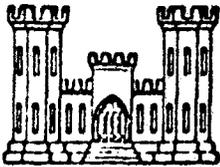


*A-1. 1/4.*

20



DESIGN MEMORANDUM NO.15

JANUARY 1968

## HIDDEN RESERVOIR

Fresno River, California

# MASTER PLAN AND INITIAL RECREATION FACILITIES

DEPARTMENT OF THE ARMY  
SACRAMENTO DISTRICT, CORPS OF ENGINEERS  
SACRAMENTO, CALIFORNIA

ENGCW-OM (2 Jan 68)

2nd Ind

SUBJECT: Hidden Reservoir, Fresno River, California; Design Memorandum  
No. 15, Master Plan and Initial Recreation Facilities

DA, CofEngrs, Washington, D. C., 20315

19 April 1968

TO: Division Engineer, South Pacific

1. The Master Plan and Initial Recreation Facilities are approved subject to the following comments:

a. Par. 33. In the interest of clarity concerning referenced letter, the recreation features of the project will be provided for under Category C.

b. Par. 33b.(2). The publication, "Outdoor Recreation Outlook to 1980, Fresno Metropolitan Area", prepared by the State of California, Department of Parks & Recreation and dated November 1967, shows a critical deficiency for marina slips and mooring facilities within the zero-to-two hour travel time zone from Fresno. This service area encompasses Hidden Reservoir. Based on these findings it would appear that marina facilities should be operative by the time the project is placed in operation. Additionally, it may be desirable to re-examine Plate 5 on the space requirements for a marina facility. General guidance on concession space requirements is shown in EC 1130-2-44, subject, "Master Planning for Commercial Concession and Other Self-Liquidating Recreational Developments".

c. To comply with the instructions of ENGCW-EY, Engineer Letter 65-3, subject, "Hydrologic and Hydraulic Planning and Design Considerations for Water-Oriented Recreation", dated 15 January 1965, the plan should show findings of geologic, hydrologic and hydraulic investigations and the conclusions reached concerning siting shoreline facilities.

d. Primitive camp clusters should be considered in the initial development program (ER 1130-2-312, App. 1, P. 6).

e. Appendix D. A prorated share of costs for recreation access roads, ramps and parking areas required for access to the project for operational purposes and including costs of the road and parking area located at the observation area should be shown under Cost Account No. 08. (para. 11, ER 1130-2-312).

f. The public use potentials of the project should be investigated and discussed, especially those for outlet channel fishing in the area immediately downstream of the dam (EM 1130-2-302, par 4g.(2)).

g. Chapter VI and Plate 2 are satisfactory as to planning considerations for the land and water areas shown on the drawing. When all the land is acquired the material should be updated to reflect changes in ownership and proposals for public use.

ENG CW-OM (2 Jan 68)

19 April 1968

h. Par. 32 and App B. The various proposals for environmental enhancement give sufficient information at this stage in project planning. However, a master plan should identify existing overall needs for erosion control, scenic enhancement, protection of biological resources, and other needs appropriate to environmental enhancement.

2. The development chapter of the master plan should propose specific action plans for realizing total project environmental benefits (EM 1110-2-38, 13 Feb 1968).

FOR THE CHIEF OF ENGINEERS:

1 Incl  
w/d

  
MARK S. GURNEE  
Chief, Operations Division  
Civil Works

SPDGT-C (2 Jan 68) 3d Ind

SUBJECT: Hidden Reservoir, Fresno River, California; Design Memorandum  
No. 15, Master Plan and Initial Recreation Facilities

Division Engineer, South Pacific 8 May 1968

TO: District Engineer, Sacramento

  
E. L. K.

SPKED-P (2 Jan 68) 4th Ind

SUBJECT: Hidden Reservoir, Fresno River, California; Design Memorandum  
No. 15, Master Plan and Initial Recreation Facilities

DA, Sacramento District, Corps of Engineers, 650 Capitol Mall,  
Sacramento, California 95814 29 January 1969

TO: Division Engineer, South Pacific

Those actions required by the 2d indorsement, including report revisions (seven copies of each replacement page are inclosed), have been or will be complied with as described in the following lettered subparagraphs corresponding to similarly identified paragraphs in the 2d indorsement:

a. Paragraph 33 has been modified to clarify that the recreation features of the project will be provided for under Category C of referenced letter (see revised page 14).

b. With regard to establishment of an operational marina for the first year of project operation, experience in this District has shown that, even though there is a demand for marina services early in the life of a project, few concessionaires are interested in developing marinas at reservoirs before significant levels of attendance are actually observed. As stated in paragraph 33b, it is anticipated that a marina concession can be established during the initial three-year period of operation, as soon as public use reaches attractive proportions for prospective marina concessionaires. Plate 5 and the space requirements for a marina and associated facilities shown thereon have been re-examined in relation to general guidance provided by EC 1130-2-44. The space indicated was determined on the basis of the anticipated operation of the reservoir as discussed in paragraph 8; substantial amounts of space for marina operations and associated activities are expected to be available on lands below the gross pool elevation. Operational experience in this District in similar situations substantiates this expectation. Accordingly, designation of additional space for a marina on plate 5 is not considered necessary.

c. The guidelines contained in ENG-CY-EY letter 65-3, dated 15 January 1965, subject: "Hydrologic and Hydraulic Planning and Design Considerations for Water-Oriented Recreation," were followed during preparation of this Design Memorandum. Appropriate wording has been inserted in paragraph 1a of appendix B, Basis of Design, (see revised page 1, appendix B).

d. The planned overflow area, discussed in paragraph 33a and shown on plate 4, has been included in the proposed initial development program to serve as a primitive camp cluster area, based on needs indicated by experience at operating reservoirs in the Sacramento District. Further development of primitive camp clusters at more remote locations on the

SPKED-P (2 Jan 68) 4th Ind

29 January 1969

SUBJECT: Hidden Reservoir, Fresno River, California; Design Memorandum  
No. 15, Master Plan and Initial Recreation Facilities

project was considered and rejected because of potential fire hazard and interference with the operation of the designated wildlife management area.

e. The comment regarding a prorated share of costs for recreation access roads, ramps and parking areas to be shown under Cost Account No. 08 has been noted; however, based on the issuance of ENGCW-OM change 1 to ER 1130-2-312 dated 10 June 1968, it is believed that such prorated share is no longer desired.

f. Public use potentials of the project were investigated and are discussed in paragraph 29; corroborative information is presented in other portions of the Master Plan, including the appendixes. The public use potential of the area immediately downstream of the dam was investigated during the preparation of this plan in accordance with EM 1130-2-302, paragraph 4g(2). An examination was made of the hypothetical operation of the reservoir over the period of recorded streamflows as affected by the needs of the irrigation interests and their planned integrated use of water from several alternative water sources, which will include water available to them from the Central Valley Project of the U. S. Bureau of Reclamation as well as Fresno River flows stored in Hidden Reservoir. This information indicated that in many years there would be no releases from the reservoir during the high recreation use period of July and August; in some years small releases would be made which would provide only a "trickle" of water that would be unsuitable as a recreation resource; in other years large releases would be made. The releases would vary greatly from one period of the year to the other. In addition to this unattractive flow regimen, it is anticipated that summertime temperatures would be considerably higher within the canyon than around the reservoir. Accordingly, it was concluded that the area downstream of the dam would not produce an attractive recreation potential which should be developed to promote recreation use. Information obtained since preparation of this plan has not led to a change in this conclusion; a statement briefly describing why the area was not selected for development has been added to paragraph 31 (see revised page 14).

g. At an appropriate time after land acquisition has been completed, chapter VI and plate 2 will be updated to reflect needed changes.

h. (and para. 2) The environmental resources of the project have been studied in accordance with the instructions contained in EM 1110-2-38, and foreseeably required measures and guidelines for protection and enhancement of natural beauty are included in appropriate portions of the Master Plan, particularly paragraph 32. When plans and specifications

SPKED-P (2 Jan 68) 4th Ind

29 January 1969

SUBJECT: Hidden Reservoir, Fresno River, California; Design Memorandum  
No. 15, Master Plan and Initial Recreation Facilities

for accomplishment of work at the project are prepared, Master Plan guidelines relative to natural beauty would provide direction to ensure that specific plans for beautification, erosion control and protection of biological resources are instituted. Specific plans and beautification measures as needed will also be included in future feature design memorandums as a continuing program to implement OCE instructions contained in EM 1110-2-38.

- 3 Incl (7 cys)
- 1. Rev. pg. 13-14
- 2. Rev. pg. 21-22
- 3. Rev. pg. 1-2 (app. B)

*George B. Fink*  
GEORGE B. FINK  
Colonel, CE  
District Engineer

SPDED-TC (2 Jan 68) 5th Ind

SUBJECT: Hidden Reservoir, Fresno River, California; Design Memorandum  
No. 15, Master Plan and Initial Recreation Facilities

Division Engineer, South Pacific 25 February 1969

TO: District Engineer, Sacramento

The actions taken and proposed in the 4th Indorsement are concurred in.

FOR THE DIVISION ENGINEER:

wd all incl

  
E. L. KNUTSON  
Chief, Engineering Division

(Furnished for info during interim that ans 4th Ind  
is to be prepared.)

ENGCW-OM (2 Jan 68)

2nd Ind

SUBJECT: Hidden Reservoir, Fresno River, California; Design Memorandum  
No. 15, Master Plan and Initial Recreation Facilities

DA, CofEngrs, Washington, D. C., 20315

19 April 1968

TO: Division Engineer, South Pacific

1. The Master Plan and Initial Recreation Facilities are approved subject  
to the following comments:

a. Par. 33. In the interest of clarity concerning referenced letter, the recreation features of the project will be provided for under Category C.

b. Par. 33b.(2). The publication, "Outdoor Recreation Outlook to 1980, Fresno Metropolitan Area", prepared by the State of California, Department of Parks & Recreation and dated November 1967, shows a critical deficiency for marina slips and mooring facilities within the zero-to-two hour travel time zone from Fresno. This service area encompasses Hidden Reservoir. Based on these findings it would appear that marina facilities should be operative by the time the project is placed in operation. Additionally, it may be desirable to re-examine Plate 5 on the space requirements for a marina facility. General guidance on concession space requirements is shown in EC 1130-2-44, subject, "Master Planning for Commercial Concession and Other Self-Liquidating Recreational Developments".

c. To comply with the instructions of ENGCW-EY, Engineer Letter 65-3, subject, "Hydrologic and Hydraulic Planning and Design Considerations for Water-Oriented Recreation", dated 15 January 1965, the plan should show findings of geologic, hydrologic and hydraulic investigations and the conclusions reached concerning siting shoreline facilities.

d. Primitive camp clusters should be considered in the initial development program (ER 1130-2-312, App. 1, P. 6).

e. Appendix D. A prorated share of costs for recreation access roads, ramps and parking areas required for access to the project for operational purposes and including costs of the road and parking area located at the observation area should be shown under Cost Account No. 08. (para. 11, ER 1130-2-312).

f. The public use potentials of the project should be investigated and discussed, especially those for outlet channel fishing in the area immediately downstream of the dam (EM 1130-2-302, par 4g.(2)).

g. Chapter VI and Plate 2 are satisfactory as to planning considerations for the land and water areas shown on the drawing. When all the land is acquired the material should be updated to reflect changes in ownership and proposals for public use.

19 April 1968

h. Par. 32 and App B. The various proposals for environmental enhancement give sufficient information at this stage in project planning. However, a master plan should identify existing overall needs for erosion control, scenic enhancement, protection of biological resources, and other needs appropriate to environmental enhancement.

2. The development chapter of the master plan should propose specific action plans for realizing total project environmental benefits (BR 1110-2-38, 13 Feb 1968).  
EM

FOR THE CHIEF OF ENGINEERS:

1 Incl  
w/d

*Mark S. Gurnee*  
MARK S. GURNEE  
Chief, Operations Division  
Civil Works

For holders of Hidden M.P. (DM 43):

- ① This 2<sup>d</sup> Ind approval transmitted to SPK by SPDET-C 3<sup>d</sup> Ind dated 8 May 68
- ② Ans 4<sup>th</sup> Ind to be prepared by Proj Plus Bcr when funds available.
- ③ When complete, copies of the entire correspondence chain will be furnished for all copies of the M.P.

APR 23 1968  
11 00 00 AM '68



DEPARTMENT OF THE ARMY  
SACRAMENTO DISTRICT, CORPS OF ENGINEERS  
650 CAPITOL MALL  
SACRAMENTO, CALIFORNIA 95814

IN REPLY REFER TO  
SPKGP

2 January 1968

SUBJECT: Hidden Reservoir, Fresno River, California; Design Memorandum  
No. 15, Master Plan and Initial Recreation Facilities

TO: Division Engineer, South Pacific

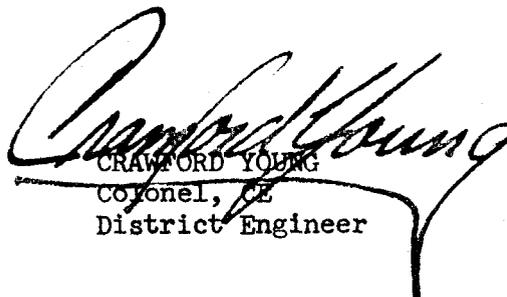
1. Pursuant to the requirements of EM 1130-2-302, ER 1110-2-1150, and DR 1110-2-3, transmitted are seven copies of the subject design memorandum for review and approval.

2. The master plan has been indorsed by the Real Estate Division pursuant to the requirements of EM 405-2-835.

3. It is recommended that this master plan be approved as a guide for the preservation, development, and administration of the recreational, biological, and scenic resources of the reservoir area.

4. It is also recommended that the initial facility development presented in this design memorandum be approved for construction, at an estimated cost of \$1,245,000.

1 Incl (7 cys)  
DM No. 15 & App. D  
dtd Jan 68 (Ser. Nos. 1-7)

  
CRAWFORD YOUNG  
Colonel, CE  
District Engineer

SPDGT-C (2 Jan 68)

1st Ind

SUBJECT: Hidden Reservoir, Fresno River, California; Design Memorandum  
No. 15, Master Plan and Initial Recreation Facilities

Division Engineer, South Pacific Division

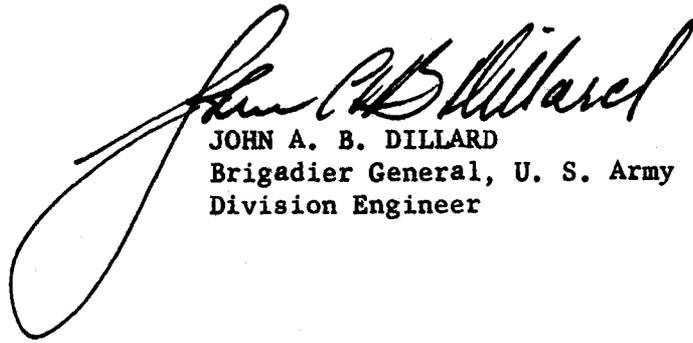
13 February 1968

TO: Chief of Engineers, ATTN: ENGCW-C

1. The subject design memorandum is furnished for your review  
with approval recommended.

2. An expedited review would be appreciated.

1 Incl  
wd 2 cy



JOHN A. B. DILLARD  
Brigadier General, U. S. Army  
Division Engineer

# DISPOSITION FORM

(AR 340-15)

REFERENCE OR OFFICE SYMBOL

SPKGP

SUBJECT

Design Memorandum No. 15  
Hidden Reservoir Master Plan

TO Chief, Real Estate Div

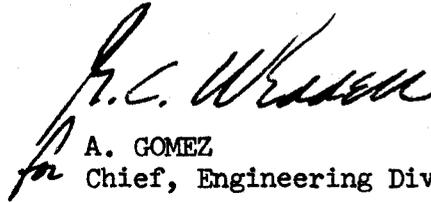
FROM Chief, Engrg Div

DATE 28 Jul 67  
Clark/lh/2456

CMT 1

1. Transmitted is a draft copy of subject design memorandum for your review and approval.

2. Pursuant to the provisions of ER 450-2-835, your concurrence of the proposed land use classification, development and management program will be made an indorsement to this report.

  
A. GOMEZ  
Chief, Engineering Division

1 Incl  
Draft Design Memo #15

SPKRA (28 Jul 67)

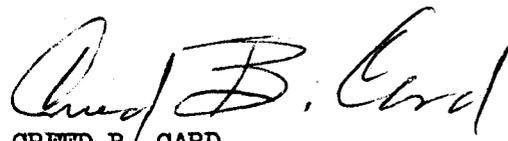
TO Chief, Engineering Div

FROM Chief, Real Estate Div

DATE 17 Aug 67  
Clark/mi/3403  
RB 2/16/67

CMT 2

The features of the master plan have been reviewed. The Real Estate Division is in concurrence with the Priority One land use classification.

  
CREED B. CARD  
Chief, Real Estate Division

1 Incl  
nc

DESIGN MEMORANDUM NO. 15  
FRESNO RIVER BASIN, CALIFORNIA  
HIDDEN RESERVOIR  
FRESNO RIVER

January 1968

REVISIONS

Date	New Pages or Drawings

HIDDEN RESERVOIR  
FRESNO RIVER, CALIFORNIA

DESIGN MEMORANDUMS

No.	Date	Title	Approved
1.	15 Jun 64	Hydrology	OCE, 20 Aug 64
2.	17 Dec 64	Water Quality Control	SPD 1st Ind, 5 Jan 65
3A	May 65	Preliminary Master Plan	OCE 2nd Ind, 13 Oct 65
4.	Dec 65	General Design Memorandum	OCE 2nd Ind, 17 Mar 66
5.	Dec 65	Site Geology	OCE 2nd Ind, 18 Feb 66
	15 Aug 66	Supp 1 to DM #5	SPD, 6 Sep 66
	23 Aug 67	Supp 2 to DM #5	
6.	Feb 66	Embankment Design	OCE 2nd Ind, 28 Mar 66
7.	Aug 65	Relocations	SPD 1st Ind, 1 Apr 66
8.	Sep 65	Administration Buildings & Observation Area	OCE 2nd Ind, 20 Oct 65
9.	Nov 65	Reservoir Clearing	OCE 2nd Ind, 14 Jan 66
10.	Jan 66	Real Estate	OCE, 1 Aug 66
11.	31 Mar 66	Concrete Materials Design	OCE 2nd Ind, 27 May 66
12.	Apr 66	Spillway and Outlet Works	OCE 2nd Ind, 21 Jul 66
13.	31 Oct 66	Cemetery Relocation	OCE 2nd Ind, 19 Dec 66
14.	30 Sep 66	Instrumentation Design	OCE 2nd Ind, 11 Jan 67

DESIGN MEMORANDUM NO. 15  
FRESNO RIVER BASIN, CALIFORNIA  
HIDDEN RESERVOIR  
FRESNO RIVER

MASTER PLAN

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APPENDIXES

APPENDIX A	Methods Used for Estimating Attendance and Facilities
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DESIGN MEMORANDUM NO. 15  
 FRESNO RIVER BASIN, CALIFORNIA  
 HIDDEN RESERVOIR  
 FRESNO RIVER

MASTER PLAN

PERTINENT DATA (PRELIMINARY)

1. General data

Authorization	1962 Flood Control Act, Public Law 87-874.
Survey document	Senate Document No. 37, 87th Congress, 1st Session.
Stream	Fresno River
Purpose	Flood control, irrigation, recreation and fish and wildlife.
Drainage area above dam	234 square miles

2. Reservoir data

<u>Feature</u>	<u>Elev. (ft.)</u>	<u>Area (acres)</u>	<u>Storage capacity (ac. ft.)</u>	<u>Length of shoreline (miles)</u>	<u>Length of pool (miles)</u>
Inactive pool	448	280	5,000	10	2.0
Normal recreation pool	476	650	18,000	15.5	2.9
Gross pool	540	1,570	90,000	24	3.2

3. Dam

Type	Rolled earthfill
Maximum height above streambed	162 feet
Crest elevation	561 feet
Crown width	20 feet
Crest length	5,730 feet

PERTINENT DATA (PRELIMINARY) (Cont'd)

4. Spillway

Type	Ungated
Location	Left abutment
Crest elevation	540 feet
Crest length	575 feet
Capacity at spillway design flood pool (elev. 556.2 feet)	106,000 c.f.s.

5. Outlet

Type and location	Single-barrel concrete conduit through main dam
Number	1
Size	oblong 13'-10" x 9'-2"
Control gates	2 service slide gates 5'-0" x 11'-9" 2 emergency slide gates 5'-0" x 11'-9"

6. Dikes

Type	Rolled earthfill
Number	6
Height	Varies, 4-36 feet
Crown width	20 feet
Crest elevation	561 feet
Length	Varies, 75-350 feet

DESIGN MEMORANDUM NO. 15  
FRESNO RIVER BASIN, CALIFORNIA  
HIDDEN RESERVOIR  
FRESNO RIVER

MASTER PLAN

CHAPTER I - INTRODUCTION

1. Authorization. - Hidden Project was authorized by the Flood Control Act of 1962, Public Law 87-874, to be constructed substantially in accordance with the recommendations of the Chief of Engineers in Senate Document No. 37, 87th Congress, 1st Session.
2. Project purposes. - The project, comprising Hidden Dam, reservoir and downstream channel improvements, was authorized for flood control, irrigation, recreation (general recreation and fish and wild-life), and other purposes.
3. Scope of master plan. - This master plan is intended to serve as a guide for the progressive development, management, and administration of public-use facilities, and for protection of scenic, biological and recreation resources, consistent with the authorized project purposes. Information concerning construction of initial recreation facilities is furnished for approval in lieu of submitting a separate construction design memorandum.

## CHAPTER II - PROJECT DESCRIPTION

4. General location. - Hidden Reservoir is located on the Fresno River in the Sierra Nevada foothills, about 15 miles northeast of the city of Madera. The reservoir will be located entirely within the boundaries of Madera County. The extent of project lands and waters is shown on plate 1.

5. Project area. - The reservoir area, which is bounded by low, rolling foothills, lies within the relatively narrow valley of the Fresno River. The terrain is characterized by many small hills and ravines which will result in an irregular reservoir shoreline with moderate slopes. Because of shallow soil and numerous rock outcroppings the ground cover is sparse, except in springtime when native grasses and wildflowers cover most of the hills. Acquisition of 3,160 acres of land for project purposes, as noted in the Real Estate Design Memorandum, was approved 1 August 1966. All project lands will be available for potential public use with the exception of the lands needed for operational purposes in the vicinity of the main dam and spillway and the administration area, as shown on plate 2.

6. Project plan. - Hidden Dam and Reservoir will be constructed, operated, and maintained by the Corps of Engineers. Local interests are required to maintain and operate all completed channel improvement works in accordance with regulations prescribed by the Secretary of the Army, and to preserve or restore and thereafter maintain the Fresno River channel from Hidden Dam downstream to the Chowchilla Canal to the capacities prevailing in 1959. The project will be financially integrated with the Bureau of Reclamation's Central Valley Project, and local interests will repay project costs allocated to irrigation.

7. Hidden Dam will be a rolled homogeneous earthfill dam with a height 162 feet above streambed elevation and a crest length of about 5,730 feet. There will be six small dikes across saddles in the ridges which extend northerly from the right abutment. An observation area is planned near the left abutment of the dam, as shown on plate 1. Required relocations would include approximately 3.4 miles of County Road 407, approximately 2.3 miles of County Road 400, and telephone lines.

8. Reservoir description. - Waters of the Fresno River and its tributaries which will be impounded in Hidden Reservoir originate from a watershed area of about 234 square miles. Reservoir data pertaining to size and fluctuations are presented in the following subparagraphs.

a. Size. - The reservoir will have a gross pool capacity of 90,000 acre feet. An inactive pool of 5,000 acre feet will be maintained

for sediment storage, recreation, fish and wildlife resources, and other project purposes. At gross pool level (elevation 540 feet), the reservoir will have a surface area of about 1,570 acres, a length of about 3.2 miles, and a shoreline of about 24 miles. The normal recreation pool (the average pool available during the April-September recreation season) will have 650 surface acres and a shoreline of about 15.5 miles at elevation 476, as determined from hypothetical reservoir operation studies based on a 30-year period, 1922 through 1951. The reservoir at inactive pool (elevation 448 feet), will have a surface area of about 280 acres, a length of about 2.0 miles, and a shoreline of about 10 miles.

b. Fluctuations. - The reservoir will be operated for flood control, irrigation, recreation and fish and wildlife, and other purposes. Examination of the theoretical operation of the reservoir for the 30-year period of study shows that frequent fluctuations of the reservoir level would occur, varying as much as 73 feet during the recreation season (April through September). The reservoir would approach gross pool level once every 15 to 20 years on the average, and would reach inactive pool level each year. The maximum pool level during each year would normally be reached in the latter part of May or early June.

### CHAPTER III - VIEWS OF OTHER AGENCIES

9. General. - Views and comments of other agencies obtained to date pertaining to land requirements, initial developments and operation of the project are attached as Appendix C and are discussed in the following paragraphs.

10. Bureau of Sport Fisheries and Wildlife. - In a preliminary report of the Bureau of Sport Fisheries and Wildlife dated 25 September 1959, the Regional Director concluded there was no apparent means of compensation for losses of wildlife habitat in the reservoir area. This conclusion was modified in a subsequent letter to the District Engineer dated 30 September 1964 in which the acquisition of a 320 acre wildlife management area was requested for mitigation of wildlife to be displaced from lands inundated by the reservoir. Subsequently, a fish and wildlife management plan dated 18 July 1966 was furnished recommending the use of a 320 acre tract of project land for a wildlife management area. This tract was designated in the Preliminary Master Plan, Design Memorandum No. 3A. The wildlife management area will be located in the upper end of the reservoir area, as shown on plate 1. The BSWF further recommended that wildlife habitat be improved in this area at an estimated cost of \$2,000; that a fence be provided; that provision of access roads with terminal automobile parking be included; that \$200 annually be provided to the California Department of Fish and Game for maintenance of wildlife habitat; that the inundated portion of the area be designated as a fish management area; and that a speed limit of 5 m.p.h. be established within the area. An amount of \$2,000 was requested for rough fish control and game fish planting. The BSWF also suggested that Hidden Reservoir be operated for fish conservation and development. Actions to be taken pursuant to these recommendations are discussed in paragraph 43.

11. National Park Service. - The Assistant Secretary of the Interior's letter to the Chief of Engineers dated 17 June 1960, published in the survey document, reported that the National Park Service recommends precautionary measures be taken to insure minimum impact of dam construction on the existing natural physical features and recreational values of the area. Because of the historical and archeological values and resources present at the reservoir site, the National Park Service arranged for the preparation of a report on these resources, entitled "A History of the Hidden Reservoir Area, Fresno River, California," dated 15 September 1966 and written by Mr. William A. Scheidt. A copy of this report is in the District's files; information contained therein has been considered, and suitable measures are planned to protect historical and archeological resources as noted in paragraph 23.

12. Public Health Service. - Suggestions from the Public Health Service, Department of Health, Education and Welfare, were provided in their letter of 16 June 1965, and are essentially as follows:

(1) All brush and trees in the area to be flooded should be cut close to the ground; (2) these cuttings should be burned shortly before the area is flooded; (3) shorelines in the zone of fluctuation should have all stumps and roots removed and slopes should be even (and preferably steep) in order to eliminate shallow areas where water could collect; (4) any loose crust or other material on the bottom that might rise when flooded should be stripped prior to flooding.

13. Resources Agency of California. - In a letter dated 3 January 1966, W. F. Grader, Assistant to the Administrator of Resources, reported that the State of California was not interested in assuming the operation and management of Hidden Reservoir for recreational purposes and suggested that such an undertaking would be more suitable for a local entity.

14. California Department of Fish and Game. - Coordinated planning efforts with Bureau of Sport Fisheries and Wildlife personnel have included consultations with the California Department of Fish and Game, and the management plans submitted by the Bureau of Sport Fisheries and Wildlife for conservation and development of fish and wildlife resources have the concurrence of the California Department of Fish and Game.

15. California Division of Forestry. - The drainage area of Hidden Reservoir, with the exception of the upper 10 percent which is in the Sierra National Forest, is under private ownership and is furnished fire protection by the California Division of Forestry. The Fire Protection Study Report submitted by the California Division of Forestry indicates there is a definite need for fire protection measures at the Hidden Reservoir. Suggested fire-protection measures include access for fire equipment, fire breaks, fire prevention during construction, and provision of water supply for fire-fighting equipment. Details of the fire-control plan for Hidden Reservoir are presented in paragraph 42.

16. Madera County. - In a letter dated 23 November 1966 from Mr. R. H. Spotts, Administrative Officer, it was stated that the Madera County Board of Supervisors, after consideration of the requirements involved, had decided that the County of Madera should not undertake the administration, operation and maintenance of recreation areas at Hidden Reservoir. He further stated that the county would cooperate with the Corps of Engineers or any other agency that takes over operation of the recreation areas.

## CHAPTER IV - RECREATION RESOURCES

17. Existing recreation resources. - Little or no recreation use exists in the area of the Hidden Reservoir site. The lack of recreation use may be attributed to two factors: (1) the river contains only intermittent flows during dry periods and for this reason this section of the river sustains no significant fishery; similarly, the river does not have enough flow during the recreation season to support significant water-oriented recreation; (2) the lands in this area are in private ownership, and there is restricted public access, thereby limiting existing recreation use to small game and bird hunting by a few local residents.

18. Accessibility. - Access to Hidden Reservoir will be via Federal and state highways and several connecting county roads. U. S. Highway 99 is a nearby main north-south route through the state. State Highway 41 provides the principal access route from Fresno, the largest nearby city. Several county roads provide access from other nearby towns and communities, including Madera, Chowchilla, Coarsegold and Raymond. A freeway route, identified by the State of California but not yet adopted, would provide an additional major north-south access route which would cross the Fresno River about five miles downstream of the Hidden Dam site.

19. Climate. - The climate of this area is temperate and characterized by cool, wet winters and warm, dry summers. Normal annual precipitation at Hidden Dam site is about 15 inches. Temperatures measured at Madera have ranged from a summer high of 116°F to a winter low of 10°F. Temperatures may drop below freezing for a few hours on several consecutive days during the winter season, but no extended periods of below freezing temperatures are expected at the reservoir site. Temperatures at the reservoir during the recreation season are expected to range about the same as those at Madera.

20. Competitive recreation resources. - There is a moderate amount of recreation competition between areas with water-related activities in this region of California. There are two reservoirs, one State Park, and a portion of a National Forest located within a 50-mile road-travel distance of Hidden Reservoir, and the south entrance to Yosemite National Park is approximately 50 miles from Hidden Dam site. Existing recreation facilities in these areas are consistently overused, evidencing the large demand for outdoor and water-oriented recreation in this region. Buchanan Reservoir is authorized for construction on the Chowchilla River by the Corps of Engineers and will provide similar water-oriented recreation potential within 20 road miles of Hidden Reservoir. This project is scheduled for completion following the completion of Hidden Reservoir. The competitive effects of these resources have been evaluated and are included in the use prediction analysis discussed in paragraph 26.

21. Reservoir site characteristics. - The area in which the reservoir will be created is a typical foothill site of the western Sierra slopes. The soil is moderately productive for grazing and the area is semi-open grassland. Its physical description is as follows:

a. Topography. - Terrain of the reservoir area is undulating without excessively steep slopes or deep canyons. Numerous eroded granite outcroppings are scattered throughout the area. The moderately sloping terrain that would form the shoreline of the reservoir is conducive to construction and use of the type of recreation developments proposed.

b. Vegetation. - The lower reservoir area is characterized by semi-open grassland with scattered oak trees, while the flora of the upper portion of the reservoir area consists principally of grasses, chaparral, shrubs, and oak and Digger pine trees. In addition to numerous species of annual grasses and low-growing forbs, the more important species are blue oak (Quercus douglasii), live oak (Quercus wislizenii), buck brush (Ceanothus cuneatus), and Digger pine (Pinus sabiniana). There are also riparian species adjacent to the river which cover about 12 percent of the reservoir area and these include semi-dense stands of willows (Salix spp.), alders (Alnus spp.), cottonwoods (Populus spp.) and scattered patches of perennial grasses. Photographs of vegetative types that will be present in the recreation areas are shown on plates 10 and 11.

22. Fish and wildlife resources. - Wildlife known to be in the area include mule deer (Odocoileus hemionus), valley quail (Lophortyx californicus), mourning doves (Zenaidura macroura), black-tailed rabbits (Lepus californicus), cottontail rabbits (Sylvilagus nuttalli), raccoon (Procyon lotor), ring-tailed cats (Bassariscus astutus), ground squirrels (Citellus beecheyi), coyotes (Canis latrans), bobcats (Lynx rufus), striped skunks (mephitis mephitis), gray foxes (Urocyon cinereoargenteus) and numerous small non-game birds and small mammals. Mourning doves and quail are the most important game animals in the reservoir area. There is no significant fishery in this section of the Fresno River; however, small numbers of black bass (Micropterus spp.), bluegill (Lepomis macrochirus) green sunfish (Lepomis cyanellus), Sacramento squawfish (Ptychocheilus grandis), hitch (Lavinia exilicauda), hardhead (Mylopharodon conocephalus), Sacramento sucker (Catostomus occidentalis), and mosquito fish (Gambusia affinis) are known to be present.

23. History and archeology. - The National Park Service has been notified of the current construction schedule for Hidden Reservoir, and that agency has advised that they will program funds for necessary historical and archeological salvage work at the project. The grave of Major James D. Savage, one of the early settlers in the region, is presently located in the area to be inundated by the reservoir on land owned by the Madera County Historical Society, and is marked by a monument. A photograph of the monument is shown on plate 12. Arrangements for disinterment

and reinterment of this grave and relocation of the marker to a suitable location is being coordinated with the Madera County Historical Society. The grave and marker are to be relocated outside the project boundary, east of the relocated County Road 400, as indicated on plate 2.

## CHAPTER V - RECREATION USE ANALYSIS

24. Population and the recreation market demand area. - An area contained within a 40-road-mile radius of the reservoir was established as the market demand area from which most recreation day use would originate. The market demand area was divided into concentric 10-road-mile zones beginning at the reservoir and was then modified to compensate for competitive recreation use at other nearby water-oriented recreation resources. Based upon 1960 census figures, the market demand area for Hidden Reservoir was computed to have a resident population of 272,000. There are two principal population centers within the market demand area. The largest is Fresno with a population of 134,270, which is located in Zone IV (31-40 road miles from the reservoir). Madera, with a population of 14,430, is located in Zone II (11-20 road miles from the project). Analysis and extrapolation of population projections made by the State of California indicate that, by the year 2040, 2,340,000 persons will reside within the market demand area.

25. Recreation uses. - Because the reservoir will be located in close proximity to metropolitan areas, it is expected that most recreation will comprise day-use activities; camping use will be limited. It is expected that there will be a large number of fishermen using the reservoir in the early spring. When daytime temperatures rise with the advent of summer, waterskiing, swimming and boating activities will increase. In the fall of the year, the reservoir will provide continued fishing and access for upland game hunting.

26. Predicted use. - Public use of Hidden Reservoir has been estimated based on information obtained from studies of existing Corps of Engineers' reservoirs in California possessing characteristics similar to Hidden Reservoir. In estimating the public use which would take place during the initial year of project operation, expected to be 1970, the population projected for that year for each zone of the market demand area was multiplied by the anticipated per capita use rate derived for each zone. In deriving these per capita use rates, the effects of competition from recreation use expected to occur at other nearby water resource developments were taken into account and the rates were reduced accordingly. In a similar manner, demand for public use in ensuing years over the economic life of the project was determined by multiplying projected increases in population by expected increases in per capita use. The resultant projected use was greater than the project could be expected to support and, therefore, an ultimate project use level was established. The ultimate annual use, based on the maximum practical amount of use which can be expected upon the project lands and waters, is expected to be

reached prior to the termination of the 100-year economic life of the project. The following is a tabulation of the estimated public use of Hidden Reservoir by decade.

<u>Year</u>	<u>Recreation days</u>	<u>Year</u>	<u>Recreation days</u>
1970	65,000	2020	865,000
1980	390,000	2030	1,195,000
1990	450,000	2040	1,405,000
2000	475,000	2050	1,500,000
2010	562,000	2060	1,500,000
		2070	1,500,000

The initial growth rate, 1970-1980, is expected to be rapid due to the present lack of water-oriented recreation areas located within the demand area. The period between 1980 and 2010 is expected to have a reduced growth rate due to the anticipated availability of, and competitive effects from, the East Side Division development by the Bureau of Reclamation with its associated recreation facilities. It is expected that the rate of growth in recreation use will increase between 2010 and 2030 due to population growth and increasing per capita participation in recreation, and it is anticipated that these will result in the approach of maximum practical amounts of use at all available competing recreation resources presently anticipated. The optimum water and land use level at Hidden Reservoir is expected to be reached about 2050. Boating, fishing, picnicking and swimming are expected to be the most popular forms of day-use activities. Other activities will include camping, sightseeing, waterskiing and hunting. These activities were considered in estimating the total recreation use shown above.

## CHAPTER VI - LAND USE PLAN

27. Land classification. - All project lands are classified as either priority one, wildlife management, or operational. Lands located adjacent to the dam and spillway are needed for administration and operational requirements and are reserved for project operations. Wildlife management lands are reserved for uses discussed in paragraph 29. Priority one lands will be used for the development of public recreation areas, including integral concession developments, and are reserved for public recreation use. No lands have been identified within the tentative project boundary for priority two, three or four lands.

28. County zoning. - All lands adjacent to Hidden Reservoir have been designated by Madera County as being within an agricultural rural foothill district. The permitted land uses set forth in Madera County Ordinance 298 include the following:

a. Grazing and all other kinds of agriculture and agriculturally oriented services.

b. Farming of domestic animals, including chickens, fur-bearing animals, and swine.

c. Airstrip

d. Mine

e. One single-family residence

f. Guest house

g. Other single family dwelling in permanent structure or mobile home for occupancy by indigenous agricultural workers or a relative of the immediate family bound by the ties of consanguinity.

h. Rental houses, not to exceed a ratio of one dwelling unit per 40 acres in the ranch or farm.

Such land uses are compatible with recreational development of the project and will not encourage private developments of a conflicting nature.

29. Public use areas. - Determination of lands required for recreation and fish and wildlife at Hidden Reservoir was based on evaluation of the recreation potential of the project area, the existing and proposed development of recreation resources by other governmental and private

groups within a 50-mile radius, needs for buffer zones between public recreation use lands and adjacent private lands, and needs for development of wildlife resources in the project area. Descriptions of the recreation areas are given in the following subparagraphs and are further discussed in Chapter VII.

a. Hidden View Area. - This area was selected for initial and future camping and day-use activities. The area is located on the west side of the reservoir near the dam and comprises about 200 acres of land above gross pool. When fully developed the area could serve an estimated 280,000 visitors annually. Location and recreation development of the area are shown on plates 1 and 4. The topography is characterized by moderate slopes and relatively flat ridges. Oak-grassland is the vegetative cover type.

b. Buck Ridge Area. - Located on the east side of the reservoir, this area will be developed for initial and future day-use activities. The area comprises about 180 acres of land above gross pool. An estimated 440,000 recreation users annually could be served when this area is fully developed. The location and area development are shown on plates 1 and 5. The slopes in this area are moderate to steep with gentle undulating ridges. A few scattered oak trees provide shaded areas suitable for some of the picnic sites.

c. Arrowhead Area. - This future development area comprises about 170 acres of land above gross pool. An estimated 300,000 recreation users annually could be served when the area is fully developed. The location and development are shown on plates 1 and 7. Topography ranges from gentle to relatively steep slopes. Vegetative cover is primarily oak trees and grassland with occasional patches of chaparral.

d. Dry Creek Area. - The Dry Creek Area, comprising about 140 acres of land above gross pool, is a future development area. This area is shown on plates 1 and 8. Slopes are moderate to steep, with scattered oaks and grassland comprising the principal vegetative cover. This area could serve an estimated 260,000 recreation users annually when fully developed.

e. Savage Area. - The Savage Area, a future development site, comprises about 130 acres of land above gross pool. This area is shown on plates 1 and 9. An estimated 130,000 recreation users annually could be served at this area when fully developed. Vegetative cover is comprised of oaks and grassland with occasional patches of chaparral.

f. Wildlife management area. - Recommendations made by the Bureau of Sport Fisheries and Wildlife have provided the basis for setting aside about 320 acres of project lands for a wildlife management area.

These lands are shown on plates 1 and 2. This area is expected to support a large amount of hunting use in season and provide a natural area for other incidental recreation uses such as nature hikes and nature photography. Plate 12 contains a photograph of the area.

g. Observation area. - In addition to development of a public overlook site to provide a general view of the dam and spillway, reservoir, and project lands, this area was also selected for future development of day-use facilities. The area comprises about 90 acres of land above gross pool. An estimated 90,000 recreation users annually could be served when the area is fully developed. This area is shown on plates 1 and 6. The slopes of the area are relatively steep except for the ridge top. Vegetative cover is composed primarily of grasses with occasional oak trees.

30. Land acquisition. - Land acquisition at Hidden Dam and Reservoir will include about 430 acres of land for recreation, and together with lands needed for other project purposes, will total 3,160 acres. The Real Estate Design Memorandum, dated January 1966, was approved by OCE 1 August 1966. Land acquisition is to be initiated as soon as construction funds are available.

3160  
1570  

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1590

## CHAPTER VII - RECREATION DEVELOPMENT PLAN

31. Basis of area selection. - Public use areas were selected to provide maximum access to the lands and waters of the project. Consideration was given to proper spacing of these areas along the periphery of the reservoir so that maximum dispersal of recreation use can be provided while concentrating development of facilities to support such use so as to provide the developments economically and cause the least amount of physical disturbance to the existing resources. Careful attention has been given to location of facilities in a manner compatible with the natural terrain so as to avoid developmental aspects inharmonious with the spaciousness of the surrounding rolling hills. Inspection of the area available immediately below the dam in relation to the planned operation of the reservoir and the expected high summertime temperatures indicated that development for recreation use at this area would not be appropriate.

32. Project beautification. - Specific measures will be included in the design of project features for beautification of the project in addition to landscaping to be provided in the public-use areas that will produce beautifying effects. These measures will include vegetative plantings and other landscape treatment along roads in the vicinity of project structures, at the entrances and along roads leading to project facilities such as the administration area, operators' quarters, observation area, top of dam, and others. Plans for vegetative plantings will include appropriate trees and shrubs, particularly those which are native to the Hidden Reservoir area and to California. Beautification measures will be considered and incorporated into the final design of project structures. The overlook building and relocated grave and monument of Major James Savage will receive special consideration in this regard. During the preparation of the final design of the downstream channel works, consideration will be given to incorporating measures for beautification of this work, providing that local interests agree to assume any maintenance which may be required therefor.

33. Initial development plan. - In addition to the observation area, initial recreation developments at Hidden Reservoir will be located in two areas to provide a balanced plan of public access and to meet the basic requirements of expected public needs for three years following completion of the project. Facility development in both initial areas will be in accordance with the policy of the Chief of Engineers set forth in ENG CW-Y letter dated 5 August 1965, subject: "Implementation of the Federal Water Project Recreation Act (P.L. 89-72) in Previously Authorized Projects," wherein each initial development area is to be developed to at least two-thirds of its ultimate potential. Initial and future development at this project is to be accomplished by the Corps of Engineers as indicated for "Category C" projects noted in the above letter. Detailed descriptions of the developments, by area, are presented in the following subparagraphs:

a. Hidden View Area. - This area will be developed initially to handle an estimated 180,000 recreation days of camping and day use. The area would be easily accessible via County Road 407 which provides access from the northwest as well as the southwest. The facilities will be located generally as shown on plate 4 and are described below:

(1) Boat-launching ramp. - In order to provide launching facilities for the expected boaters using this area, a two-lane boat-launching ramp would be constructed in three separate sections in this area. Separate sections are necessary due to the topography between the gross pool and inactive pool elevations over which adequate slopes on the boat-launching ramp must be maintained.

(2) Parking. - A 40 car-trailer parking area would be provided above gross pool for the upper section of the launching ramp and a 50 car-trailer parking area would be provided at each of the lower stages of the launching ramp. Parking areas above gross pool would be surfaced with bituminous material while parking areas below gross pool would be surfaced with a stabilized aggregate surface course. Pullout or stubout parking at camp sites would be provided and surfaced with bituminous material. Stabilized aggregate parking surface for 60 cars would be provided at various stages below gross pool for day users such as fishermen and swimmers.

(3) Roads. - For access into this area, it is proposed to surface about 0.40 mile of existing Road 407 and construct an additional 0.30 mile of access road. About 0.35 mile of two-way and 0.85 mile of one-way circulation roads would be provided through the camp area. Approximately 0.90 mile of two-way road would be provided below gross pool to inter-connect the stages of the boat-launching ramp and below gross pool parking areas. Roads above or at gross pool level would be surfaced with bituminous material and roads below gross pool would be surfaced with stabilized aggregate surface course. Informational and directional signs would be provided throughout the area to orient the recreationists and maintain traffic control.

(4) Camping facilities. - Sixty-six camp sites and accompanying facilities would be provided in this area. Each camp site would have a table of standard design, a tent area, either a fireplace or a barbecue grill of the types previously approved for use at Success Reservoir; and one 30-gallon metal trash can with cover would be provided for every two sites. Shelters of the type approved for use at Isabella Reservoir would be provided at 32 of the camp sites. These shelters would provide shade while newly planted trees to be included in landscaping of the area are maturing. In addition to these sites developed above gross pool, an overflow area for campers would be provided below gross pool, generally as shown on plate 4. This overflow area would provide an access area for the extreme high-use periods that are normally expected to occur on holiday weekends.

(5) Water supply. - A water supply system would be provided to serve the future as well as the initial development. Water would be obtained from the reservoir through an intake located below the inactive pool. The water supply system would provide for complete treatment of the water, including chlorination, coagulation, sedimentation, and sand filtration, and would include a chlorinator, pressure tank, storage tank, and distribution lines to serve the camp sites. About one water supply point for every five camp sites would be provided. Hydrants would be provided at various locations to provide fill points for fire trucks.

(6) Sanitary facilities. - It is proposed to provide three 6-fixture flush-type restrooms with leaching fields and 20 portable chemical restrooms. The portable restrooms would be placed at the launching ramp, parking areas and along the beach area.

(7) Landscaping. - Because the vegetative cover consists primarily of grasses and scattered oak trees, it is proposed to provide landscaping to enhance aesthetic values as well as to provide additional shade. Suitable trees and shrubs native to the area would be most useful in obtaining the desired values. Trees would be located so as to provide the maximum amount of shade during the afternoon. Shrubs would be located to provide screening from roads, restrooms and other camp sites.

b. Buck Ridge Area. - This area would be developed initially to accommodate 290,000 recreation days of picnicking and other day use annually. Adequate access would be provided to this area by County Road 400. Facilities would be located generally as shown on plate 5 and are described below:

(1) Boat-launching ramp. - In order to provide launching facilities for the expected boaters and to provide a balanced plan of development at the reservoir, it is proposed to provide a two-lane boat-launching ramp in three sections in this area.

(2) Parking. - A bituminous surfaced, 60 car-trailer parking area would be provided at the upper section of the launching ramp and a stabilized aggregate parking area for 50 car-trailers would be provided at each of the two lower sections. In addition to the ramp area parking, it is proposed to provide a 75-car, bituminous surfaced parking area above gross pool for recreationists using a marina concession expected to be established in this area during the initial three-year period of operation. Bituminous surfaced car parking would be provided for each picnic site above gross pool, while each site below gross pool would be provided with car parking with stabilized aggregate surface.

(3) Roads. - It is proposed to provide about 0.10 mile of access road, 0.75 mile of two-way circulation road and 0.35 mile of one-way circulation road above gross pool with bituminous surfacing. About 0.45 mile of stabilized aggregate two-way circulation road would be provided above gross pool to provide access to the below gross pool picnic area. An additional 0.50 mile of stabilized aggregate two-way circulation road would be provided below gross pool to the picnic facilities and connecting the launching ramp stages. Informational and directional signs would be provided throughout the area to orient recreationists and maintain traffic control.

(4) Picnicking facilities. - Fifty-five picnic sites would be located in this area. It is proposed to provide facilities for 30 sites above gross pool and 25 sites below gross pool. Picnic sites above gross pool would consist of a standard-design table and one barbecue grill of the type previously approved for construction at Success Reservoir for every two tables; a 30-gallon metal trash can with cover would be provided for every four sites. Twelve shelters would be provided at sites above gross pool where new or existing trees are too small to give adequate shade from the afternoon sun. Picnic sites below gross pool would have portable tables with anchors and shelters, a barbecue grill for every two sites, a 30-gallon metal trash can with cover for every four sites, and 12 shelters would be provided and located at sites nearest the water surface.

(5) Water supply. - A water supply system would be provided to serve initial as well as future use in this area. Water would be taken from the reservoir through an intake located below the inactive pool. The water supply system would provide for complete treatment of the water, including chlorination, coagulation, sedimentation, and sand filtration, and would include a chlorinator, pressure tank, storage tank, and distribution lines to serve the picnic sites. One water supply point would be provided for every five picnic sites. Hydrants would be provided at various locations to provide fill points for fire trucks.

(6) Sanitary facilities. - It is proposed to provide three 6-fixture flush-type restrooms with leaching fields and 12 portable chemical restrooms. The portable restrooms would be located in the below-gross-pool picnic area and at the boat-launching ramp.

(7) Landscaping. - Because the vegetative cover consists primarily of grasses and scattered oak trees, it is proposed to provide appropriate tree and shrub plantings, particularly of those species native to the area and to California, and other landscaping features

to enhance aesthetic values as well as to provide additional shade. Trees would be located so as to provide the maximum amount of shade during the afternoon. Shrubs would be located to provide screening from roads, restrooms and other picnic sites.

c. Observation area. - During the initial phase of the main dam construction, a building would be constructed to house a public information center. The building would, during dam construction, have roughed-in plumbing for a 4-fixture restroom. During initial development, as construction proceeds, the restrooms would be completed, a water supply would be provided via a water line from the Buck Ridge area, about 10 picnic tables and three 30-gallon metal trash cans with covers would be provided, and additional trees and shrubs would be planted to enhance the natural beauty as well as provide shade. Portable chemical restrooms would be provided during this interim period for persons using the overlook to view construction. Access to this area would be afforded by County Road 400.

d. Wildlife management area. - Initial development measures in this area would be limited to access and to wildlife habitat improvement. Access would be provided by constructing a minimum-standard, gravel-surfaced road on both sides of the reservoir to the boundary of the wildlife management area. Car parking would be provided at the terminal points on both sides of the reservoir. Wildlife habitat improvement would consist of the piling of brush, selective tree falling and planting of shrubs for feed and cover. The fishery would be improved by treating the water to kill the non-game fish and then planting game fish.

34. Future development. - It is estimated that the attendance at Hidden Reservoir Project will reach maximum practical use about the year 2050 with a yearly attendance of 1,500,000 recreation days. Future facility developments have been estimated on the basis of a design load calculated at 16,900 visitors anticipated on an average weekend day during the peak month of the recreation season when maximum practical use is reached. Descriptions of proposed future developments by area are presented in the following subparagraphs:

a. Hidden View Area. - This area would ultimately be developed to accommodate 280,000 recreation days of use annually. Facility estimates are based on a design load attendance of 3,150 visitors. The campground would be enlarged to 100 sites and approximately 0.45 mile of circulation road would be added. Three additional 6-fixture flush-type restrooms would be provided to serve the added camping and day-use visitors. Two launching lanes would be added and additional parking would be provided above and below gross pool to accommodate cars and cars with trailers.

b. Buck Ridge Area. - This area would ultimately be developed to accommodate 440,000 recreation days of use annually. Facility estimates are based on a design load attendance of 4,950 visitors. The picnic area would be enlarged to 80 picnic sites. Because of the heavy day use expected in this area, the capacity of the launching ramp would be increased by providing five additional launching lanes. Additional parking above and below gross pool would be provided for cars and cars with trailers. Additional sanitary facilities would include three 6-fixture flush-type restrooms and six portable chemical restrooms. Approximately 0.30 mile of circulation road would be added. The stabilized aggregate access road to the below-gross-pool picnic area would be paved.

c. Arrowhead Area. - This area would ultimately be developed to provide facilities for 300,000 recreation days of picnicking and other day use annually. Facilities would be designed to accommodate a design load attendance of 3,380 visitors. Recreation development would include the following facilities: 65 picnic sites, one 4-lane boat-launching ramp, four 6-fixture flush-type restrooms, 10 portable chemical restrooms, approximately 1.15 miles of access road and 1.10 miles of circulation roads, water supply system, and adequate parking for cars and cars with trailers above and below gross pool. The proposed development plan is shown on plate 7. The construction of the facilities would be accomplished to meet future recreation demands. Access to this area would be provided by extending a road from the Buck Ridge area.

d. Dry Creek Area. - This area would ultimately be developed to provide facilities for 260,000 recreation days of picnicking and day use annually, based on a design load attendance of approximately 2,900 visitors. Facility development would include 55 picnic sites, one 4-lane boat-launching ramp, four 6-fixture flush-type restrooms, 10 portable chemical restrooms, a water supply system, approximately 1.1 miles of access and 1.7 miles of circulation roads, and adequate parking above and below gross pool for cars and cars with trailers. The general facility layout would be as shown on plate 8. Access to this area would be provided via County Road 407.

e. Savage Area. - This area would ultimately be developed to provide facilities to accommodate approximately 130,000 recreation days of picnicking and camping annually. Facilities would be designed to accommodate a design load of 1,460 visitors. Recreation development would consist of 40 picnic sites, a 25 camp site group camping area, three 6-fixture flush-type restrooms, six portable chemical restrooms, a water supply system, approximately 3.5 miles of access and 1.1 miles of circulation roads, and parking for cars and cars with camp trailers. There is no suitable location for a boat-launching ramp. The ramp to be developed earlier at the Dry Creek

area would be close enough to be utilized by recreationists in this area and has been sized accordingly. The proposed plan of development is shown on plate 9. Access to this area would be provided by extending a road from the Dry Creek area.

f. Observation area. - It is estimated that the maximum practical use of this area would be approximately 90,000 recreation days annually. Recreation facility developments would be designed to accommodate 1,000 visitors as a design load. Future facilities development would include 25 picnic sites, one 6-fixture flush-type restroom, four portable chemical restrooms, a water supply and distribution system, approximately 0.50 mile of circulation road and adequate parking for cars. General layouts of proposed facilities are shown on plate 6.

## CHAPTER VIII - PROJECT ADMINISTRATION

35. Policy. - Project land and water areas will be administered and managed so as to obtain maximum sustained public benefits from the recreation resources created by the project. Recreation and fish and wildlife will receive equal consideration with other project purposes so that optimum public benefits may be obtained. No activities affecting the establishment or development of recreation facilities, other than routine operation, maintenance, and replacement of existing facilities, will be accomplished except as may be approved as an item of this master plan and/or other design memorandums.

36. Division of responsibilities. - The Corps of Engineers will be responsible for administration and management of the project and will exercise overall supervision of land and water areas. In accordance with the policy of the Chief of Engineers, non-Federal participation in development, administration, and operation of recreation facilities at Hidden Reservoir has been sought. The State of California and Madera County were invited to participate in administration of the recreation areas; however, both agencies declined. Madera County has offered its cooperation, and it is anticipated that law enforcement activities will be assumed by that local governmental agency. Prior to construction of future recreation facilities, construction design memorandums will be prepared and submitted to higher authority for approval.

37. Plan of administration. - Operation and maintenance of the recreation facilities at Hidden Reservoir will be the responsibility of project personnel. Since most public use of recreation facilities at reservoirs located in the western Sierra Nevada foothill areas occurs from April through August, only a minimum permanent staff will be needed and this would be supplemented with seasonal employees during the summer season. It is estimated that the staff needed to operate the initial recreation developments would be a project manager, assistant project manager, clerk-typist, one reservoir ranger, two full-time recreation attendants and two seasonal recreation attendants. No additional personnel would be required specifically for fire protection duties. It is estimated that the equipment needed for operation and maintenance of initial developments would include a patrol boat, a workboat, tractor with trailer and accessories, sewage disposal unit, fire suppression unit and miscellaneous fire suppression equipment, resuscitator, and miscellaneous equipment and supplies. Costs for the above-estimated personnel and equipment would be about \$60,000 annually. As the project is further developed, it is estimated that additional personnel and equipment needed would include two full-time recreation attendants, two seasonal recreation attendants, a utility barge and other miscellaneous tools and supplies. Estimated costs for the additional personnel, services and equipment would be about \$40,000 annually.

38. Rules and regulations. - Federal rules and regulations governing public use at Hidden Reservoir would be prescribed by the Secretary of the Army and published as an amendment to the Code of Federal Regulations, Title 36, Chapter III. Current copies of such regulations will be printed and displayed at the project in appropriate locations frequented by the public. Concurrent jurisdiction and incorporation of these regulations by local authorities will be encouraged. State statutes and county ordinances concerning water safety, boat registration, and many other items of local jurisdiction would also govern public use.

39. Law enforcement. - Law enforcement activities at Hidden Reservoir would be primarily the responsibility of the State and County governments. Full cooperation would be given to law enforcement agencies by the Corps of Engineers' personnel at the project. Federal regulations will be administered by the Corps of Engineers' personnel, with enforcement by the Department of Justice.

40. Zoning. - Of the 3,160 acres to be acquired for Hidden Reservoir, approximately 400 acres would be zoned for administrative use and 320 acres would be zoned for wildlife management. The remaining land and water area would be available for general recreation use, except that certain portions would be zoned to avoid potential conflicts between such activities as fishing, swimming, boating, and waterskiing. A general plan for water zoning is shown on plate 3. Areas reserved for particular uses would be appropriately marked or buoyed and regulations prominently displayed to the public. Zoning of private lands adjoining the project is the responsibility of Madera County; however, Corps' personnel will work closely with County representatives in an effort to encourage only those developments that would be compatible with the purposes of the project.

41. Health and safety measures. - All water supply and sewage systems will be installed in compliance with standards of the California Department of Public Health. All construction areas will be adequately drained to prevent creation of mosquito habitat through ponding of rainfall and runoff. Any use of chemical pesticides or herbicides found necessary will be coordinated with the responsible agencies.

42. Fire-control plan. - The reservoir area and surrounding lands are primarily agricultural and are in relatively large ownership parcels. No fire of significance has burned this area for thirty years. This may have been due to the small number of local residents and lack of public access to the general area. While vegetative cover in the Hidden Reservoir area is somewhat sparse, it does constitute a flash-type fire hazard. The knee-high grasses

that cover the rolling hills become extremely dry during the summer months when daily maximum temperatures are seldom below 90°. This tinder dry grass would pose a fire threat to project lands as well as surrounding private lands. Public use at the reservoir will be highest during the summer months, and this will coincide with the high fire-danger period. In accordance with the specific recommendations of the California Division of Forestry relating to fire protection needs of the recreation areas, detailed in their report transmitted to the District Engineer by letter dated 18 May 1966, it is proposed to construct a ~~fire reduction zone~~ around the entire reservoir area, generally as shown on plate 3. This zone would be 30 feet wide and would be constructed by stripping all grass, weeds and brush, and discing and/or scarifying to a depth of six inches. A fire access road 12 feet wide would be constructed within the limits of the zone so that fire-fighting equipment could traverse the entire project boundary. The fire reduction zone would also include a ford of concrete construction across the Fresno River at the upper limits of the project. Water would be available for fire fighting from hydrants located at all improved recreation areas. Fire-fighting activities would be supervised and coordinated by the California Division of Forestry through the Assistant State Forest Ranger stationed at the town of Coarsegold. An operational fire prevention and control plan would be developed jointly by the Corps of Engineers and the State Division of Forestry prior to project completion.

43. Fish and wildlife management plan. - Based on the recommendations of the Bureau of Sport Fisheries and Wildlife, about 320 acres of project lands located at the upper end of the reservoir have been designated as a wildlife management area, as shown on plate 1. The wildlife carrying capacity of the management area would be improved by developing brush cover. This would be done by piling brush obtained from clearing operations and from trees and lower limbs of trees removed from designated areas. Coordination with the California Department of Fish and Game would include the marking of appropriate trees and limbs for removal consistent with wildlife needs and other project needs. Shrubs and other plants would be planted for the improvement of wildlife habitat on project lands in the wildlife management area above 520 feet elevation, which has been identified as the upper limit of clearing. Clearing below this elevation in the wildlife management area would be limited to the removal of debris and fallen brush and trees. The annual maintenance costs for wildlife habitat improvements would be borne by the California Department of Fish and Game or other local interests. The project area will be fenced to prevent competitive grazing of domestic livestock and to retain an abundant growth of grasses, forbs and shrubs for wildlife food, cover and nesting sites. Access roads to the wildlife management area would be provided along

the fire-control lanes on both sides of the reservoir and would consist of one-lane auto trails constructed to minimum use standards. Pedestrian access into the wildlife management area would be facilitated by providing two 10-car parking areas, one on each side of Hidden Reservoir. The lands between gross pool and minimum pool at the upper end of the reservoir would be left uncleared and designated as a fish-management area, marked by buoys and signs indicating the primary purpose and boating restrictions. Both game fish and undesirable rough fish occur in the Fresno River and certain tributaries above Hidden Dam site and in order to facilitate establishment of a warm-water game fishery in the reservoir, chemical treatment of these waters for removal of non-game fish is desirable and would be done just prior to dam closure. The California Department of Fish and Game would accomplish the chemical treatment and stock the reservoir with game fish. The Department of Fish and Game would be notified of the date of the dam closure and would be provided funds to accomplish the fishery improvement.

CHAPTER IX - SUMMARY OF COSTS

44. Initial facilities. - The total estimated cost for the proposed initial recreation developments described herein to be constructed by the Corps of Engineers is as follows:

<u>Area</u>	<u>Cost</u>
Hidden View	\$ 600,000
Buck Ridge	540,000
Observation	72,000
Wildlife Management	<u>33,000</u>
Total	\$1,245,000
Estimated annual O&M	60,000

CHAPTER X - CONCLUSIONS AND RECOMMENDATIONS

45. Conclusions. - It is concluded that:

a. Hidden Reservoir will make available to the public significant and important water-oriented recreation resources in a location where demand for the use of such resources is increasing.

b. The progressive and orderly implementation of the development proposed in this master plan would make possible the maximum practical utilization of lands and resources of the project area.

c. Construction of the initial facilities presented in this master plan would provide recreational facilities to meet predicted requirements for the initial public use.

46. Recommendations. -

a. It is recommended that this master plan be approved as the basis for the development and administration of the recreation resources of the Hidden Reservoir.

b. It is recommended that the initial facility development proposed herein be approved for construction, at an estimated cost of \$1,245,000.



**LEGEND**

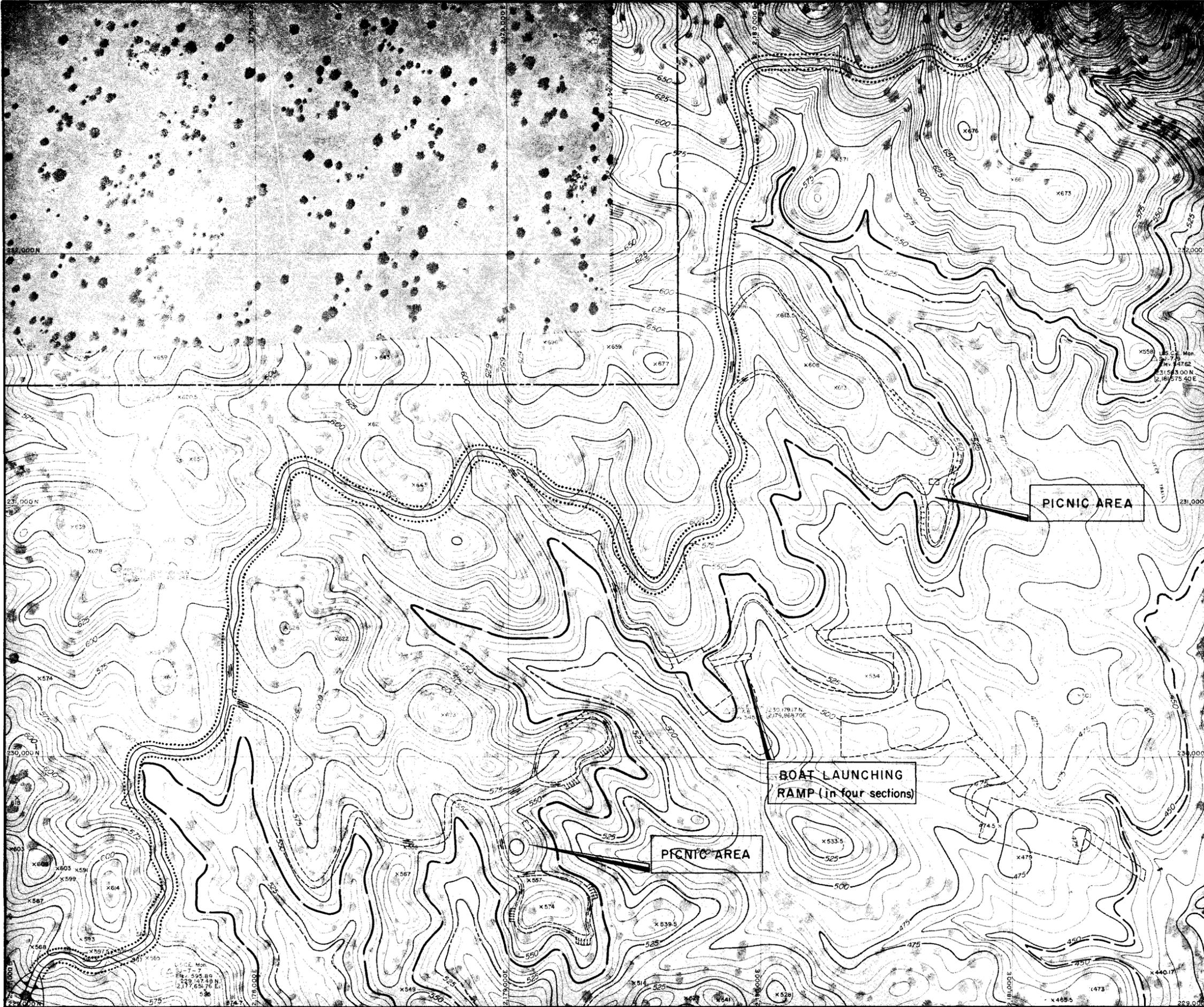
- Tentative project boundary
- Gross pool
- Upper limit of clearing
- Inactive pool
- Wildlife management area boundary
- Future development
- Fire control lane with access road (Initial)
- Fire control lane and riding and hiking trail (Initial)
- Restroom location



REVISION	DATE	DESCRIPTION	BY

U. S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA FRESNO RIVER BASIN, CALIFORNIA HIDDEN RESERVOIR FRESNO RIVER MASTER PLAN <b>ARROWHEAD RECREATION AREA</b>	
DRAWN BY: D.W.A. CHECKED BY: F.J.K. PREPARED BY: R.M.C. SUBMITTED BY: <i>[Signature]</i> CHIEF, RECREATION SECTION	APPROVED: <i>[Signature]</i> CHIEF ENGINEERING DIVISION DATE: 1 SEPTEMBER 1967
PREPARED UNDER THE DIRECTION OF <b>CRAWFORD YOUNG</b> COL. CORPS OF ENGINEERS U.S.A.	SCALE: AS SHOWN FILE NO. SJ7-13-66 SHEETS 66/1 TO 66/9 SHEET NO 66/7



**LEGEND**

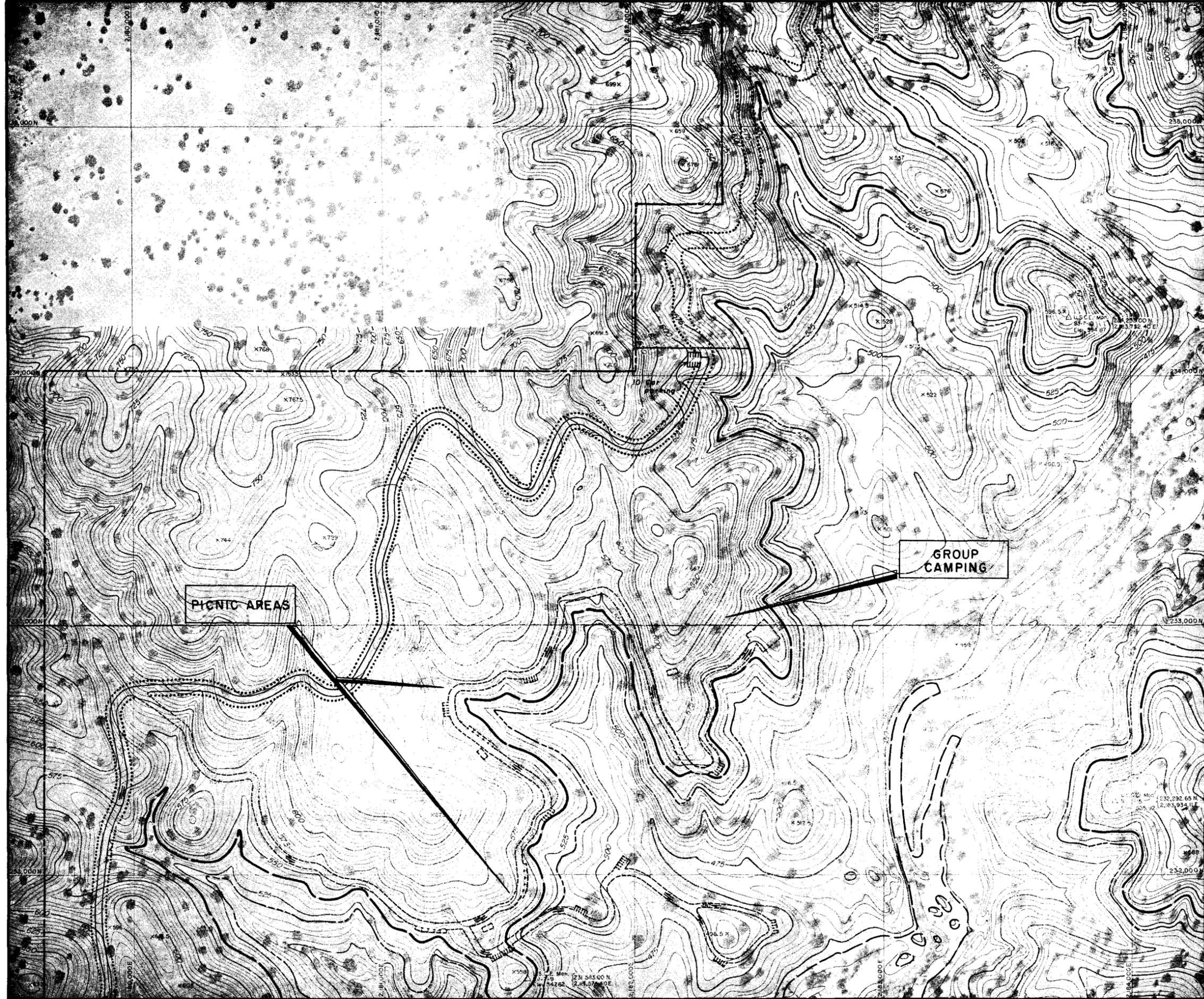
- Tentative project boundary
- ===== Gross pool
- Upper limit of clearing
- Inactive pool
- Future development
- Fire control lane with access road (Initial)
- ☐ Restroom location



REVISION	DATE	DESCRIPTION	BY

U. S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA	
FRESNO RIVER BASIN, CALIFORNIA HIDDEN RESERVOIR FRESNO RIVER	
MASTER PLAN <b>DRY CREEK</b> RECREATION AREA	
DRAWN BY: D. W. A. CHECKED BY: F. J. K. PREPARED BY: R. M. C. ADMITTED BY: <i>[Signature]</i> CHIEF, RECREATION SECTION	APPROVED: <i>[Signature]</i> CHIEF, PROJECT PLANNING BRANCH DISTRICT ENGINEER
PREPARED UNDER THE DIRECTION OF <b>CRAWFORD YOUNG</b> COL., CORPS OF ENGINEERS U. S. A.	SCALE: AS SHOWN FILE NO. SJ7-13-66 SHEETS 66/1 TO 66/9 SHEET NO. 66/8



**LEGEND**

- Tentative project boundary
- Gross pool
- Upper limit of clearing
- Inactive pool
- Wildlife management area boundary
- Future development
- Fire control lane with access road (Initial)
- Fire control lane and riding and hiking trail (Initial)
- Restroom location



REVISION	DATE	DESCRIPTION	BY

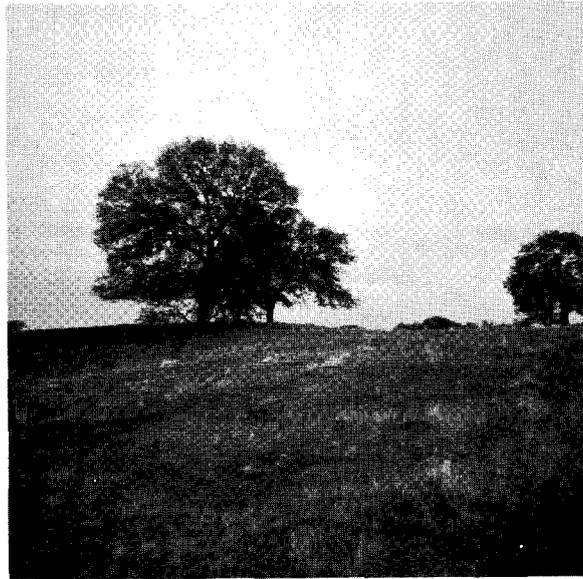
U. S. ARMY ENGINEER DISTRICT  
 CORPS OF ENGINEERS  
 SACRAMENTO, CALIFORNIA  
 FRESNO RIVER BASIN, CALIFORNIA  
 HIDDEN RESERVOIR  
 FRESNO RIVER  
**MASTER PLAN**  
**SAVAGE**  
**RECREATION AREA**

DRAWN BY: D.W.A.  
 CHECKED BY: F.J.K.  
 PREPARED BY: R.M.C.  
 SUBMITTED BY: *[Signature]*  
 CHIEF, RECREATION SECTION

APPROVED: *[Signature]* DATE: 1 SEPTEMBER 1967  
 CHIEF, PROJECT PLANNING BRANCH  
 CHIEF ENGINEERING DIVISION

PREPARED UNDER THE DIRECTION OF  
**CRAWFORD YOUNG**  
 COL. CORPS OF ENGINEERS U.S.A. DISTRICT ENGINEER

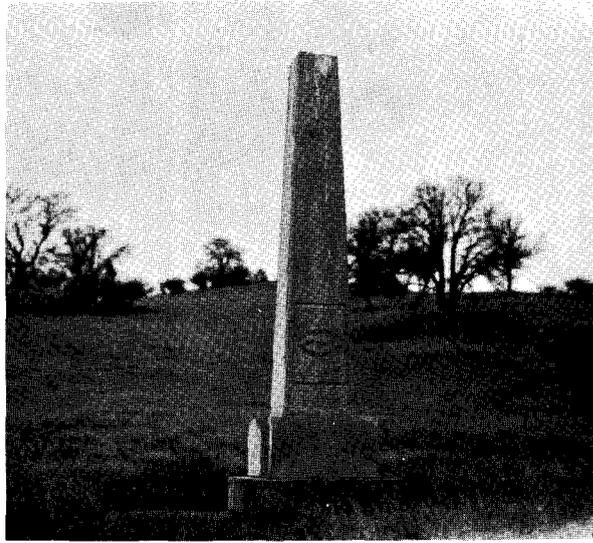
SCALE: AS SHOWN  
 FILE NO. SJ7-13-66  
 SHEETS 66/1 TO 66/9 SHEET NO. 66/9



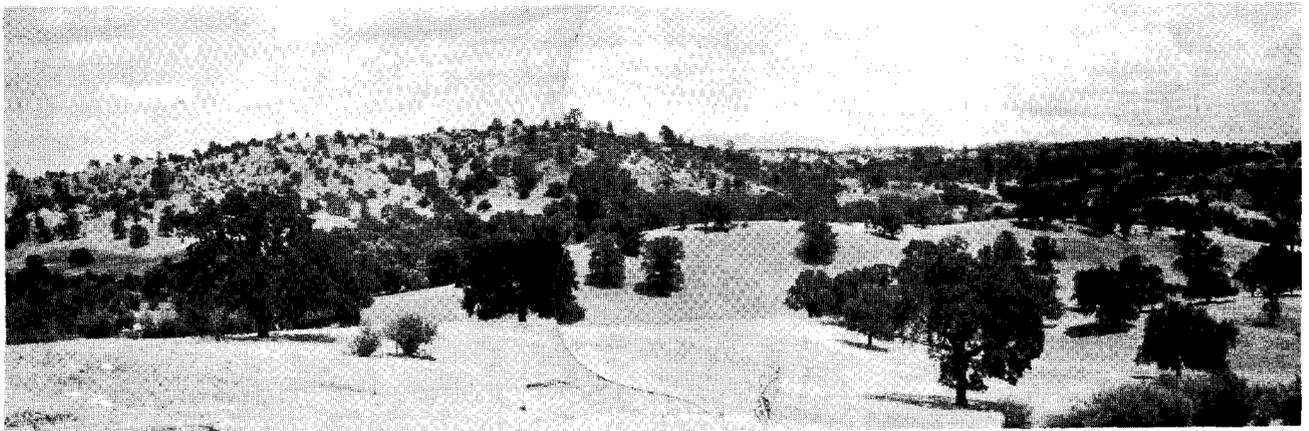
(3)  
Typical view of open oak-grassland area  
suited to multiple activities.



(4)  
View of area containing picturesque  
rock outcroppings and oaks suited to  
picnicking and other day use activities.



(5)  
The Savage Monument to be relocated



(6)  
View of the Fish and Wildlife Management Area

DESIGN MEMORANDUM NO. 15  
HIDDEN RESERVOIR  
FRESNO RIVER, CALIFORNIA

MASTER PLAN

APPENDIX A

METHODS USED FOR ESTIMATING  
ATTENDANCE AND FACILITIES

January 1968

Department of the Army  
Sacramento District, Corps of Engineers  
Sacramento, California

DESIGN MEMORANDUM NO. 15  
HIDDEN RESERVOIR  
FRESNO RIVER, CALIFORNIA

MASTER PLAN

APPENDIX A  
METHODS USED FOR ESTIMATING  
ATTENDANCE AND FACILITIES

CHAPTER I - INTRODUCTION

1. Introduction. - Presented herein is a summary discussion of the methodology used for evaluating the recreation potential of Hidden Reservoir. The procedures described below were used to calculate the amount of demand for, and estimate the use of, the recreation resources of Hidden Reservoir and facilities needed to serve such use.

## CHAPTER II - ESTIMATING ATTENDANCE

2. Estimating initial attendance. - Attendance was estimated by means of the procedural steps discussed in the following paragraphs.

3. The market demand area from which day use would originate was constructed by establishing concentric zones of ten road-miles width out to a distance of 40 miles around the project. This maximum distance for Hidden Reservoir market demand area was established from recreation demand data available from surveys of similar existing reservoirs in California. The market demand area was then modified to allow for competition from other water-oriented outdoor recreation areas. Chart 1 attached to this appendix shows the distance zones comprising the market demand area constructed for Hidden Reservoir.

4. Populations of the zones for the anticipated initial year of recreation use at Hidden Reservoir were established from information contained in "United States Census of Population 1960, California," published by the United States Department of Commerce, Bureau of Census.

5. Anticipated per capita use from each zone was determined from data collected at similar existing reservoirs. This data showed that per capita recreation use decreases as distance from a reservoir increases.

6. Zonal populations were multiplied by corresponding per capita use rates to obtain the total recreation-day use expected from the market demand area for the initial year of recreation use.

7. Projecting attendance. - Recreation use expected in future years over the economic life of the project was estimated based on projected increases in population and per capita use. Populations were projected by zones to the year 2070 using published information on county population projections of the California Department of Water Resources. Future per capita recreation use was projected by constructing a curve to describe an extension of per capita recreation use data collected from state parks of California from 1946-1962. The rate of change in each decade over the future life of the project was used as a multiplier of the base per capita use rate discussed in paragraph 5.

8. By application of the projected per capita use rates to the projected populations by zone for each decade, a total projected visitation was computed for the project. It is estimated that the population of the market demand area for Hidden Reservoir would be about 250,000 persons in 1970 and that this would increase to an estimated 2,800,000 persons by the year 2070.

9. Maximum practical use. - The upper level of recreation attendance is limited by the water and land areas available. Based on water surface and land areas that would be available at Hidden Reservoir and the maximum amount of various uses which could be accommodated without detriment to the recreation resources and without undue restrictions imposed on recreation activities as we know them today; based on the amounts of recreation use occurring on the water and land areas at existing projects; and assuming that there would be considerable urban development around the reservoir in future years, an annual visitation of 1,500,000 was determined to be the maximum practical use which could be accommodated at the project.

### CHAPTER III - ESTIMATING FACILITIES

10. Estimating facilities. - The kinds, amounts, and scheduling of facilities to be provided are calculated based upon the estimated attendance and anticipated recreation uses. The estimated attendance on an annual basis is reduced to a design load attendance. The design load is then modified by expected recreation activity percentages and other factors to estimate the amounts of facilities needed. Prospective construction schedules for future facilities can be anticipated on the basis of the projected increase in recreation use. An outline of the procedures for estimating facilities is presented in the following paragraphs, and examples are included.

11. Design load. - The annual attendance is reduced to a design load on which an estimate of facilities needed can be based. Based on surveys of recreation use at existing reservoirs, the design load is calculated in the following manner:

a. Peak month percentage. - The percentage of annual use anticipated to occur during the peak month of the recreation season is estimated. For Hidden Reservoir, it is estimated that the peak month use will be 15 percent of the annual use.

b. Weekend percentage. - The percentage of peak month use which will occur on weekends is estimated at 60 percent for Hidden Reservoir. The number of weekend days during the peak month is also used in the calculation to compute the design load.

c. Example. - The maximum practical use at Hidden Reservoir is estimated at 1,500,000 recreation days of use annually. The design load (DL) of this attendance is calculated as follows:  $DL = \text{Annual Attendance (AA)} \times \text{percent of use during peak month (PM)} \times \text{percent of use on an average weekend day during peak month (AWD)} \div \text{number of weekend days during peak month (WD)}$ , or  $DL = AA \times PM \times AWD \div WD$ . By application of the values discussed above, the design load equals  $1,500,000 \times .15 \times .60 \div 8$  or 16,875 visitors.

12. Participation in recreation activities. - Studies of recreation use data taken from surveys of use at existing reservoirs provide the basis for estimating the percentages of participation in various activities which are expected to take place at Hidden Reservoir. Information obtained at two existing reservoirs (Success Reservoir on the Tule River and Terminus Reservoir on the Kaweah River in California) was used as a guide to estimate the participation in various activities at Hidden Reservoir. Activity percentages are expressed in percent of design load. Based on the design load of the ultimate attendance expected at the two public use areas to be developed initially, participation percentages are as follows: Camping - 5 percent, picnicking - 27 percent, boating - 13 percent, sight-seeing - 15 percent, and fishing, swimming and other activities - 40 percent.

As urbanization develops around the reservoir, it is expected that activity participation percentages will change approximately as follows: camping - 3 percent, picnicking - 40 percent, boating - 18 percent, sightseeing - 15 percent, and fishing, swimming, and other activities - 24 percent.

13. Computation factors. - Other factors are also used in estimating facilities, such as the number of people per automobile or boat, turnover rates (or number of parties expected to use the facilities in one day), and percent of those picnicking who require facilities such as tables and stoves (many persons who picnic do not desire the use of formal facilities and prefer informal arrangements at more remote locations).

14. Initial development. - Initial recreational facilities at Hidden Reservoir will be constructed at two recreation areas, Buck Ridge and Hidden View, located on the east side and west side of the reservoir respectively, to provide a balanced plan of development for the reservoir. Evaluation of the project and the visitation expected by the third year of useful operation indicated that a campground should be developed on the west side, while a marina area and a picnic ground should be developed on the east side of the reservoir. Taking into consideration the terrain, tree cover and amount of lands needed as buffer areas, it was estimated that the maximum practical use at Buck Ridge and Hidden View would be 440,000 and 280,000 annual visitors respectively.

15. Initial facilities. - Based on the percentages and factors discussed in paragraphs 12 and 13, and based upon the policy of the Chief of Engineers contained in letter ENG CW-Y dated 5 August 1965<sup>1/</sup>, subject: "Implementation of the Federal Water Project Recreation Act (P.L. 89-72) in Previously Authorized Projects," the extent of facilities development in each initial area was estimated. The steps used in estimating facilities needed are presented in the following sequential calculations. Using the factors presented in paragraph 11, it is estimated that 1.125 percent of annual attendance will occur on an

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<sup>1/</sup> This policy instructs that public use areas should be selected for initial development on the basis of providing a balanced plan for public access in the vicinity of project structures and water area in accordance with the level of recreation use anticipated during the first three years of operation, and instructs further that each primary area so selected should be developed initially to a level of at least two-thirds of its ultimate potential. On this basis in the case of Hidden Reservoir, the amount of facilities to be constructed initially would accommodate the level of use presently anticipated during the second decade of project operation.

average weekend day of the peak month of use and this is the design load. As an example, for the Buck Ridge and Hidden View Recreation Areas with an estimated maximum practical use of 720,000 visitors annually, the 1.125 factor gives a design load of 8,100.

a. Picnicking. - With 40 percent of visitors picnicking, a turnover rate of 2.5, 4 picnickers per party, and 40 percent of picnickers wanting facilities, the number of picnic sites needed are calculated on the following basis:  $(0.4) (0.27) (8,100) + (4) (2.5) = 81.1$  picnic sites needed; two-thirds of 81.1 = 54; and by rounding, 55 picnic sites are required for initial development.

b. Launching lanes. - With about 13 percent of visitors boating, 3.5 boaters per party, 40 boat launchings and haulouts per day per lane, and making an assumption based on experience and survey data that about 200 boaters would use marina-docked boats, the number of lanes needed are calculated as follows:  $(0.13 \times 8,100) - 200 + (3.5) (40) = 6.09$ ; and this rounded indicates that 6 lanes are needed; two-thirds of 6 = 4, the number of lanes required for initial development.

c. Camping. - With about 5 percent of visitors camping and an average of 4 people per camp site the number of camp sites needed are:  $(0.05) (8,100) + 4 = 100$  camp sites needed; two-thirds of 100 = 66 camp sites, the number to be provided for initial development.

d. Sanitary facilities. - These facilities include restroom buildings with flush-type fixtures and portable chemical restrooms to be placed at the boat-launching ramps and along the shoreline. The following criteria were used as a guide in estimating the sanitary facilities needed:

- (1) Provide one fixture unit for every 20 campers.
- (2) Provide one fixture unit for every 75 picnickers using picnic sites.
- (3) Provide one fixture unit for every 170 picnickers (not using developed picnic sites), onshore fishermen, swimmers, sightseers and other participants in various activities.
- (4) Provide four portable chemical restroom units for every two boat-launching lanes.

Based on the above criteria, the following is a sequence of calculations used to estimate sanitary facilities: with 5 percent of visitors camping and 20 campers per fixture unit, the fixtures needed

for camping are  $(0.05) (8,100) + 20 = 20$  fixtures needed; to fulfill this requirement, three 6-fixture flush restrooms will be developed initially in the camping area. With 27 percent of visitors picnicking, 40 percent using picnic facilities, and 75 picnickers per fixture unit, the facilities needed are  $(0.27) (8,100) (0.40) + 75 = 11.6$  fixtures needed; to fulfill this requirement, two 6-fixture flush restrooms will be developed initially in the picnicking area. For the remaining visitors, sanitary facilities will be provided at the rate of one fixture for every 170 visitors,  $6,400 + 170 = 38$  fixtures; to fulfill this requirement, one 6-fixture flush restroom in the day-use area for marina visitor use, 20 portable chemical restrooms at Hidden View to be placed along the ramp and in the overflow camping area, and 12 portable chemical restrooms in the Buck Ridge area along the ramp and in the below-gross-pool picnic area would be provided initially.

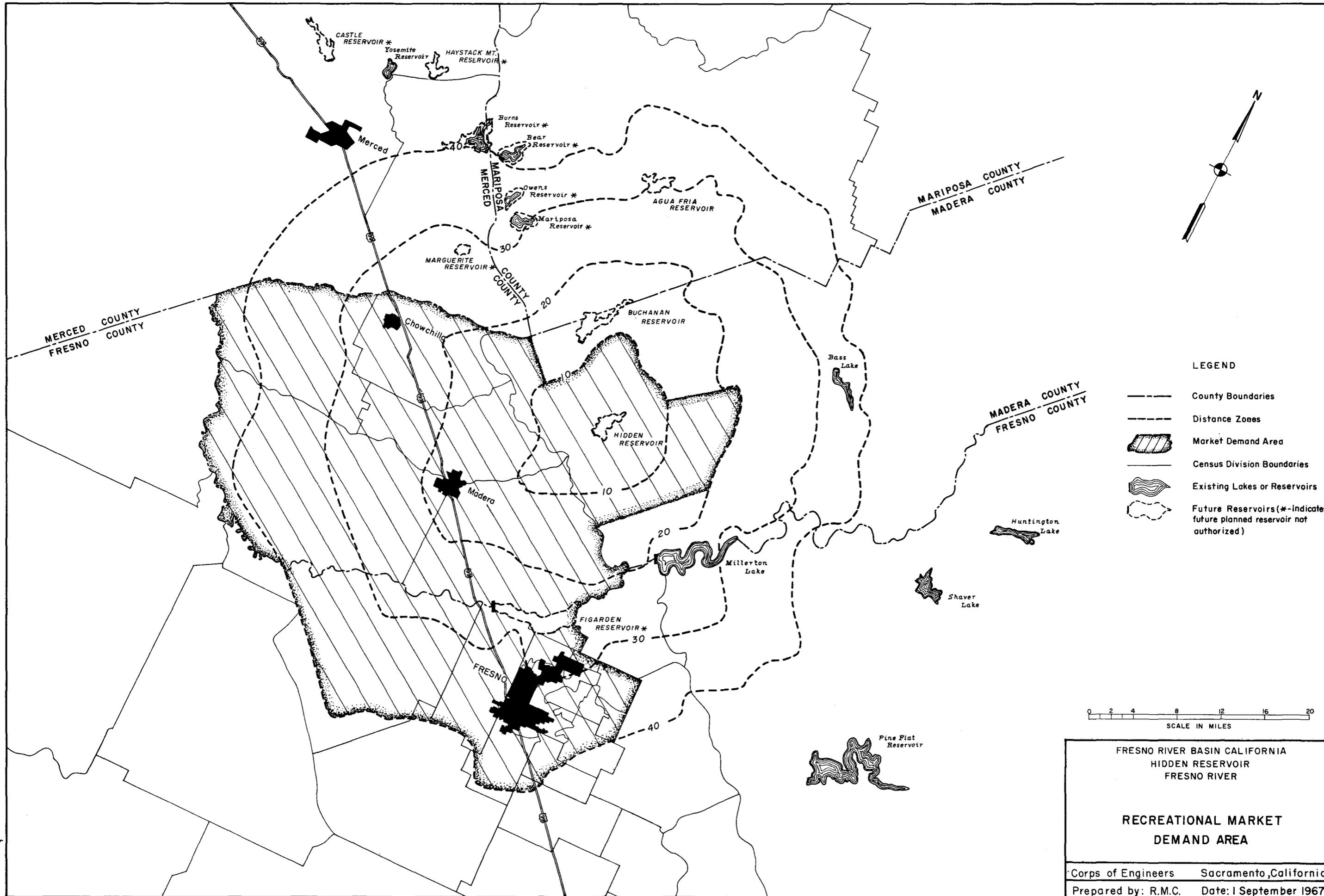
DESIGN MEMORANDUM NO. 15  
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HIDDEN RESERVOIR  
FRESNO RIVER

MASTER PLAN

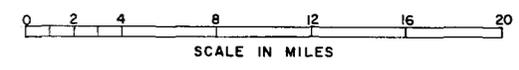
APPENDIX B  
BASIS OF DESIGN

January 1968

Department of the Army  
Sacramento District, Corps of Engineers  
Sacramento, California



- LEGEND**
- County Boundaries
  - - - Distance Zones
  - ▨ Market Demand Area
  - Census Division Boundaries
  - ~ Existing Lakes or Reservoirs
  - ⊛ Future Reservoirs (\*-Indicates future planned reservoir not authorized)



FRESNO RIVER BASIN CALIFORNIA  
HIDDEN RESERVOIR  
FRESNO RIVER

**RECREATIONAL MARKET  
DEMAND AREA**

Corps of Engineers Sacramento, California  
Prepared by: R.M.C. Date: 1 September 1967

DESIGN MEMORANDUM NO. 15  
FRESNO RIVER BASIN, CALIFORNIA  
HIDDEN RESERVOIR  
FRESNO RIVER

MASTER PLAN

APPENDIX B  
BASIS OF DESIGN

1. General. - The plan of development and basic facilities proposed in this master plan would serve an estimated 1,500,000 people annually when fully developed. Layouts and designs of the facilities were prepared in accordance with criteria contained in Engineering Manual 1130-2-312, dated 1 May 1960. County and State public health and sanitation requirements will be adhered to in the design and construction of facilities. The basis of design of the proposed facilities is discussed in the following paragraphs. Information presented on initial facilities construction and on wildlife improvement measures constitutes the information which would otherwise be presented in a separate initial facilities construction design memorandum. Recreation features have been located and designed in consonance with existing geologic and anticipated hydrologic and hydraulic effects at the project. Particular attention has been given to the design of recreation facilities so as to achieve maximum usefulness at all reservoir stages. Boat-launching ramps, parking areas and roads, which must be located below the gross pool elevation to serve the public at low pool stages, are to be located and designed so that the effects of wave erosion and sediment deposition will be minimized. Other facilities located below gross pool would be portable or would incorporate features for withstanding inundation.

2. Camping facilities. - Basic facilities for initial developments were based on a design day load of 270 campers. Each camp site will have a permanent concrete table with attached benches and wooden tops, a barbecue grill and a cleared and graded area for a tent. Demountable portable shelters (District Standard Design Drawing File No. 80-25-755) will be provided at selected sites to supplement natural cover for shade. All sites were designed with a parking spur or turnout, depending on terrain, to accommodate a car with camping trailer. A 30-gallon metal trash can with cover will be furnished at the rate of one for every two camp sites.

3. Picnicking facilities. - Initial facilities development was based on provision of facilities for 2,000 picnickers. Picnic site designs above gross pool include a permanent concrete table and benches, with wooden tops, one barbecue grill for every two sites, one trash receptacle for every four sites, and shelters at selected sites. Picnic site designs below gross pool include one portable table with anchor for each site, one demountable barbecue grill for every two sites, and a 30-gallon metal trash can with cover for every four sites. Demountable shelters would also be provided at about half of the sites below gross pool.

4. Roads. - Since recreation traffic is nonexistent in the areas at the present time, traffic analysis within the proposed recreation areas has been based on projections derived from anticipated usage, using data obtained from existing recreation facilities within the Sacramento District. Using a 20-year projection, it is anticipated that the annual use in 1990 will be 450,000 recreation days. This figure is used in the following calculations. The Design Hourly Volume (DHV) is computed as follows:

Assuming 4 persons per vehicle. . .  $450,000 \div 4 = 112,500$   
vehicles.

Each vehicle to make 2 trips. . .  $112,500 \times 2 = 225,000$ .

Average Daily Traffic (ADT). . .  $225,000 \div 365 = 616$ .

DHV. . . 15% of 616 = 92.

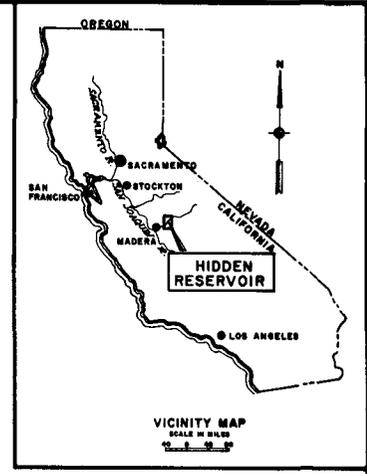
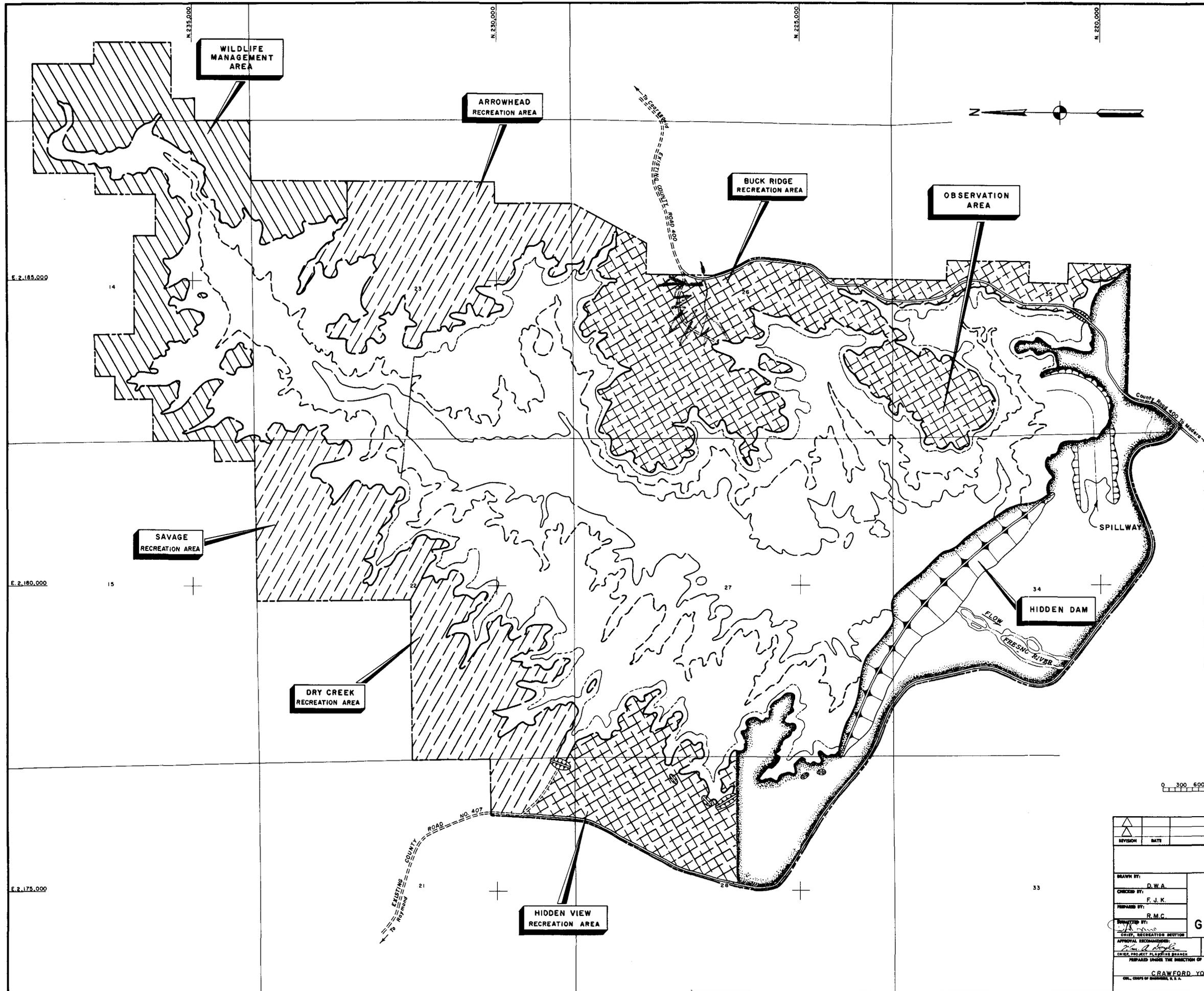
From Table I, TM 5-822-2, a Class E designation is assigned to all recreation roads and parking areas. Using criteria from TM 5-822-5, a traffic composition of Category I is designated. For the above class and category, from Table III of TM 5-822-5, a Design Index of 1 is required. Entering the curves of Figure 3, TM 5-822-5, using an uncompacted subgrade CBR of 4 and a Design Index of 1, the required thickness of pavement and base is 13.5 inches. With a compacted subgrade CBR of 9 and a design index of 1, the required thickness of pavement and base is 7.5 inches. The subgrade materials will produce a CBR of 9 when a minimum thickness of 6 inches is compacted to 95 percent of CE 55 compactive effort designation, test method 102 of MIL-STD-621A. Stabilized aggregate materials have produced CBR values of 80 when compacted to 100 percent of CE 55 compactive effort designation. The pavement will be a 1.5 inch thick bituminous surface course which exceeds the minimum requirements of Table II, TM 5-822-5. Bituminous prime coat (MC-70) will be applied to the surface of the stabilized aggregate base course. The base course will be 6 inches thick, which exceeds the requirement of Table II, TM 5-822-5, but meets the requirements of Figure 3 in the same manual. Geometrics of the roads will be as follows:

Access roads. . . Two 10-ft. lanes with 4-ft. shoulders.

Circulation roads. . . Two 9-ft. lanes with 4-ft. shoulders or

One 12-ft. lane with 4-ft. shoulders.

All roads above gross pool will be paved, with oiled shoulders to minimize erosion. Roads below gross pool will consist of a 6-inch stabilized aggregate base course on a prepared subbase. Road designs include signs, barriers and guide posts to be installed throughout

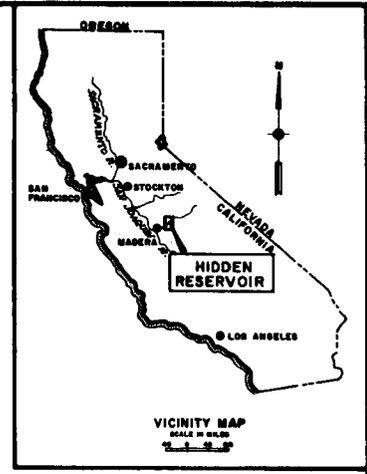
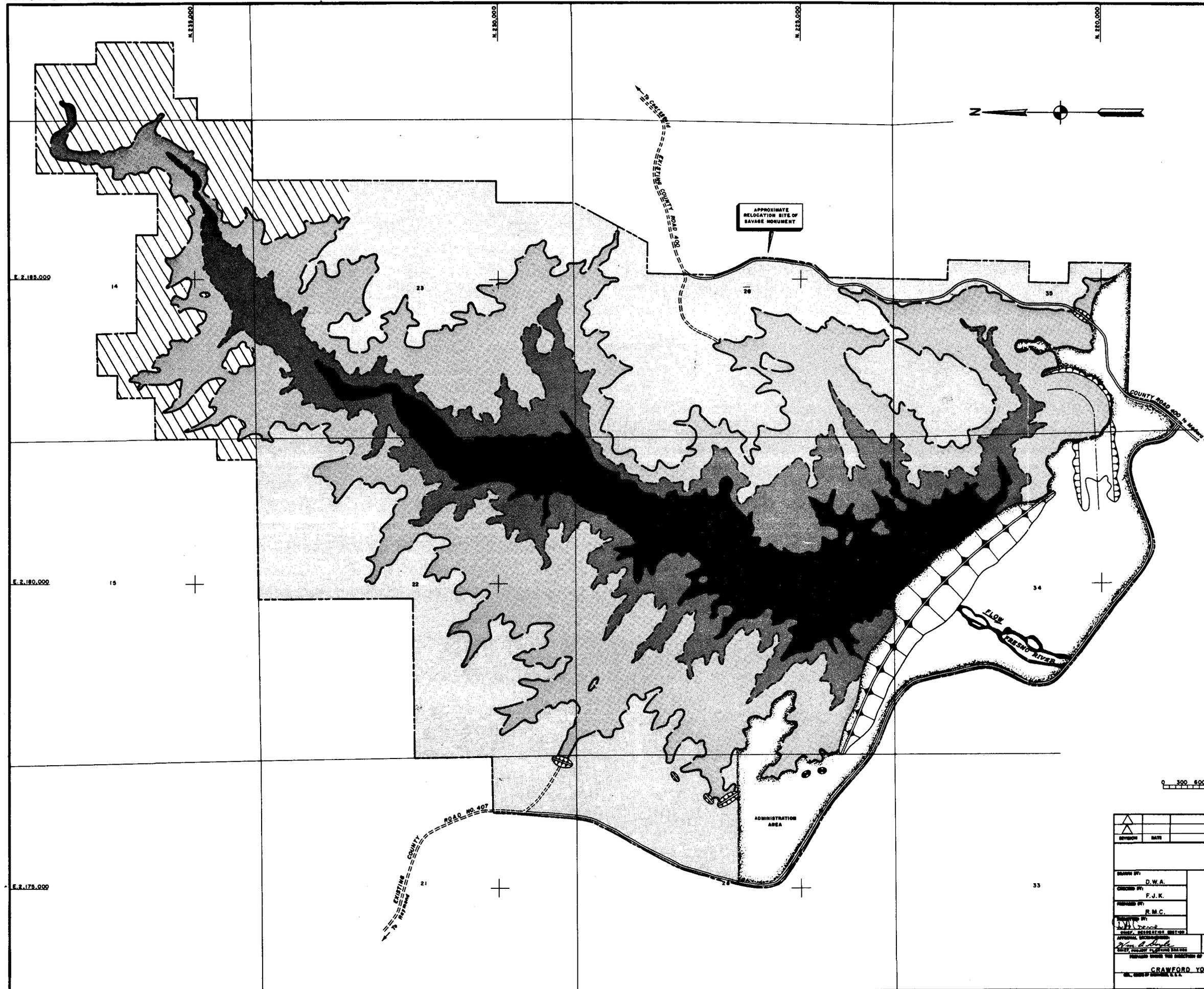


**LEGEND**

- Grass Pool Elev. 540'
- - - Upper Limit of Clearing
- - - Normal Recreation Pool Elev. 476'
- - - Inactive Pool Elev. 448'
- - - Tentative Project Boundary
- ==== Existing Roads
- ==== Proposed Roads Relocation
- ▨ Wildlife Management Area
- ▩ Proposed Recreation Areas (Initial & Future Development)
- ▧ Proposed Recreation Area (Future Development)
- ▭ Operational Area



REVISION	DATE	DESCRIPTION	BY	BY
<b>U. S. ARMY ENGINEER DISTRICT</b> CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA				
DRAWN BY: D.W.A.		FRESNO RIVER BASIN, CALIFORNIA HIDDEN RESERVOIR FRESNO RIVER MASTER PLAN		
CHECKED BY: F.J.K.		<b>GENERAL RECREATION PLAN</b>		
PREPARED BY: R.M.C.		DATE: 1 SEPTEMBER 1967		
APPROVED BY: [Signature]		SCALE: AS SHOWN SPEC. NO.		
CHIEF, RECREATION SECTION		FILE NO. SJ7-13-66		
CHIEF, PROJECT PLANNING BRANCH		SHEETS: 66/1 TO 66/9		
PREPARED UNDER THE DIRECTION OF		SHEET NO. 66/1		
CRAWFORD YOUNG		DATE: 66/1		
CHIEF, CORPS OF ENGINEERS, U.S.A.		DATE: 66/1		

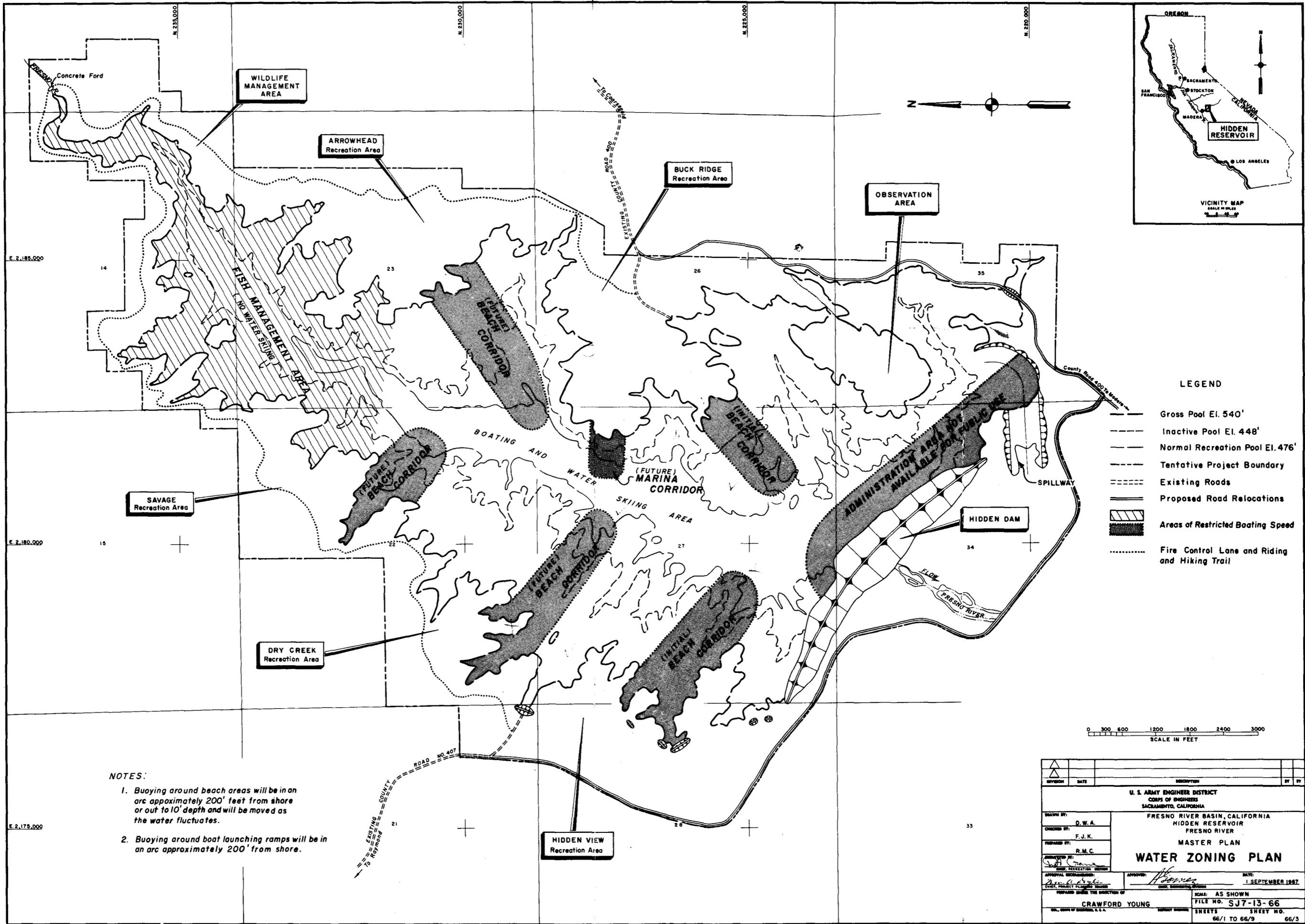


LEGEND

- Gross Pool Elev. 540'
- Normal Recreation Pool Elev. 476'
- Inactive Pool Elev. 446'
- Tentative Project Boundary
- Existing Roads
- Proposed Road Relocation
- Priority No. 1 Lands For Public Use
- Wildlife Management Lands
- Lands Reserved For Project Operations



REVISION	DATE	DESCRIPTION	BY	IT
U. S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA				
FRESNO RIVER BASIN, CALIFORNIA HIDDEN RESERVOIR FRESNO RIVER MASTER PLAN <b>LAND USE PLAN</b>				
DESIGNED BY:	D.W.A.	DATE: 1 SEPTEMBER 1967		
CHECKED BY:	F.J.K.			
APPROVED BY:	R.M.C.			
DESIGNED BY:	[Signature]			
DRAWN BY: [Signature]		APPROVED: [Signature]		
PREPARED UNDER THE DIRECTION OF CRAWFORD YOUNG		DRAWN AS SHOWN FILE NO. SJ7-13-66 SHEETS 66/1 TO 66/9 66/2		

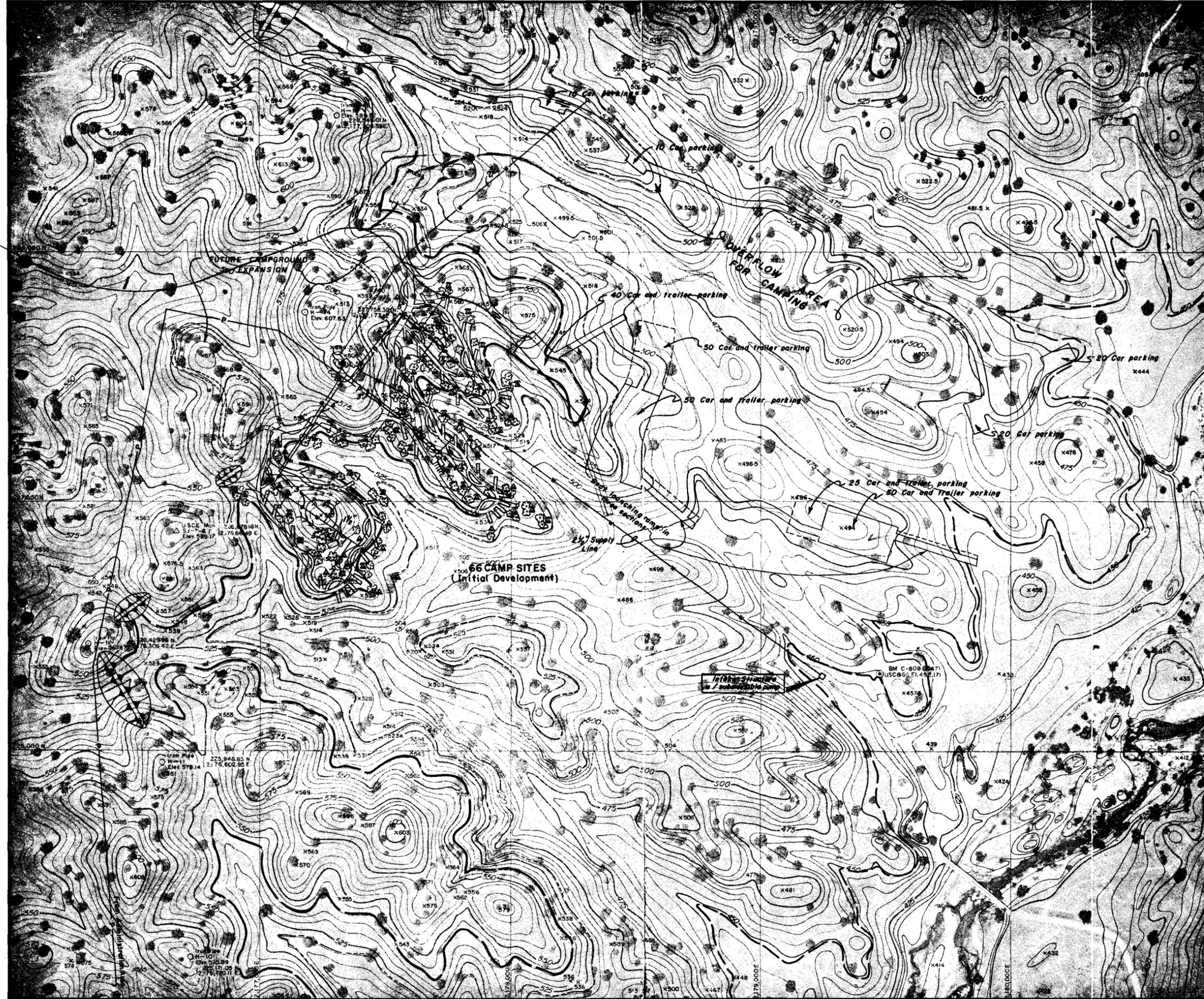


- NOTES:
1. Buoying around beach areas will be in an arc approximately 200' feet from shore or out to 10' depth and will be moved as the water fluctuates.
  2. Buoying around boat launching ramps will be in an arc approximately 200' from shore.

- LEGEND
- Gross Pool El. 540'
  - - - Inactive Pool El. 448'
  - Normal Recreation Pool El. 476'
  - - - Tentative Project Boundary
  - - - Existing Roads
  - Proposed Road Relocations
  - ▨ Areas of Restricted Boating Speed
  - ..... Fire Control Lane and Riding and Hiking Trail

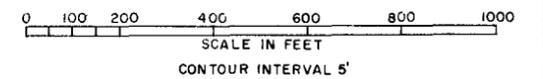


DESIGN	DATE	DESCRIPTION	BY
U. S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA			
DESIGNED BY:	D. W. A.	FRESNO RIVER BASIN, CALIFORNIA HIDDEN RESERVOIR FRESNO RIVER MASTER PLAN <b>WATER ZONING PLAN</b>	
CHECKED BY:	F. J. K.		
FORWARDED BY:	R. M. C.		
APPROVED BY:	<i>[Signature]</i>	DATE:	1 SEPTEMBER 1967
PREPARED UNDER THE DIRECTION OF CRAWFORD YOUNG CHIEF, PROJECT PLANNING BRANCH		SCALE:	AS SHOWN
SHEET NO. 66/1 TO 66/9		FILE NO.	SJ7-13-66
		SHEETS	SHEET NO. 66/3



**LEGEND**

- Gross pool
- - - - Upper limit of clearing
- Inactive pool
- Initial development
- - - - Future development
- ▲ Camp site
- ⊠ Camp site with shelter
- ⊗ Landscaping
- Water treatment facility
- Pneumatic system
- Water storage tank
- ⊙ Hose bibb
- ⊠ Restroom
- ⊠ ← ← ← Septic tank and leaching field
- Water line
- Power line

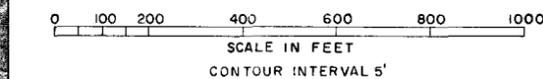


REVISION	DATE	DESCRIPTION	BY
<b>U. S. ARMY ENGINEER DISTRICT</b> CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA <b>FRESNO RIVER BASIN, CALIFORNIA</b> <b>HIDDEN RESERVOIR</b> <b>FRESNO RIVER</b> <b>MASTER PLAN</b> <b>HIDDEN VIEW</b> <b>RECREATION AREA</b>			
DRAWN BY:	D.W.A.	APPROVED: <i>[Signature]</i> DATE: 1 SEPTEMBER 1967 CHIEF, PROJECT PLANNING BRANCH CHIEF ENGINEERING DIVISION	
CHECKED BY:	F.J.K.		
PREPARED BY:	R.M.C.		
SUBMITTED BY:	<i>[Signature]</i>		
PREPARED UNDER THE DIRECTION OF <b>CRAWFORD YOUNG</b> <small>COL. CORPS OF ENGINEERS U.S.A. DISTRICT ENGINEER</small>		SCALE: AS SHOWN FILE NO. SJ7-13-66 SHEETS 66/1 TO 66/ SHEET NO. 66/4	



LEGEND

- Tentative project boundary
- Gross pool
- - - Upper limit of clearing
- - - Inactive pool
- Initial development
- - - Future development
- - - Fire control lane with access road
- △ Picnic site
- ⊗ Picnic site with shelter
- ⊙ Landscaping
- Water treatment facility
- Pneumatic system
- Water storage tank
- σ Hose bibb
- Restroom
- ← ← ← Septic tank and leaching field
- 2" W Water line
- P Power line



REVISION	DATE	DESCRIPTION	BY	BY

U. S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
SACRAMENTO, CALIFORNIA

FRESNO RIVER BASIN, CALIFORNIA  
HIDDEN RESERVOIR  
FRESNO RIVER  
MASTER PLAN  
BUCK RIDGE  
RECREATION AREA

DRAWN BY: D.W.A.  
CHECKED BY: F.J.K.  
PREPARED BY: R.M.C.  
SUBMITTED BY: [Signature]

APPROVED: [Signature] DATE: [ ]

CHIEF, PROJECT PLANNING BRANCH CHIEF ENGINEERING DIVISION

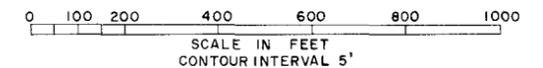
PREPARED UNDER THE DIRECTION OF  
CRAWFORD YOUNG  
COL, CORPS OF ENGINEERS U.S.A. DISTRICT ENGINEER

SCALE: AS SHOWN  
FILE NO: SJ7-13-66  
SHEETS 66/1 TO 66/9 SHEET NO. 66/5



**LEGEND**

- Tentative project boundary
- Gross pool
- Upper limit of clearing
- Inactive pool
- Initial development
- Future development
- Pneumatic system
- Water storage tank
- Overlook and restrooms
- ← ← ← Septic tank and leaching field
- Restroom location
- w — Water line
- p — Power line
- △ Picnic sites
- ⊗ Landscaping



REVISION	DATE	DESCRIPTION	BY

U. S. ARMY ENGINEER DISTRICT  
CORPS OF ENGINEERS  
SACRAMENTO, CALIFORNIA

FRESNO RIVER BASIN, CALIFORNIA  
HIDDEN RESERVOIR  
FRESNO RIVER  
MASTER PLAN  
**OBSERVATION AREA**

DRAWN BY: D.W.A.  
CHECKED BY: F.J.K.  
PREPARED BY: R.M.C.  
SUBMITTED BY: *[Signature]*  
CHIEF, RECREATION SECTION

APPROVED: *[Signature]* DATE: 1 SEPTEMBER 1967  
CHIEF, PROJECT PLANNING BRANCH CHIEF, ENGINEERING DIVISION

PREPARED UNDER THE DIRECTION OF  
CRAWFORD YOUNG  
COL. CORPS OF ENGINEERS U.S.A. DISTRICT ENGINEER

SCALE: AS SHOWN  
FILE NO. SJ7-13-66  
SHEETS 66/1 TO 66/9 SHEET NO 66/6

each area as well as center-line striping on all bituminous surfaced roads for traffic control and safety purposes.

5. Parking facilities. - Parking in the campground areas is designed to provide parking adjacent to each camp site with a pullout or stubout parking space sized to accommodate a car and camp trailer. Parking in the picnic area is designed to provide parking spaces in groups of five in close proximity to picnic sites. Designs were based on providing one parking space for each camp or picnic site. Parking lots adjacent to the boat-launching ramps are designed for pull-through type parking for a car with a boat-trailer. Additional parking would be designed to accommodate cars adjacent to the marina. Parking stalls will be 10 feet by 20 feet for cars and 10 feet by 40 feet for cars with trailers. All parking facilities above gross pool will have a pavement design of 1-1/2 inches of bituminous surface course on 6 inches of stabilized aggregate. Parking below gross pool will have a 6 inch stabilized aggregate surface. Wooden wheel stops and striping of paved areas will be used throughout for safety and traffic control.

6. Water supply. - Water facilities will be designed in accordance with TM 5-813-1, TM 5-813-4 and TM 5-813-5. Field investigations indicate that wells probably cannot be developed with sufficient capacity to supply the recreation areas, and accordingly it will be necessary to take the water directly from the reservoir. Water supply systems for the recreation areas will be designed to provide complete treatment of the water for each area, including chlorination, coagulation, sedimentation, and sand filtration. Each system will consist of the following:

- Intake structure with submersible pump
- Pressure filter with chemical mixing and reaction tanks
- Storage tank
- Hypochlorinator and accessories
- Pneumatic system
- Distribution system

The capacities of the water supply systems were based on allowances of:

Camp area provided with flush restrooms--25 gal/camper/day

Picnic areas provided with flush restrooms--10 gal/picnicker/day

Boaters, sightseers, and others provided with portable chemical toilets--5 gal/person/day

The restrooms will be equipped with flush-valve toilets which require a minimum residual pressure of 25 p.s.i. when flushing. Therefore, each

distribution system will be designed for a minimum static pressure of 40 p.s.i. A pneumatic system will be used for the initial development areas since the static pressure from the storage tank alone would be too low. The storage tank in each area will be designed to supply sufficient water for the design load users over a 24-hour period, with a reserve capacity for watering trees and shrubs. The tanks will have a capacity of about 40,000 gallons. Hose bibbs will be provided throughout each area on the basis of one for every five camp or picnic sites. In day-use areas combination installations incorporating a hose bibb and drinking fountain will be used. Demountable hose bibbs will be used on those portions of the distribution systems extending below gross pool. Water supply for the Observation Area will be provided by a 2-inch supply line laid across the reservoir from the Buck Ridge Recreation Area. This supply system will also incorporate a chlorinator and accessory equipment, a 3,000 gallon underground storage tank, and a pneumatic system which will deliver water at a minimum pressure of 40 p.s.i. Water supply for the three future recreation areas would be similar to Hidden View and Buck Ridge areas. However, pneumatic systems would not be required as it is anticipated that the storage tanks could be located at a sufficient height to provide the 40 p.s.i. minimum pressure required. Field hydrants will be provided at each restroom and at or near the entrance to each recreation area to provide fill points for fire trucks.

7. Sanitary facilities. - Design of sanitary facilities will be in accordance with EM 1110-345-241 and TM 5-814-3. Based on field tests conducted in the Hidden View area, septic tanks and leaching fields will be used for sewage treatment and disposal. Using standard test procedures, absorption rates of 14 minutes-0 seconds, 26 minutes-15 seconds, and 12 minutes-35 seconds were measured for a 1-inch drop of water surface. Since soil characteristics were found to be similar in the initial and future development areas, septic tanks and leaching fields would be used in all areas for sewage treatment and disposal. Septic tank design would be based on 3.5 gallons per capita per day per fixture, assuming 75 people per fixture per day, in day-use areas; and 13 gallons per capita per day per fixture, assuming 20 people per fixture per day, in campground areas. On this basis, a 6-fixture restroom would be expected to generate approximately 1,575 gallons of outflow per day. Allowing a minimum of 20 percent by volume for sludge storage, a 2,000-gallon septic tank would provide a 24-hour retention period of operation. Portable chemical restrooms would be provided along the boat-launching ramp and shoreline areas to be utilized by boaters, fishermen and swimmers. Since the duration of visit of most of the visitors expected in these areas would be relatively short, the number of portable restrooms was based on 170 visitors per restroom.

8. Boat-launching ramps. - Boat-launching ramps would be constructed with a minimum of two 12-foot lanes. Ramps will be constructed of 6 inches of concrete, reinforced with wire fabric, with dowled construction joints. The surface of the concrete pavement will be serrated transversely to provide a non-skid surface. The ramps will be constructed on slopes ranging from 10 to 14 percent. In order to achieve this slope, each ramp will be constructed in three sections and will provide access to the reservoir at all stages between gross and inactive pool. Four-foot wide stabilized aggregate shoulders will be provided on each side of the ramp, and in embankment sections a 6-inch concrete curb would be provided for safety purposes. Additional lanes would be added to the initial ramps in 12-foot wide increments and launching ramps of similar construction would be provided in the future areas when demand justifies their construction.

9. Landscaping. - Tree and shrub plantings would be provided for shade and screening. Tree species would be selected to provide reasonably rapid growth, a broad canopy of shade, drought tolerance, pest resistance and adaptability to local conditions of soil and temperature. Shrubs will be planted throughout the public use areas to provide screening from roads and to provide a degree of privacy at camp sites. Shrub species of rapid growth and proven hardiness would be selected. A partial list of trees and shrubs suitable for planting at Hidden Reservoir is as follows:

Trees

Goldenrain  
 Modesto Ash  
 Moraine Locust  
 California Black Walnut  
 Chinese Elm  
 Sawleaf Zelkova  
 Austrian Pine  
 Siberian Elm

Shrubs

Toyon  
 Japanese Privet  
 Pyracantha  
 Dwarf Blue Gum  
 Holly-leaf Cherry  
 Hakea  
 Abelia  
 Callistemon

Landscape planting procedures will include preparation of planting pits and addition of fertilizers and imported topsoil to promote establishment and initial growth of the plants. Subsequent maintenance and care of the plantings will be important in obtaining successful landscaping developments, and this should include adequate watering and pruning where required. The natural beauty of each recreation area would be developed through use of available rocks and boulders as functional and aesthetic dividers to separate sites and to control traffic.

10. Fencing. - Design of fencing around the structures such as water treatment facilities will be based on OCE standard drawing FE-6 to reduce vandalism. Fencing of project boundaries and other areas would be of less costly design.

11. Fire-control lanes. - Provision for fire-control lanes is based on containing fires within a relatively small area. Where natural barriers such as county and access roads do not exist, a fire-control lane would be constructed along the project boundary. Fire-control lanes would consist of a 30-foot wide zone cleared of combustible vegetation, including tree limb trimming up to 6 feet above the ground. Within this lane a 12-foot wide unpaved road will be graded to accommodate a fire truck. At the upper end of the reservoir a reinforced concrete ford would be constructed across the Fresno River to connect the fire lanes on each side of the reservoir.

12. Power supply. - Electric service would be obtained from the Pacific Gas and Electric Company. Primary transmission lines would bring power to the dam site and administration area. In order to serve the recreation areas, including the Observation Area, the primary lines would be extended to these areas. Secondary lines within each area would provide electric service to restrooms, water treatment buildings and pumping equipment.

13. Wildlife management area. - Provision of brush coverts for wildlife habitat improvement would be accomplished by cutting and piling selected trees and lower tree limbs and piling trees and brush from clearing operations. Access to the wildlife management area would be via low quality roads in the fire-control lanes, which would be graded to permit car use. An unpaved 10-car parking area would be provided adjacent to the wildlife area on each side of the upper end of the reservoir. Elimination or severe reduction of the existing fishery resource, primarily composed of rough fish, upstream of the dam would be accomplished through chemical treatment and a new game fish resource would be established through introduction of such fish to the newly created reservoir.

14. Cost estimates. - The cost estimates shown in Appendix D are presented in two categories: initial facilities and future facilities. Detailed quantity estimates were made for initial facilities and unit costs were derived from contract costs experienced under the most recent and similar circumstances. Future facility costs were determined by less detailed methods and are based on average quantity and unit cost conditions experienced for similar contract work.

DESIGN MEMORANDUM NO. 15  
FRESNO RIVER BASIN, CALIFORNIA  
HIDDEN RESERVOIR  
FRESNO RIVER

MASTER PLAN

APPENDIX C  
VIEWS OF OTHER AGENCIES

1. Bureau of Sport Fisheries and Wildlife
2. National Park Service
3. Public Health Service
4. Resources Agency of California
5. California Division of Forestry
6. Madera County

January 1968

Department of the Army  
Sacramento District, Corps of Engineers  
Sacramento, California



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
BUREAU OF SPORT FISHERIES AND WILDLIFE

ADDRESS ONLY THE  
REGIONAL DIRECTOR

730 N. E. PACIFIC STREET  
P. O. BOX 3737  
PORTLAND, OREGON 97208

Reference: RBS

July 18, 1966

Your reference: SPKGP  
November 9, 1965

District Engineer  
Sacramento District, Corps of Engineers  
P. O. Box 1739  
Sacramento, California 95808

Dear Sir:

This responds to your request for our Bureau's assistance in the preparation of a fish and wildlife management plan for incorporation into your Master Plan for the authorized Hidden Dam and Reservoir project, Fresno River, Madera County, California. These management measures are proposed to mitigate fish and wildlife losses occasioned by project construction.

We have based this plan on information received from the California Department of Fish and Game; comments provided in our letters to you, dated September 30, 1964 and June 25, 1965; and data contained in your Preliminary Master Plan, dated May 1965. In arriving at a mutually acceptable plan for fish and wildlife management, there have also been several conferences between personnel of our Bureau, the California Department of Fish and Game, and your staff.

Our management plans for conservation and development of fish and wildlife resources were concurred in by the California Department of Fish and Game, as indicated in Director W. T. Shannon's July 1, 1966 letter to us.

Pertinent Hidden Reservoir data is summarized in the following table I:

Table I

<u>Reservoir Storage</u>	<u>Elev. <sup>1/</sup> (ft.)</u>	<u>Area (acres)</u>	<u>Storage Capacity (acre-feet)</u>	<u>Shore-line (miles)</u>	<u>Length of pool (miles)</u>
Inactive	448	280	5,000	10	2.0
Normal	476	650	18,000	15.5	2.9
Gross	540	1,570	90,000	24	3.2

1/ All elevations in this table and letter are in feet and refer to mean sea level datum.

Based on a forecast 30-year period of operation, your studies indicate that Hidden Reservoir would approach gross pool level (el. 540 ft.) once in 15 to 20 years and would rise above elevation 520 feet once in 3 years. The period of this inundation would not exceed three days. The reservoir level would fluctuate a maximum of 73 feet during the recreation season, April through September. The maximum pool level would normally be reached during late May or early June. Water levels would recede to the inactive pool level each year.

#### Wildlife Management Area

To mitigate for wildlife habitat that will be inundated by Hidden Reservoir, a 320-acre tract has been designated as a wildlife management area. These lands are located at the upper limits of the reservoir in sections 13, 14, 15 and 23, T. 9 S., R. 19 E. (See attached map Plate I). Within this total acreage, about 180 acres would lie above the gross pool; 115 acres between gross pool and normal pool; and 25 acres below normal pool. All lands within the proposed wildlife management area would be acquired for normal project operation.

Increased wildlife carrying capacity on the management area could be achieved by fencing, brush piling, and manipulation of existing vegetation. Improvement of wildlife habitat would be limited to lands situated above the 540-foot reservoir contour line and would be accomplished by felling trees and cutting limbs at appropriate locations throughout the area. Digger pines could be used for this purpose by cutting every other tree, and whenever possible, felling them across rock outcroppings. Such rock support beneath felled trees would help to maintain them as

brush shelters. Live oaks could also be used to provide ground cover. Limbs could be cut from the top part-way through so that they would break or bend to touch the ground. This might result in continued growth of some of these limbs.

A fire lane would be required around the perimeter of the wildlife management area. Ground cover could also be developed by piling brush and trees cleared from the firebreak.

The cost for development of brush cover, by felling trees and cutting limbs, is estimated at \$2,000, and this cost should be a project responsibility. No cost has been assigned to brush cover developed by clearing the firebreak, since your staff has advised us that this activity will be a normal part of project development.

Personnel of the California Department of Fish and Game would mark trees and limbs designated for cutting prior to development work. That Department would also provide personnel to accompany members of your project work crew to acquaint them with the desired method for ground cover development. The Department should be notified in advance so that it would have personnel available.

Clearing in the wildlife management area, below the 520-foot elevation, would be limited to the removal of debris and fallen brush and trees.

Annual maintenance of the established ground cover would be required to sustain wildlife carrying capacity. Maintenance should be relatively simple; however, there will be some costs involved in replenishing brush piles to maintain the area's wildlife production capacity. The California Department of Fish and Game has requested that \$200 be provided to the Department annually for this maintenance. This cost should be a project cost.

The principal cost associated with the wildlife management area would be maintenance of the boundary fence. Fencing would prevent grazing by domestic livestock and assure a more abundant growth of grasses, forbs, and shrubs for wildlife food, cover, and nesting sites. We understand that your present plans provide for fencing the entire project boundary (including the wildlife management area) and that maintenance of the fence would be accomplished by project personnel. We believe that your plans should provide for both fence construction and maintenance as a project responsibility.

Access in the wildlife management area should be restricted to pedestrians. However, access roads and terminal automobile parking spaces should be provided at entry points into the management unit.

Appropriate signs should be posted at entry points into the wildlife management area. Design and sign nomenclature would be left to your discretion, provided that the signs clearly indicate the primary purpose of the designated lands for wildlife management and hunting. Sign maintenance should be accomplished by project personnel as a part of normal project operation.

Your present plans propose development of five recreation areas around the perimeter of Hidden Reservoir. Two of these areas have been selected for initial and future day-use developments. The three remaining areas would be developed as the demand for recreational needs increases. All lands required for recreation purposes would be acquired initially. Project lands proposed for future recreational development could provide interim hunter use until these lands are needed for general recreational purposes. Since no wildlife development is requested on these lands, this procedure could be accomplished at no additional cost to the project. No conflict between hunting and other project associated recreational uses would be expected, since major periods of general recreation and hunter use would occur at different seasons of the year. There would be no hunting on these lands during the prime recreation period from April through August.

#### Fish Management Area

Your present clearing plans provide for retention of vegetation in the upper limits of Hidden Reservoir below the 520-foot elevation in sections 22 and 23, T. 9 S., R. 19 E. This uncleared tract has been designated as a fish management area. (See map Plate I attached). The unit's purpose would be to increase fish production in the reservoir. This location is strategic to concentrate fish where they would be most available for angler harvest.

The boundary of the fish management area, contiguous to the main part of Hidden Reservoir should be marked by buoys with attached signs. The numbers and design of these items and the sign wording would be left to your discretion, provided that the signs clearly indicate that the primary purposes of the area are for fish production and

fishing. We also believe that boat speeds here should be limited to not more than 5 miles per hour for boating safety.

Although the primary purpose of this area would be to increase fish production and angling, fishing should also be permitted on the remainder of Hidden Reservoir.

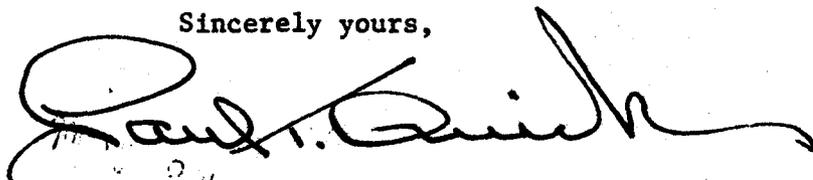
Both game fishes and undesirable rough fishes occur in Fresno River and certain tributaries in and above Hidden Dam and Reservoir site. Maximum control of these nongame fishes in the impoundment area and in certain upstream waters by chemical treatment immediately prior to dam closure would be most desirable. Following treatment, and dam closure, the reservoir would be stocked with warmwater game fish selected to provide optimum sport fish populations. The California Department of Fish and Game would accomplish the rough fish control and reservoir fish stocking activities. That Department has requested that the initial cost of chemical treatment and fish planting be accomplished at project cost. These costs are estimated at \$2,000. The Department should be notified of the date of Hidden Dam closure as soon as possible to permit adequate time to arrange for chemical treatment of rough fish and subsequent restocking with game fish. Chemicals used and method of treatment would require mutual approval by our Bureau and the California Department of Fish and Game.

The quality of Hidden Reservoir sport fishery could be maintained by periodic chemical control of nongame fishes followed by restocking with game fish species. To minimize costs, these periodic fish management measures should be permitted by the Corps of Engineers when Hidden Reservoir content is at a minimum. We anticipate that such corrective measures would be necessary at 5 to 10 year intervals. After initial treatment, the costs of this recurring activity to maintain the Hidden Reservoir fishery would be assumed by the California Department of Fish and Game.

We would appreciate the opportunity for informal review of the final revision of your Master Plan draft. Please advise us of the action you propose to take concerning our proposals to conserve and develop fish and wildlife resources with Hidden Dam and Reservoir project. If you require additional data, we will be pleased to provide it.

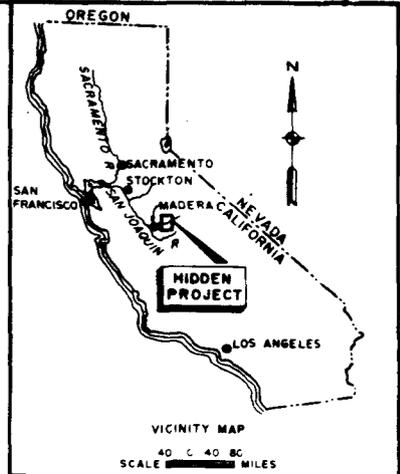
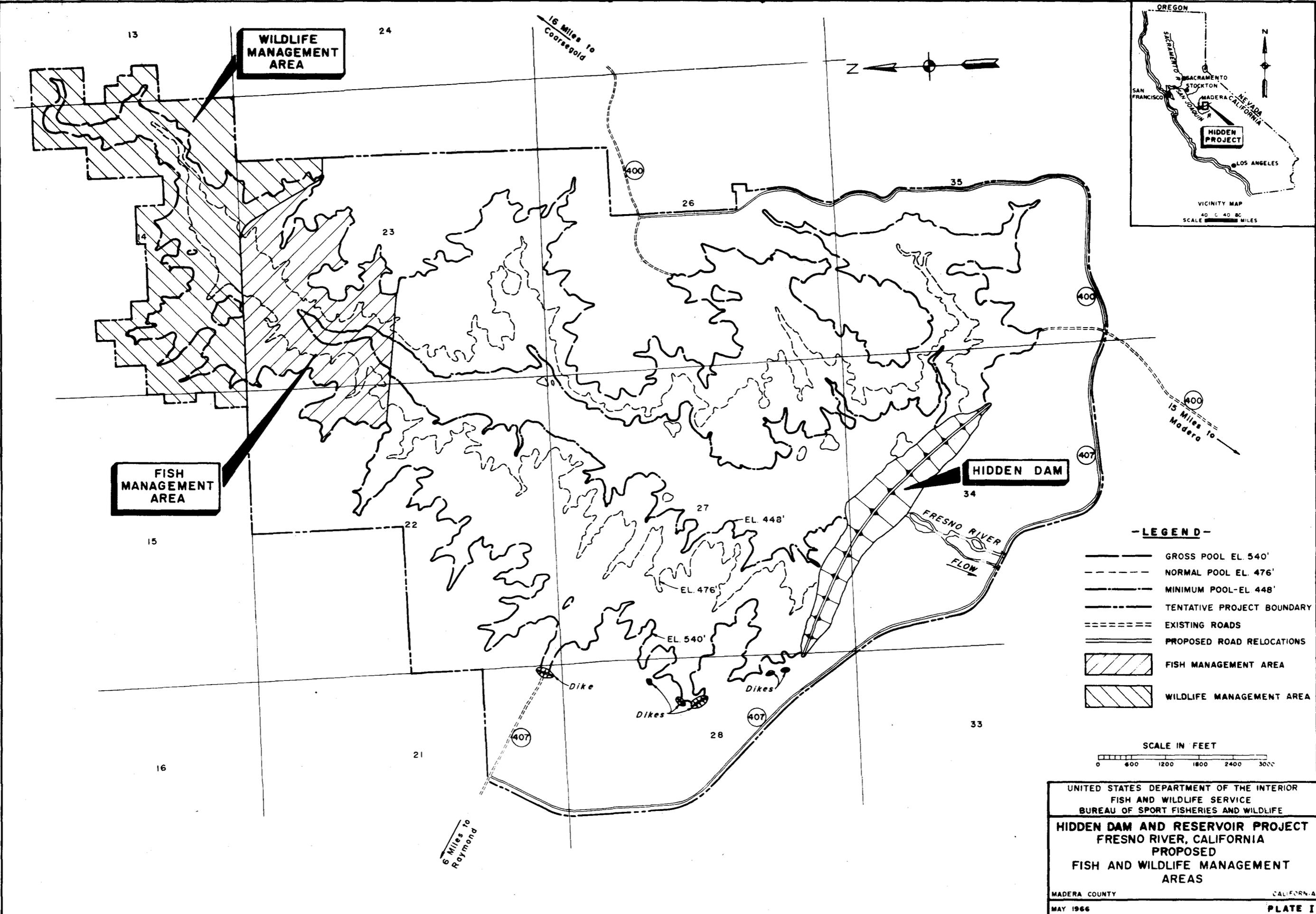
The excellent cooperation of your staff during the course of our study is sincerely appreciated.

Sincerely yours,

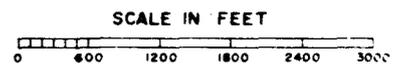


PAUL T. QUICK  
Regional Director

Attachment



- LEGEND-**
- GROSS POOL EL. 540'
  - - - NORMAL POOL EL. 476'
  - MINIMUM POOL-EL. 448'
  - - - TENTATIVE PROJECT BOUNDARY
  - EXISTING ROADS
  - PROPOSED ROAD RELOCATIONS
  - FISH MANAGEMENT AREA
  - WILDLIFE MANAGEMENT AREA



UNITED STATES DEPARTMENT OF THE INTERIOR  
 FISH AND WILDLIFE SERVICE  
 BUREAU OF SPORT FISHERIES AND WILDLIFE

**HIDDEN DAM AND RESERVOIR PROJECT  
 FRESNO RIVER, CALIFORNIA  
 PROPOSED  
 FISH AND WILDLIFE MANAGEMENT  
 AREAS**

MADERA COUNTY CALIFORNIA  
 MAY 1966 PLATE I



UNITED STATES  
DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE

WESTERN REGIONAL OFFICE

450 Golden Gate Avenue, Box 36063  
San Francisco, California 94102

IN REPLY REFER TO:

L7423

June 15, 1965

Your reference:  
SPKGD-C

Col. Robert E. Mathe, District Engineer  
U. S. Army Engineer District, Sacramento  
Corps of Engineers  
650 Capitol Mall  
Federal Bldg. - U. S. Court House  
Sacramento, California 95814

Dear Colonel Mathe:

Your letter of May 27, 1965 points out that Hidden Dam and Reservoir was authorized by Public Law 874, and that construction was tentatively scheduled to commence in June 1967. Your letter also request our review and comment on your plans, in accordance with the request contained in the penultimate and last paragraphs of the Assistant Secretary of the Interior's letter, dated June 17, 1960.

We have reviewed the clearing plan shown in Drawing No. SJ-7-6-34, sheet 1 and Photo No. SJ-7-18-35, sheet 1, and note that all borrow areas are within the reservoir flow line and below elevation 520. We suggest that your contractors be required to shape the sides of these areas so as not to create safety hazards to bathers, or unsightly conditions in periods when the water is drawn down below this elevation. Your plan to clear or top trees to elevation 438 is consistent with good safety for water skiers as well as boaters.

We will program archeological salvage activities for the Fall of 1966 prior to your plan to commence your activities in June 1967. With reference to historical values we note that the reservoir will flood the site of one of James Savage's trading posts and probably the scenes of other pioneer and gold mining activities which should be studied, and photographic records obtained. We do not have funds available for this work and suggest that you make \$300 available to us for this purpose.

We wish to thank you for this opportunity to comment on your plans prior to the initiation of your construction activities.

Sincerely yours,

Leo J. Biederich  
Assistant Regional Director

Exhibit G



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
REGIONAL OFFICE

PUBLIC HEALTH SERVICE

Water Resources Section - DWS&PC  
Federal Office Building  
50 Fulton Street - Room 260  
San Francisco, California 94102

16 June 1965

U. S. Army Engineer District  
Corps of Engineers  
Federal Building  
650 Capitol Mall  
Sacramento, California 95814

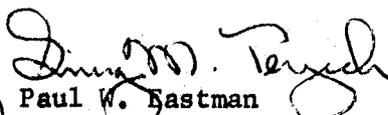
Gentlemen:

Thank you for your letter of 27 May 1965 requesting our review of your Hidden Reservoir clearing plan. We have reviewed your plan and our June 1959 public health comments. The following additional comment is appropriate considering the dissolved oxygen problems that have developed in some California reservoirs. Our suggestion is directed to the downstream section of the reservoir and not to the wildlife area.

Proper preparation of the reservoir site can greatly improve water quality since algal growths and decaying organic matter may result in odor problems and depletion of dissolved oxygen. The recommended procedure is: (1) all bushes and trees in the area to be flooded should be cut close to the ground; (2) these cuttings should be burned shortly before the area is flooded; (3) shorelines in the zone of fluctuation should have all stumps and roots removed and slopes should be even (and preferably steep) in order to eliminate shallow areas where water could collect; (4) any loose crust or other material on the bottom that might rise when flooded should be stripped prior to flooding.

The above has become a standard public health review comment since we last provided public health comments on your Hidden Project.

Sincerely yours,

  
for Paul W. Eastman  
Regional Program Director  
Water Supply and Pollution Control

cc: Foster (Department of Public Health, Berkeley)  
Andrews (Department of Public Health, Fresno)

Exhibit C

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REPORT ON  
THE PUBLIC HEALTH ASPECTS  
of the

HIDDEN RESERVOIR PROJECT,  
Madera County, California.

Prepared for

U. S. ARMY ENGINEER DISTRICT, SACRAMENTO  
CORPS OF ENGINEERS

By

THE U. S. PUBLIC HEALTH SERVICE

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
REGION IX, SAN FRANCISCO, CALIFORNIA

JUNE 1959

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PUBLIC HEALTH ASPECTS  
of the  
HIDDEN RESERVOIR PROJECT

INTRODUCTION

The Hidden Reservoir Project report presents a plan for the solution of the flood problems of the Fresno River, California, and for furnishing a supplementary water supply to the service area. The project, as recommended by the Corps of Engineers, consists of a multiple-purpose reservoir with a capacity of 90,000 acre-feet and seven miles of supplemental channel improvements.

The proposed dam will be earthfill across the Fresno River at the Hidden site, about fifteen (15) miles northeast of Madera, California. The reservoir would make available an additional 23,800 acre-feet per year of irrigation water. No direct domestic use of the reservoir water is contemplated.

The proposed channel improvements would provide a minimum capacity of 5,000 cfs on Fresno River, between the Hidden Dam site and the Chowchilla Canal. Flood control accomplishments would protect agricultural areas against a 50-year flood, and provide flood benefits to the City of Madera and agriculture lands estimated at \$615,000 per year.

The total Federal first costs of the project is \$14,380,000, or an annual cost of \$614,000. The benefit cost ratio for the entire project is 1.36 to 1.0.

SANITARY ENGINEERING

Water Supply:

The Madera Irrigation District is the largest organized water user in the service area. The district diverts water from the Fresno River and imports water from the Central Valley Project through the Madera Canal, for surface irrigation and ground water replenishment.

The City of Madera is dependent upon the ground water as its source of domestic supply. Ten wells (150' - 450') serve an estimated population of 14,000. 85,000 gal. of elevated storage is provided. The water is generally of good quality and should be adequate to meet future needs if there is no overdraft for irrigation purposes.

Operation studies with the project indicate Hidden Reservoir will make available for irrigation a new water supply of about 23,800 acre-feet per year. This new source should help to replenish the groundwaters and protect its quality. However, groundwater injection of runoff waters from highly fertilized areas should be discouraged.

Estimated present and probable ultimate mean seasonal requirements for water in the Chowchilla - Fresno River areas have been determined by the California Department of Water Resources as, respectively 2,200 and 93,700 acre-feet. The difference of these values plus the present supplemental requirements was taken as the measure of the probable ultimate supplemental water requirement for the area, or 91,500 A.F. This shortage is greater than can be developed by storage in the Fresno River (23,800 A.F.) plus any storage on the Chowchilla River (Buchanan Reservoir). Additional importation of water will therefore be required, and it is recommended that if at all feasible, the flood waters of these rivers be spread for ground water replenishment.

Sewage Disposal and Water Pollution Control:

The City of Madera provides secondary sewage treatment for an estimated 12,000 population in the area. The effluent from the plant is used for irrigation purposes. Most of the small farms have individual disposal systems consisting of septic tanks, cesspools, and in some cases pit privies. Protection of these facilities from flood flows which spread pollution should greatly improve the environmental sanitation in the area. The proposed operation would control a flood equal to 90 percent of the standard project flood (49,000 c.f.s.). This flow would be reduced to about 12,000 c.f.s. through the City of Madera, and should not cause any significant damage.

Sewage disposal facilities for the Administration Building at the dam site, and any other dwellings which might be built for the construction, supervision, and operation of the project, should be built in accord with local health codes. The California Department of Public Health is charged by law with the responsibility, along with local authorities, for control of contamination of State waters. Discharge requirements for waste waters in the watershed must meet any standards set by the State Water Pollution Control Board. Particular care should be taken for sewage disposal in the reservoir area where recreational activities may develop.

Sanitation:

Operation studies of the reservoir indicate that during wet and average years, storage retained in the reservoir would be adequate for a substantial amount of public use during the recreation season. During dry years when the storages for irrigation are low, the 5,000 A.F. of inactive storage space could still be used by local interests for the maintenance of a minimum recreational pool, if the necessary water supply is provided. The California Department of Public Health has definite regulations for the recreational use of impounded waters for domestic purposes. Appropriate sanitary measures should therefore be provided for any recreational development, and these should preferably be a part of the project.

Proper maintenance and cleaning of the channel is essential to reduce stagnant water areas and nuisance problems. Inspection of the works is desirable in the fall and spring, in addition to after each major flood, to determine what maintenance activities are required. Measures should also be incorporated in the operation and maintenance regulations to protect the channel from being used as a trash dump or open sewer.

In the past, flood control channels have presented an accident hazard to children --- the danger of their falling into or being trapped in them when a flood flow is passed. To minimize this hazard, we recommend that the channels be effectively fenced through or near populated areas.

#### VECTOR PROBLEMS

##### Vector-Borne Disease and Past Problems:

Mosquitoes are the principal vectors which might be affected by the proposed project. Encephalitis is the most important mosquito-borne disease in the area.

Culex tarsalis, the encephalitis mosquito, is prevalent in the area. This mosquito is produced in a wide range of aquatic habitats including seeps, grassland pools, flooded roadside ditches, and shallow vegetated areas of ponds and reservoirs.

The pasture mosquito, Aedes nigromaculis, is also prevalent in the area. This species is a severe biter and is highly annoying to man and domestic animals. Pondered water on pastures and in roadside ditches, is particularly favorable for production of A. nigromaculis.

##### Anticipated Effects of the Project Upon Vector Problems:

The overall effects of the proposed flood control project should be beneficial from the standpoint of mosquito control. The flood control storage provided by the reservoir, together with proposed levee construction and channel clearing and enlargement, should reduce flooding of low-land areas, thereby reducing the extent of aquatic habitats suitable for mosquito production.

Mosquito production could be expected to occur in shallow portions of the reservoir and in embayments where the water is protected from wave action, and contains emergent vegetation and/or flottage.

RECOMMENDATIONS

In order to prevent or minimize any large scale public health problem associated with the proposed flood control project, it is recommended that the following principles and practices be adhered to in its design, construction, operation, and maintenance.

Hidden Reservoir:

I. Prior to impoundage, the reservoir basin should be prepared as follows:

1. The normal summer fluctuation zone should be completely cleared, except for trees and sparse vegetation along abrupt shore lines which will be exposed to wave action.
2. Borrow areas resulting from construction of the dam should be located where they will be permanently inundated, if possible. Borrow areas located in the normal summer fluctuation zone or outside the reservoir basin should be made self-draining.
3. Depressions which will be flooded by the reservoir at high pool levels and which will retain water at lower pool levels should be connected with the reservoir by drains to insure complete drainage or fluctuation of water within the depression.

II. After impoundage, the following maintenance measures should be carried out to minimize mosquito production:

1. Vegetation of a type and density favorable for mosquito production in flat, protected areas within the normal summer fluctuation zone should be periodically controlled by mechanical, chemical, or biological measures. Flotage and other debris should be removed from shallow protected portions of the reservoir where there is little wave action.
2. Seepage areas that develop below dams or dikes should be adequately drained.
3. Vegetation, debris, and flotage should be removed periodically from all drains to insure free flows and reduce ponding.

Levee Construction and Channel Improvement:

1. Borrow areas should be left in a self-draining conditions.
2. Adequate drains should be installed to prevent ponding behind levees, spoil banks, diversion dams and dikes.

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3. Culverts, inlets, underdrains, etc., should be installed on grade to insure complete drainage.
4. By-passed natural drainageways should be filled in and graded to insure complete drainage into the new channel.
5. All channels should be effectively fenced through or near populated areas.

Water Supply and Water Pollution Control:

1. The floodwaters of the river should be spread for groundwater replenishment if possible.
2. Groundwater injection of runoff waters from highly fertilized areas should be discouraged.
3. Discharge requirements for waste waters in the watershed should meet standards set by the State Water Pollution Control Board.
4. Appropriate sanitary measures should be provided for any recreational development on the reservoir.

In the event any public health problems arise in connection with the proposed Hidden Reservoir project, technical assistance may be obtained from the California State Department of Public Health and the U. S. Public Health Service.

HUGO FISHER  
ADMINISTRATOR

EDMUND G. BROWN  
GOVERNOR OF  
CALIFORNIA

OFFICE OF THE ADMINISTRATOR  
RESOURCES BUILDING  
NINTH AND O STREETS

Department of Conservation  
Department of Fish and Game  
Department of Parks and Recreation  
Department of Water Resources  
State Reclamation Board  
State Water Quality Control Board  
State Water Rights Board  
Regional Water Pollution  
Control Boards



THE RESOURCES AGENCY OF CALIFORNIA  
SACRAMENTO, CALIFORNIA

JAN 3 1968

Major C. E. Cluck  
Acting District Engineer  
Department of the Army  
Sacramento District, Corps of Engineers  
650 Capitol Mall  
Sacramento, California - 95814

Dear Major Cluck:

Thank you for your letter of December 2, 1965, which requests the comments of the State of California regarding the possible management of the recreational facilities and areas of the proposed Hidden Dam Project.

Because of the limited size of the project, it is my opinion that this undertaking would be more suitable for a local entity.

I am sure you can appreciate the financial burden which must be borne by the State in the maintenance and operation of the recreation facilities associated with the State Water Project. Inclusion of recreational areas at non-State reservoir projects into the State Park System must necessarily be on the basis of a significant contribution to the recreational needs and use of the entire State's population.

For the above reasons, I must decline your offer. Please feel free, however, to contact me at any time if you feel further consideration by the State should be afforded the Hidden Dam Project.

Sincerely yours,

*W. F. Grader*  
Administrator of Resources

DEPARTMENT OF CONSERVATION  
DIVISION OF FORESTRY  
SACRAMENTO



WATERSHED MANAGEMENT  
U.S.A.C.E.  
Hidden Reservoir Project  
Madera Unit  
District IV

May 18, 1966

OG-5-18

Col. Robert E. Mathe  
District Engineer  
Sacramento District  
U. S. Army Corps of Engineers  
650 Capitol Mall  
Sacramento, California - 95814

Dear Colonel Mathe:

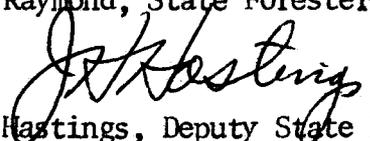
Attached is the original and one copy of the completed fire protection study for the Hidden Dam Project which we believe is reasonably complete.

We trust this will meet your needs., As requested in your 15 December, 1965, letter.

Very truly yours,

F. H. Raymond, State Forester

By

  
J. H. Hastings, Deputy State Forester

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Attach.

FIRE PROTECTION STUDY AND REPORT  
HIDDEN DAM - MADERA COUNTY

I. Purpose: The Hidden Dam is located on the Fresno River in the Madera Ranger Unit. Public Law 874, 87th Congress, 2nd Session authorized the Corps of Engineers to construct the Hidden Dam for Flood Control, Irrigation, Recreation and Fish and Wildlife conservation.

II. Area: The area involved is in the Fresno River drainage. This drainage covers many thousands of acres from the Central Valley up to the Mt. Raymond divide in Mariposa County. This drainage area, with the exception of the upper 10% which is within the Sierra National Forest, is under private ownership and is being protected by the California Division of Forestry.

There are some 1,570 acres below the maximum pool. This pool will have a drawdown of 92 feet, which will usually be reached in October of normal rainfall years.

FIRE PROBLEM

I. Values: The values to be protected above the proposed structure are primarily agricultural, particularly grazing. However, the area to be protected from flood by the structure are in the Madera City area with relatively high values both urban and agricultural. In this area the agricultural values are in orchards, cotton, and row crops. An area of some 145,000 acres is to be protected.

Following the completion of the project, additional recreational values in the area adjacent to the dam will be increased. Already a subdivision is being constructed just above the high water level. Proposed camping around the water will increase the land use in this area.

II. Hazards: The fuels at the construction site are light, the cover being mainly woodland grass with light concentrations of chapparel at the higher elevations. There are now no buildings in this location.

Following completion of the project proposed subdivisions will increase the hazards surrounding the dam. However, there will be little change of the vegetation above the water level.

III. Risks: The risks in the area in which the construction will be done are low. Probably less than 30 people a day pass through the area and these use existing county roads. Past fire history shows no major fires in this area during the past 30 years.

During construction we expect the risks to increase greatly. Not only will the number of people in the area be increased over 1000% but the large amount of equipment used in construction must be considered.

Following construction, the use of the area will remain high. The heavy use of the area will follow the fire season pattern as it is at this time that the boaters, campers and fishermen will be using the new facilities. It is predicted by the Madera County Planning Commission that in excess of 140,000 people will be using the area annually. There will be approximately 20 miles of shoreline involved and in need of fire protection.

IV. Control Problems:

A. Fuels: While the fuels are quite light with comparative ease of control, it is a flash fuel with a very rapid spread under normal wind conditions. This has been well illustrated by fires in adjacent areas where in excess of 3,000 acres have burned within an hour. It is not expected that these fuels will change with the future management plans.

B. Weather: This area, being in the low foothills, has a high summer temperature, usually in excess of 90° from July through September. The greatest weather problem is in the high wind. These factors, together with the flash fuels, account for the rapid spread of fires. The average fire load index for this location is 30 for the summer months.

C. Topography: Topography is gently rolling with some rather steep slopes from the Fresno River canyon in the upper portion of the project.

D. Access: The present access to the area is by county road from Raymond, Madera, and Coarsegold. A 4-wheel drive rancher road is now available for access in the northern part of the project. Travel time for forest fire equipment to the project area at present is approximately 15 minutes from Raymond, 30 minutes from Coarsegold, and 30 minutes from Madera. The local Assistant State Forest Ranger who is administratively responsible for fire in the project area is located at Coarsegold.

During and after construction the roads proposed by the Recreational Plan for the project will provide access to the northern part which will be somewhat faster than the present jeep road.

E. Water Availability: At present the only water available is in the Fresno River. The amounts are variable and in many years non-existent in late summer. Following the completion of the project water will be generally available the year round through standpipe facilities provided in the recreation areas.

#### FIRE PROTECTION NEEDS

##### I. Supervision and Coordination

A. Project Coordination: The project will be supervised and the fire control activities coordinated by the Coarsegold Assistant State Forest Ranger, in whose district the project lies. He will represent the Madera Ranger Unit Ranger whose Headquarters is at Madera.

B. Project Fire Prevention Patrolman: It is recommended that the Corps of Engineers provide for the establishment and salary of a Fire Prevention Patrolman, who will be assigned to both the Hidden Dam and Buchanan Dam projects. This man should be of the Forest Fire Foreman class or equal. The sole duties of this patrolman shall be the prevention and suppression of fires on the project area. It is also our recommendation that the patrolman be hired and be on the job prior to the beginning of construction.

C. Transportation: It is recommended that a 3/4 ton, 4-wheel drive pickup pumper with at least 500 feet of Dacron hose, 1 inch in diameter, be made available by the Corps for the patrolman.

D. Communications: (To be a part of the formal agreement between the Corps of Engineers and the Division of Forestry.

1. A standard mobile type radio (C.D.F. Type 7) be installed in the patrolman's pickup.

2. A handie-talkie be purchased for the patrolman's use. This should have local and air-net frequencies.

3. Adequate communication between the contractors and the Madera Ranger Unit Dispatcher be provided. This will probably consist of monitoring radios on the contractor's frequencies.

II. Relocation of Existing Facilities Disrupted by the Project: Access will probably be the only item involved. Here the existing road system should be kept in a passable condition until the relocated roads are completed.

III. Additional Facilities to be Provided by the Project:

A. Access: It is recommended that a firebreak be constructed around the perimeter of the project. This should be approximately 30 feet in width and located in such a manner that it may be traversed by a conventional firetruck during the fire season. This firebreak will include a concrete

slab crossing of the Fresno River at the upper end of the project. Some of the proposed ~~campground~~ roads may be incorporated as portions of this firebreak. An on-~~the~~-ground inspection by the Corps of Engineers and the Division of Forestry personnel will determine the most advantageous final location of the firebreak.

B. Additional firebreaks: Additional firebreaks will be constructed around all borrow pits and operating areas and maintained in an effective condition throughout the period of high fire hazard.

High risk and hazard areas, such as buildings, fuel storage areas, explosive dumps, servicing areas, etc., will be protected by adequate clearings of at least 30 feet in width.

C. Firefighting Equipment: It is recommended that water carrying mobile equipment be furnished with a water pump capable of pumping a minimum of 80 gallons of water per minute at 150 pounds pressure through a 1½ inch hose with a 1/2 inch tip and a minimum of 200 feet of 1½ inch National Standard Thread hose and located in areas where construction is in progress. This should be a part of the bid specifications and supplied by the contractors.

#### FIRE SUPPRESSION RECOMMENDATIONS

- I. In accordance with a written fire plan, men should be supplied from project areas and placed at the disposal of Forest officers, upon request, for fire fighting purposes upon the project area and areas adjacent thereto.
- II. The Fire Protection Agency will make every effort to avoid calling on the Corps and Contractor's employees for fires not immediately adjacent to the project except in emergencies, and any employees furnished for such fires shall be relieved from fire fighting duties on such distant fires as soon as practical.

- III. The attack on a fire should be made by the first man on the scene. If the fire is too large to handle, the discoverer should report it to the nearest Foreman, who will initiate control action and dispatch additional help.
- IV. If the fire is first reported to the Corps or contractor's office, a report should immediately be made to the Project Dispatcher and initial attack crews will be dispatched. The Madera California Division of Forestry dispatcher will also be immediately notified.
- V. On all fires a Forest Officer should be dispatched to act as Fire Boss and to have full charge of the fire suppression responsibility.
- VI. All burning and blasting will be done only within the required clearings and under a written permit issued by a California Division of Forestry representative.

#### RECREATION AREA

The following recommendations apply to the camping, picnicking and boat launching areas.

A. Build and maintain firebreaks at least 30 feet in width around each campground.

B. Erect standpipes, not more than 1/4 mile apart, to fill fire fighting equipment on all water lines within each campground. These are to have 1½ inch National Standard threads.

C. An operational plan should be developed jointly between the Corps Project Supervisor and the Division of Forestry Unit Ranger before the project is completed. This will be updated annually.

#### STATE FOREST AND FIRE LAWS APPLICABLE TO THE PROJECT

Attached are excerpts of the State Forest and Fire laws which are applicable to the foothill areas of Madera County.

ESTIMATED COSTS OF FIRE EQUIPMENT AND PERSONNEL\*

Initial equipment cost not an annual factor:

1-3/4 ton, 4-wheel drive, pickup pumper	\$3,900.00
1 Mobile Radio (CDF Type 7)	1,250.00
1 Handie-talkie	<u>700.00</u>
Total	\$5,850.00

Estimate Annual Expenditures

1 Patrolman - 12 man months	8,592.00
1-3/4 ton pickup pumper - 12,000 miles	1,776.00
Fire tools	125.00
Telephone calls	100.00
Radio Maintenance	
1 Mobile radio	122.94
1 Handie-talkie	45.47
Travel Expense	<u>500.00</u>
Sub-Total	\$11,261.41
Reserve for Contingencies	<u>500.00</u>
Total	\$11,761.41
Equipment (first year)	<u>5,850.00</u>
GRAND TOTAL	\$17,611.41

\*The patrolman and his equipment will service both the Hidden Dam and the Buchanan Dam projects. Therefore, the above costs will be shared by both projects.

ADMINISTRATIVE and PERSONNEL OFFICE  
COUNTY OF MADERA, CALIFORNIA

MADERA COUNTY GOVERNMENT CENTER  
209 WEST YOSEMITE AVENUE  
MADERA, CALIFORNIA 93637  
TELEPHONE: 674-4641

November 23, 1966

Ref.: SPKGP 5/24/66  
Hidden Dam - Fresno River

Department of the Army  
Sacramento District  
Corps of Engineers  
650 Capitol Mall  
Sacramento, California 95814

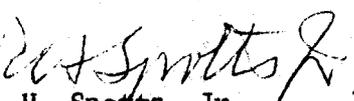
ATTENTION: Robert E. Mathe, Colonel, C.E.  
District Engineer

Dear Colonel Mathe:

Your letter of May 24, 1966, enquired concerning the interest and desire of Madera County to administer, operate and maintain the Hidden Dam Project recreation areas when completed. On October 5, the County's Director of Planning met with members of your staff and discussed various matters relating to the recreation areas, including the several questions in our September 7, letter to you.

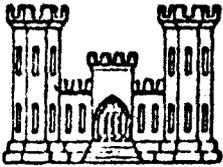
After consideration of the new commitments and requirements involved in administration, operation, and maintenance of the Project's recreation areas by the County, the Board of Supervisors on November 15, 1966, determined that the County of Madera should not participate. You can, of course, expect County cooperation with your office and the agency that does take over the recreation areas when completed.

Very truly yours,

  
R. H. Spotts, Jr.  
Administrative Officer

RHS:jk

cc: Board of Supervisors  
Dir. of Planning



DESIGN MEMORANDUM NO. 15

JANUARY 1968

## HIDDEN RESERVOIR

Fresno River, California

### MASTER PLAN APPENDIX D COST ESTIMATES

DEPARTMENT OF THE ARMY  
SACRAMENTO DISTRICT, CORPS OF ENGINEERS  
SACRAMENTO, CALIFORNIA

DESIGN MEMORANDUM NO. 15  
FRESNO RIVER BASIN, CALIFORNIA  
HIDDEN RESERVOIR  
FRESNO RIVER

MASTER PLAN

APPENDIX D  
COST ESTIMATES

1. Basis of cost estimate. - The cost estimates herein are based on 1 July 1967 price levels. Due to the lack of complete field surveys and the need for exploration work to determine the depth and extent of rock excavation required, which is predominant in most areas, a contingency allowance of 25 percent has been used. Prescribed percentages have been included for Engineering and Design and Supervision and Administration.

2. Tables I through IV are estimates of the initial developments while tables V through X are estimates of future developments.

DESIGN MEMORANDUM NO. 15  
 FRESNO RIVER BASIN, CALIFORNIA  
 HIDDEN RESERVOIR  
 FRESNO RIVER

MASTER PLAN

APPENDIX D - COST ESTIMATES

Table I - Cost Estimate, Development of  
Initial Recreation Facilities - Hidden View Area  
 (1 July 1967)

Cost acct. no.	Feature	Unit	Quantity	Unit cost (\$)	Estimated cost (\$)
14	RECREATION FACILITIES				
	Access & circulation road (paved double lane)	Mile	1.05	52,000	54,600
	Access & circulation road (paved single lane)	Mile	0.85	35,000	29,750
	Circulation road (unpaved double lane)	Mile	0.90	39,000	35,100
	Parking areas (paved)	S.Y.	4,500	3.50	15,750
	Parking spurs & turnouts (paved)	Each	66	600	39,600
	Parking facilities (unpaved)	S.Y.	13,300	2.25	29,925
	Boat-launching ramp (2 lane)	L.S.	1	22,000	22,000
	Camp sites with shelter	Each	32	500	16,000
	Camp sites without shelters	Each	34	275	9,350
	Sanitary facilities:				
	Flush type restrooms	Each	3	19,000	57,000
	Portable chem. restrooms	Each	20	250	5,000
	Water supply & distrib. system	L.S.	1	54,000	54,000
	Signs and barriers	L.S.	1	1,000	1,000
	Landscaping	L.S.	1	5,250	5,250
	Fire reduction zone <sup>1/</sup>	Mile	3.5	2,000	7,000
	Electrical facilities	L.S.	1	9,000	9,000
	Subtotal				390,325
	Contingencies				99,675
	Total Initial recreational facilities				490,000
30	ENGINEERING AND DESIGN				74,000
31	SUPERVISION AND ADMINISTRATION				36,000
	Total initial recreation development				600,000

<sup>1/</sup> Includes entire fire reduction zone from Hidden View Area upstream along northwestern boundary of project which is to be included in the initial construction program.

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APPENDIX D - COST ESTIMATES

Table II - Cost Estimate, Development of  
 Initial Recreation Facilities - Buck Ridge Area  
 (1 July 1967)

Cost acct. no.	Feature	Unit	Quantity	Unit cost (\$)	Estimated cost (\$)
14	RECREATION FACILITIES				
	Access & circulation road (paved double lane)	Mile	0.85	52,000	44,200
	Access & circulation road (paved single lane)	Mile	0.35	35,000	12,250
	Circulation road (unpaved double lane)	Mile	0.95	39,000	37,050
	Parking facilities (paved)	S.Y.	11,600	3.50	40,600
	Parking facilities (unpaved)	S.Y.	10,900	2.25	24,525
	Boat-launching ramp (2-lane)	L.S.	1	28,800	28,800
	Picnic sites (permanent with shelters)	Each	12	470	5,640
	Picnic sites (permanent without shelters)	Each	18	245	4,410
	Picnic sites (portable with shelters)	Each	12	410	4,920
	Picnic sites (portable without shelters)	Each	13	185	2,405
	Sanitary facilities:				
	Flush type restrooms	Each	3	19,000	57,000
	Portable chemical toilets	Each	12	250	3,000
	Water supply & distribution system	L.S.	1	55,000	55,000
	Signs and barriers	L.S.	1	1,000	1,000
	Landscaping	L.S.	1	2,800	2,800
	Fire reduction zone <sup>1/</sup>	Mile	3.0	2,000	6,000
	Electrical facilities	L.S.	1	25,000	25,000
	Subtotal				354,600
	Contingencies				85,400
	Total initial recreational facilities				440,000
30	ENGINEERING AND DESIGN				66,000
31	SUPERVISION AND ADMINISTRATION				34,000
	Total initial recreation development				540,000

<sup>1/</sup> Includes entire fire reduction zone from Buck Ridge Area upstream along southeastern boundary of project which is to be included in the initial construction program.

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Table III - Cost Estimate, Observation Area  
Initial Development - Observation and Recreation Facilities  
 (1 July 1967)

Cost acct. no.	Feature	Unit	Quantity	Unit cost (\$)	Estimated cost (\$)
14	RECREATION FACILITIES				
	Picnic sites (permanent with shelters)	Each	5	470	2,350
	Picnic sites (permanent without shelters)	Each	5	245	1,225
	Subtotal				3,575
	Contingencies				1,425
	Total initial recreation facilities				5,000
19	BUILDINGS, GROUNDS & UTILITIES				
	Sanitary facilities (septic tank and leaching field)	L.S.	1	3,600	3,600
	Water supply and distribution system	L.S.	1	29,000	29,000
	Landscaping	L.S.	1	1,400	1,400
	Electrical facilities	L.S.	1	10,000	10,000
	Subtotal				44,000
	Contingencies				11,000
	Total initial observation facilities				55,000
30	ENGINEERING AND DESIGN				
					8,000
31	SUPERVISION AND ADMINISTRATION				
					4,000
	Total initial development				72,000

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Table IV - Cost Estimate, Wildlife Management  
Initial Development - Wildlife Management Area  
 (1 July 1967)

Cost : acct. : no. :	Feature	: Unit :	: Quantity :	: Unit : cost :	: Estimated cost :
				(\$)	(\$)
06	WILDLIFE FACILITIES				
	Habitat improvement	L.S.	1	2,000	2,000
	Access road (minimum standard)	Mile	3	6,000	18,000
	Rough fish control and game fish planting	L.S.	1	2,000	<u>2,000</u>
	Subtotal				22,000
	Contingencies				<u>6,000</u>
	Total initial wildlife facilities				28,000
30	ENGINEERING AND DESIGN				
					3,000
31	SUPERVISION AND ADMINISTRATION				
					<u>2,000</u>
	Total initial wildlife development				33,000

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Table V - Cost Estimate, Development of  
 Future Recreation Facilities - Hidden View Area  
 (1 July 1967)

Cost : acct. : no. :		Estimated cost (\$)
14	RECREATION FACILITIES	
	Circulation road (paved single lane)	15,800
	Parking spurs and turnouts (paved)	20,400
	Parking facilities (unpaved)	17,600
	Sanitary facilities	57,000
	Water supply and distribution	19,900
	Additional boat-launching lanes	10,200
	Additional camp sites	9,400
	Signs and barriers	1,000
	Landscaping	2,100
	Electrical facilities	<u>1,800</u>
	Subtotal	155,200
	Contingencies	<u>38,800</u>
	Total recreation facilities	194,000
30	ENGINEERING AND DESIGN	29,000
31	SUPERVISION AND ADMINISTRATION	<u>15,000</u>
	Total future recreation development	238,000

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Table VI - Cost Estimate, Development of  
 Future Recreation Facilities - Buck Ridge Area  
 (1 July 1967)

Cost acct. no.	Feature	Estimated cost (\$)
14	RECREATION FACILITIES	
	Circulation road (paved double lane)	3,600
	Circulation road (paved single lane)	10,500
	Parking facilities (paved)	19,600
	Parking facilities (unpaved)	40,700
	Sanitary facilities	58,500
	Water supply and distribution	18,000
	Additional boat-launching lanes	41,400
	Additional picnic sites	6,100
	Signs and barriers	1,000
	Landscaping	1,000
	Electrical facilities	400
	Subtotal	<u>200,800</u>
	Contingencies	<u>50,200</u>
	Total recreation facilities	251,000
30	ENGINEERING AND DESIGN	37,000
31	SUPERVISION AND ADMINISTRATION	<u>20,000</u>
	Total future recreation development	308,000

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Table VII - Cost Estimate, Development of  
 Future Recreation Facilities - Observation Area  
 (1 July 1967)

Cost acct. no.	Feature	Estimated cost (\$)
14	RECREATION FACILITIES	
	Access & circulation road (paved double lane)	20,900
	Access & circulation road (paved single lane)	2,400
	Parking facilities	15,000
	Sanitary facilities	20,000
	Water supply and distribution	9,000
	Picnic sites	6,100
	Signs and barriers	1,000
	Landscaping	1,600
	Electrical facilities	<u>1,000</u>
	Subtotal	77,000
	Contingencies	<u>20,000</u>
	Total recreation facilities	97,000
30	ENGINEERING AND DESIGN	14,000
31	SUPERVISION AND ADMINISTRATION	<u>7,000</u>
	Total future recreation development	118,000

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Table VIII - Cost Estimate, Development of  
 Future Recreation Facilities - Arrowhead Area  
 (1 July 1967)

Cost acct. no.	Feature	Estimated cost (\$)
14	RECREATION FACILITIES	
	Access and circulation road (paved double lane)	96,200
	Circulation road (unpaved double lane)	13,600
	Circulation road (unpaved single lane)	1,600
	Parking facilities (paved)	30,400
	Parking facilities (unpaved)	42,100
	Sanitary facilities	78,500
	Water supply and distribution	78,000
	Boat-launching ramp	38,000
	Picnic sites (above gross pool)	9,800
	Picnic sites (below gross pool)	4,600
	Signs & barriers	1,000
	Firebreak	100
	Landscaping	2,800
	Electrical facilities	<u>13,000</u>
	Subtotal	409,700
	Contingencies	<u>102,300</u>
	Total recreation facilities	512,000
30	ENGINEERING AND DESIGN	77,000
31	SUPERVISION AND ADMINISTRATION	<u>41,000</u>
	Total future recreation development	630,000

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Table IX - Cost Estimate, Development of  
 Future Recreation Facilities - Dry Creek Area  
 (1 July 1967)

Cost acct. no.	Feature	Estimated cost (\$)
14	RECREATION FACILITIES	
	Access and circulation road (paved double lane)	93,600
	Circulation road (unpaved single lane)	24,000
	Parking facilities (paved)	18,400
	Parking facilities (unpaved)	58,100
	Sanitary facilities	78,500
	Water supply and distribution	72,000
	Boat-launching ramp	43,000
	Picnic sites	13,500
	Signs and barriers	1,000
	Landscaping	2,800
	Electrical facilities	<u>14,900</u>
	Subtotal	419,800
	Contingencies	<u>105,200</u>
	Total recreation facilities	525,000
30	ENGINEERING AND DESIGN	79,000
31	SUPERVISION AND ADMINISTRATION	<u>41,000</u>
	Total future recreation development	645,000

## HENSLEY LAKE INTERPRETIVE PROSPECTUS

### I INTRODUCTION

The objective of interpretation at Hensley Lake is to assist the individual in understanding his rights and responsibilities as they apply to outdoor recreation and resource management. Our goal is to encourage a sense of guardianship, not simply a user of our Nations Corps Lakes.

This prospectus will outline our plan to initiate and maintain a favorable image of Hensley Lake, along with an analysis of the Visitor Information Center.

### II VISITATION ANALYSIS

#### a. The Park Visitor.

Visitor use patterns are important in discussing visitation at Hensley Lake. There are three basic types or characteristic groups of visitors:

- (1) Day Users, whose activities include fishing, boating, water skiing and picnicing.
- (2) Campers, particularly on weekends from March thru September.
- (3) Sightseers who stop by for a brief visit.

#### b. Use Patterns:

The variety of visitor needs that exist at Hensley Lake are described as they pertain to the previously listed "Use Patterns".

(1) Visitors who come to the Lake for day-use activities or a brief visit need short, highly visible interpretation. The Lake's Information Center might, as its greatest advantage, kindle an interest in returning to the Lake for more formal, in-depth interpretation such as campfire programs, nature walks, etc.

(2) Campers usually stay long enough for such formal interpretation and can be expected to take advantage of such programs. As the length of stay increases, the need for programs planned by Lake personnel increases. This is due partially to the need for "something to do" on the part of the visitor. Arrangements should also be made to provide interpretive services for the Madera and Fresno County residents who use Hensley Lake on a year round basis.

(3) The boating visitor's interests are primarily water oriented recreation. Interpretive programs that involve water sports would more likely be attended by this large percentage of the visiting public. Boating safety would be an important part of such a program. History and geology buffs, schools, church and scout groups, along with nature enthusiasts, are also attracted to Hensley Lake and programs should be developed for their needs.

(4) All park visitors to Hensley Lake have a desire for some form of recreation. Interpretation that centers around major recreational activities can also include other subjects, such as the before mentioned safety aspects of boating. The story of the U.S. Army Corps of Engineers, the agencies roles in the construction of Hidden Dam, the Hensley Lake recreation areas, etc., should also be told.

(5) The Lake Information Center would be excellent for telling these stories. The Center is designed to be self-guiding, interpreting ideas without aid of an interpreter. If possible, within manpower limitations, an employee should be on duty to further explain the displays.

#### c. Visitors to the Lake Information Center.

(1) The Park visitors have varied interests and levels of knowledge concerning Hensley Lake, the lake facilities, its history and resources. The Information Center, through well planned exhibits, can foster a greater appreciation and sense of understanding of the lake and of the Corps of Engineers.

(2) Presently 5% of the park visitors stop by the park office. With staffing possible on weekends and increased visitor attendance over all, it is estimated that this figure should approach 20%.

(3) From the opening date of 17 June 1978 until 31 December 1978, Hensley Lake experienced 214,000 park visitors. Visitation since that time has shown a steady increase with many first time visitors. The Information Center would be invaluable to the first time visitors.

(4) The Center would be available to organized groups, particularly school groups. For groups with particular interests, the Information Center will be somewhat flexible to cater to special interests.

### III INTERPRETIVE OBJECTIVES

#### a. The principle purpose of the Information Center:

(1) Explain the history of the Corps and its role in the development and operation of Hidden Dam - Hensley Lake.

(2) The environmental impact on the Fresno River and adjacent areas. More than just providing a source of public information, the Center should provide a stimulus for individual responsibility in the wise use of the natural resources and facilities provided at the park.

b. Priorities.

(1) Purpose of Hidden Dam - Hensley Lake.

(2) Lake Area (Madera County)

(3) Responsibility for the Dam and Lake

c. Objectives of the interpretive displays, presentations, and demonstrations need to include the following:

(1) Park visitors will know why Hidden Dam was constructed, why location was selected and who designed and built the Dam and its facilities.

(2) Park visitors will know who manages and operates the Dam, Recreation Facilities and Resources.

(3) Who the U.S. Army Corps of Engineers, Sacramento District is and how the work of the corps effects everyone nationwide.

(4) Park visitors will be shown what is available in recreation, historical interests and natural resources. The role of visitors in the proper use of all these resources will also be demonstrated.

(5) How Hensley Lake is part of a state wide water system cooperating with other state and federal agencies.

(6) Changes that have occurred for the better since the completion of Hidden Dam.

#### IV IDENTIFICATION & EVALUATION OF RESOURCE MATERIALS

The following is a list of potential resource material which may be used in developing Hensley Lake's interpretive displays.

1. Project Authorization documents
2. Original plans
3. Current project master plans
4. Information from project files and fact sheet on:

a. Project purposes

- (1) Flood control
- (2) Irrigation
- (3) Recreation
- (4) Fish and Wildlife habitat enhancement
- (5) Water quality enhancement

b. Project facilities

- (1) Dam and related structures
- (2) Recreation areas and facilities
- (3) Natural resources
  - (a) Flora and fauna
  - (b) Geological
  - (c) Historical
  - (d) Environmental
  - (e) Cultural
  - (f) Economic

Additional information concerning the areas can be obtained from the following sources.

1. Offices of the local Chambers of Commerce in Fresno, Madera and the mountain communities.
2. Records of the Madera and Fresno Historical Societies.
3. Sacramento District Public Affairs Office files.

This does not represent a complete list of resources available for use in interpretation but does list the most readily obtainable materials. Additional research will be conducted by the park staff.

## V INTERPRETIVE TECHNIQUES

a. Story Line and Interpretive Themes.

(1) The story of the Hensley Lake - Hidden Dam Project is an interesting and important one. The story line and interpretive themes used at the Lake Information Center should be a reflection of:

- (a) The resources and reasons for the Hensley Lake Project.
- (b) The role of the Corps of Engineers in the planning, construction and operation of the dam and lake facilities.
- (c) The history of this portion of the San Joaquin Valley and the surrounding foot hill mountain region, and the effects of the Lake on development of the area.

(2) The Hensley Lake story is one of providing for resource management, irrigation, recreation and flood control. The interpretive themes used at the Information Center will not only tell the history of the lake and Corps of Engineers, but will include the history of the entire area and its development.

(3) Using a combination of Corps, Lake and regional history as the basis for interpretive themes at the Information Center will allow development of programs that will be enjoyable and beneficial to the public.

(4) Interpretive themes will include discussions relating to the early Indian inhabitants through the present communities in the area.

(5) The general story line should also include the geological and biological environments of the area and how the various cultures have used these resources.

b. Specific Themes

(1) The Project

- (a) Purpose and history
- (b) Impact of water resource development
- (c) Location, why this particular site
- (d) Operation and management
- (e) Area resources and management
- (f) Recreation opportunities and management
- (g) Flora of area
- (h) Fauna of area

(2) The Corps of Engineers

- (a) History and purpose
- (b) Contributions and accomplishments
- (c) Role in planning, design and construction

(3) Fresno River Area History

- (a) Geological history
- (b) Natural History
- (c) Cultural heritage
- (d) Resource usage (historical and present)

c. Some of the functions that should be provided by the Information Center and staff are:

(1) Personal services

- (a) Interpretive talks and programs
- (b) Tours and walks
- (c) Demonstrations

(2) Exhibits

- (a) Pictures
- (b) Drawings
- (c) Maps
- (d) Paintings
- (e) Diagrams
- (f) Models and mounted animals, fish, birds, insects, etc.
- (g) Cultural and historic artifacts

(3) Audio Visual

- (a) Movies
- (b) Slide Shows

d. Methods to Accomplish Interpretive Goals

- (1) Self-guided trails
- (2) Periodic guided walks along trails
- (3) Campfire programs
- (4) Displays located at the Information Center
- (5) Programs and talks presented at the Information Center, at local schools, service clubs, etc.
- (6) Guest speakers with expertise in various topics
- (7) Ranger lead tours through dam control tower
- (8) Display located in tower to assist in explaining, during guided tours, the construction and operation of the dam.

VI THE INFORMATION CENTER

a. Location - Conference Room, front room and patio at Park Headquarters.

b. Development Constraints

- (1) Size of front room, 10' x 13'
- (2) Size of conference room, 12' x 16' (displays to be placed against the walls to permit the use of 11' x 14' area for conference activities)

(3) Size of patio, 15' x 15'

(4) Availability of man power to construct displays

## VII THE AMPHITHEATER

Location - On hill above restroom #4 in Hidden View Campground

## TENTATIVE IDEAS FOR THE INFORMATION CENTER

Since Hensley Lake does not have a building set aside as a Visitors Center, existing facilities will be used for a Visitor's Information Center. The Park Headquarters is an ideal location for the Information Center as it can easily be found by visitors and it is a secure area with personnel close at hand. Space is limited in this building, however, the use of the patio area, front room and multiple use of the Conference Room will provide adequate space to introduce park visitors to Hensley Lake.

The patio area is the first area encountered by park visitors and will remain open at all times. Displays in this area will orient visitors and inform them about recreation opportunities at Hensley Lake. In addition, other displays in this area could inform visitors about the function of Hidden Dam, the history of the Sacramento District, and the Corps of Engineers nationwide responsibilities.

The front room and the conference room of the Park Headquarters will be open during regular business hours. The theme of the front room will be the history of the Hensley Lake area. The displays will be a progression as follows:

Indians - Gold Mining - James D. Savage - Early Settlers  
Madera Sugar Pine Flume - Hensley Lake

The display concerning Hensley Lake will include a discussion of the dam, including why it was constructed and the benefits derived from it.

The theme of the conference room will be natural history of the area with emphasis on the Corps Resource Management of the area. Individual displays might include a Woodduck Nesting Box and a discussion of Hensley Lake's Woodduck Management Program, Hensley Lake's Dove Cone Program, a live snake display and mounts showing local birds and other animals.

\*Displays in this room will be against the walls, with some moveable, to permit the use of the center of the room (approximately 11' x 14') for conference activities and provide seating for a mini-theater.

\*An enclosed projection booth will be mounted in the wall at the east end of the room for showing films and slide programs on the existing screen.