir setting is rural and no towns are located along the shoreline except for the town of Fort Peck which lies immediately below the damsite (1). Fort Peck is a federally-owned town established during dam construction to house and support construction workers (2). Most project personnel currently live in the town of Fort Peck (2); other towns and communities near the reservoir include Park Grove (downstream from Fort Peck), Glasgow (north-northwest of the damsite), and Jordan (south of the reservoir) (Figure D.3.1).

Paved access to the dam site is provided by MT 24 and 249. An all-weather perimeter road system, which is extremely distant (50 mi) from the reservoir at several points, is provided by MT 200 (20) to the south, MT 19 and U. S. 191 to the west, U. S. 191 and 2 to the north, and MT 24 to the east (Figure D.3.1). From these perimeter roads, numerous un-surfaced and improved-gravelled roads provide limited access to the reservoir.

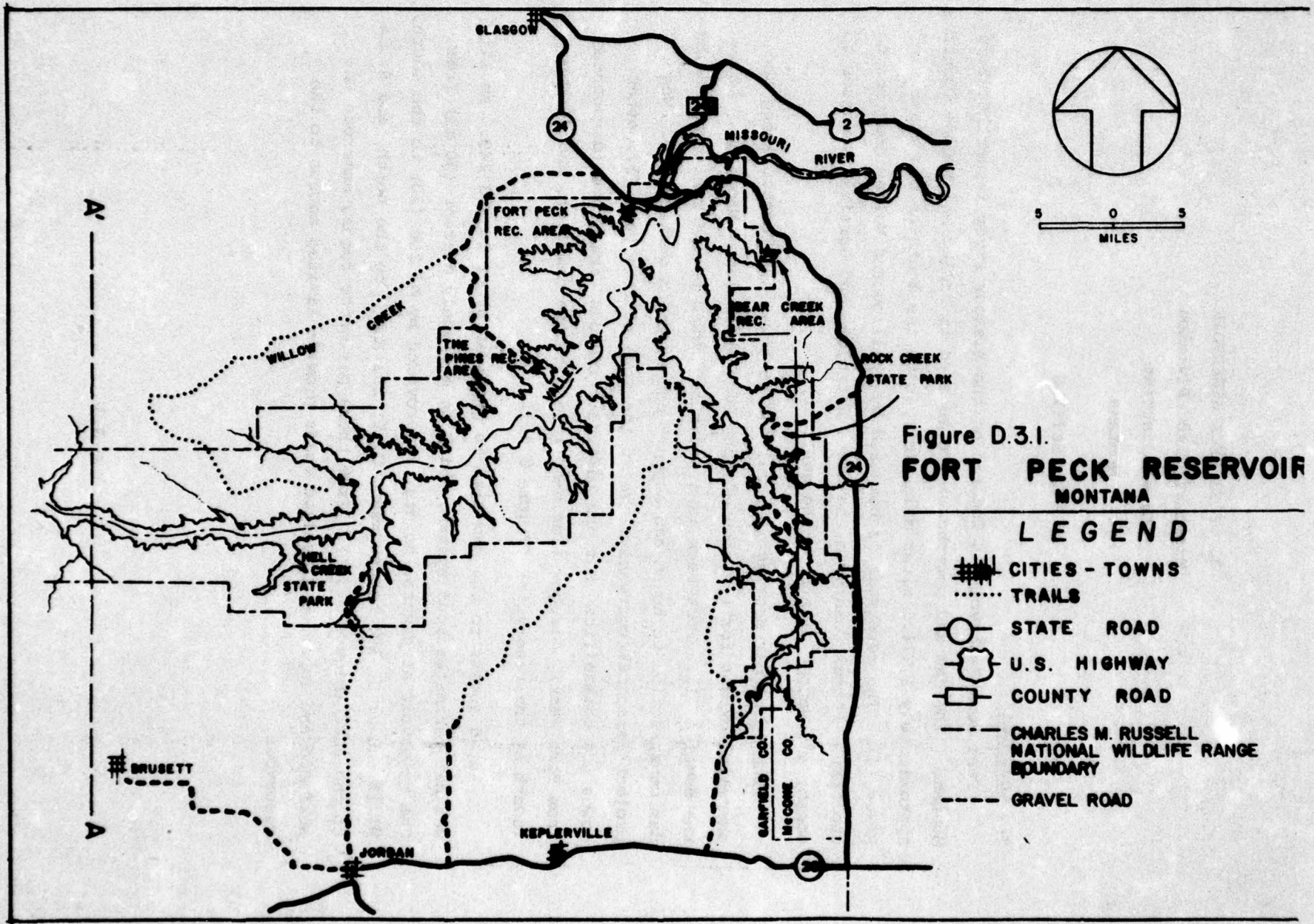

Figure D.3.1.

FORT PECK RESERVOIR

MONTANA

B. Authorization and Purposes

The Fort Peck Dam project was placed in the Public Works Administration program in 1933 by Executive Order (1). The project was later incorporated into the "Pick-Sloan" plan authorized by Congress in 1944 (3); purposes of the Fort Peck project which are now being realized are flood control, hydroelectric power, navigation, and irrigation (1).[a]

C. Features

Fort Peck Reservoir is the first of a system of six multi-purpose reservoirs on the Missouri River (1). The five main stem reservoirs below Fort Peck are Lake Sakakewa (North Dakota), Oahe Reservoir (ND and South Dakota), Lake Sharpe (SD), Lake Francis Case (SD), and Lewis and Clark Lake (SD and Nebraska).

The shoreline topography around the reservoir is generally rugged, consisting of rolling slopes and eroded coulees, resulting in numerous tributary bays, coves, and inlets. Soils in the vicinity are composed primarily of bearpaw shale (1); clay constituents (gumbo) become extremely slippery when wet rendering conventional vehicular passage along unimproved roads practically impossible (2).

Native vegetation generally consists of mixed short and tall grasses, sagebrush, pine and juniper. Tree growth is variable but generally good in protected ravines and tributary valleys. The Big Dry Arm of the reservoir (Figure D.3.1) contains few trees whereas tree cover in other areas ranges from sparse in The Pines and Hell Creek areas to moderately dense in the upper portions of the reservoir (1).

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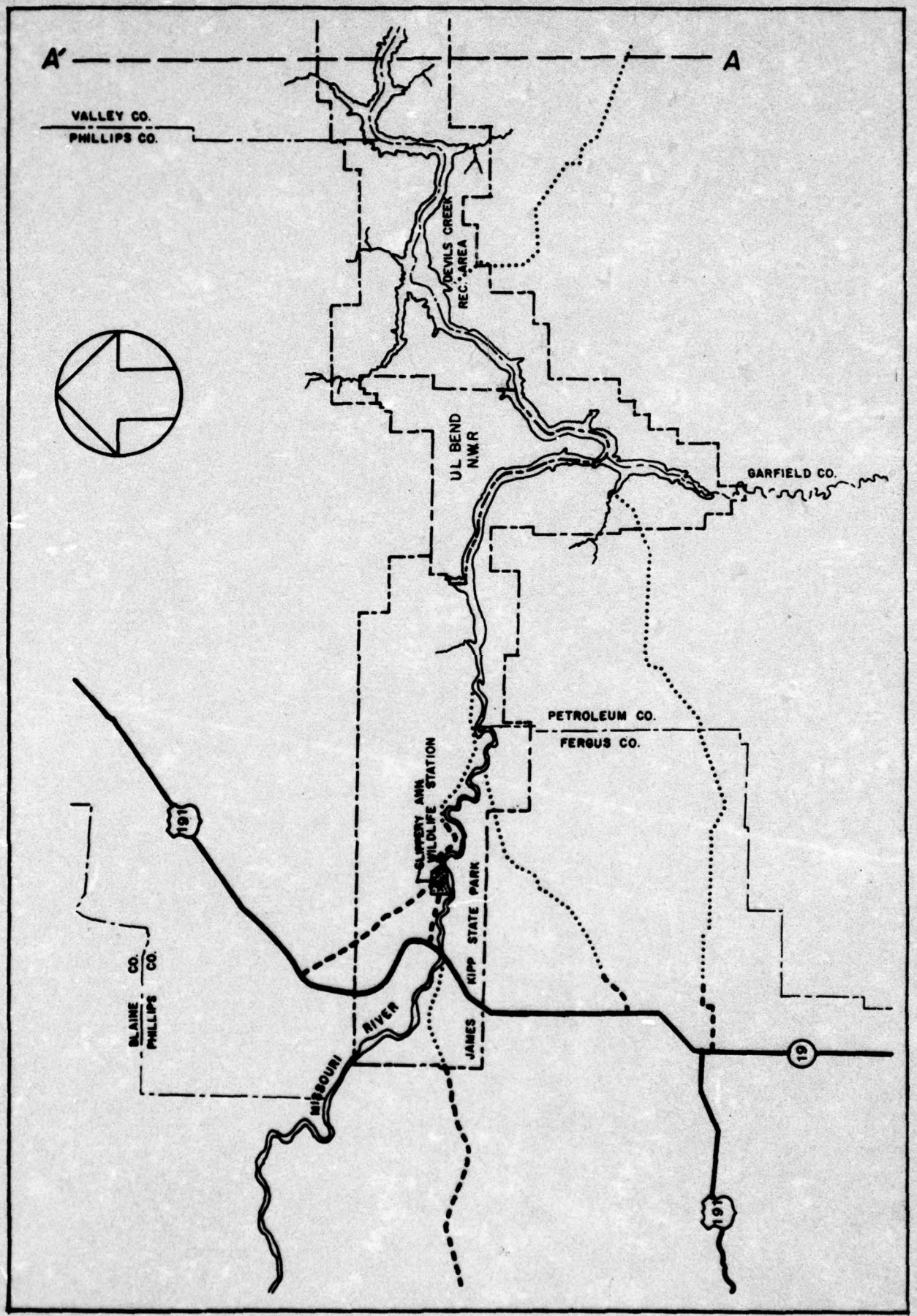
[a]The Secretary of the Army has been authorized, since 1944, to construct, maintain, and operate public park and recreational facilities at water resource development projects. 16 U.S.C. 460d. Since 1946, the Army Corps of Engineers has been required, when consistent with a project's primary purposes, to make adequate provision for the conservation, maintenance, and management of wildlife resources. 16 U.S.C. 663(a).

The rugged nature of lands surrounding the reservoir are unsuitable for agriculture although livestock grazing and haying are practiced (1).

The pool elevation generally rises during the April to July runoff season (1). The peak elevation of about 2,244 feet above mean sea level (ft msl) usually occurs in July (4). The reservoir is gradually lowered during the fall with the minimum elevation of approximately 2,234 ft msl generally occurring in March (4).

Fort Peck Reservoir is approximately 134 valley mi long (at full pool) and has a drainage area of 57,500 square mi (5). Power production is by 5 generators (5) located in two powerhouses just below the dam. Estimated cost through July 1973 for the completed project was $159,900,000 (5). Additional resource statistics are presented in Table D.3.1.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KIPP STATE PARK
JAMES
BLAINE CO.
PHILLIPS CO.
MISSOURI RIVER
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D.3.A.

Table D.3.1. Resource Statistics, Fort Peck Lake.

Date of Authorization		1944[a,b]
Rights in Land Acquired Between		1934-1939[c]
Date of Impoundment		November, 1937[d]
Date of Full Operation		May, 1942[d]
Lake Size When Water Level is at:		
Spillway gate elevation (2250 ft msl)		249,000 acres[e]
Normal Maximum Pool Elevation (2246 ft msl)		240,000 acres[e]
Normal Minimum Pool Elevation (2234 ft msl)		212,000 acres[e]
Minimum Design Elevation (2160 ft msl)		92,000 acres[e]
Water Fluctuation - Summer Recreation Season		2.5 - 3.5 feet[f]
Shoreline at Normal Pool		1,520 miles[d]
Held in Fee Simple by Corps		1,520 miles[d]
Land Area Managed by Corps		
Total Land in Project		610,085 acres[d,g]
Fee Title in U. S.	589,774 acres[d]	
Easements	311 acres[d]	
River Bed	20,000 acres[d]	
Project Operation Lands		17,000 acres[d]
Manageable Resource Lands		380,774 acres[h]

[a]Omaha District. 1965. Design memorandum no. MFP-105C; master plan for Fort Peck Reservoir, Missouri River, Montana. Omaha, Nebraska.

[b]Initially a Public Works Administration project under a 1933 Executive Order.

[c]Personal communication, 25 October 1974. Omaha District, Real Estate Division, Management and Disposal Branch, Omaha, Nebraska.

[d]RRMS. 1973.

[e]Missouri River Division. 1974. Summary of engineering data - Missouri River main stem reservoirs. Omaha, Nebraska.

Table D.3.1 (Continued)

[f]Personal communication, September 1974 - February 1975. Omaha District, Operations Division, Omaha, Nebraska.

[g]385,691 acres are included within the Charles M. Russell National Wildlife Range (RRMS 1973 and Personal communication, 9-10 September 1974. Omaha District, Operations Division, Recreation-Resource Management Branch, Omaha, Nebraska).

[h]Total Project Land Minus (Land Flooded at Normal Minimum Pool Elevation + Project Operation Land + Easements) = 610,085 - (212,000 + 17,000 + 311).

II. LAND USE, RECREATION, AND FISH AND WILDLIFE CONSIDERATIONS

A. Analytical Unit

The primary zone which influences the physical character of the lake is the immediate drainage area surrounding the lake. Due to the rugged and rolling nature of lands contiguous to the reservoir, the immediate drainage band may be quite narrow in isolated areas yet extend for several mi at other sites.

Fort Peck Reservoir is the largest expanse of water in Montana (1) and influences recreation in a large area. Potential public use zones were defined by the Corps based primarily on anticipated water-based recreation demand, projected population trends, vacation travel patterns, and the availability of public transportation systems (1). The day-use zone is a somewhat rectangular area roughly 175 by 100 mi around the reservoir center. This area generally extends about 50 mi from the reservoir and includes Glasgow, Wolf Point, Circle, Malta, Havre, and Lewistown.

The weekend-use zone extends from the middle of the reservoir approximately 250 mi to the southeast, 150 mi to the southwest and northwest, and 125 mi to the northeast (1). Great Falls, Helena, and Billings, MT and portions of North Dakota are included in the weekend-use zone. The estimated population of the area influenced by the reservoir was 765,000 in 1965; population in these areas is expected to increase by 38% by 1980 (1).

B. Ownership

Of the 610,085 acres in the Fort Peck project, 422,069 acres were former public lands that were transferred to the Department of the Army by Executive Order, 167,705 acres were purchased in fee simple, 311 acres were acquired as flowage easements, and 20,000 acres were in river bed (1, 4, 6). Approximately 385,691 acres of the project area lies

within the 910,000 acre Charles M. Russell National Wildlife Range (NWR) (6, 7). The entire reservoir is located within the Charles M. Russell NWR which was established by a 1936 Executive Order which provided for joint administration by the Bureau of Biological Survey (now the U. S. Fish and Wildlife Service) (USF&WS) and the Grazing Service (now the BLM). The Slippery Ann Wildlife Station (USF&WS) and the U. L. Bend National Wildlife Refuge are located within the NWR; mostly BLM-administered lands surround the Charles M. Russell NWR (8).

However, numerous scattered parcels of Montana Trust Lands (school lands), which were established under Enabling Act of 1889, also lie around the reservoir (9). Approximately 34,708 acres of these Trust Lands are within the Charles M. Russell NWR boundary (4).

C. Resource Management

1. Recreation

There are 10 Corps recreation areas located at Fort Peck Reservoir (2); these recreation sites consist of approximately 3,721 acres (10). Facilities at most Corps recreation areas include pit or flush toilets, picnic tables and shelters, and swimming areas. Other facilities at some sites include parking lots, camping areas, car and trailer spaces, change houses, a sanitary dump station, fireplaces, boat docks, showers, a museum, and playground equipment (3, 6). Picnic areas are also provided by the BSF&W below the damsite and at the Slippery Ann Wildlife Station (4, 6). As of 1974, the total Corps investment into recreational facilities at the reservoir was $1,325,000 (10).

The Corps currently charges $1 per night (plus $0.50 if electricity is furnished) for overnight camping at two areas (3, 4). Fees are collected by a ranger and $1,985 were collected in 1973; costs of collection were $2,184 (6).

Two outgrants have been let by the Corps for commercial concessions at the reservoir: the Fort Peck Marina and the D. R. Aasen operation at the Rock Creek recreation area (4, 10) (Table D.3.2). Also not listed in the commercial outgrant table is a store complex in the town of Fort Peck just below the damsite. The Fort Peck Marina, located at the Fort Peck recreation area, is under a 20-year lease and offers boat rental and storage facilities and a cafe. The Rock Creek establishment, located on the Big Dry Arm of the reservoir south of the damsite (Figure D.3.1), also offers boat rentals and eating facilities (4, 10). Both commercial operators reside on the concession site (4). Seventy-five percent of the rental fees collected by the Corps from concessioners is returned to the respective counties through the state (2). The number of commercial concession turnovers appeared insignificant and no major problem were noted concerning concession operations.

The Corps has outgranted five areas to the Montana Department of Fish and Game (MDFG) (Table D.3.3). Two 25-year leases are for three public use areas: the Rock Creek State Park (236 acres), Hell Creek State Recreation Area (113 acres), and the James Kipp State Park (465 acres) (10, 11). A fourth area containing 12.7 acres below the damsite is licensed to the MDFG for the management and propagation of waterfowl (10). A 30-acre fishing access area (trout pond) located below the damsite is also leased to the state (10).[a] A shelter and sanitary facilities are currently planned for this area (11).

James Kipp State Park, located on the very upper end of the reservoir, offers camping, picnicking, boat launching, and swimming facilities (6, 11). This park is also often heavily used during the hunting

[a]The combined outgranted areas below the damsite amount to 50 acres according to the MDFG.

Table D.3.2. Outgrants for Recreation -- Commercial, Fort Peck.[a]

Location	Grantee	Instrument	Rental Date (Original / Current)	Rental Term (yrs)	Rental Basis	Annual Rent Paid ($)	Acreage	Investment To 1974 ($)	Investment Planned ($)	Turn-overs
Rock Creek	D. R. Aasen	Lease	1961 / 1969	25 / --	Fixed	60.00	8.5	25,000	N/A[b]	1
Fort Peck Recreation Area	Fort Peck Marina	Lease	1959 / 1970	20 / --	Fixed	575.00	15.0	35,000	N/A	1
Totals	2					635.00	23.5	60,000		

[a]Personal communication, September - November 1974. Omaha District, Real Estate Division, Management and Disposal Branch, and Report of compliance inspection -- outgrants, 30 September 1974. Omaha, Nebraska.

[b]Not available.

Table D.3.3. Outgrants for Fish and Wildlife and Recreation -- Public Parks, Fort Peck Lake.[a]

Grantee	Instrument	Rental		Annual Rent Paid ($)	Acreage	Investment	
		Date	Term (yrs)			To 1974 ($)	Planned
U. S. Fish and Wildlife Service	Permit	1960	15	0	471.8	N/A[b]	N/A
U. S. Fish and Wildlife Service	Permit	1961	Indef.	0	57,862.9	N/A	N/A
U. S. Fish and Wildlife Service	Permit	1961	15	0	501.8	N/A	N/A
U. S. Fish and Wildlife Service	Permit	1961	Indef.	0	31,259.6	N/A	N/A
U. S. Fish and Wildlife Service	Permit	1970	5	0	246.0	N/A	N/A
U. S. Fish and Wildlife Service	Permit	1971	Indef.	0	9,225.7	N/A	N/A
State of Montana, Dept. of Fish & Game	License	1947	30	0	12.7	N/A	N/A
State of Montana, Dept. of Fish & Game	Lease	1962	25	0	30.0[c]	N/A	N/A
Total (Fish and Wildlife)	8			0	99,610.5		

Table D.3.3 (Continued)

Grantee	Instrument	Rental		Annual Rent Paid ($)	Acreage	Investment	
		Date	Term (yrs)			To 1974 ($)	Planned ($)
State of Montana, Dept. of Fish and Game	Lease	1959	25	0	465.0	N/A	N/A
State of Montana, Dept. of Fish and Game	Lease	1966	25	0	348.8	N/A	N/A
Total (Recreation -- Public Park)	2			0	813.8		
Grand Total	10			0	100,424.3		

[a]Personal communication, September - November 1974. Omaha District, Real Estate Division, Management and Disposal Branch, and Report of compliance inspection -- outgrants, 30 September 1974. Omaha, Nebraska.

[b]Not available.

[c]The combined outgranted areas below the damsite amount to 50 acres according to a personal communication, 30 October 1974, Montana Department of Fish and Game, Helena, Montana.

season (11). Camping, picnic, boat launching, and commercial concession (boating and fishing supplies) facilities are available at the Hell Creek State Recreation Area (located about one-third the way up the reservoir). The concessioner has a 10-year lease and is charged a flat rental rate plus a percent of gross; rental revenues are utilized for operation and maintenance of the area (11). The Rock Creek State Recreation Area contains camping and picnic areas. The James Kipp Park is overseen by a caretaker who lives adjacent to the area; the Rock Creek Area has an itenerant caretaker whereas the Hell Creek Area is maintained by a summer resident caretaker (11). Sanitation facilities are furnished at all three state areas (11).

The facilities at the James Kipp State Park were constructed by the MDFG. However, many of the facilities (picnic tables, shelters, and sanitary facilities) at the Hell and Rock Creek State Recreation areas were constructed by the Corps in the late 1940's (11).

Four outgrants involving 132 acres have been let by the Corps for quasi-public recreation at Fort Peck Lake (Table D.3.4). Two leases are to church groups; the lease to the Missionary Gospel group is for a youth camp located at The Pines. A third lease is held by the Boy Scouts of America and 44 acres are permitted to the U. S. Air Force (Opheim) (10).

Recreational days of use were reported as 692,600 during 1973 (6). Picnicking and sightseeing were the two most popular visitor activities and accounted for 35 and 36% respectively of the reported activity use (6). The period June through August accounted for 52% of all recreational days of use (6). Visitation during 1973 was reported as 569,400 at nine Corps recreation areas, 700 at the Slippery Ann Wildlife Station, and 102,600 at James Kipp, Rock Creek, and Hell Creek state areas (6). The most popular Corps sites were the Downstream and Fort Peck Recreation

Table D.3.4. Outgrants for Recreation -- Quasi-Public, Fort Peck Lake.[a]

Grantee	Instrument	Rental			Current Annual Rent ($)	Acreage	Investment	
		Date	Term (yrs)	Basis			To 1974 ($)	Planned ($)
Evangelical Church	Lease	1969	10	--	0	17.9	N/A[b]	N/A
Boy Scouts of America	Lease	1951	25	--	0	16.7	N/A	N/A
Missionary Gospel	Lease	1970[c]	13	$1/term	0.08[e]	54.0	N/A	N/A
Opheim (Air Force)	Permit	1971[d]	5	--	0	43.5	N/A	N/A
Totals 4					0	132.1		

[a]Personal communication, September - November 1974. Omaha District, Real Estate Division, Management and Disposal Branch, and Report of compliance inspection -- outgrants, 30 September 1974. Omaha, Nebraska.

[b]Not available.

[c]Previously leased by Glasgow Elks Lodge No. 1922; same acreage, dates unknown.

[d]Air Force leased previously; relinquished, then re-leased.

[e]Token payment; not totalled.

areas (6). Most clientele were indicated as being from eastern and central MT with a high number of repeat visitors.

Detailed visitation surveys (last taken in the spring, summer, fall, and winter of 1965) are utilized to obtain information on load factors and visitor originations and activities. These data, when utilized with traffic counter information, may be used to make inferences concerning visitation rates and recreational days of use (2, 4).

Corps, USF&WS, and state recreation facilities appeared adequate and well adapted to meet public needs and pressures. Additionally, there is a fairly wide diversity of recreational opportunities for all age groups, even for the elderly (pond fishing) (4). The Corps recognizes needed improvements and appeared to be continually striving to upgrade recreation facilities to better serve the public. A visitor center, which is staffed during the summer (4), is located at the damsite. This center assists in public orientation and helps maximize public awareness of recreational opportunities available at the lake (4).

Many recreation sites are remote and served only by unpaved roads. The clay soils (gumbo) of the area become extremely slippery when wet, rendering conventional vehicular passage impossible (2, 4, 11, 14). Although access is relatively poor at remote recreation sites, public utilization of many areas may be relatively low due to the sparse local population.

2. Lake Resources

The Montana State Department of Health and Environmental Sciences (MSDHES) has classified the waters of Fort Peck Reservoir as $B\text{-}D_3$ (12). This classification stipulates that water quality is to be maintained suitable for drinking (after adequate treatment), bathing, swimming, recreation, fish (non-salmonid), wildlife, and agriculture and water supply (13). Both the Environmental Protection Agency (EPA) and the

Corps have sampled Fort Peck Reservoir waters. The MSDHES reviewed the Corps' 1972 water sampling data and found no indications of water quality problems (12). The National Eutrophication Studies of the EPA will include the Fort Peck Reservoir (12).

Soils around the reservoir are naturally erodable and shoreline sloughing and siltation are major environmental problems (11, 12). Siltation is especially prominent in the headwaters section of the reservoir (11, 14). The rough topography, in combination with grazing of unsuitable areas, overgrazing, and wave and ice action, seem to be the major causes of erosion and siltation (11, 12, 14).

The state is currently negotiating with the Corps and Bureau of Reclamation (BuRec) on who should market waters of Fort Peck for industrial use (11, 15). The state already has a clear right to market Fort Peck waters for municipal, agricultural, and irrigational purposes; however, the high bluffs around the lake and the lack of electrical power have retarded interest in water utilization for agricultural or irrigational purposes (15). Indians of the Fort Peck Reservation feel that they should have a major input into reservoir water management practices since release waters flow past tribal lands (15). Burlington Northern, Inc. has filed a request with the state for usage of Fort Peck waters for a coal gasification and fertilizer plant in McCone County (11, 15). Water would be taken from the Nelson Bay-McGuire Creek area (Big Dry Arm) and piped across Corps land (11). Environmentalists have expressed concern that (1) pipelines may create additional erosion problems, (2) water extraction may disrupt excellent walleye spawning areas, (3) additional plants or irrigation projects may be constructed once an initial plant is operable, and (4) salinity changes may result from large water extractions from the reservoir (11). Several other groups have shown an interest in reservoir waters for the

irrigation of corn, sugar beets, and alfalfa (15). There are numerous water intakes for domestic use at Corps-leased cottage sites around the lake; permits and use fees are required by the Corps (4).

The large size of the reservoir and the variation of aquatic habitats cause difficulty in the administration of fishery resources (11). The complex interrelations of various fishes and available niches are somewhat poorly understood and the fishery resources at Fort Peck Lake cannot be considered independently of biological resources at other main-stem reservoirs (11). The MSGFD has stocked the reservoir with rainbow and lake trout, Northern pike, walleye, crappie, perch, coho salmon, bass, and kokanee; no stocking has been conducted in the last 2 or 3 years; approximately 1,400 walleye were tagged during the spring of 1974 (11). The Corps has constructed five state-operated rearing ponds at various points around the reservoir. These ponds are approximately 1 acre and are stocked with eggs or day-old Norther pike fry from federal hatcheries. After about 6 weeks in the rearing ponds, (about the second week in June) fish are then released into the reservoir in order to help mitigate the lack of natural reproduction (11). There are also three state-managed rainbow trout ponds near the reservoir which are open for public fishing (11). Three commercial fishing operations currently remove goldeneye and buffalo fish from the reservoir (4).

Water discharges are generally directly related to demands for electricity with high daytime discharges and low nighttime releases (11). Such changes in water discharge volume have created some problems with the tailrace fishery. Sauger generally spawn during the day and oftentimes the nighttime reduction in water discharge may cause egg desication (11). Water fluctuations may also be detrimental to nesting shorebirds (14), and some complaints from downstream irrigators have

resulted from low water releases (15). The tailrace fishery could probably be improved if it were possible to release waters from various reservoir levels rather than just from the lake bottom (11).

Reductions in Northern pike production have been caused by (1) delayed water rises during the spawning season, and (2) a lack of vegetative growth caused by a high summer pool level (11). The Corps is aware of the fishery problems at Fort Peck Reservoir but must consider many other factors, such as the water situation at downstream reservoirs, downstream water users, and power demands, in establishing management practices (4, 11). Since Fort Peck Lake is the highest reservoir in the Missouri main-stem chain, there are no upstream impoundments from which to draw. Nevertheless, in 1974 the Corps did manage reservoir water levels in accordance with suggestions by the MDFG (flooded vegetation in May-June; low level in late summer) (4, 11). The MDFG would like the water level drawn down for a couple of years in order to enhance vegetative growth for increased Northern pike production (4, 11). However, such a prolonged drawdown would conflict with other project uses such as irrigation, power, recreation, and grazing (4).

3. Wildlife

The BSF&W administers wildlife and game range resources within the Charles M. Russell NWR (which includes the project area) whereas the MDFG sets regulations governing resident game species (11, 16). The Corps is responsible for the dam and powerhouse and related structures and for the establishment and maintenance of Corps recreation areas (2, 4, 14). However, management plans must be submitted to the Corps for all lands which were acquired by the Corps in fee title and are administered by the BLM and USF&WS (385,691 acres) (2).

The Corps has entered into a cooperative agreement with BSF&W concerning 33,776 acres of land and water for the conservation, maintenance, and management of wildlife resources in connection with the National Migratory Bird Management Program. These lands are managed on a share-crop basis with local farmers and ranchers. An annual management plan, specifying crops to be produced for wildlife food and cooperator compensation, is submitted to the Omaha District Engineer for approval. Crop yields in excess of wildlife requirements may be sold by the BSF&W (1).

The Corps has permitted six parcels of land totalling 99,567.8 acres to the USF&WS for fish and wildlife management purposes (10) (Table D.3.3). Various uses and locations of these lands are summarized in Table D.3.5. The largest acreage permitted to the USF&WS is for the Slippery Ann Wildlife Station; developments include a Canada Goose farm (with rearing ponds and a capture flock), an administration site, and access roads (1). The U. L. Bend National Wildlife Refuge, consisting of 9,225.7 acres of Corps-permitted land (10), also provides good migratory bird habitat (4). The Corps has expended $3,042,470 on fish and wildlife at the project (10).

Although the Charles M. Russell NWR was primarily established for Sharp-tailed Grouse and pronghorn antelope, other species are managed, such as migratory waterfowl, to maintain a balanced wildlife population (16). Mule deer rapidly increased with protection and management but after 1960 the population declined. White-tailed deer have done well on the western part of the range in noninundated river-bottom habitat. Elk were restored to the range in 1951 and have been able to sustain controlled hunting. Rocky Mountain bighorns and Merriam Turkeys were stocked on the western part of the range and seem to be adapting well. Habitat is also provided for Ring-necked Pheasants and Mourning Doves (16). About 176,140 acres of the Charles M. Russell NWR appear suitable

Table D.3.5. Uses and Locations of Lands Permitted to the USF&WS, Fort Peck Reservoir.[a]

Location	Use	Acreage
Below damsite	Game range and pasture	471.8
Slippery Ann Wildlife Station	Wildlife station	57,862.9
Below damsite	Production of cereal crops for wildlife food	501.8
Upstream from James Kipp State Park	Fish and wildlife management	31,259.6
Damsite	Buffalo park	246.0
U. L. Bend National Wildlife Refuge	U. L. Bend National Wildlife Refuge	9,225.7
TOTAL		99,567.8

[a]Personal communication, September - November 1974. Omaha District, Real Estate Division, Management and Disposal Branch, and report of compliance inspection - outgrants, 30 September 1974. Omaha, Nebraska.

for inclusion in the National Wilderness Preservation System (16). Wildlife range lands are open to upland game bird and big game hunting in accordance with state regulations (16).

Grazing resources within the Charles M. Russell NWR are administered by the BLM (11, 16). The Corps has also entered into a cooperative agreement with the BLM and the BSF&W concerning 61,148 acres of land and water for the conservation, maintenance, and management of wildlife and grazing resources (1).

BLM grazing permits are issued on an indefinite basis and permittees apparently have little incentive for good land management since renewal is not a consideration (4). Only the right to utilize grass resources is granted to permittees but many ranchers severely restrict access and harass hunters on permitted lands (4). BLM grazing fees are nominal and probably do not cover collection costs (4). Management policies of the three BLM offices responsible for administering grazing resources around the lake are often inconsistent and staff shortages render control difficult (14). The BLM returns to the Corps a prorated amount of the grazing fees collected based on the percent of Corps land grazed (10).

The MDFG believes that grazing rates are too intensive during the May to October grazing season on BLM-administered lands (11). Studies have indicated that utilization of grasses above 60% results in range damage; however, in some areas of the Charles M. Russell NWR 80 to 90% of the grasses have been consumed, especially during dry years (11). When overgrazing occurs, nonpalatable plants (e.g., sagebrush and club moss) become established and the BLM often applies control measures (spraying, chisel-plowing, and seeding) for range restoration (11).

Past year-round cattle grazing has practically eliminated some excellent mule deer browse plants (e.g., choke cherry and willow) in

some areas (11). Additionally, cattle are allowed to graze the shoreline and other fragile and easily erodable areas (11). The BLM has also constructed stock watering ponds, some of which have promoted local overgrazing (due to stock concentration) (11). Serious overgrazing of state school trust lands, which are not managed by the BLM, was also reported as occurring on many areas around the lake (14). Virtually all lands within the Charles M. Russell NWR are grazed (14) and wildlife considerations in determining grazing rates appear minimal (11); it also appears that wildlife enhancement provided by the Charles M. Russell NWR may be seriously reduced by overgrazing. Overgrazing problems may be reduced somewhat by the rest-rotation system currently being tried by many ranchers; however, more definitive steps may be required to insure Charles M. Russell NWR lands are not abused by livestock grazing.

The Corps has outgranted 350 private cabin sites comprising 112.2 acres (10) (Table D.3.6). The construction of approximately 200 summer cottages seems to have presented no major problems (4). Minor problems at a few cabin sites are (1) inadequate maintenance, and (2) erosion. Although cabin sewage systems must meet MSDH standards (2), potential disposal problems appeared to exist due to topography, the relative crowding of cabins within a development, and the close proximity of developments to the lake. An additional consideration concerning cabin site developments is that they reduce considerably the aesthetic benefits of the lake, especially when placed in conspicuous areas (e.g., near the damsite). Cabin site lessees do not control the waterfront although dock permits are allowed (4). Seventy-five percent of the cabin site rental fees collected by the Corps is returned to the respective counties (4). A summary of outgrants for the Fort Peck Reservoir are presented in Table D.3.7.

Table D.3.6. Outgrants for Rights of Way, Private Recreation, and Miscellaneous Purposes, Fort Peck Lake.[a, b]

Purpose	Grantee	Outgrants	Instrument	Rental		Annual Rent Paid ($)	Acreage	Investment	
				Date	Term (yrs)			To 1974 ($)	Planned ($)
Rights of Way	Summary	37	Easement[c] Permit License	1938-1973	5-indef.	49.50	460.8	N/A[d]	N/A
Private Recreation	Summary	350	Lease	----	17-30[e]	6,910.00	112.2	N/A	N/A
Miscellaneous[f]	Summary	19	Permit License Lease	1959-1974	4-50	1,816.00	36.3	N/A	N/A
Totals		406				8,775.50	609.3		

[a]Personal communication, September - November 1974. Omaha District, Real Estate Division, Management and Disposal Branch, and Report of compliance inspection -- outgrants, 30 September 1974. Omaha, Nebraska.

[b]Grazing permits handled by the BLM.

[c]Most are easements.

[d]Not available.

[e]Mostly 20-year terms.

[f]Telephone exchange, storage, school, church, radio tower, laundromat and general store (in town of Fort Peck just below dam), navigational aids, etc.

Table D.3.7. Summary of Outgrants, Fort Peck Lake.

Purpose	Number	Annual Rent ($)	Acreage	Investment to 1974 ($)
Fish and Wildlife and Recreation -- Public Parks	10	0	100,424.3	N/A[a]
Recreation -- Quasi-Public	4	0	132.1	N/A
Recreation -- Commercial	2	635.00	23.5	60,000
Rights of Way, Private Recreation, and Miscellaneous Purposes	406	8,775.50	609.3	N/A
Totals	422	9,410.50	101,189.2[b]	60,000

[a] Not available.

[b] Manageable resource lands (Table D.3.1) = 380,774 acres; difference in manageable resource acreage and outgranted acreage = 279,548.8 acres; due to collateral land uses, outgranted acreage is somewhat inflated.

Project lands were used for Corps blasting experiments (Pre-Gondola and Project Diamond Ore) (4) around 1968 and again in 1970-71. These experiments caused (1) a disruption of local fish and wildlife populations, (2) a severe disturbance of vegetative and range conditions, and (3) a reduction in the aesthetic benefits provided by the lake (11). Such disruptions were made even more apparent when blasting areas were not immediately reclaimed and revegetated (including the removal of litter and other debris) (11). Another potential environmental problem is the Corps' proposed reshaping of the spillway area to relieve bank pressures (11). Approximately two million cubic yards of earth may be removed from the spillway banks (4) and deposited in environmentally sensitive areas such as the floodplain below the dam and coulees and bays (11).

The Corps proposed to construct additional roads in the reservoir vicinity in order to improve access (11). Approximately 11 mi of a "perimeter road" was constructed on the northern side of the reservoir (4) and initially the MDFG and USF&WS felt such a road was worthwhile (11, 14). However, both the MDFG and USF&WS objected to the Corps' inadequate consideration of route location and felt that the road as it was being constructed would destroy valuable big game habitat and the isolation required by elk for occupation of parts of the area (11, 14). The USF&WS feels access is adequate for the people who are utilizing the lake and that the potential increase in visitation with additional road construction is not worth the potential sacrifice in big game resources (14).

5. Resource Use Controls

Problems have resulted from federal interagency disagreements and the lack of a clear field delineation of BLM-Corps-USF&WS management authority and responsibilities (11, 14). For example, the USF&WS would like to close certain roads for off-road vehicles to enhance elk usage

of selected areas whereas the Corps feels obligated to insure public access to the lake (4, 14). Unclear management authority may hinder state-federal resource management cooperation at the field level.

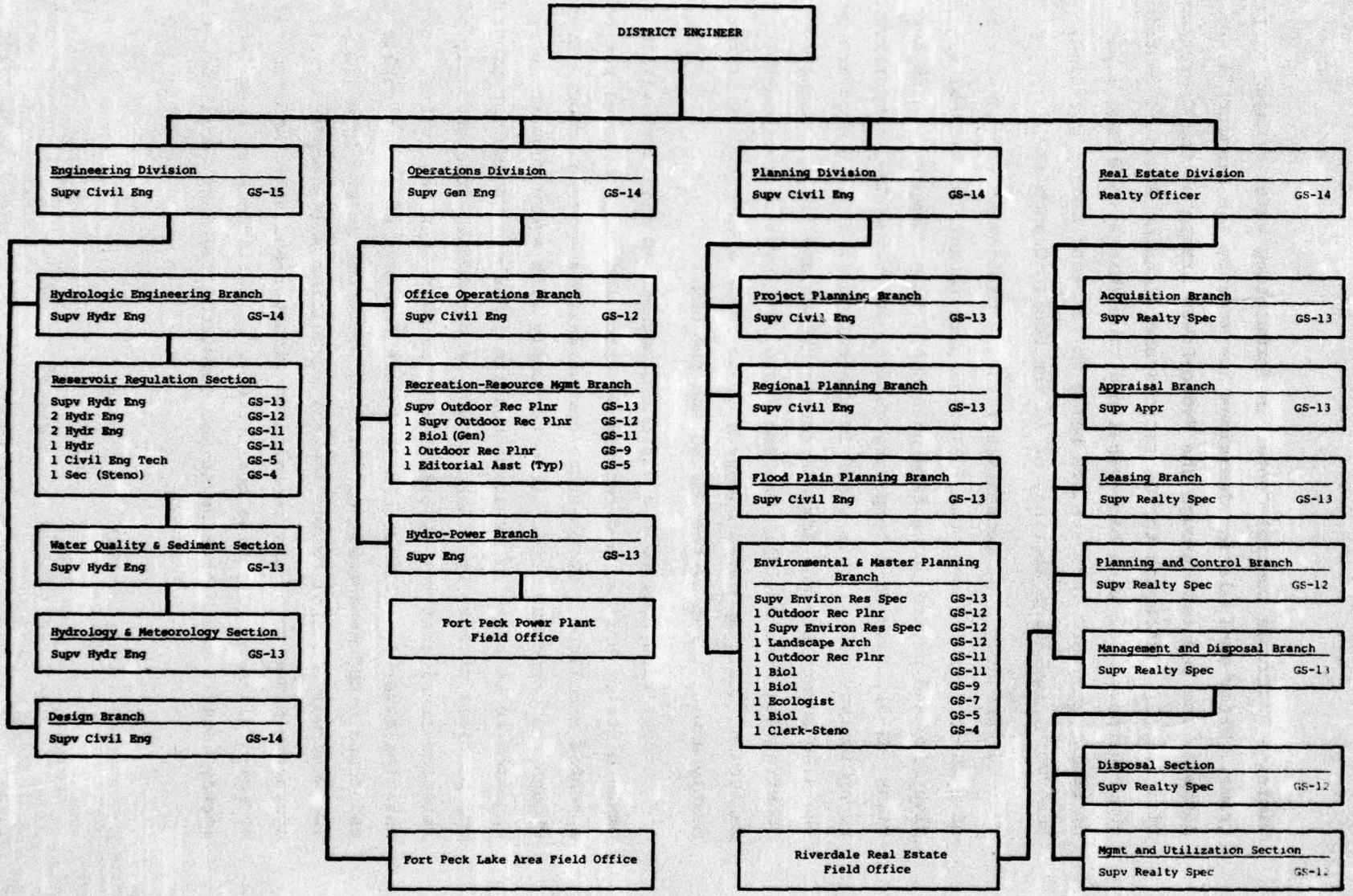
Corps field assistance appeared especially good (2, 11, 14). The Corps has helped the state construct ponds, boat ramps, and picnic shelters and assisted with erosion problems at outgranted recreation areas (11). Additionally, the Corps has provided equipment and vehicular maintenance for the USF&WS (14).

Overall planning, including master plan formulation, is the responsibility of the Environmental and Master Planning Branch, (2), which contains several biologists, recreation planners, and an ecologist; this branch is headed by a supervisory environmental resource specialist (GS-13) (Figure D.3.2). After origination, plans then go to the Design Branch of the Engineering Division for formulation into a design memorandum. Plan feasibility is then evaluated by the Recreation-Resource Management Branch, Operations Division (2) which contains two biologists and three recreation planners (17). The impact and further evaluation of proposed plans are then made by the Planning Division before submittal to the Missouri River Division for approval. Recreation-resource proposals may also originate in the Recreation-Resource Management Branch and be submitted to the Environmental and Master Planning Branch and/or the Design Branch (2).

Wildlife management plans generally originate in the Operations Division and are then submitted to the Planning Division. If applicable, the Real Estate Division will also become involved in wildlife planning and the Engineering Division is generally kept abreast of wildlife developments (2).

The Reservoir Regulation and the Hydrology and Meteorology Sections collect and formulate data utilized by the Missour River

Figure D.3.2. Recreation-Resource Management Interrelationships - Omaha Engineer District.



Division Reservoir Control Center in formulating water management programs. Water manipulation decisions are made by the Missouri River Division and enacted through the Hydro-Power Branch of the Operations Division (2). Although the Operations and Planning Division contain numerous personnel with biological and recreational planning expertise, no biologists were indicated as being in the Real Estate Division, Reservoir Regulation Section, or in the Design Branch (17).

The project level recreation-resource management personnel consists of a GS-11 park manager, two full-time park technicians (GS-5, GS-7), five fire and police protection personnel, three temporary park technicians (GS-5), five GS-4 temporary guides, and three GS-3 temporary receptionists (18). This staff is supervised by a GS-13 area manager who also supervises the Administrative Branch and Project Maintenance/ Construction Branch (18). The small project-level recreation-resource management staff appeared adequate since lands around the reservoir are mostly administered by the USF&WS and the BLM.

Cooperation between the various branches and divisions within the Omaha District office, and between district and project level personnel, appeared excellent. Corps-state communications appeared good. Even though the Corps may not be able to comply with every request, they appeared to be aware of areas of concern. Fishery management programs and problems at Fort Peck Lake cannot be considered independently of resource considerations at other Missouri main-stem reservoirs. Various entities have been formed to help insure the most efficient public use and coordinated management of existing resources at the lake (2, 11). The Reservoir Control Center (Omaha) formulates main-stem reservoir operating plans which are coordinated with various state and federal agencies via a coordinating committee (2). Periodic Fort Peck Interagency Council and Fisheries Ad Hoc Committee meetings facilitate the

communication of problems and management program objectives and enhance management coordination and problem solving (2, 11). The formation of the Missouri Basin Interagency Committee (MBIAC) has helped schedule and coordinate both state and federal efforts on the Missouri River Program (2).

Reservoir formation has had only minimal effects on land use and values around the reservoir (2). Possible reasons are (1) the amount of federal land surrounding the reservoir, (2) the rough topography of the area, and (3) the remoteness of the reservoir relative to population centers. The reservoir has provided some support to local economies, however, especially in Glasgow and the town of Fort Peck (4).

Although law enforcement in the town of Fort Peck was reported good (4), policing of the reservoir is somewhat inadequate primarily due to the (1) remoteness of recreation sites, (2), lack of cooperation of some county law enforcement personnel, and (3) minimal Corps staff (2).

At the time of the field visit, there were no effective land use regulations governing lands adjacent to the project (2, 11, 19). Currently no demands for such guidelines exist due to the remoteness of the reservoir and lack of population pressures in the area (2, 19). Nevertheless, subdivision regulations were scheduled to go into effect by 1 January 1975 and development would be prohibited in areas that are obvious hazards to public health (19).

The Corps' landfill for garbage disposal has presented problems of (1) blowing trash and debris, and (2) unauthorized usage by ranchers. Apparently the landfill is covered only infrequently and burning garbage is not uncommon (14).

Some complaints (nuisance) have resulted from the sewage lagoon serving the Town of Fort Peck (below the damsite) (12). Although the lagoon was designed according to U. S. Department of Health, Education, and Welfare standards (4), apparently there is a high degree of seepage and only a limited amount of biological reduction of wastes (12). At one time during pump failure, sewage was released in the Dredge Cuts public use area (which is indirectly connected to the Missouri River) (4, 14). An inspection of the lagoon during the field visit showed no indications of problems.

Corps personnel are currently handling recreation area garbage collection and grounds maintenance (4). However, there has been some problem with getting good clean-up performance since grounds maintenance is apparently not a popular job (4). To help alleviate this problem, the Corps plans to obtain a contract for garbage collection next year (4).

III. KEY FINDINGS

A. Recreation

1. Corps, USF&WS, and state recreation facilities appeared adequate and well adapted to meet public needs and pressures. Additionally, there was a fairly wide diversity of recreational opportunities for all age groups, even for the elderly (pond fishing). The Corps recognizes needed improvements and is continually striving to upgrade recreation facilities to better serve the public. The visitor center, which is staffed during the summer, assists in public orientation and helps maximize public awareness of recreational opportunities available at the lake.

2. Many recreation sites are remote and served only by unpaved roads. The clay soils (gumbo) of the area become extremely slippery when wet, rendering conventional vehicular passage impossible. Although access is relatively poor at remote recreation sites, public utilization of many areas is relatively low due to the sparse local population.

3. Operation of the two commercial concessions on the reservoir has presented no major problems.

4. The Corps has outgranted 350 private cabin sites. The construction of approximately 200 summer cottages seems to have presented no major problems. Minor problems at a few cabin sites are (1) inadequate maintenance, and (2) erosion. Although cabin sewage systems must meet MSDH standards, potential disposal problems appeared to exist due to topography, the relative crowding of cabins within a development, and the close proximity of developments to the lake. An additional consideration concerning cabin site developments are that they reduce considerably the aesthetic benefits of the lake, especially when placed in conspicuous areas (e.g., near the damsite). Cabin site lessees do not control the waterfront although dock permits are allowed.

5. Corps personnel are currently handling recreation area garbage collection and grounds maintenance. However, there has been some problem with getting good clean-up performance since grounds maintenance is apparently not a popular job. To help alleviate this problem, the Corps plans to obtain a contract for garbage collection next year.

B. Fish and Wildlife

1. Water discharges are generally directly related to demands for electricity with high daytime discharges and low nighttime releases. Such changes in water discharge volume have created some problems with the tailrace fishery. Sauger generally spawn during the day and oftentimes the nighttime reduction in water discharge may cause egg desication. Water fluctuations may also be detrimental to nesting shorebirds, and some complaints from downstream irrigators have resulted from low water releases.

2. Reductions in Northern pike production have been caused by (1) delayed water rises during the spawning season, and (2) a lack of vegetative growth caused by a high summer pool level. The Corps is aware of the fishery problems at Fort Peck Reservoir but must consider many other factors, such as the water situation at downstream reservoirs, downstream water users, and power demands, in establishing management practices. Since Fort Peck Lake is the highest reservoir in the Missouri main-stem chain, there are no upstream impoundments from which to draw. Nevertheless, in 1974 the Corps did manage reservoir water levels in accordance with suggestions by the MDFG (flooded vegetation in May-June; low level in late summer). The MDFG would like the water level drawn down for a couple of years in order to enhance vegetative growth for increased Northern pike production. However, such a prolonged drawdown would conflict with other project uses such as irrigation, power, recreation, and grazing.

3. The large size of the reservoir and the variation of aquatic habitats cause difficulty in the administration of fishery management resources. The complex interrelations of various fishes and available niches are somewhat poorly understood and the fishery resources at Fort Peck Lake cannot be considered independently of biological resources at other main-stem reservoirs.

C. Corps and Contiguous Land Use

1. The state is currently negotiating with the Corps and BuRec on who should market waters of Fort Peck for industrial use. The state already has a clear right to market Fort Peck waters for municipal, agricultural, and irrigational purposes; however, the high bluffs around the lake and the lack of electrical power have retarded interest in water utilization for agricultural or irrigational purposes. Indians of the Fort Peck Reservation feel that they should have a major input into reservoir water management practices since release waters flow past tribal lands. Burlington Northern, Inc. has filed a request with the state for usage of Fort Peck waters for a coal gasification and fertilizer plant in McCone County. Water would be taken from the Nelson Bay-McGuire Creek area (Big Dry Arm) and piped across Corps land. Environmentalists have expressed concern that (1) pipelines may create additional erosion problems, (2) water extraction may disrupt excellent walleye spawning areas, (3) additional plants or irrigation projects may be constructed once an initial plant is operable, and (4) salinity changes may result from large water extractions from the reservoir.

2. At the time of the field visit, there were no effective land use regulations governing lands adjacent to the project. Currently no demands for such guidelines exist due to the remoteness of the reservoir and lack of population pressures in the area. Nevertheless, subdivision regulations were scheduled to go into effect by 1 January

1975 and development would be prohibited in areas that are obvious hazards to public health.

3. Reservoir formation has had only minimal effects on land use and values around the reservoir. Possible reasons are (1) the amount of federal land surrounding the reservoir, (2) the rough topography of the area, and (3) the remoteness of the reservoir relative to population centers. The reservoir has provided some support to local economies, however, especially in Glasgow and the town of Fort Peck.

4. Although law enforcement in the town of Fort Peck was reported good, policing of the reservoir is somewhat inadequate primarily due to the (1) remoteness of recreation sites, (2) lack of cooperation of some county law enforcement personnel, and (3) minimal Corps staff.

D. Real Estate Programs and Practices

1. The BSF&W administers wildlife and game range resources within the Charles M. Russell NWR (which includes the project area) whereas the MDFG sets regulations governing resident game species. The Corps is responsible for the dam and powerhouse and related structures and for the establishment and maintenance of Corps recreation areas; grazing resources are administered by the BLM.

2. The MDFG believes that grazing rates are too intensive during the May to October grazing season on BLM administered lands. Studies have indicated that utilization of grasses above 60% results in range damage; however, in some areas of the Charles M. Russell NWR 80 to 90% of the grasses have been consumed, especially during dry years. When overgrazing occurs, nonpalatable plants (e.g., sagebrush and club moss) become established and the BLM often applies control measures (spraying, chisel-plowing, and seeding) for range restoration.

3. Past year-round cattle grazing has practically eliminated some excellent mule deer browse plants (e.g., choke cherry and willow) in some areas. Additionally, cattle are allowed to graze the shoreline and other fragile and easily erodable areas. The BLM has also constructed stock watering ponds, some of which have promoted local overgrazing (due to stock concentration). Serious overgrazing of state school trust lands, which are not managed by the BLM, was also reported as occurring on many areas around the lake. Virtually all lands within the Charles M. Russel NWR are grazed and wildlife considerations in determining grazing rates appear minimal; it also appeared that wildlife enhancement provided by the Charles M. Russell NWR may be seriously reduced by overgrazing. Overgrazing problems may be reduced somewhat by the rest-rotation system currently being tried by many ranchers; however, more definitive steps may be required to insure NWR lands are not abused by livestock grazing.

4. BLM grazing fees are nominal. Management policies of the three BLM offices responsible for administering grazing operations around the lake are often inconsistent and staff shortages render control difficult.

5. BLM grazing permits are issued on an indefinite basis and permittees apparently have little incentive for good land management, since renewal is not a consideration. Only the rights to utilize grass resources are granted to permittees, but many ranchers severely restrict access and harass hunters on permitted lands.

E. Corps Organization

1. Cooperation between the various branches and divisions within the Omaha District office and between district and project level personnel, appeared excellent. The Corps' resource management staff at the project is small but probably adequate since lands around the reservoir are mostly administered by the USF&WS and the BLM.

2. Problems have resulted from federal interagency disagreements and the lack of a clear field delineation of BLM-Corps-USF&WS management authority and responsibilities. For example, the USF&WS would like to close certain tracks for off-road vehicles (ORV) to enhance elk usage of selected areas. On the other hand, the Corps, while guided by general policies controlling ORVs on Corps land (ER 1130-2-405), feels obligated to leave the tracks open to facilitate public access to the lake. Unclear management authority may hinder state-federal resource management cooperation at the field level.

3. Corps field assistance appeared especially good. The Corps has helped the state construct ponds, boat ramps, and picnic shelters and assisted with erosion problems at outgranted recreation areas. Additionally, the Corps has provided equipment and vehicular maintenance for the USF&WS.

4. The Fort Peck Interagency Council and Fisheries Ad Hoc Committee meetings facilitate the communication of problems and management policies and enhance management coordination and problem solving.

F. Environmental Problems

1. Soils around the reservoir are naturally erodable and shoreling sloughing and siltation are major environmental problems. Siltation is especially prominent in the headwaters section of the reservoir. The rough topography, in combination with grazing of unsuitable areas, overgrazing, and wave and ice action, seem to be the major causes of erosion and siltation.

2. The Corps' landfill for garbage disposal has presented problems of (1) blowing trash and debris, and (2) unauthorized usage by ranchers. Apparently the landfill is covered only infrequently and burning garbage is not uncommon.

3. Some complaints (nuisance) have resulted from the sewage lagoon serving the town of Fort Peck (below the damsite). Although the lagoon was designed according to U. S. Department of Health, Education, and Welfare standards, apparently there is a high degree of seepage and evaporation and only a limited amount of biological reduction of wastes. At one time during pump failure, sewage was released in the Dredge Cuts public use area (which is indirectly connected to the Missouri River).

4. The Corps proposed to construct additional roads in the reservoir vicinity in order to improve access. Approximately 11 mi of a "perimeter road" was constructed on the northern side of the reservoir and initially the MDFG and USF&WS felt such a road was worthwhile. However, both the MDFG and USF&WS objected to the Corps' inadequate consideration of route location and felt that the road as it was currently being constructed would destroy valuable big game habitat and the isolation required by elk for occupation of parts of the area. The USF&WS feels access is adequate for the people who are utilizing the lake and that the potential increase in visitation with additional road construction is not worth the potential sacrifice in big game resources.

5. Project lands were used for Corps blasting experiments (Pre-Gondola and Project Diamond Ore) around 1968 and again in 1970-71. These experiments caused (1) a disruption of local fish and wildlife populations, (2) a severe disturbance of vegetative and range conditions, and (3) a reduction in the aesthetic benefits provided by the lake. Such disruptions were made even more apparent when blasting areas were not immediately reclaimed and revegetated (including the removal of litter and other debris). Another potential environmental problem is the Corps' proposed reshaping of the spillway area to relieve bank pressures. Approximately two million cubic yards of earth may be removed from the spillway banks and deposited in environmentally sensitive areas such as the floodplain below the dam and coulees and bays.

IV. REFERENCES

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3. Omaha District. ND. Fort Peck Lake (brochure). Fort Peck, Montana.

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5. Missouri River Division. 1974. Summary of engineering data - Missouri River main stem reservoirs. Omaha, Nebraska.

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16. U. S. Department of the Interior, Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife. 1974. Charles M. Russell National Wildlife Range descriptive literature and maps. Fort Peck, Montana.

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18. Omaha District. 1974. Fort Peck project organization charts. Omaha, Nebraska.

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4. OAHE RESERVOIR

Missouri River Division

Omaha District

South Dakota and North Dakota

I. SETTING

A. Location

The Oahe Reservoir is located on the Missouri River and lies between Pierre, South Dakota and Bismarck, North Dakota (Figure D.4.1). The dam and powerhouse are located in Hughes County, SD.

Lake Oahe is one of a system of six multiple-purpose reservoirs on the main stem of the Missouri River. The two main-stem reservoirs above Oahe Reservoir are Fort Peck (Montana) and Lake Sakakewa (ND); Lake Sharpe (SD), Lake Francis Case (SD), and Lewis and Clark Lake (SD and Nebraska) are Missouri main-stem reservoirs below Lake Oahe. Specifically, Lake Oahe is located approximately 67 miles (mi) south-southeast of Lake Sakakawea and about 17 mi north-northwest of Lake Sharpe.

The eastern side of Oahe Reservoir is served by ND and SD secondary roads leading from U. S. 83; additionally, the reservoir is crossed by U. S. 12 and 212 in SD. Access to the ND portion of the western side of the reservoir is provided by ND 1806 and 24. Limited access to the SD portion of the western side of the reservoir is generally provided by secondary roads from U. S. 14, 212, and 12 and from SD 63.

B. Authorization and Purposes

The Oahe Reservoir project was authorized by the Flood Control Act of 1944 (PL 78-534). The project was originally authorized for

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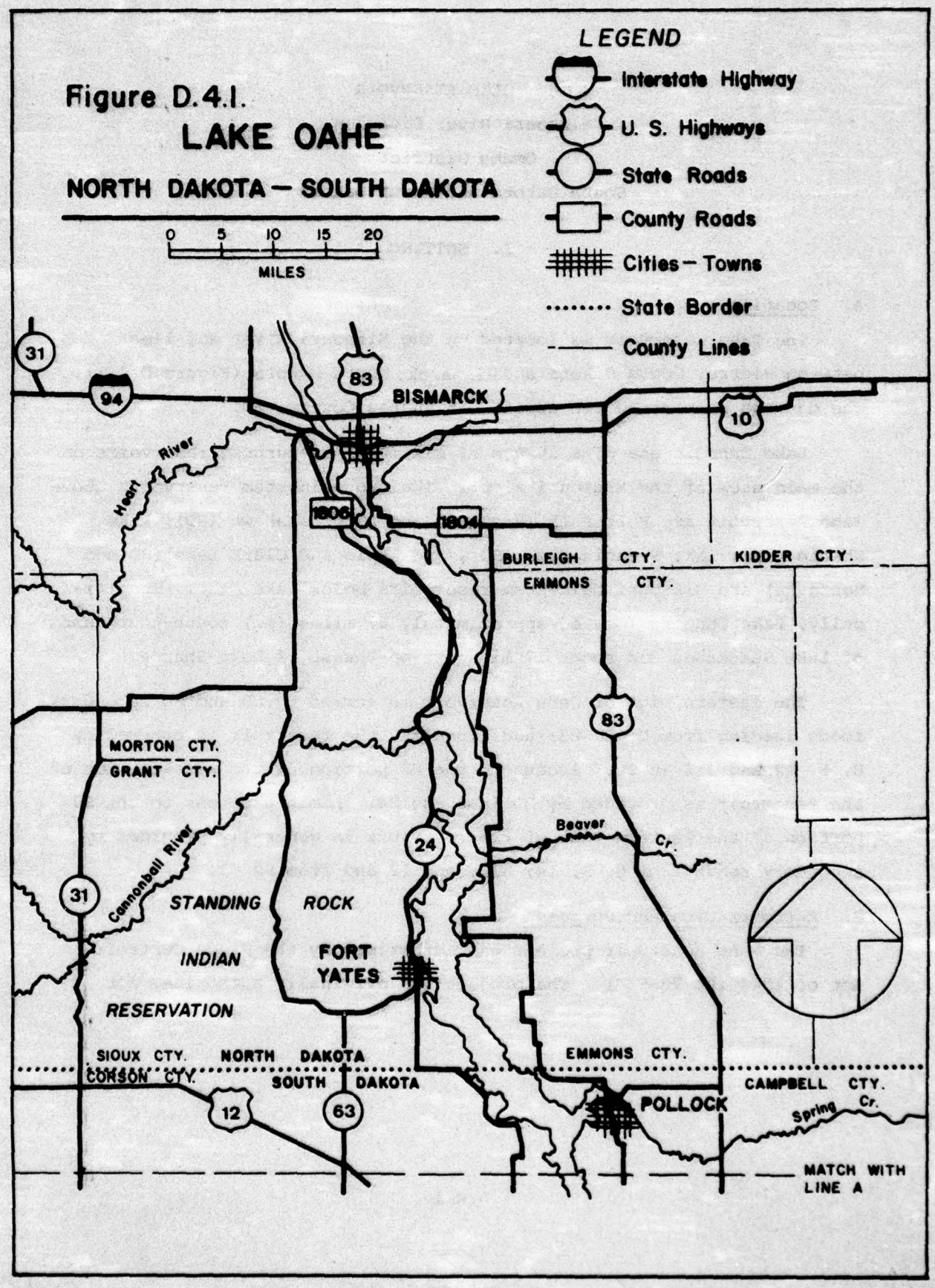
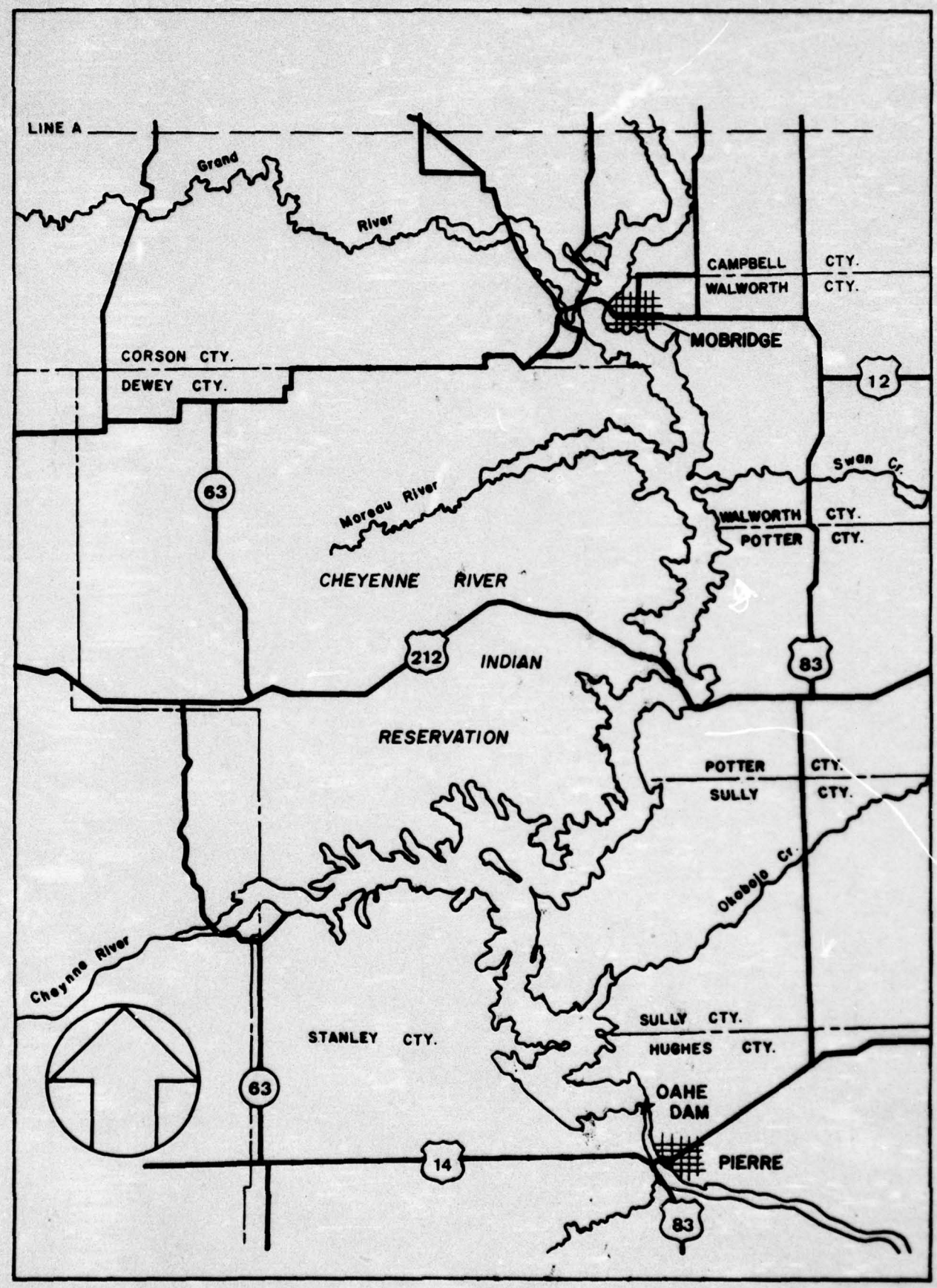


Figure D.4.1.
LAKE OAHE
NORTH DAKOTA – SOUTH DAKOTA
0 5 10 15 20
MILES
LEGEND
Interstate Highway
U. S. Highways
State Roads
County Roads
Cities – Towns
State Border
County Lines
31
94
83
BISMARCK
10
Heart River
1806
1804
BURLEIGH CTY.
KIDDER CTY.
EMMONS CTY.
83
MORTON CTY.
GRANT CTY.
Beaver Cr.
24
31
Cannonball River
STANDING ROCK
INDIAN RESERVATION
FORT YATES
SIOUX CTY.
NORTH DAKOTA
CORSON CTY.
SOUTH DAKOTA
EMMONS CTY.
CAMPBELL CTY.
POLLOCK
Spring Cr.
12
63
MATCH WITH LINE A


LINE A
Grand
River
CAMPBELL CTY.
WALWORTH CTY.
MOBRIDGE
CORSON CTY.
DEWEY CTY.
12
63
Swan Cr.
Moreau River
WALWORTH CTY.
POTTER CTY.
CHEYENNE RIVER
212
INDIAN
83
RESERVATION
POTTER CTY.
SULLY CTY.
Oahe Dr.
Cheyenne River
SULLY CTY.
STANLEY CTY.
HUGHES CTY.
63
OAHE DAM
14
PIERRE
83

D.4.2A

flood control, navigation, power, irrigation, and "other beneficial purposes" (1).[a]

C. Features

The drainage area above Oahe Dam is about 243,490 square (sq) mi and there are approximately 2,250 shoreline mi at the average recreation pool elevation (1,607.5 feet above mean sea level) (ft msl). The dam is 9,300 ft long (excluding the spillway) and has a maximum height of 245 ft (2). The powerhouse contains seven generators with a total installed capacity of 595,000 kilowatts (2). Additional project features are presented in Table D.4.1.

The reservoir pool elevation is generally lowest during early spring (March and April) and may be as low as 1,600 ft msl (3). During spring and early summer, the pool elevation gradually rises as a result of snow melt and rainfall to a crest generally not exceeding 1,617 ft msl by July or August. The average recreation pool elevation is 1,607.5 ft msl (4). The pool is gradually drawn down during late summer and fall in preparation for the spring flood season (3).

The topography of lands around the lower half of the reservoir generally consists of rugged bluffs (Missouri River breaks) adjoined by flat to rolling prairie. Lands surrounding the northern portion of the reservoir are less rugged and tend to be rolling.

The extreme upper portion of the project area is within the Fox Hills sandstone geologic formation; the Pierre shale formation extends throughout the remaining portion of the reservoir (1). Compressed

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[a]The Secretary of the Army has been authorized, since 1944, to construct, maintain, and operate public park and recreational facilities at water resource development projects. 16 U.S.C. 460d. Since 1946, the Army Corps of Engineers has been required, when consistent with a project's primary purposes, to make adequate provision for the conservation, maintenance, and management of wildlife resources. 16 U.S.C. 663(a).

Table D.4.1. Resource Statistics, Lake Oahe.

Date of Authorization		1944[a]
Rights in Land Acquired Between		1959-1966[b]
Date of Impoundment		August, 1953[c]
Date of Full Operation		April, 1962[c]
Lake Size When Water Level is at:		
Spillway Elevation (1,620 ft msl)		371,000 acres[d]
Normal Pool Elevation (1,617 ft msl)		356,000 acres[d]
Normal Minimum Pool Elevation (1,607.5 ft msl)		313,000 acres[d]
Minimum Dasign Elevation (1,540 ft msl)		118,000 acres[d]
Water Fluctuation - Summer Recreation Season		7-9 feet[e]
Shoreline at Normal Pool		2,250 miles[c]
Held in Fee Simple by Corps		2,250 miles[c]
Land Area Managed by Corps		
Total Land in Project		477,883 acres[c]
Fee Title in U. S.	421,416 acres[c]	
Easements to Flood	2,467 acres[c]	
River Bed	54,000 acres[c]	
Project Operation Lands		4,040 acres[c]
Manageable Resource Lands		158,376 acres[f]

[a] Omaha District. 1962. Oahe Reservoir, North Dakota and South Dakota; design memorandum no. MO-150B, master plan for reservoir development (with revisions). Omaha, Nebraska.

[b] Personal communication, 25 October 1974. Omaha District, Real Estate Division, Management and Disposal Branch, Omaha, Nebraska.

[c] RRMS. 1973.

[d] Missouri River Division. 1974. Summary of engineering data-Missouri River main-stem reservoirs. Omaha, Nebraska.

[e] Personal communication, 20 November 1974. Omaha District, Operations Division, Omaha, Nebraska.

[f] Total Project Land minus (Land Flooded at Normal Minimum Pool + Project Operation Land + Easements) = 477,883 minus (313,000 + 4,040 + 2,467).

muds and clays, with numerous bentonite seams which may become weak when saturated, are primary constituents of the Pierre shale formation (1). Lands on the western side of the reservoir are generally used for grazing whereas lands on the eastern side are primarily in small grain production (5). The Cheyenne, Grand, Moreau, and Cannonball Rivers are the main tributaries of Oahe Reservoir.

Tree cover in the lower portion of the reservoir is fairly sparse and generally confined to shelterbelts or tributary ravines. There are some bottomland hardwood areas in the upper portions of the reservoir which contain a mixture generally including elm, cottonwood, box elder, and willow (1).

II. LAND USE, RECREATION, AND FISH AND WILDLIFE CONSIDERATIONS

A. Analytical Unit

The primary zone which influences the physical character of the lake consists of the immediate drainage area surrounding the reservoir. On the lower end of the reservoir this band may be wider than a mi or as narrow as 0.25 to 0.5 mi, extending only from the shoreline to the immediate ridge-top. On the upper end of Lake Oahe and where the shoreline topography is less rugged, this analytical band may be several mi wide.

The lake influences both recreation and economic development in a large area and the analytical unit of immediate influence is extremely variable depending upon location. Near populated areas and at reservoir road crossings, the immediate analytical unit influenced by the lake probably does not exceed 25 mi. At other more remote sites along the reservoir, such as in agricultural and grazing areas, the unit immediately influenced by the lake may extend only a couple of mi from the reservoir. Aside from the primary area influenced by the lake, many additional people from more distant areas (many out-of-state) visit the lake for recreational purposes (3).

The project master plan defines three use zones for the lake: day, weekend, and vacation (1). The day-use zone generally extends from Bismarck to Pierre as a 50-mi band on both sides of the reservoir. The circular weekend use area extends radially approximately 100 mi from Pierre; this zone also includes Lake Sharpe, Lake Francis Case, and the Lewis and Clark Lake (other Corps main-stem reservoirs). The vacation use zone extends southwest from the reservoir to St. Louis, Missouri, east to Milwaukee, Wisconsin, and west-southwest to Rapid City, SD (1); numerous Corps projects are within this area.

B. Ownership

1. Corps

The Corps claims ownership of all lands contiguous to the reservoir and has fee title to 421,416 acres (4). Boundry line monumentation is approximately 25% complete (6). The generally narrow Corps take line primarily ranges from elevation 1,610 msl (2.5 ft above the average recreation pool) to approximately 2 mi in the extreme upper reaches of the reservoir (7). However, in most areas the take line is generally less than 1,500 ft (7). The majority of lands surrounding Corps holdings on Lake Oahe are in private and tribal ownership.

2. State

The State of SD owns two parcels of land on Lake Oahe (8). The first is an 851-acre tract just south of the Potter-Sully County line on the eastern side of the reservoir. The second area consists of 395 acres and is located on the eastern side of the lake just north of Sully Creek in Sully County. Additionally, there are numerous scattered tracts of SD School Lands (a portion of which are sold each year for school support) around the reservoir, and many of these lands adjoin Corps holdings (8).

The State of ND owns two small parcels of land (48.4 and 30 acres) near the reservoir. These tracts are on the very upper end of the reservoir in the vicinity of lands leased by the state from the Corps (9).

3. Tribal

Two Indian reservations are located on the western side of Lake Oahe (6). The Standing Rock Indian Reservation occupies Sioux County in ND and portions of Corson County, SD. The Cheyenne River Indian Reservation is located in Dewey and Ziebach Counties, SD.

4. Town

Several small communities and two major towns are located on Lake Oahe. The Town of Fort Yates is essentially on an island approximately

2 mi long connected by a narrow land strip to the main portion of Sioux County, ND. The Town of Mobridge occupies an area of about 2 sq mi on the eastern side of the reservoir in Walworth County, SD (7).

C. Resource Management

1. Recreation

There are 43 recreation areas at Lake Oahe, 38 of which are managed by the Corps (6,10). Corps recreation sites occupy approximately 10,765 acres (10). Facilities provided at most recreation sites include boat docks and ramps, toilets, picnic tables, and fireplaces. Additional public facilities at some recreational areas include boat rentals, sanitary dump stations, showers, water wells, change houses, and camping and picnic areas (3). Corps investment into recreation facilities at the lake as of November 1974 was $5,025,000 (10).

A $2 per night charge was levied by the Corps at four recreational sites in 1974; an additional $0.50 was charged for electricity which was available at two areas (6).[a] Fee collection on two of the areas was made by the use of access control gates; fees were collected on the remaining two areas by personal contact (6).

Corps recreation sites appeared well-kept and only minor examples of inadequate maintenance were noted. Litter is a problem at the numerous undeveloped and uncontrolled sites, especially on the upper end of the lake (11). Informational signs appeared inadequate (both in number and in information displayed) at some sites on the lower end of the reservoir Access to the reservoir is a problem at many areas which are not located near towns, especially on the western side of the lake (3, 6, 8, 11, 12, 13).

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[a]Project personnel indicated that there were six fee areas: three $1 per night areas and three $2.50 per night areas (3).

The main Corps-outgranted concession (Oahe Recreation Corporation) on Lake Oahe is located adjacent to the Downstream Recreational Area on the Western side of the river. Facilities provided include boat rentals and supplies and a restaurant (3). The current annual rental rate for this 19-acre area is $900 plus a percentage of gross receipts; the lease period is 25 years with no option for renewal (Table D.4.2) (10). Three other minor concessioners have a license from the Corps to operate on Lake Oahe; two of these operators each have 4 boats for rent and pay a fixed annual license fee of $20 and $25. The third minor commercial operator currently pays an $80 per year fee for a mobile concession (offering bait and other supplies) and generally operates in the Beaver Creek area. Licenses for minor concessionaires are for 5 years (except for the mobile concessionaire who is licensed for 2 years) and fees are based on appraised value. Seventy-five percent of the concession rental fees collected by the Corps are returned to the respective counties; the remaining 25% goes into the general fund to the U.S. Treasury (10).

Five sites totaling approximately 413.9 acres are outgranted by the Corps to local units of government for public park and recreational purposes (Table D.4.3). Lease or license periods are for 25 years and no rental fees are charged (10). Two of the five recreation sites are outgranted (one by lease and the other a license) to the Burleigh County (ND) Park Board (10). These areas (totaling 276.2 acres) (10) are on the extreme upper end of the lake on the eastern shore and attracted 66,600 visitors during 1973 (4). The General Sibley Park Area is extensively developed (toilets, showers, water wells, fireplaces, tables, camp sites, electricity) and a $3 fee is charged for camping. The second area outgranted to Burleigh County is developed very little and contains only a few picnic tables (6). The City of Pollock leases 47.5 acres from the Corps as a recreational area (10);

Table D.4.2. Outgrants for Recreation -- Commercial, Lake Oahe.[a]

Location	Grantee	Instrument	Rental Date	Rental Term (yrs)	Rental Basis	Annual Rent Paid ($)	Acreage	Investment To 1974 ($)	Investment Planned ($)	Turnovers
			Original / Current							
Downstream Recreation Site	Oahe Recreation Corp.	Lease	1966	25	$100 + % gross	900	19.2	115,000	N/A[b]	1[c]
			1970[c]	--	$900 + % graduated					
Upstream[d]	E. J. Bush	License	1968	5	Fixed	20	0	N/A	N/A	0
			1973	5	Fixed					
Upstream[d]	R. E. Smith	License	1969	5	Fixed	25	0	N/A	N/A	0
			1974	5	Fixed					
Beaver Creek Area[e]	D. Walther	License	1974	2	Fixed	80	254.0	2,000	N/A	0
Totals (current)	4					1,025	273.2	117,000		

[a]Personal communication, 1974. Omaha District, Real Estate Division, Management and Disposal Branch, and Report of compliance inspection - outgrants, 30 September 1974. Omaha, Nebraska.

[b]Not available.

[c]Corporate presidency changed around 1970.

[d]Boat rental site.

[e]General area of operation for mobile concessionaire.

Table D.4.3. Outgrants for Fish and Wildlife and Recreation -- Public Parks, Lake Oahe.[a]

Grantee	Instrument	Rental		Annual Rent Paid ($)	Acreage	Investment	
		Date	Term (yrs)			To 1974 ($)	Planned ($)
Burleigh Cnty Park Board	License	1961	25	0	137.8	N/A[b]	N/A
Burleigh Cnty Park Board	Lease	1966	25	0	138.4	N/A	N/A
City of Fort Yates	Lease	1963	25	0	1.2	N/A	N/A
City of Mobridge	Lease	1964	25	0	89.0	N/A	N/A
City of Pollock	Lease	1965	25	0	47.5	N/A	N/A
State of North Dakota	Lease	1971	25	0	136.3	N/A	N/A
South Dakota State Historical Society	Lease	1964	50	0	0.2	N/A	N/A
State of South Dakota	Lease	1964	25	0	4.5	N/A	N/A
Totals (Public Parks)	8			0	554.9		
U. S. Fish & Wildlife Service	Permit	1966	25	0	1.0	N/A	N/A
U. S. Fish & Wildlife Service	License	1968	Indef.	0	2,540.0	N/A	N/A
ND State Game and Fish Dept.	License	1966 1974	5 5[c]	0	23,901.4 23,991.1	N/A N/A	N/A N/A
Totals (Fish and Wildlife)	3			0	26,532.1		
Grand Total	11			0	27,087.0		

Table D.4.3 (Continued)

[a]Personal communication, 1974. Omaha District, Real Estate Division, Management and Disposal Branch, and Report of compliance inspection - outgrants, 30 September 1974. Omaha, Nebraska.

[b]Not available.

[c]Renewed annually from 1971-1973; acreage increased in 1971.

1973 visitation was reported as 12,500 (4). Facilities provided at the Pollock site include a boat dock and ramp, picnic tables, fireplaces, and toilets (6). The Town of Fort Yates also leases 1.2 acres for a city park (change house, beach, ball park) and Mobridge has a license for 89.0 acres for park purposes (only limited development has occurred at the Mobridge site) (10).

The State of ND has a 25 year lease on 136.3 acres for public park purposes; this area, which is currently undeveloped, was previously a railroad right of way and lies between Mandan and the ND - SD line. SD has two lease areas from the Corps: a 4.5-acre roadside park and a 0.2-acre chapel site (Table D.4.3) (10).

There are currently two Corps outgrants for quasi-public recreation (Table D.4.4). One 16-acre site is leased for 20 years by the Sakakawea Girl Scouts and a second 40-acre area is outgranted for 5 years to the Sioux Indian YMCA. The YMCA was charged $1 for the term of its outgrant (10).

Approximately 220,500 people visited Oahe Dam and Reservoir during 1961. Activities included boating, picnicking, camping, and viewing construction operations. About 34% of the 1961 visitors were fishermen (1). During 1973, 2,032,400 recreational days of use were recorded at Lake Oahe (4) with visitation at 37 Corps recreation sites reported as 1,101,800 (4). Greatest recreational usage (46%) occurred during May-June, especially on weekends and holidays. Fishing and sightseeing were the two most popular activities (accounting for 55 and 40% respectively of all recreational days of use); camping and picnicking also accounted for a moderate amount of recreational activity. Other 1973 recreational activities included swimming, skiing, and boating (4).

An estimated one-third of all visitors to the main public use area (the Downstream Area) come from within a 50 mi radius of the dam site (3).

Table D.4.4. Outgrants for Recreation -- Quasi-Public, Lake Oahe.[a]

Grantee	Instrument	Rental			Current Annual Rent ($)	Acreage	Investment	
		Date	Term (yrs)	Basis			To 1974 ($)	Planned ($)
Sakakawea Girl Scouts[b]	Lease	1971	20	----	0	16.0	N/A[c]	N/A
Sioux Indian YMCA	Lease	1973	5	$1[d]	0[e]	40.0	N/A	N/A
Totals	2				0[e]	56.0		

[a]Personal communication, 1974. Omaha District, Real Estate Division, Management and Disposal Branch, and Report of compliance inspection - outgrants, 30 September 1974. Omaha, Nebraska.

[b]Renewed once; initial acreage = 5; initial date and term unavailable.

[c]Not available.

[d]Term.

[e]Less than $0.50.

Another estimated one-third come from greater than 50 mi away but live within SD; the remaining Downstream Area visitors come from outside SD (3).

Traffic counters (60-65), which are read monthly, are utilized to obtain estimates of lake visitors. Around 1965, two or three 24-hour surveys were conducted to obtain detailed visitation information (car-load factors and usage data) (3). Inferences from these visitation surveys, in conjunction with traffic counter data, are utilized to obtain estimates of lake visitors and recreational days of use and to characterize visitor activities (3).

2. Lake Resources

Water quality in Lake Oahe was reported generally good (3, 8, 12, 14). The Corps monitors water quality at the powerhouse and at Mobridge (3). The North Dakota State Department of Health has classified reservoir waters as Class I (suitable for irrigation, stock watering, fish propagation, wildlife, and swimming and other water recreation) (15). Some water quality problems, however, have occurred at Lake Oahe. Erosion and siltation, from bank sloughing and farming and grazing activities, have resulted in periodic turbidity increases and shoreline encroachment problems (3, 8, 12, 14, 16). Siltation is a problem at the upper end of the reservoir where river waters meet the reservoir pool (9, 11) although sediment deposition is probably greatest in the lower third of the reservoir (16). Also, changes in pool elevation often result in the accumulation of dead trees and other debris, especially on the upper end of the lake (11).

Irrigation and domestic water supply are main uses for reservoir waters (12, 17). SD claims the right to utilize reservoir waters amounting to the natural flow before dam construction (12) whereas ND claims jurisdiction over residual flows above reservoir storage (17).

Water use permits are required by both states and permitting procedures are similar. Once state permits are issued, potential water users must secure a permit to pipe across Corps lands. Approximately 60 SD and 12 ND water use permits have been issued (12, 17). The Oahe Irrigation Project, currently under construction by the U. S. Bureau of Reclamation (BuRec), will remove water through the dam for the irrigation of sugar beet and small grain crops (3, 8, 12). Additionally, two other smaller irrigation projects have also been proposed in SD (12). Additional water withdrawals during the dry summer season may affect water levels and management practices, and thus recreational opportunities and biological resources, at the lake.

Mercury pollution apparently has resulted from Home-Stake gold mining operations (8, 16). Although mercury-contaminated discharges (which entered the reservoir via the Belle Fourche and Cheyenne Rivers (8) supposedly stopped in December 1971, there apparently has been no significant decrease in monitored mercury levels over the last 3 years (16). Fairly high mercury concentrations were detected in certain predator fishes, such as muskellunge and Northern pike (16).

The city of Bismarck has experienced some problems with their sewage treatment and disposal; generally, waste treatment and state monitoring were regarded as poor (9). During the summer of 1974, a plant breakdown resulted in raw sewage entering the Missouri River (9).

During reservoir filling, new vegetation was continually being flooded resulting in excellent Northern pike spawning areas (9). Consequently lake production, especially of Northern pike, was initially high with peak production occurring around 1969 (16). However, land and water management practices (some of which are not under Corps control) have seriously reduced the biological productivity of the lake (16). Missouri River fish have apparently adapted to rising spring

water levels and a summer-flooded, vegetated, littoral nursery zone (16). Littoral vegetation has been seriously reduced or eliminated in many areas by (1) cattle grazing, especially when the water level is low, and (2) silt deposition on existing vegetation as a result of increased turbidity from bank erosion (due to ice and wave action and cattle trampling) and siltation from farming and grazing activities (8, 16). Lack of shoreline vegetation, in combination with a late spring pool rise and subsequent inadequate maintenance of water levels on key nursery areas, has resulted in a decrease in littoral plankton populations and poor production and survival of Northern pike and forage fishes (8, 9, 11, 16). Tremendous changes in water releases, dictated by power demands, flush plankton, nutrients and larval (and sometimes adult) fishes from the lake (16). Adequate plankton exists in many open-water areas but not in many of the important production and nursery areas (16). The productivity of the lower end of the reservoir is especially low (6).

The South Dakota Department of Game, Fish, and Parks (SDDGFP) believes that current stocking capabilities can not sustain the Northern pike fishery in Lake Oahe (8) and the North Dakota State Game and Fish Department (NDSGFD) indicated that they have conducted relatively little Northern pike and walleye stocking (9). Corps field personnel stated that efforts were being made to manage lake water levels such that every third year resulted in good natural Northern pike and walleye production (3). However, the NDSGFD and the SDDGFP have stocked Lake Oahe with various species including kokanee salmon, lake trout, paddle fish, Bonneville cisco and possum shrimp (6, 8, 9). The SDDGFP is currently evaluating stocking results and indicated that walleye, which have decreased because of forage fish shortages, are currently sustaining most of the sport fishing. Reproduction of yellow perch, which

are preyed upon by walleye, has been decreasing and hardly any reproduction was reported for carp, sucker, and buffalo; gizzard shad were present at one time but lake waters are currently too cold for their survival (8).

A shoreline vegetation survey is currently in progress by the University of South Dakota (6) and the Corps is in the process of zoning the lakeshore (6). The Corps also helps support the activities of and cooperates with North Central Reservoir Investigations (NCRI), USF&WS (3). NCRI, located on a 1-acre parcel of Corps-permitted land just below the dam (Table D.4.3), conducts extensive biological research relative to a number of north-central reservoirs, including Oahe (3).

3. Wildlife

Inundation of Missouri River bottomlands by Oahe Reservoir eliminated a large expanse of prime wildlife habitat. Preimpoundment field observations indicated that Ring-necked Pheasant, grouse, cottontail rabbit, mule and white-tailed deer, and various species of furbearers and waterfowl were the main game animals of the area (1). Wildlife experts believe that white-tailed deer were especially negatively affected by reservoir formation (6, 8, 9).

Some feelings of resentment apparently exist due to the lack of mitigation for SD bottomland hardwoods (generally considered prime wildlife habitat) inundated by the reservoir. Mitigation was reportedly somewhat hampered by landowner and county resistance to losing more lands in conjunction with the Corps' unwillingness to pursue the purchase of areas for wildlife mitigation, and SD's reluctance to enter into condemnation proceedings (6, 8). Due to increases in land values in certain areas desirable for mitigation and because of the length of time since project construction, acquisition to mitigate the loss of

Missouri River bottomlands appears improbable (8). Currently, the SDDGFP has very little interests on Oahe, except for the designation of waterfowl refuge areas on the lake and the two state-owned land parcels (Sutton and Koenig Areas). The 851-acre Sutton Area has poor access resulting in low public usage (8). State management practices at Sutton include the establishment of food plots and tree plantings (cedar, green ash, elm, Russian olive, lilac, plum, red cedar, and ponderosa pine). The establishment of winter cover was the main management objective for this parcel (8).

The 395-acre Koenig Area receives more public use than does the Sutton Area. Cooperative farming practices are utilized on the Koenig Area as a means to provide wildlife food (corn and sorghum). The state negotiates annual leases to farmers who harvest two-thirds of the crop; former landowners have lease priority and crop harvest procedures are established by the state. The state's one-third of the crop is left unharvested except that a portion may be harvested if an excess Crop results. Monies generated from the sale of the state's portion of the crop are returned to the state general fund and the SDDGFP must pay taxes on the lands they own. Both state-owned land parcels are open to public hunting (8).

SD State school lands, including the scattered acreage around project lands, are leased by sealed bid. About 98% of these lands are utilized for haying and grazing; most state school lands are not fenced (8).

Main reasons cited for the SDDGFP's lack of interest in Oahe project lands are (1) take lands are very narrow rendering management difficult, (2) the shoreline is generally steep, rough, and dry, and (3) the state has experienced problems at other Corps reservoirs (e.g., Lake Francis case: flooded recreation facilities) (8). The SDDGFP

believes, however, that recreational and wildlife potentials exist at many areas on the lake (8).

The Corps and the SDDGFP have cooperated in establishing alternating waterfowl refuge areas (which are closed to hunting) on the lake (3, 8). Wildlife populations (especially waterfowl) have also been enhanced by management practices on the Pocasse National Wildlife Refuge (NWR) (3). This refuge (a subimpoundment near Pollock, SD) consists of 2,540 acres licensed to the USF&WS by the Corps (Table D.4.3) (10). Project lands, excluding waterfowl refuge areas, Pocassee NWR, recreation areas, and project operations lands, are open to hunting in accordance with state and federal hunting regulations (3).

Fencing and tree planting are currently the only Corps wildlife management practices at the lake (3, 6) but a more specific wildlife management program is being designed (6). Approximately 800 acres of trees have been planted in shelterbelts around the lake (350 acres near the dam) (3) but apparently additional wildlife cover, especially for winter protection, is needed (8). Soil conditions render tree establishment difficult in certain areas on the project (3). The Corps has expended $177,075 on fish and wildlife at the project (10).

ND has assumed a major responsibility in the management of outgranted Corps lands (9) and 23,991.1 acres are currently licensed to the NDSGFD for fish and wildlife enhancement (Table D.4.3) (10). Of the 23,991 outgranted acres, approximately 18,000 acres are subject to flooding (10) and during 1971 about 13,000 acres were flooded (18). Approximately 6,000 to 7,000 acres are natural bottomland hardwoods (Table D.4.5), consisting of cottonwood, elder, ash, and oak (9). State management practices on outgranted lands include fencing, the elimination of grazing, tree planting (red cedar, ponderosa pine, buckeye, smooth sumac, locusts, and others), timber thinnings, and the construction of access roads. Sharecropping is also utilized to enhance

Table D.4.5. Classes of Lands at Oahe Reservoir Outgranted to the North Dakota State Game and Fish Department, 1971.[a]

Use	Acres
Cultivated	1,284.8
Hayland	1,238.0
Timber, brush, miscellaneous	8,468.2
Flooded	13,000.0
Total	23,991.0

[a] North Dakota State Game and Fish Department. 1971. Oahe Game Management Area 1971 annual progress report and 1972 management plan. Report No. A-948. Bismarck, North Dakota.

wildlife with sharecroppers cultivating state outgranted lands for 70% of the crop. The remaining crop is left in the field for wildlife or, if the state determines there is an excess which cannot be utilized by wildlife, a portion may be sold. Funds received from the state portion of marketed crops is turned over directly to the Corps and amounted to $3,384.23 in 1973 (9). Approximately 1,341 acres were cultivated in 1973; the two main crops were corn and oats (Table D.4.6) (9). Wildlife surveys (Ringed-necked Pheasant, deer), Turkey releases, and the compilation of hunter-kill data are additional NDSGFD management practices performed at Lake Oahe (9).

One of the two small land parcels owned by ND was purchased to provide better access to the lake. The other 30-acre site will be fenced and managed similar to lands leased from the Corps (9).

Problems have arisen between the Corps and the NDSGFD concerning allowable management practices on Corps lands (6, 9). Since state-licensed lands were not monumented for fenced, they were surveyed and fenced at state expense (9). State surveys revealed several areas where the Corps take line was under water, resulting in additional jurisdictional problems (9, 18). An additional problem currently exists concerning the manner in which the state would like to conduct cropsharing practices on lands licensed from the Corps; the state would like to utilize funds (to administer fish and wildlife programs on licensed areas) generated from the sale of any portion of the state's share of the crop (30%) which cannot be utilized by wildlife (6, 9). Currently the state is required to submit all such cropshare funds not utilized for wildlife food directly to the Corps. The initial Corps license allowed excess crop-generated funds to be utilized for the management of these licensed areas but in 1967 the license was amended (9). The NDSGFD contends that (1) these crops are needed for

Table D.4.6. Agricultural Use of Lands at Oahe Reservoir Outgranted to the North Dakota State Game and Fish Department, 1973.[a]

Agricultural Use	Acres
Corn	447.9
Oats	734.6
Barley	50.0
Millet	6.0
Flax	84.9
Grass seeding	18.0
Total Cultivated	1,341.4
Summer fallow	28.7
Hay	802.1
Idled crops (herbaceous cover)	728.0
Total non-crop	1,558.8
Grand Total	2,900.2

[a]Personal communication, 15 October 1974. North Dakota State Game and Fish Department, Bismarck, North Dakota.

wildlife food, (2) the state is helping replace prime wildlife habitat destroyed by project construction, (3) any crop-generated funds are needed for the development and management of areas licensed from the Corps, (4) the state is not making money from such operations since they must sign, fence, plant trees, and provide access to these Corps lands, and (5) the relinquishment of such funds results in double taxation (since the Corps returns 75% of these funds to the counties and the state must also make county payments (one percent of the assessed value of noninundated lands) in lieu of taxes (9). Further, the NDSGFD feels that they will be forced to reduce recreational improvements on lands licensed from the Corps if crop-generated funds cannot be retained. The NDSGFD renewed their license only on an annual basis (until 1974 when it was renewed for 5 years) in hopes that the Corps would reverse its decision concerning cropsharing practices. Annual renewal, however, rendered planning (both state and Corps) difficult (9). Failing to resolve this situation through normal Corps channels, the state is currently seeking a congressional solution (9).

Indians have unregulated hunting, fishing, and grazing rights on former Indian lands within the project boundary which are not specifically needed for project purposes (6, 9). Big-game resources on some tribal lands have been over exploited in ND (9).

4. Other Land Uses

Approximately 17,358 acres are outgranted for agricultural purposes (Table D.4.7) (10). All agricultural leases are restricted thus prohibiting the growing of price supported crops (10); haying is currently a common practice on outgranted agricultural lands (3). Approximately 29,576.5 acres of Corps lands are outgranted for grazing (Table D.4.7) plus Indians have grazing rights on former Indian lands which do not require additional lease instruments (10). Most all

Table D.4.7. Outgrants for Agriculture, Grazing, Rights-of-way, Housing, and Miscellaneous Purposes, Lake Oahe.[a]

Purpose	Grantee	Outgrants	Instrument	Rental		Annual Rent Paid ($)	Acreage	Investment	
				Date	Term (yrs)			To 1974 ($)	Planned ($)
Agriculture	Summary	112	Lease	----	2-4[b]	21,811	17,358.3	N/A[c]	N/A
Grazing	Cheyenne River Sioux	1	License	1969	10	0	809.5	N/A	N/A
	Others	109	Lease	----	2-4[b]	19,794	28,767.0	N/A	N/A
Rights of Way	Summary	132	Easement	----	20-indef.	43[d]	1,691.6	N/A	N/A
Housing	Dept. of HUD	1	Lease	1970	50	25	0.6	N/A	N/A
Miscellaneous[e]	Summary	22	Lease, Permit, Easement	----	1-indef.	1,443	4,502.2	N/A	N/A
Totals		377				43,116	53,129.2		

[a]Personal communication, 1974. Omaha District, Real Estate Division, Management and Disposal Branch. 30 September 1974, and Report of compliance inspection - outgrants, Omaha, Nebraska.

[b]Mostly 3 year terms.

[c]Not available.

[d]Excluding $1,086 for 12 outgrants for indefinite terms.

[e]Oil and gas, area maintenance, archeological investigation, borrow areas, sewer, waterline, land fill, etc.

agricultural and grazing leases are issued for 3 years and are awarded by competitive sealed bids which generally must equal the appraised lease value of the outgranted acreage (10).

Overgrazing has occurred on some lands around Oahe Reservoir (3, 6, 8, 9, 11, 14) (noted areas included sites just above the dam and north of Fort Yates) and in many areas cattle are allowed to graze the shoreline (3, 8, 9). The Corps has insufficient field personnel to adequately control overgrazing (especially on small areas) and cattle encroachment onto project lands (3), and apparently not enough consideration has been given to delineating suitable grazing areas and grazing rates (8, 9, 11). Many project lands have easily erodable, nonproductive soils and/or steep slopes (3, 6) that will not sustain intensive grazing pressures. Also, grazing and agricultural leases appear somewhat of a bargain, currently averaging $0.69 and $1.26 respectively per acre per year. ND's policy of subleasing Corps lands to former or nearby landowners appeared to create less local resentment than did the Corps' policy of competitive bidding (after dam closure) (9).

There are 132 outgrants for rights-of-way with easement terms ranging from 20 years to indefinite (10). A summary of outgrants for Lake Oahe is presented in Table D.4.8.

Approximately 110 - 120 homes have been built on private holdings near the river and/or reservoir just south of Bismarck and land values in this area have increased greatly (11, 19). Initially lot size was about 5 acres in one development but in order to increase sales, lot size was drastically reduced (11). Therefore, it appears that the number of houses in this area could potentially triple (11). Downstream areas seem less conducive to housing developments due to the steep nature of the reservoir banks in most areas (9).

Table D.4.8. Summary of Outgrants, Lake Oahe.

Purpose	Number	Annual Rent ($)	Acreage	Investment to 1974 ($)
Fish and Wildlife and Recreation -- Public Parks	11	0	27,087.0	N/A[a]
Recreation -- Quasi-Public	2	0[b]	56.0	N/A
Recreation -- Commercial	4	1,025.00	273.2	117,000
Agriculture, Grazing, Rights of Way, Housing, and Miscellaneous	377	43,115.58	53,129.2	N/A
Totals	394	44,140.78	80,545.4[c]	

[a] Not available.

[b] Less than $0.50.

[c] Manageable resource lands (from Table D.4.8) = 158,376 acres; difference in Manageable Resource Acreage and Total Outgranted Acreage = 77,830.6 acres with approximately 10,765 of these acres in Corps recreational sites. An additional estimated 21,700 acres of Corps lands are former Indian lands (these lands lie adjacent to Indian Reservations and most are grazed) and cannot be outgranted. Most of the remaining 45,366 acres lie between the spillway elevation pool (1,620 ft msl) and the average recreation pool elevation 1,607.5 ft msl. Due to collateral land uses, total outgranted acreage is somewhat inflated (Personal communication, November 1974. Omaha District, Real Estate Division, Management and Disposal Branch, Omaha, Nebraska).

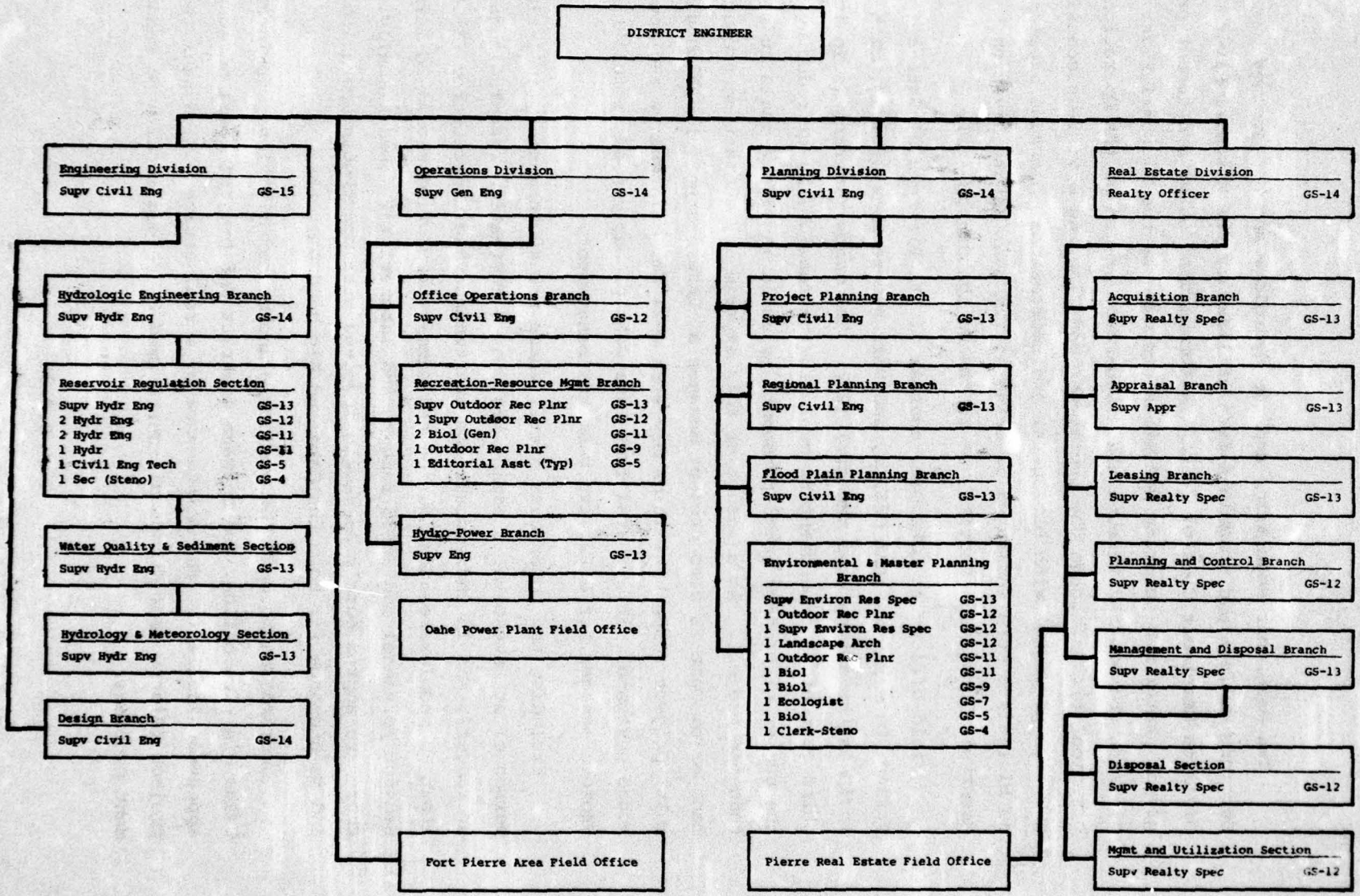
The value of lands adjacent to Corps holdings has generally not increased significantly as a result of reservoir formation (8, 13), except in areas suitable for (1) housing (mostly above the reservoir) (9), or (2) irrigation (where agricultural lands lie adjacent to gradual and low-sloping reservoir banks) (6, 12). Apparently the remoteness of the reservoir, in combination with the generally rough nature of the shoreline, renders most lands adjacent to the project boundary undesirable for development especially in the absence of high population pressures.

5. Resource Use Controls

Overall planning, including master plan formulation, is the responsibility of the Environmental and Master Planning Branch, (6), which contains several biologists, recreation planners, and an ecologist; this branch is headed by a supervisory environmental resource specialist (GS-13) (Figure D.4.2). After origination, plans then go to the Design Branch of the Engineering Division for formulation into a design memorandum. Plan feasibility is then evaluated by the Recreation-Resource Management Branch, Operations Division (6) which contains two biologists and three recreation planners (20). The impact and further evaluation of proposed plans are then made by the Planning Division before submittal to the Missouri River Division for approval. Recreation-resource proposals may also originate in the Recreation-Resource Management Branch and be submitted to the Environmental and Master Planning Branch and/or the Design Branch (6).

Wildlife management plans generally originate in the Operations Division and are then submitted to the Planning Division. If applicable, the Real Estate Division will also become involved in wildlife planning and the Engineering Division is generally kept abreast of wildlife developments (6).

Figure D.4.2. Recreation-Resource Management Interrelationships - Omaha Engineer District.



The Reservoir Regulation and the Hydrology and Meteorology Sections collect and formulate data utilized by the Missouri River Division Reservoir Control Center in formulating water management programs. Water manipulation decisions are made by the Missouri River Division and enacted through the Hydro-Power Branch of the Operations Division (6). Although the Operations and Planning Divisions contain numerous personnel with biological and recreational planning expertise, no biologists were indicated as being in the Real Estate Division, Reservoir Regulation Section, or in the Design Branch (20).

Field offices at Lake Oahe consist of the Pierre Real Estate Office, Oahe Power Plant Office, and Fort Pierre Area Office (which includes the acting area manager) (20). The Omaha District is in its third year of an experiment to evaluate the feasibility of reducing the number of project level personnel by utilizing individuals at more than one project. As a result of this experiment, the acting project manager at Oahe is also project manager at Lake Sharpe (3). Although multi-project responsibilities may work well for maintenance and powerhouse personnel, it appeared that Lake Oahe probably needs a full-time project manager for effective resource management.

Excluding the powerhouse staff, there are 25 permanent, full-time personnel at Lake Oahe: 5 administrative, 5 recreation resource managers or rangers, and 15 individuals for maintenance and construction (3). About 60 people are added during the summer: approximately 25-30 maintenance personnel and 30-35 rangers and laborers (3). Additionally, there are approximately 38 people involved with powerhouse operation and maintenance for both the Oahe and Big Bend Dams (3).

Cooperation between the various branches and divisions within the Omaha District office, and between district and project level personnel, appeared excellent. The maintenance of a real estate office near the project (Pierre Real Estate Office) seemed to reduce local land management problems.

Corps-state communications appeared good. Even though the Corps may not be able to comply with every request, they appeared to be aware of areas of concern. Fishery management programs and problems at Lake Oahe cannot be considered independently of resource considerations at other Missouri main-stem reservoirs. Lake characteristics and problems may be different on divergent ends of the reservoir (9), and the fact that Lake Oahe lies within two states further requires a coordinated approach to resource management. Various entities have been formed to help insure the most efficient public use and coordinated management of existing resources at the lake (3, 6). The Reservoir Control Center (Omaha) formulates main-stem reservoir operating plans which are coordinated with various state and federal agencies via a coordinating committee (3). Periodic Oahe-Big Bend Interagency Council and Fisheries Ad Hoc Committee meetings facilitate the communication of problems and management program objectives and enhance management coordination and problem solving (3, 6, 8, 9). The formation of the Missouri Basin Interagency Committee (MBIAC) has helped schedule and coordinate both state and federal efforts on the Missouri River Program (3). The SDDGFP and the NDSGFD indicated they would like more of an opportunity to review and contribute to Corps management plans, similar to the Corps' review opportunity of management plans for lands licensed to the state (8, 9). These agencies also feel they are closer to many of the local issues and thus in a better position (than the Corps) to rectify many problems (8, 9).

Indians in certain areas have harassed visitors, resulting in reduced recreational opportunities on the western side of the lake (3, 6). Reservation lands are under the jurisdiction of the Bureau of Indian Affairs and the jurisdiction of local officials is not completely clear (3). Harassers are difficult to apprehend because the violations tend to occur randomly at remote sites (3). Law enforcement by local

agencies is variable but important due to the expanse of project lands and small ranger staff (3). Some law enforcement officers apparently feel that the Corps does not contribute to their salary and thus are reluctant to render assistance (3, 6); other officers seem more cooperative (3). Only relatively minor violations have occurred on Corps lands, mainly thefts and vandalism. Both the U. S. Coast Guard and SD and ND officials patrol the reservoir (3).

Some problems exist with the control of off-the-road vehicles (3, 8) but the Corps is helping to alleviate this problem by designating specific off-the-road vehicle areas (3). Illegal parking of trailers on Corps lands is a recurring problem (approximately 60-80 incidents per year) (3, 6). Cases are handled on an individual basis by (1) field contact, (2) letter, and (3) a warning citation (if necessary). These problems are generally solved at the field level, even though some trailer owners feel compelled to complain to their congressmen (3).

As a result of differential acquisition dates, miscalculations of shoreline configuration, and bank erosion, the take line in certain areas on the upper end of the reservoir is at times inundated and in many other areas the freeboard is extremely narrow (3, 6, 9). Additionally, the lack of complete monumentation (25% of the boundary has been marked (6)) has resulted in jurisdictional problems and promoted landowner confusion in some areas (9). Undefined or extremely narrow banks of Corps land seem difficult to administer.

Potential residential development problems adjacent to project lands on the northern end of the reservoir (south of Bismarck) are (1) sewage contamination of aquifers and the reservoir (9, 11, 21) (poor soil conditions may enhance this problem), and (2) the possibility of homes becoming flooded (11). Although Morton, Sioux, and Burleigh Counties currently have some basic land use regulations or ordinances

(21), indications were that current regulations were not very effective (9, 11). In SD, Dewey and Ziebach Counties currently have some land use plans or regulations and all counties are required by state law to develop comprehensive plans by 1 July 1976 (13).

Archeological sites within the Oahe Reservoir area were investigated under the Inter-Agency Archeological Salvage Program (5). The National Park Service, in conjunction with the Smithsonian Institution, administered the program on a national scale. Field investigations were conducted by units of the Smithsonian Institution and by state and private agencies, with the Corps and providing support (5). More than 350 archeological sites were found within the Oahe Reservoir project area. Although only a small percentage of the sites were salvaged due to time and fund shortages (22), enough was accomplished to characterize prehistoric life in the area (5).

III. KEY FINDINGS

A. Recreation

1. Corps recreation sites appeared well-kept and only minor examples of inadequate maintenance were noted. Litter is a problem at the numerous undeveloped and uncontrolled sites, especially on the upper end of the lake. Informational signs appeared inadequate (both in number and information displayed) at some sites on the lower end of the reservoir. Access to the reservoir is a problem at many areas which are not located near towns, especially on the western side of the lake.

2. During 1973, 2,032,400 recreational days of use were recorded at Lake Oahe. The last detailed, 24-hour, visitor information survey was conducted around 1965.

3. Indians in certain areas have harassed visitors, resulting in reduced recreational opportunities on the western side of the lake. Reservation lands are under the jurisdiction of the Bureau of Indian Affairs and the jurisdiction of local officials is not completely clear. Harassers are difficult to apprehend because the violations occur randomly at remote sites. Law enforcement by local agencies is variable but important due to the expanse of project lands and small ranger staff. Some law enforcement officers apparently feel that the Corps does not contribute to their salary and thus are reluctant to render assistance; other officers seem more cooperative. Only relatively minor violations have occurred on Corps land, mainly thefts and vandalism.

4. Some problems exist with the control of off-the-road vehicles but the Corps is helping to alleviate this problem by designating specific off-the-road vehicle areas. Illegal parking of trailers on Corps lands is a recurring problem (approximately 60-80 incidents per year). Cases are handled on an individual basis by (1) field contact,

(2) letter, and (3) a warning citation (if necessary). These problems are generally solved at the field level, even though some trailer owners feel compelled to complain to their congressmen.

B. Fish and Wildlife

1. Land and water management practices (some of which are not under Corps control) have seriously reduced the biological producitivity of the lake. Missouri River fish have apparently adapted to rising spring water levels and a summer-flooded, vegetated, littoral nursery zone. Littoral vegetation has been seriously reduced or eliminated in many areas by (1) cattle grazing, especially when the water level is low, and (2) silt deposition on existing vegetation as a result of increased turbidity from bank erosion (due to ice and wave action and cattle trampling) and siltation from farming and grazing activities. Lack of shoreline vegetation, in combination with a late spring pool rise and subsequent inadequate maintenance of water levels on key nursery areas, has resulted in a decrease in littoral plankton populations and poor production and survival of Northern pike and forage fishes. Tremendous changes in water releases dictated by power demands flush plankton, nutrients and larval (and sometimes adult) fishes from the reservoir. Adequate plankton exists in many open water areas, but not in the important production and nursery areas.

2. Fencing and tree planting are currently the only Corps wildlife management practices at Lake Oahe but a more specific wildlife management program is being designed. Approximately 800 acres of trees have been planted in shelterbelts around the lake (350 acres near the dam) but apparently additional wildlife cover, especially for winter protection, is needed. Soil conditions render tree establishment difficult in certain areas on the project.

3. Some feelings of resentment apparently exist due to the lack of mitigation for SD bottomland hardwoods (generally considered prime wildlife habitat) inundated by the reservoir. Mitigation was reportedly somewhat hampered by landowner and county resistance to losing more lands, in conjunction with the Corps' unwillingness to pursue the purchase of areas for wildlife mitigation, and SD's reluctance to enter into condemnation proceedings. Due to increases in land values in certain areas desirable for mitigation and because of the length of time since project construction, acquisition to mitigate the loss of Missouri River bottomlands appears improbable. Currently, the SDDGFP has very little interests on Oahe, except for two state-owned land parcels and the designation of waterfowl refuge areas on the lake. Main reasons cited for SDDGFP's lack of interest in Oahe Corps lands are (1) take lands are very narrow rendering management difficult, (2) the shoreline is generally steep, rough, and dry, and (3) the state has experienced problems at other Corps reservoirs (e.g., Lake Francis Case: flooded recreation facilities). The SDDGFP does believe, however, that recreational and wildlife potentials exist at many areas on the lake. The NDSGFD has assumed a major responsibility in the management of outgranted Corps lands (23,991.1 acres) for fish and wildlife enhancement.

4. Indians have unregulated hunting, fishing, and grazing rights on former Indian lands within the project boundary which are not specifically needed for project purposes. Big-game resources on some tribal lands have been over exploited in ND.

C. Corps and Contiguous Land Use

1. As a result of differential acquisition dates, miscalculations of shoreline configuration, and bank erosion, the take line in certain areas on the upper end of the reservoir is at time inundated and in many other areas the freeboard is extremely narrow. Additionally, the

lack of complete monumentation (25% of the boundary is marked) has resulted in jurisdictional problems and promoted landowner confusion in some areas. Undefined or extremely narrow bands of Corps land seem difficult to administer.

2. Siltation is a problem at the upper end of the reservoir where river waters meet the reservoir pool although sediment deposition is probably greatest in the lower third of the reservoir. Also, changes in pool elevation often result in the accumulation of dead trees and other debris, especially on the upper end of the lake.

3. Mercury pollution apparently has resulted from Home-Stake gold mining operations. Although mercury-contaminated discharges (which entered the reservoir via the Belle Fourche and Cheyenne Rivers) supposedly stopped in December 1971, there apparently has been no significant decrease in monitored mercury levels over the last 3 years. Fairly high mercury concentrations were detected in certain predator fishes, such as muskellunge and Northern pike.

4. Potential residential development problems exist on the upper end of the reservoir (south of Bismarck) adjacent to both the Missouri River and Corps project lands. Approximately 110 - 120 homes have already been constructed on private lands in this area. Building lot size has been reduced in one development to increase lot salability and the current number of private homes could triple during the next few years. Potential problems are (1) sewage contamination of aquifers and the reservoir (poor soil conditions may enhance this problem), and (2) the possibility of homes becoming flooded. Although Morton, Sioux, and Burleigh Counties (ND) currently have some basic land use regulations or ordinances, indications were that current regulations were not very effective. Downstream areas seem less conducive to housing developments due to the steep nature of reservoir banks at most sites. All

counties in SD are required by law to develop comprehensive plans by 1 July 1976.

5. The value of lands adjacent to Corps holdings has generally not increased significantly as a result of reservoir formation, except in areas suitable for (1) housing (mostly above the reservoir), or (2) irrigation (where agricultural lands lie adjacent to gradual and low-sloping reservoir banks). Apparently the remoteness of the reservoir, in combination with the generally rough nature of the shoreline, renders most lands adjacent to the project boundary undesirable for development, especially in the absence of high population pressures.

6. The city of Bismarck has experienced some problems with their sewage treatment and disposal; generally, waste treatment and state monitoring were regarded as poor. During the summer of 1974, a plant breakdown resulted in raw sewage entering the Missouri River.

7. The Oahe Irrigation Project, currently under construction by the BuRec, will remove water through the dam for the irrigation of sugar beet and small grain crops. Two other smaller irrigation projects have also been proposed in SD. Additional water withdrawals during the dry summer season may affect water levels and management practices, and thus recreational opportunities and biological resources, at the reservoir.

D. Real Estate Programs and Practices

1. Problems have arisen between the Corps and the NDSGFC concerning allowable management practices on Corps lands. Since state-licensed lands were not monumented or fenced, they were surveyed and fenced at state expense. State surveys revealed several areas where the Corps take line was under water, resulting in additional jurisdictional problems. An additional problem currently exists concerning the manner in which the state would like to conduct cropsharing practices on lands

licensed from the Corps; the state would like to utilize funds (to administer fish and wildlife programs on licensed areas) generated from the sale of any portion of the state's share of the crop (30%) which cannot be utilized by wildlife. Currently the state is required to submit all such cropshare funds not utilized for wildlife food directly to the Corps. The initial Corps license allowed excess crop-generated funds to be utilized for the management of these licensed areas but in 1967 the license was amended. The NDSGFD contends that (1) these crops are needed for wildlife food, (2) the state is helping replace prime wildlife habitat destroyed by project construction, (3) any crop-generated funds are needed for the development and management of areas licensed from the Corps, (4) the state is not making money from such operations since they must sign, fence, plant trees, and provide access to these Corps lands, and (5) the relinquishment of such funds results in double taxation (since the Corps returns 75% of these funds to the counties and the state must also make county payments, one percent of the value of noninundated lands) in lieu of taxes. Further, the NDSGFD feels that they will be forced to reduce recreational improvements on lands licensed from the Corps if crop-generated funds cannot be retained. The NDSGFD renewed their license only on an annual basis (until 1974 when it was renewed for 5 years) in hopes that the Corps would reverse its decision concerning cropsharing practices. Annual renewal, however, rendered planning (both state and Corps) difficult. Failing to resolve this situation through normal Corps channels, the state is currently seeking a congressional solution.

2. Overgrazing has occurred on some lands around Oahe Reservoir (noted areas included sites just above the dam and north of Fort Yates) and in many areas cattle are allowed to graze the shoreline. The Corps has insufficient field personnel to adequately control overgrazing (especially on small areas) and cattle encroachment onto project lands,

and apparently not enough consideration has been given to delineating suitable grazing areas and grazing rates. Many grazed areas have easily erodable, nonproductive soils and/or steep slopes that will not sustain significant grazing pressures. Also, grazing and agricultural leases appear somewhat of a bargain, currently averaging $0.69 and $1.26 respectively per acre per year. ND's policy of subleasing Corps lands to former or nearby landowners appeared to create less local resentment than did the Corps' policy of competitive bidding (after dam closure).

E. Corps Organization

1. The Omaha District is in its third year of an experiment to evaluate the feasibility of reducing the number of project level personnel by utilizing individuals at more than one project. As a result of this experiment, the acting project manager at Oahe is also project manager at Lake Sharpe. Although multi-project responsibilities may work well for maintenance and powerhouse personnel, it appeared that Lake Oahe probably needs a full-time project manager for effective resource management.

2. Cooperation between the various branches and divisions within the Omaha District office, and between district and project level personnel, appeared excellent. The maintenance of a real estate office near the project (Pierre Real Estate Office) seemed to reduce local land management problems.

3. Corps-state communications appeared good. Even though the Corps may not be able to comply with every request, they appeared to be aware of areas of concern. Lake characteristics and problems may be different on divergent ends of the reservoir, and the fact that Lake Oahe lies within two states further requires a coordinated approach to resource management. Various entities have been formed to help

insure the most efficient public use and coordinated management of existing resources at the lake. The various interagency council and committee meetings facilitate the communication of problems and policies and enhance management coordination and problem solving.

4. The NDSGFD and the SDDGFP indicated they would like more of an opportunity to review and contribute to Corps management plans, similar to the Corps' review opportunity of management plans for lands licensed to the state. These agencies also feel they are closer to many of the local issues and thus in a better position (than the Corps) to rectify many problems.

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5. COLEBROOK RIVER LAKE

New England Division

NA[a]

Connecticut and Massachusetts

I. SETTING

A. Location

Colebrook River Lake is located in rural northwestern Connecticut and southwestern Massachusetts in the towns of Colebrook, CT and Sandisfield and Tolland, MA. The project is situated in the Farmington River watershed on the West Branch of the Farmington River, and is the fourth largest tributary watershed in the Connecticut River Basin (1). The dam site is approximately 2 miles (mi) south of the MA-CT state line, is 4 mi upstream from Riverton, CT and overlooks the Charles A. Goodwin Dam which is located 1.5 mi downstream.

Access to Colebrook lake is provided by Route 8 (CT and MA 8) which parallels the west side of the lake (Figure D.5.1).

B. Authorization and Purposes

The Colebrook River Lake project was authorized by the Flood Control Act of 1960 (PL 86-645). The project was authorized for flood control and water supply.[b]

C. Features

Glaciation has modified the topography by rounding and smoothing the crests of hills and ridges, steepening some of the valley walls,

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[a] District not applicable.

[b] The Secretary of the Army has been authorized, since 1944, to construct, maintain, and operate public park and recreational facilities at water resource development projects. 16 U.S.C. 460d. Since 1946, the Army Corps of Engineers has been required, when consistent with a project's primary purposes, to make adequate provision for the conservation, maintenance, and management of wildlife resources. 16 U.S.C. 663(a).

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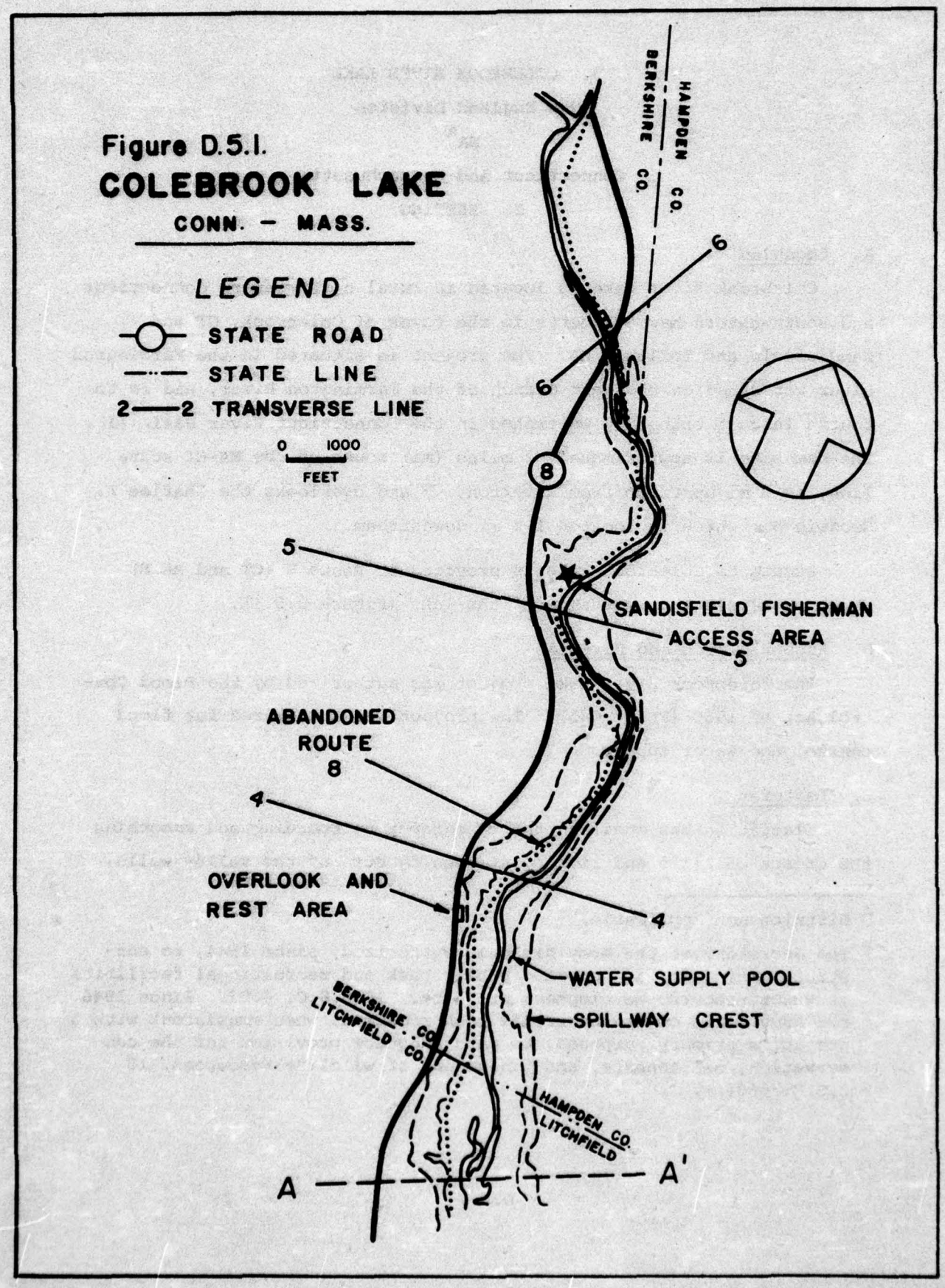
Figure D.5.1.
COLEBROOK LAKE
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BERKSHIRE CO.
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SANDISFIELD FISHERMAN ACCESS AREA
5
ABANDONED ROUTE 8
4
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OVERLOOK AND REST AREA
WATER SUPPLY POOL
SPILLWAY CREST
BERKSHIRE CO.
LITCHFIELD CO.
HAMPDEN CO.
LITCHFIELD
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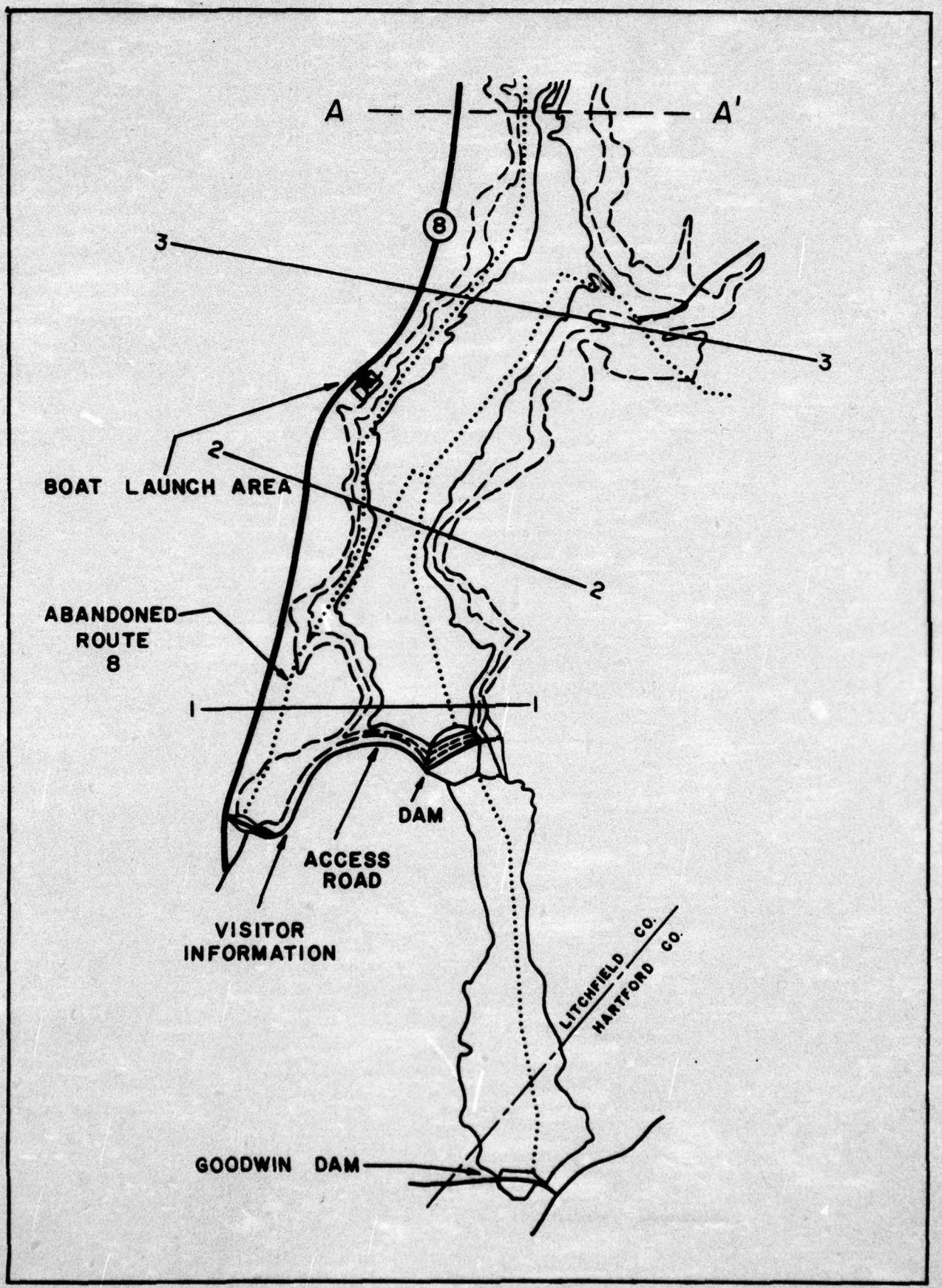
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BOAT LAUNCH AREA
ABANDONED ROUTE 8
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DAM
ACCESS ROAD
VISITOR INFORMATION
LITCHFIELD CO.
HARTFORD CO.
GOODWIN DAM

D.5.2.A

and filling the valley bottoms. Between exposed bedrock, a thin veneer of till covers the upper slopes of the hills and ridges (1).

The steep slopes bordering the lake are vegetated by a dense, second-growth deciduous forest containing birch, maple, oak, hickory, and poplar. This growth is interspersed with scattered stands of hemlock, fir, and white pine.

Following severe flood damage in 1955, the Corps proposed a system of three projects, including the Colebrook project, in the Farmington watershed to control drainage of 141 square mi. The Colebrook project assumes approximately 85% (119 square mi) of flood control for this system; this project was to reduce flooding in the downstream communities along the Farmington River and to help desynchronize flood flows in the Connecticut River. However, the flood control purpose of the project has been compromised by downstream communities which have permitted encroachment upon the flood plain (1).

Colebrook Dam is operated by the Corps with the Metropolitan District Commission (MDC) assuming part of the operating costs. The reservoir has a maximum storage capacity of 97,700 acre-ft, of which 50,200 acre-ft are available for flood control. Water supply capabilities provide 30,700 acre-ft for future use by the MDC. Fishery conservation pools consist of 15,000 acre-ft (1). Additional features are shown on Table D.5.1.

Water rights agreements have been made between downstream riparian owners and the Corps, MDC, and CT. The Corps may only store that portion of the inflow which exceeds 150 cubic ft per second (cfs) and must pass at all times a minimum flow of 50 cfs to satisfy downstream riparian agreements. Releases from the reservoir are controlled by the Corps, MDC, and the Connecticut Board of Fisheries and Game (1).

Table D.5.1. Resource Statistics, Colebrook River Lake.

Date of Authorization		1960[a]
Rights in Land Acquired Between		1967 to 1974[b]
Date of Impoundment		Feb., 1969[c]
Date of Full Operation		April, 1969[c]
Lake Size When Water Level is at:		
Spillway Elevation (761 ft msl)[a]		1185 acres[b]
Normal Pool Elevation (N/A)[d]		750 acres[b]
Normal Minimum Pool Elevation (N/A)		370 acres[b]
Minimum Design Elevation (641 ft msl)[a]		90 acres[b]
Water Fluctuation - Summer Recreation Season		65-70 feet[b]
Shoreline at Normal Pool		13 miles[c]
Held in Fee Simple by Corps of Engineers		13 miles[c]
Land Area Managed by Corps of Engineers		
Total Land in Project		1,411 acres[b]
Fee Title in U. S.	352 acres[b]	
Easements	1,059 acres[a]	
Project Operation Lands		179 acres[a]
Manageable Resource Lands		173 acres[e]

[a]New England Division. 1974. Environmental assessment of the operation and maintenance of Colebrook River Lake. Waltham, Massachusetts.

[b]Personal communication, 18 November 1974. New England Division, Real Estate and Hydrology Divisions, Waltham, Massachusetts.

[c]RRMS. 1973.

[d]Not available.

[e]Total project land minus (Land Flooded at Normal Pool + Project Operation Lands + Easements).

II. LAND USE, RECREATION, AND FISH AND WILDLIFE CONSIDERATIONS

A. Analytical Unit

The project area is approximately 7 mi long and 0.5 mi wide and is bordered by steep rugged slopes with elevations ranging from 700 to 1,500 feet mean sea level (ft msl) (Figure D.5.2). The Corps boundary extends to the 790 ft msl contour line and the majority of lands above the Corps boundary to the bordering ridge tops is controlled by the MDC (2). Consequently the Corps and the MDC control over the project area, combined with the steep rugged slopes, discourages development and insures the continuance of the present setting.

B. Ownership

The bulk of Corps lands were obtained from various governmental agencies of CT. Of the 1,925.31 acres shown on the real estate maps, 83% originated from state ownership while the remainder was obtained from private landowners. The average value paid by the Corps for fee and easement lands was $115 per acre (3). Total land acquired by the Corps was about 2,021 acres; approximately 1,646 acres are easements for flowage and construction purposes on land owned by the MDC and the Connecticut Department of Environmental Protection (CDEP).

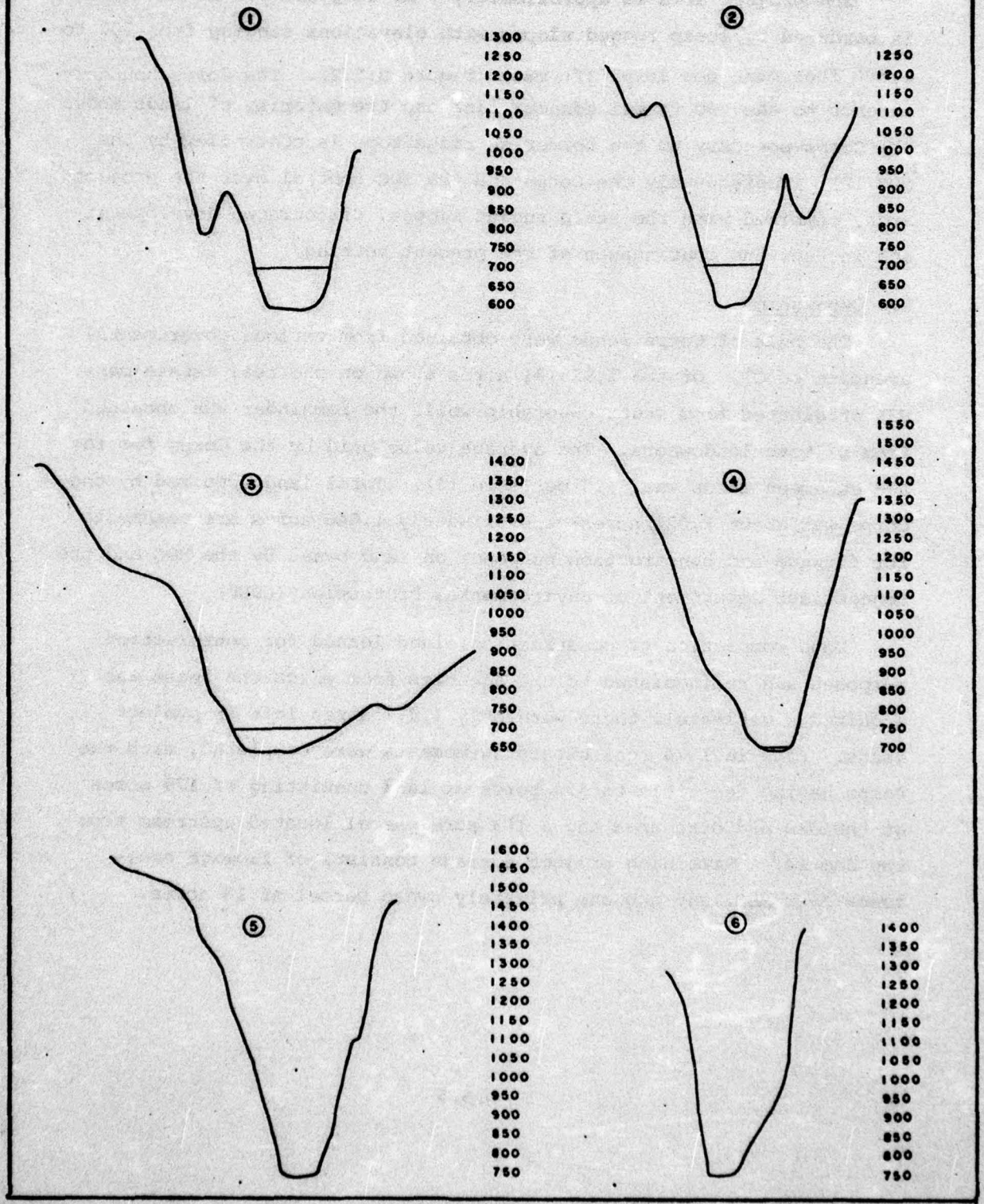
Upon completion of construction, land leased for construction purposes was relinquished to the agencies from which the lease was acquired. Ultimately there were only 1,411 acres left in project lands. Late in 1974 real estate agreements were completed, with the Corps having fee title to 352 acres of land consisting of 179 acres at the dam and dike area and a 173 acre parcel located upstream from the dam (4). Remaining project acreage consists of flowage easements over MDC land and one privately owned parcel of 18 acres.

Figure D.5.2

TRANSVERSE PROFILES

COLEBROOK LAKE

VERTICAL EXAGGERATION 10:1



C. Resource Management

1. Recreation

The opportunity to develop diverse, water-oriented recreation in the upper Farmington River was foregone when the decision was made to construct a flood control dam at the Colebrook River site (5). The USF&WS favored construction of a lake in New Boston, MA., a site identified by the Corps that would meet flood control requirements (5). The Colebrook damsite was within a newly completed MDC water supply lake (Goodwin Dam). Construction at this site required a Corps commitment to replace the water supply storage taken by Colebrook Dam. A Corps supply storage was incorporated in the project (the full proportional share was paid for by the MDC). CT's stringent restrictions were applied on the use of reservoir waters and lands.

There are four recreational or access areas at Colebrook River Lake, all of which are non-fee areas. A visitor and information center is incorporated within the dam tender's office providing public restrooms and informational brochures about the project. The area is immaculately maintained. The overlook area on the dam provides parking for approximately 30 automobiles, and a view of the Colebrook project and the Goodwin reservoir. The access road to these facilities is paved and is easily accessible from CT 8.

The boat launching ramp and associated parking lot is located approximately 1.5 mi north of the dam. This facility was constructed to mitigate the loss of a comparable access point on the Goodwin Reservoir (6). The access road to the boat ramp is paved and is easily accessible from CT 8. The parking lot can accommodate 50 cars and 75 car-trailer combinations. The boat ramp, however, was constructed facing the prevailing winds rendering launching difficult (7). Trash containers and a chemical toilet are provided at this site.

Construction cost for the boat ramp and parking lot was $260,000 plus $190,000 for shore protection around the facility (4).

Approximately 5.5 mi north of the boat ramp old Route 8 and new Route 8 intersect. Old Route 8 provides access for shoreline fishing and the launching of light boats and canoes. Supporting facilities at this site includes two chemical toilets and refuse containers.

Visitation figures are obtained from one traffic counter located at the entrance to the damsite. Percentage of activity use is performed by visual estimations (7). An estimation of recreational days of use in 1973 were reported as 103,000. July was reported as the most active month having 15,200 recreational days of use. Greatest activity was reported as sightseeing and fishing which accounted for 73% and 28% respectively of activity use (8).

There are no outgrants to the Connecticut Division of Parks and Recreation (CDPR) at Colebrook River Lake. Additionally an interview with CDPR revealed that CT has not expanded its park system since the 1940's due to budgeting restrictions (9).

The MDC controls the major portion of properties around the project and is empowered by its charter to construct, operate, and maintain recreational facilities. The MDC developed and operates recreational facilities at the Compensating Reservoir which is approximately 7 mi southeast of Colebrook River Lake. The MDC believes that development at this area has fulfilled their recreational responsibilities in the region it serves. Subsequently, the MDC does not encourage overnight use or picnicking around the Colebrook project because they feel that these activities would conflict with CT use restrictions placed on designated public water supplies (2). Activities allowed on and around the Colebrook Reservoir include fishing, boating, sight-

seeing, and to some degree hunting. Water contact sports, such as swimming and water skiing, are prohibited by the Connecticut Department of Health (CDH) (10).

Occasionally white water canoe races sponsored by civic clubs are held below Goodwin Dam. To obtain sufficient water for this activity, the Corps releases water into the Goodwin Reservoir from Colebrook River Lake upon request from the MDC (11).

2. Lake Resources

The waters in Colebrook River Lake are classified by CT as AA, a classification applied to waters that are existing or proposed sources of drinking water (12). Restrictions imposed by the CDH for protection of such waters guarantees the integrity of waters placed in this class. Consequently, there are no water quality problems and none are anticipated for Colebrook River Lake (10).

The Connecticut Division of Fish and Wildlife (CDFW) reports that natural fish productivity is good within the lake and since impoundment the area has had increased production. Common sport fish include trout, large and smallmouth bass, pickerel, and yellow perch.

Although natural reproduction of trout takes place in the lake, it is heavily stocked by the fishery agencies of MA and CT, as well as the USF&WS. Interviews with the CDFW revealed that stocking of trout by these agencies is accomplished without interagency cooperation or planning (1). Pool level increases resulting from heavy rains occurring in late spring and early summer are released through bottom discharge, depleting cold waters in the reservoir which are necessary for trout survival. Subsequently, trout populations in the reservoir are reduced (13).

Two 5,000 acre-foot water storage increments are provided for enhancement of the fishery between Goodwin Dam and the Connecticut

River. One increment is stored from regular river flows to support the shad runs; the second is stored from flood waters and released on demand from the CDFW to assist brown trout runs. A 5,000 acre-foot increment constitutes a minimum conservation pool that may not be withdrawn from the lake. This conservation pool serves to mitigate the stream fishery inundated by the reservoir (1). The full impact of lake operations on the fisheries will not be realized until the MDC begins to draw down the water supply increment leaving only the minimum conservation pool to support the lake fishery.

3. Wildlife

Very few waterfowl are reported in the area. Shallow zones, necessary for dabbling ducks as feeding areas, are scarce. Waterfowl occur during the migratory periods utilizing the lake for resting. The damtender has designated an abandoned beaver pond as a wildlife area. This area is adequate to support some waterfowl populations and is quite suitable for wood ducks.

Corps holdings are too small for an intensive management program for big game. However small game, such as rabbits, Grouse, Woodcock, and squirrel, could be managed on MDC land with MDC cooperation.

4. Other Land Use

Due to the small amount of acreage administered by the Corps there is not a forestry management program.

Land use over the majority of the lands which border Colebrook River Lake are controlled by MDC. As a result, the setting of the lake has changed little since impoundment and there is very little likelihood that the setting will change significantly.

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STUDY OF LAND USE FOR RECREATION AND FISH AND WILDLIFE ENHANCEM--ETC(U)
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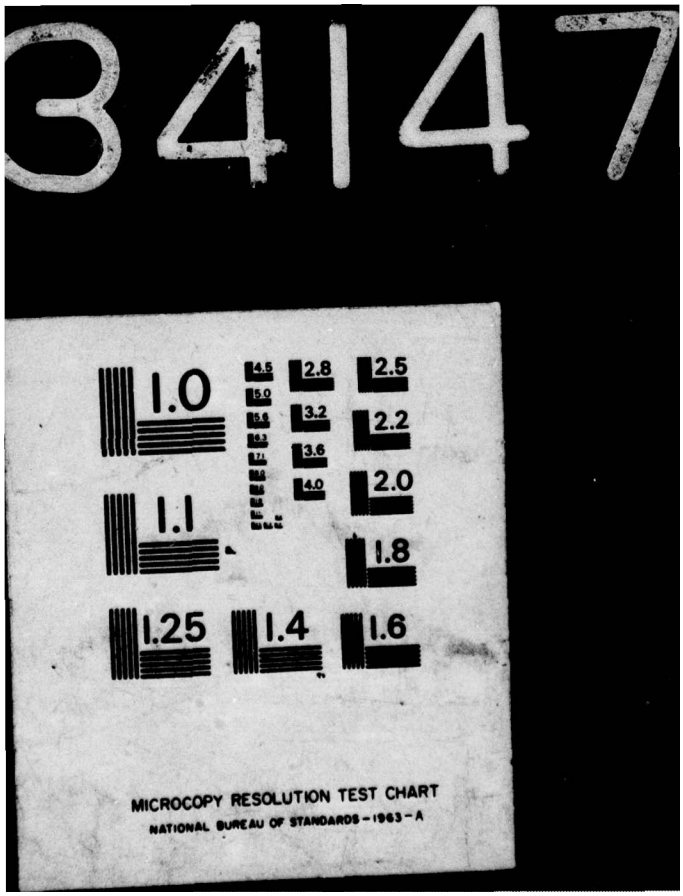
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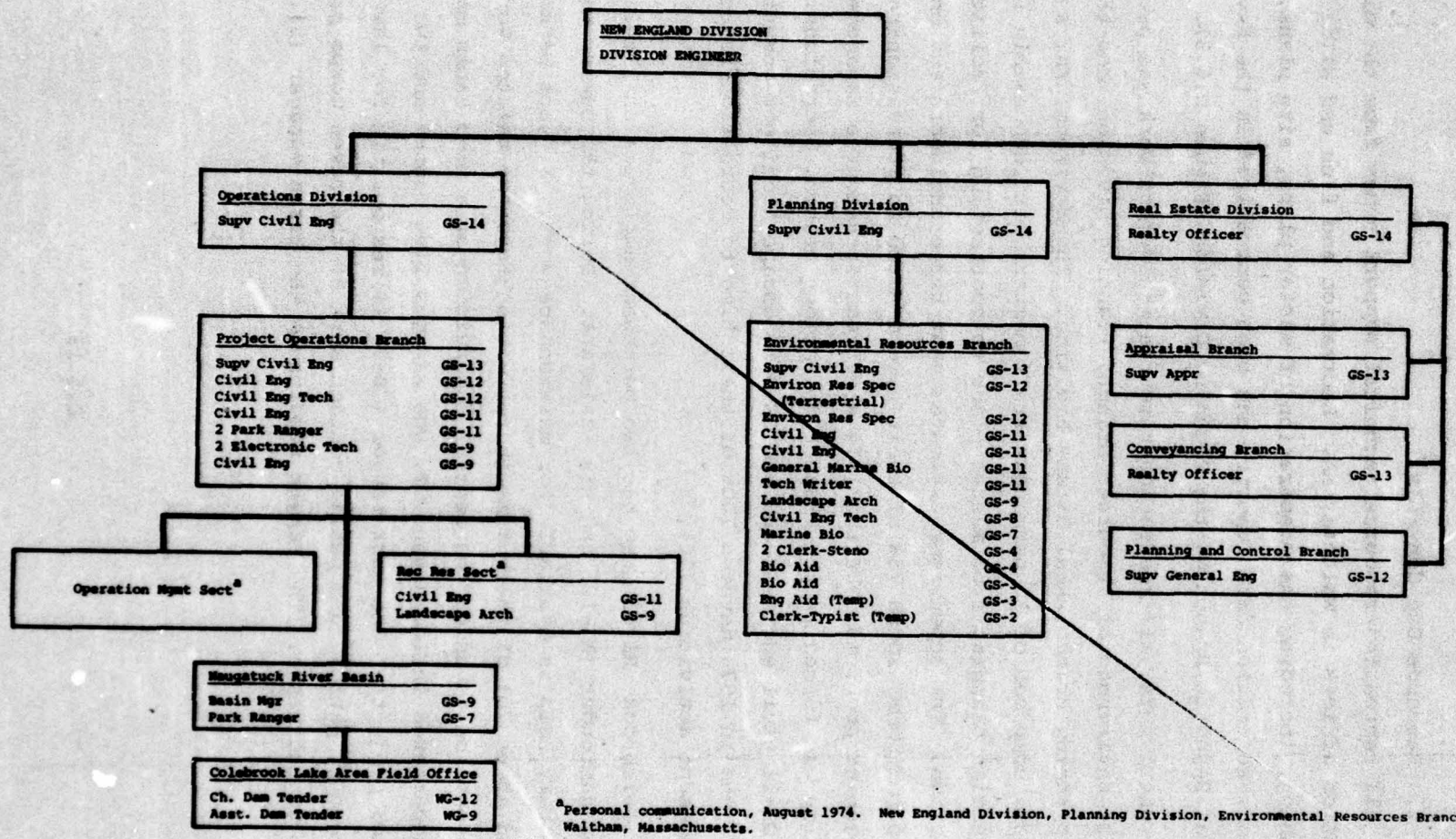
5. Resource Use Controls

All recreation-resource technical support comes from the district-division offices in Waltham, MA. Recreation and fish and wildlife planning, including the preparation of master plans, site plans, and outdoor recreation data reports, has been centralized in the Environmental Resource Branch of the Planning Division (Figure D.5.3).

Until 1974, all recreation-resource management work was performed by the Environmental Resources Branch, Planning Division, and the Conveyancing Branch, Real Estate Division. The Environmental Resources Branch, composed of 14 permanent staff members, is responsible for all recreation planning from master plans to contracting for facility construction. The supervisor estimates that three engineers and one landscape architect spend 75% of their time devoted to recreation-resource management problems. During 1974 a Recreation-Resource Management Section was formed in the Project Operations Branch, Operations Division. One GS-11 civil engineer and one GS-9 landscape architect comprises the staff and in 1974 devoted 100% of their time to recreation-resource management activities (14).

Colebrook River Lake has two permanent employees on site; the chief damtender (WG-12) and his assistant. During the summer months temporary help is available for maintenance work. Project personnel spend about 70% of their time in recreation-resource related work. This section is under the general supervision of a GS-9 basin manager, headquartered in Thomaston, CT, who manages five manned and two unmanned projects. One park ranger (GS-7) is responsible for law enforcement, patrol, and public contact work at the seven Corps projects in the basin. The ranger reports to the basin manager (5).

Figure D.5.3. Recreation-Resource Management Interrelationships - New England Division.



[a]Personal communication, August 1974. New England Division, Planning Division, Environmental Resources Branch, Waltham, Massachusetts.

Fishing regulations are enforced by the conservation officers of MA and CT and either state's fishing license is valid within the project area.

Contractual agreements between the Corps and the State of CT give the state the option to take over operation, control, and maintenance of the reservoir. CT has exercised this option on Corps projects at Mad River, Sucker Dam, Halls Meadow, and East River (2).

Planning services are provided to communities by the Litchfield Hills Regional Planning Agency. Each of the towns has an active conservation commission that reports on land use matters to the selectmen. In addition, the Farmington River Watershed Association is a potent citizen's organization that reflects resident interests in land use.

III. KEY FINDINGS

A. Recreation

1. The opportunity to develop diverse water-oriented recreation in the upper Farmington River was foregone when the decision was made to construct a flood control dam at the Colebrook River site. The USF&WS favored construction of a lake in New Boston, MA, a site identified by the Corps that would meet flood control requirements. The Colebrook damsite was within a newly completed MDC water supply lake (Goodwin Dam). Construction at this site required commitment to replace the water supply storage taken by Colebrook Dam. A Corps supply storage was incorporated in the project (the full proportional share was paid for by the MDC), CT's stringent restrictions on use of reservoirs and adjacent land applied. The boat launching ramp affording access to Colebrook Lake mitigates the loss of a comparable access point on the Goodwin Reservoir.

2. The only recreation facilities constructed on the lake have been a boat launching ramp and an overlook at the damsite. The ramp faces the prevailing winds, making boat launching difficult. No overnight camping is permitted and picnicking is discouraged.

3. The CDPR has not expanded its park system since the 1940's due to budgeting restrictions.

4. The MDC is empowered by its charter to construct, operate, and maintain recreational facilities and feels that MDC recreation development at the Compensating Reservoir below Barkhamsted Dam fulfills its recreational responsibilities in the region.

5. Visitation figures are not accurate; the one counter at the entrance to the damsite is inadequate for the three access areas.

B. Fish and Wildlife

1. Two 5,000 acre-foot water storage increments are provided for enhancement of the fishery between Goodwin Dam and the Connecticut River. One increment is stored from regular river flows to support the shad runs; the second is to be stored from flood waters and released on demand from the CDFG to assist brown trout runs. A 5,000 acre-foot increment constitutes a minimum conservation pool that may not be withdrawn from the lake. The purpose of the conservation pool is to mitigate the stream fishery inundated by the reservoir.

2. Natural fish productivity is good in the reservoir. Trout are heavily stocked without interagency planning or cooperation between MA, CT, and USF&WS. The full impact of the lake operations on the fisheries will not be known until the MDC begins to drawdown the water supply increment leaving only the minimum conservation pool to support the lake fishery.

3. Heavy rain runoff occurring in late spring and early summer are released through bottom discharge depleting the cold waters in the reservoir which are necessary for trout survival. Subsequently trout populations in the reservoir are reduced.

C. Corps and Contiguous Land Use

1. Of the 1,411 acres in the project, only 352 acres are owned in fee by the Corps. Except for one small private parcel the remainder is owned by MDC and CT.

2. The majority of the land in the analytical unit described in Section II is owned by MDC. As a result, the landscape surrounding the lake has changed little since impoundment and there is very little likelihood that land use patterns will change significantly.

3. The flood control purpose of the project has been compromised by downstream communities which have permitted encroachment upon the flood plain.

4. Planning services are provided by the Litchfield Hills Regional Planning Agency. Each of the towns has an active conservation commission that reports on land use matters to the selectmen. In addition, the Farmington River Watershed Association is a potent citizens organization that reflects resident interests in land use.

D. Corps Organization

1. Colebrook is one of five manned and two unmanned projects under the general supervision of a GS-9 basin manager headquartered in Thomaston, CT. One park ranger (GS-7), responsible for law enforcement, patrol, and public contact work at the seven Corps projects in the basin, reports to the basin manager.

2. All recreation-resource technical support comes from the district-division offices in Waltham, MA. Recreation and fish and wildlife planning, including the preparation of master plans, site plans, and outdoor recreation data reports, has been centralized in the Environmental Resource Branch of the Planning Division. The branch is staffed by 14 permanent employees with three engineers and one landscape architect spending an estimated 75% of their time on recreation related work. A Recreation-Resource Management Section has recently been established within the Project Operations Branch, Operations Division. The basin managers report to the Chief, Project Operations Branch; the Recreation Resource Management Section now has responsibility for the ranger force and for recreation-resource information, including visitor surveys. The section is staffed by one civil engineer (GS-11) and one landscape architect (GS-9).

3. The project is manned by a damtender (WG-12), who is responsible for controlling releases from the dam. Project personnel spend about 70% of their time devoted to recreation activities (maintenance, cleanup, and visitor contact).

4. Contractual agreements between the Corps and CT give the state the option to take over operation, control, and maintenance of the reservoir. Such action has occurred on Corps constructed projects at Mad River, Sucker Dam, Halls Meadow, and the East River projects.

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