Environmental Impact Statement

Lake Berryessa Reservoir Area
Management Plan

FINAL

May 1992

UNITED STATES DEPARTMENT OF THE INTERIOR

Bureau of Reclamation

Final Environmental Impact Statement for the Lake Berryessa Reservoir Area Management Plan Napa, California

This Environmental Impact Statement (EIS) is prepared in compliance with the National Environmental Policy Act, Public Law 91-190; Council on Environmental Quality Regulations (40 CFR, Part 1500-1508); Department of the Interior Manual 516, Implementing Procedures; Bureau of Reclamation, National Environmental Policy Handbook; Floodplain and Wetlands Executive Orders 11988 and 11990, respectively; Fish and Wildlife Coordination Act (16 USC Sec. 661 et seq.); Endangered Species Act (16 USC Sec. 1531 et seq.); and the National Historic Preservation Act (16 USC Sec. 470 et seq.). It is a broad-based document which addresses the impacts from several land, water surface, and concession management actions the Bureau of Reclamation is considering for eventual adoption and expansion in a Reservoir Area Management Plan. Subsequent site-specific NEPA reviews, of much narrower scope, will be conducted prior to implementation of any action.

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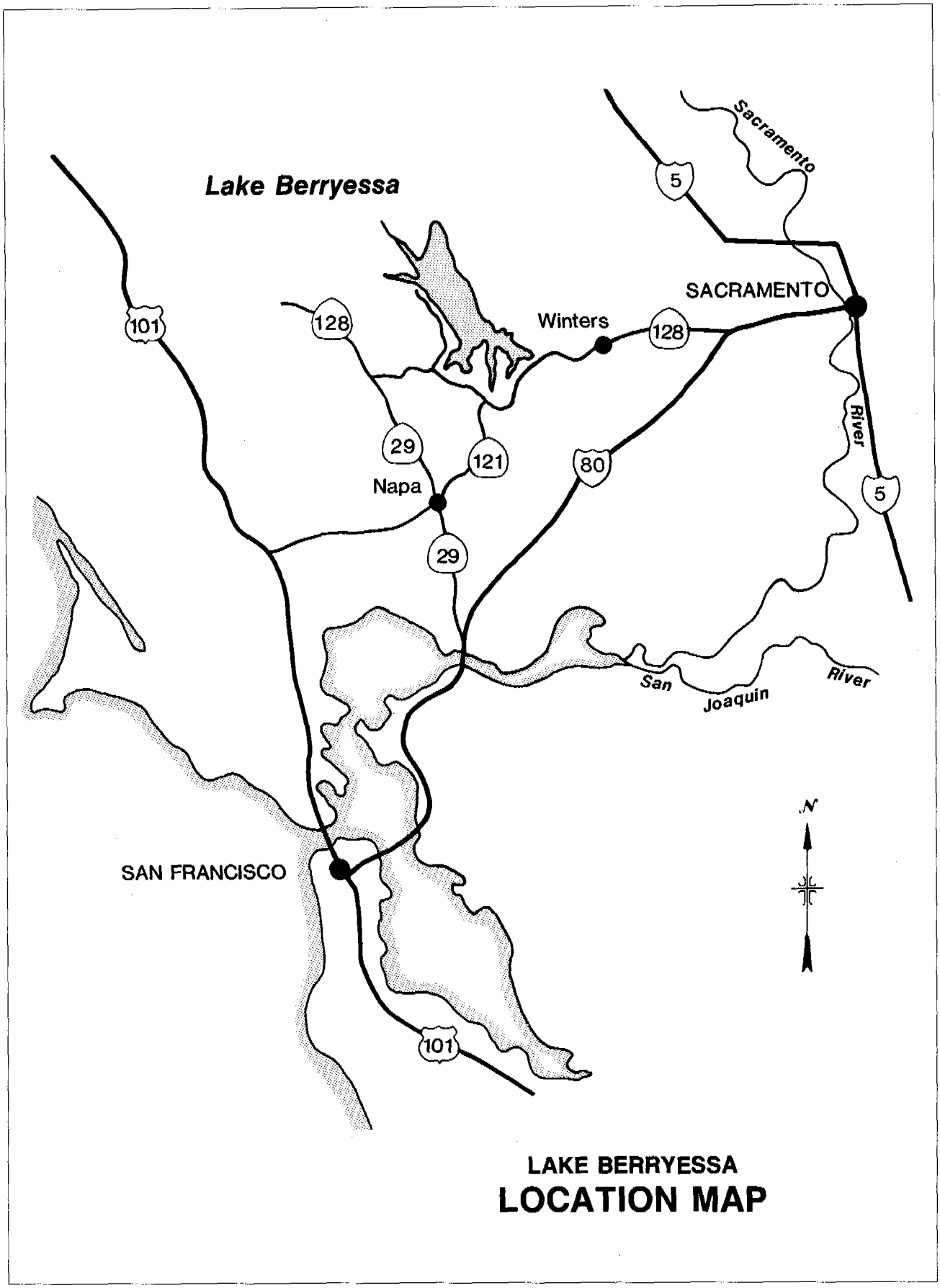
FIGURE 1



LAKE BERRYESSA
LOCATION MAP

EXECUTIVE SUMMARY

INTRODUCTION

This Programmatic Environmental Impact Statement (EIS) is prepared in compliance with the National Environmental Policy Act, Public Law 91-190; Council on Environmental Quality Regulations (40 CFR 1500-1508); Department of Interior Manual 516, Implementing Procedures; Bureau of Reclamation, National Environmental Policy Handbook; Floodplain and Wetlands Executive Orders 11988 and 11990, respectively; the Fish and Wildlife Coordination Act; the Endangered Species Act; and the National Historic Preservation Act. This EIS addresses the impacts from several Actions being considered as part of a Reservoir Area Management Plan (RAMP) for Lake Berryessa, Napa County, California.

Background In 1948 Lake Berryessa was authorized as part of the Solano Project. The Solano Project was authorized for flood control and to supply water for irrigation, municipal, and industrial uses. Due to anticipated radically fluctuating water levels, recreational use of Lake Berryessa was initially considered not important.

The primary project facility was the Monticello Dam which was constructed on Putah Creek in 1957. Lake Berryessa has a total storage capacity of 1.6 million acre-feet with 19,250 acres of surface water area, and is approximately 23 miles long and 3 miles wide, at the widest point. Approximately 28,916 acres of Federally-owned or managed lands surround the lake.

Lake Berryessa became officially available for public use in 1959. A Public Use Plan (PUP) was prepared by the National Park Service (NPS) in 1959. The PUP included a General Development Plan to guide development according to: (1) the capacities of the land and water to accommodate public use, and (2) the recreation needs and desires of the people who would use the area.

In 1958 Reclamation and Napa County (Napa) entered into a Management Agreement whereby Napa would administer and develop Federally-owned lands at Lake Berryessa. Under concession agreements with Napa, seven resorts were developed on 1,700 acres of land and water.

In general, the initial recreational development of Lake Berryessa did not adhere to the recommendations of the 1959 PUP. In 1971 the United States General Accounting Office (GAO) completed a study of public recreation facilities at Lake Berryessa and found them not adequately developed. The GAO report found that all seven concessionaires had concentrated on the development of mobile home parks instead of the PUP's recommendations for campground and day use areas.

In March 1974, Napa informed Reclamation of their intent to withdraw from the management of the lake in 1975. In October 1974, Congress passed Public Law 93-493 (see Appendix A) of which Title VI authorized Reclamation to assume the management role of Lake Berryessa and authorized the appropriation of $3 million for developments described in the Act. When Reclamation assumed management in 1975, the PUP and all of the existing developments were reviewed. The PUP was found to be suitable as long as it was amended to reflect the existing facilities in the resorts and to better define recreation and land use objectives for the lake. Three amendments to the PUP have been implemented.

In addition to amending the PUP, several operational policies have been implemented as part of Reclamation's management direction at Lake Berryessa. Operational policies establish specific standards for day-to-day operation and maintenance of existing recreation areas and facilities. Additional operational policies shall be developed as a result of those Actions described in this EIS and ultimately incorporated in the RAMP.

The lack of adequate facilities for the public at the lake became a major issue in the 1970's which prompted Reclamation, and as authorized by Public Law 93-493, to develop the first non-resort public day use facilities at Oak Shores and a no-fee boat-launch ramp at Capell Cove. The improvements were immediately accepted by the public.

PURPOSE AND NEEDS

Purpose Currently Reclamation is responsible for the overall administration and management of Lake Berryessa including the seven privately operated resorts located on Federal lands. This responsibility includes the preservation and conservation of natural resources and providing a wide range of outdoor recreational opportunities in a healthy and safe environment consistent with other authorized functions of the Solano Project.

The purpose of this EIS is to address the impacts from several Land Management, Water Surface Management, and Concession Management Actions Reclamation is considering for eventual adoption and expansion in the RAMP for Lake Berryessa. A RAMP is a comprehensive land and water use document that establishes development and use priorities for specific areas. The RAMP will be prepared after completion of this EIS and the filing of

a Record of Decision (ROD) which lists those Preferred or Alternative Actions selected for implementation. It will serve to update the PUP which was prepared in 1959 by the NPS.

This EIS and subsequent RAMP are meant to be "Generic" or "Programmatic" documents which will provide the overall direction for planning, development, and management of Lake Berryessa. All Actions eventually selected will be subject to subsequent environmental analysis and reports if necessary as they are considered for implementation. The planning period for this EIS and ultimately the RAMP will extend to the year 2009 when all existing concession agreements for privately developed resort areas will have expired.

Needs After several years of directly managing Lake Berryessa, Reclamation has determined the need to update the previous PUP for Lake Berryessa. Recreation developments have been made which have not always followed the original designations for specific areas and some lands have not been fully developed as specified in the PUP. The demand for day use and other short-term facilities has increased while a majority of the development is still oriented towards long-term use.

Following is a list of some of the needs which have prompted Reclamation to develop a RAMP for Lake Berryessa:

1. to provide additional short-term recreation opportunities
2. to develop land and water use zoning and restrictions
3. to enhance wildlife management and resource protection
4. to provide additional law enforcement
5. to develop resort master planning strategies
6. to provide for the protection of uses/ improvements in the floodplain
7. to determine appropriate fee assessments

THE PLANNING PROCESS AND DEVELOPMENT OF ACTIONS

Scoping Issues Prior to the preparation of this EIS the public was provided, through the scoping process, an opportunity to make input on significant issues or concerns that needed to be addressed. An example of the type of issues or concerns voiced includes: public access; water surface uses, management and safety; boat access camping; conversion of long-term uses to short-term uses; eastside land use and management; resort management, planning and development; protection of water quality; additional visitor information services; wildlife and endangered species management and protection.

Many of the issues and concerns were considered for further analysis in the EIS. Those that were related were grouped together as key issues as follows: Soils and Topography; Water Resources; Vegetation and Wildlife; Fish Resources; Recreation; Land Use; Cultural Resources; Traffic and Circulation; Scenic Resources; Socio-economic Setting; Visitor Health and Safety; and Law Enforcement.

One issue that received considerable comment dealt with flooding. This issue was given a great deal of consideration in the development of several Preferred and Alternative Actions.

A few issues were identified by the public that have been rejected from further consideration in this EIS or deferred until a later date. These issues were either outside the scope of this EIS or were those over which Reclamation has no direct jurisdiction.

Precepts for Planning After the scoping workshops Reclamation's planning team assigned to the RAMP effort reviewed all issues and concerns raised by the public, and conducted additional analyses on the recreational uses of the lake. From this process, "Planning Precepts" for the future management of Lake Berryessa were developed.

These Planning Precepts represent Reclamation's direction and intent for managing the lake and provided the basis for the development of the Preferred Actions listed in this EIS. The Planning Precepts represent a synthesis of research, public input, and accepted recreation planning objectives for Federal lands at Lake Berryessa and reflect those needs identified in Section II. The following is a brief discussion of the Planning Precepts:

Overall Goal--The overall goal in the management of Lake Berryessa will be to accommodate and provide for a wide range of outdoor recreation opportunities in a natural environment while optimizing visitor experience levels and safety consistent with other authorized functions of the Solano Project.

Resource Protection--Projects and Actions will comply fully with the intent of the National Environmental Policy Act (NEPA). This includes the protection and management of wildlife resources with special attention to endangered species.

Public Access--Public access to Lake Berryessa and its shoreline will be maintained and improved to meet the expanding demand for recreation and minimize congestion and use conflicts. Existing uses may evolve with day use and other short-term uses taking

precedent. The elimination or conversion of some long-term uses may be required to attain this. Access for special needs populations will be emphasized.

Improvement of Short-term Uses--Short-term uses and facilities will be improved in quality and quantity, emphasizing low density development as most preferable, and located in shoreline areas to support water-oriented recreational opportunities.

Continued Long-term Uses--Long-term exclusive uses will be allowed in concession areas. Current long-term exclusive uses assist in supporting necessary services for the short-term users and low cost public access. These long-term exclusive uses will be located or relocated in areas that are neither prime shoreline locations that are desirable for short-term uses or conflict with other greater public needs. Long-term uses will be designed to blend in more effectively with the natural environment.

Floodproofing--Structures and facilities in the reservoir floodplain (440 - 455 foot level) will be floodproofed and/or anchored, or removed in accordance with Floodplain Management Executive Order #11988 and subsequently developed Reclamation Instructions, part 215.13.

Protection of Water Resources--All resource and recreational developments will be designed and constructed to minimize impacts on water quality. Safeguards will be instituted to ensure sewage, toxic materials, and other harmful substances are not allowed to contaminate the lake.

Maintenance of Visual Resources--Reclamation recognizes Lake Berryessa as a regional recreation area that has inherent aesthetic and recreational values. Existing developments and new projects will be designed to conform and blend with natural features and visual resources.

Encourage Water-oriented Outdoor Recreational Uses--Management of water uses and activities at Lake Berryessa is an integral element of Reclamation's responsibility. Decisions and Actions will provide for the health and safety of users, protection and enhancement of resources, and compatibility of uses on the water surface.

Improve Enforcement Capabilities--Through agreements with local enforcement agencies or through additional authorities, law enforcement presence will be expanded to provide for the health and safety of visitors and protection of resources.

Expand Visitor Information Services--Reclamation will expand visitor awareness of the lake's environment, wildlife, water management, and safety issues. This will be accomplished by developing visitor information services in concession and public use areas.

Periodic Review of the RAMP--The RAMP will be reviewed and modified, if necessary, every five years. Assistance from other land managing agencies, local universities and colleges, and the public will be encouraged to provide information on current and future recreational uses and needs.

A key element of planning for recreation at Lake Berryessa is the land use classification system. Using the Planning Precepts as a general guide, this system was developed to designate planned appropriate use and/or development for all lands under Reclamation jurisdiction.

The planning team for this EIS carefully analyzed and considered existing land uses, accessibility, topography, wildlife and other resource concerns, scenic resources, public health and safety, and potential recreation demand and demographics prior to classifying any lands.

Under this system lands can be designated in one of five classification categories which depict the highest use and level of development which may be allowed in a given area. The system is as follows:

Land Use Classification System

CLASS I High Density Recreation Areas

Intensely developed and managed areas intended for mass public use, such as resorts with restaurants, marinas, mobile home parks, campgrounds, restrooms, day use areas, etc.

CLASS II General Outdoor Recreation Areas

Substantially developed areas intended for specific recreation uses, e.g. camping, picnicking, boat-launching; but of lower density than Class I.

CLASS III Dispersed Recreation Areas

Minimally developed areas, generally with road access, minimal sanitation facilities, road pullouts, and trails, intended for less intensive use with no major improvements.

CLASS IV Semi-primitive Areas

Undeveloped natural areas, with limited or constrained access, intended for limited recreational use; minimal improvements, such as fencing and trails would be allowed.

CLASS V Restricted and Easement Areas

Areas which have restricted recreation potentials due to their use for project administration and operation, or where flood easements are involved.

The above system is based on the principle that by providing specific types of recreation settings, a manager can ensure a balance between differing types of recreational opportunities without one activity becoming predominant and can control future use and development.

PREFERRED ACTIONS AND ALTERNATIVES

The EIS planning team formulated a list of 41 Preferred Actions and 73 Alternative Actions which are a reflection of Reclamation's Planning Precepts, and those issues provided by the public and other agencies. If a Preferred Action is ultimately selected for implementation, associated Alternative Actions for that Preferred Action will not be implemented. Where applicable, mitigation measures are included as part of the Actions.

To facilitate their review and consideration, all Preferred and Alternative Actions have been placed in four categories depending upon their relationship to "Land Management, Uses, and Facilities"; "Water Surface Management"; "Compliance Management"; or "Concession Management". Under "Concession Management" the Actions and Alternatives have been further divided into those which would be implemented prior to a resort reorganization and those which would be implemented after a resort reorganization.

Under the terms of the existing concession agreement, a reorganization plan for Steele Park Resort will be negotiated upon completion of the RAMP. For Pleasure Cove Resort, portions of its reorganization plan may be renegotiated upon completion of the RAMP. By the 2009 the concession agreements for all seven resorts will have expired and new or expanded reorganizations may occur.

The following is a general outline of the four categories and the related Preferred Actions. Alternatives, including a "no action" alternative, were then developed for each Preferred Action.

A. Land Management, Uses, and Facilities

1. Land Acquisition
2. Land Disposal
3. Dispersed Recreation Area Improvements
4. Administration Point Day Use Area
5. Smittle Creek Day Use Area
6. Facilities for Special Needs Populations
7. Trail Development
8. Boat Access Camping
9. Island Uses and Improvements
10. North Area Campground
11. Boat Launching
12. User Fees
13. Fish and Wildlife Management Area
14. Visitor Information Services
15. Limited Special Uses of Lands
16. Special Events on Land

B. Water Surface Management and Uses

17. Water Surface Zoning and Restrictions
18. Limited Special Uses of the Water Surface
19. Special Water Use Events
20. Water Craft Carrying Capacity

C. Compliance Management

21. Establish Law Enforcement Capabilities

D. Concessions Management - Prior to Resort Reorganization

22. Floodproofing and/or Anchoring of Structures and Facilities in the Base Floodplain
23. Prohibit Construction and Placement of Facilities in Reservoir Floodplain
24. Limitation on Long-term Uses
25. Removal of Structures and Facilities for Environmental Causes
26. Storage in Shoreline Areas
27. Resort Master Plans and Limitation on Development
28. Land Planning and Development Criteria
29. Facility Development and Design Standards
30. Commercial Houseboats/Overnight Occupancy Vessels (OOVs)
31. Sewage and Gray Water Holding Facilities
32. Private Houseboats/Overnight Occupancy Vessels (OOVs)
33. Limitations on Shoreline Modifications Below 440 Feet Mean Sea Level

E. Concessions Management - Associated with Reorganization of Resorts

34. Removal of Long-term Uses from Base Floodplain Area and Floodproofing/and or Anchoring Long-term Uses Between 450 - 450 Feet.
35. Floodproof or Remove Permanent Structures and Facilities in the Reservoir Floodplain
36. Create Short-term Sites from Existing Long-term Sites
37. Relocation of Long-term Sites

38. Facility Development and Design Standards
39. Deletion of Land from Concessions Areas
40. Variable Rate Franchise Fees
41. Fee Reviews and Approvals

F. Alternatives Eliminated From Further Study

During the public scoping process, many alternatives were developed that were reviewed by Reclamation for inclusion in this EIS. Most of the alternatives were directly incorporated into or used to formulate preferred or alternative actions. However, of the numerous alternatives, six were eliminated from further study.

AFFECTED ENVIRONMENT

Before an evaluation of impacts to the environment could be completed, a review was made of the "Affected Environment". For the purpose of this EIS the review includes existing soils and topography, water resources, vegetation and wildlife, fish resources, recreation (uses), land use, cultural resources, traffic and circulation, scenic resources, socio-economic setting, visitor health and safety, and law enforcement. This review set the groundwork for the EIS and provided the means to measure the degree of impact the preferred and alternative actions may have.

CONSEQUENCES (IMPACTS) AND MITIGATION

The scope of this EIS is quite large and complex. Since it is intended to be a broad-based document that is "GENERIC AND PROGRAMMATIC", it generally assesses various ranges of impacts instead of site specific impacts. In some cases where information is available, specific impacts have been described. Specific plans or actions will be subject to further environmental documentation prior to implementation, as necessary.

The twelve resource categories in this section correspond to those described in Section V, Affected Environment. Each is assessed as to how the (41) preferred\and (73) alternative actions might impact it. Impact narratives were compiled by an interdisciplinary team. Integral to the preparation of each narrative was the development of an Environmental Impact Matrix (see Appendix N). This matrix serves to illustrate the potential impacts in a condensed form.

Within the impact narratives, the Actions have been grouped by the type of impacts they may cause (negative or positive) and their severity. Negative impacts have been given three levels of value: minor, moderate, or major. These levels are meant to be relative to one another only within the specific resource category. Positive impacts have not been given relative values.

Minor impacts may be characterized as having lesser importance, low detectability, generally negligible, and mitigation efforts when necessary may greatly lessen the impact. Major impacts may be characterized as being substantial, highly detectable, consequential, and may require significant mitigation measures. Moderate impacts are related closer in intensity to major impacts than minor impacts. Therefore, they could also require significant mitigation measures.

After the consequences for each resource category are discussed, an additional narrative describes various mitigation measures that may be implemented to reduce or alleviate the severity of negative impacts.

The consequences of the Preferred Actions vary in degree. Positive impacts include increases in recreational opportunities, planning and design, protection of cultural resources, health and safety, planning for visual resource protection, water quality, public access, etc.

Many Actions would have no impacts or no new impacts on the existing environment. In addition, while some Preferred Actions may produce negative impacts to one resource category, they may produce positive or beneficial impacts to other resource categories. In most cases the cumulative impacts of the Preferred Actions being proposed are beneficial.

Table ES 1 (Condensed Matrix located at the end of executive summary) summarizes the major or moderate negative impacts associated with any of the 114 Actions. The first page of the table identifies impacts to Preferred Actions and the remaining pages of the table applies to Alternative Actions.

Those Actions which have minor negative impacts, positive impacts, no new impacts, unknown impacts, varying impacts, or no impacts have not been included here but can be found in the complete Environmental Impacts Matrix included in Appendix N. Following the Condensed Matrix, a list of environmental commitments associated with Preferred Actions is provided in Section VI.

Generally the Preferred Actions (Actions 1-41) represent less negative impacts than the Alternative Actions (Actions 1a or b, 2a or b, 3a or b, etc.) and more completely meet the Planning Precepts. However, some of the Preferred Actions that may be adopted may produce negative impacts which can't be

completely mitigated. Subsequent site specific environmental documentation will address these impacts, if any.

From Table ES 1, 15 of the 41 Preferred Actions and 29 of the 73 Alternative Actions could have major or moderate negative impacts on the resource categories assessed. Following is a review of some of the representative negative impacts. Each Preferred or Alternative Action has been numbered. In the following paragraphs the clustering of numbers, such as [5,9b,16b] etc., is used to identify those Actions which are being referenced.

Soils and Topography

Moderate and major negative impacts on soils and topography could occur as a result of additional development such as the north shore campground [10], boat-launching ramps at the north shore campground [11], converting Smittle Creek to a concession-operated RV park [5b], construction of a recreational airstrip or resort/convention center on Big Island [9b,9c], the relocation of long-term sites within the resorts [37], etc.

Many of the Preferred Actions that would produce positive benefits by establishing building and design criteria [28,29,38], restricting or controlling land and recreational uses [3,13,15,16], restricting or eliminating developments in floodplains or other sensitive areas [22,23,24,25,26,34,35], should more than offset any negative impacts to soils and topography (as noted in the paragraph above).

Erosion control measures could also greatly mitigate most negative impacts.

Water Resources

None of the Preferred Actions or Alternatives will cause an appreciable impacts to the reservoir water supply (hydrology).

The development of a resort/convention center could have moderate negative impacts on water quality. Additional intensive use could create increased erosion sources and oil and tire residue deposition problems.

Any additional negative water quality impacts due to new developments would be more than offset through those Actions which produce positive benefits by restricting or eliminating developments in floodplain areas [22,23,26,34,35], controlling discharges of sewage and gray water [31] from houseboats or other similar vessels [30,32], and restricting the use of shoreline areas for storage [26].

Typical mitigation activities could include erosion control measures involving plantings and seeding, and careful monitoring of waste water treatment operations and solid waste disposal.

Vegetation and Wildlife

Only one of the Preferred Actions [37], relocation of long-term sites displaced by other Actions, could have a moderate negative impact on this category. Alternative actions involving more significant developments such as the Big Island Actions [9b,9c], allowing an expansion of long-term sites [24b], etc., could involve a loss of vegetative cover, loss of habitat and disturbance of wildlife populations.

Loss of vegetation and wildlife habitat due to new developments could be offset (in-kind) by the results of those Actions that require the removal and restoration of long-term sites from within the base floodplain [22,25,34,35], removal and restoration of sites for environmental causes [25], deletion of unused lands from concession boundaries [39], or requires greater planning and development criteria [27,28,29, 38] which could protect pockets of vegetation and habitat. Entering into a management agreement with DFG [13] could also greatly improve the quality and quantity of vegetation and wildlife habitat on lands surrounding the lake, especially those on the east shore.

Mitigation measures would involve restorative actions such as revegetation with native species, re-seeding, locating facilities to avoid important wildlife areas, etc. Campsites and other structures will be designed to minimize upland disturbances and prevent damage to wetlands and riparian communities.

Fish Resources

The development of a resort/convention center on Big Island [9c], could have moderate negative impacts by destroying productive fish habitats and degrading water quality through dredge and fill activities.

Loss of fish habitat due to new developments could be offset (in-kind) by Preferred Action [13] which would establish a Fish and Wildlife Management Area on the east shore and increase fishery habitat programs. By implementing Preferred Actions which allow limited shoreline modifications [33], prohibit new developments within the floodplain [23,26], etc., thereby improving the general condition of soils, vegetation, and water quality (as noted above), fish resources should be improved lakewide.

Recreation

None of the Preferred Actions and few of the Alternative Actions would cause major or moderate negative impacts on existing recreational uses of the lake, with the exception of those which allow one use to dominate over others. The establishment of a fish and wildlife management area for most lands [13b], could decrease recreational activities if current dispersed day use activities were eliminated. Prohibiting all commercial houseboats [30c] would negatively impact current users as well as future houseboating recreationists. Not allowing any relocation opportunities for long-term users displaced by other Actions [37b] would have major impacts on some of the lake's traditional users.

Any minor negative impacts caused by the Preferred Actions will be more than offset by the positive impacts that can be attributed to most of the Preferred Actions. Where recreational use by a particular user group may be limited, overall use will be increased for a greater number of individuals and groups. The intent of the Preferred Actions is to provide for the majority, not a select minority.

Land Use

Most of the Actions would not impact or only slightly impact existing land uses on or off the project. The establishment of a fish and wildlife management area [13,13b] could result in decreased grazing opportunities which historically have occurred.

Anticipated benefits to fish and wildlife resources derived from the establishment of a fish and wildlife management area [13] outweigh any decreases in grazing area which could occur. The eastshore is a very popular wintering area for the threatened Aleutian Canada goose and the endangered Bald Eagle. In addition, the American peregrine falcon is known to inhabit the bluffs above the eastshore.

No mitigation for the loss of grazing opportunities on Federal lands at the lake have been identified.

Cultural Resources

None of the Preferred or Alternative Actions would cause moderate or major negative impacts on cultural resources. However, some minor impacts associated with some of the developments could easily be prevented by appropriate archaeological investigations prior to soil-disturbing activities.

Based upon the decisions made regarding the Actions chosen, Reclamation will consult with the California State Historic Preservation Officer for compliance with Section 106 of the National Historic Preservation Act before actual implementation of an Action. Through an expanded visitor information system (with appropriate protective signing) [14], and a more aggressive law enforcement program [21], cultural resources in all areas of the lake would receive greater protection and enhancement. With master planning and identification of future development areas [27], destruction of cultural resources could effectively be prevented.

Traffic and Circulation

The development of a large resort complex on Big Island [9c] or a significant increase in the number of long-term uses in existing resort areas [24b] could moderately impact existing traffic and circulation.

None of the Preferred Actions are anticipated to significantly increase traffic and circulation problems. Increasing the number of short-term campsites will generally occur simultaneously with a decrease in long-term sites. This should limit increased traffic and circulation problems on all but the busiest weekends. Many Preferred Actions may minimize traffic and circulation problems through greater management and disbursement of uses over the entire area. The increase in law enforcement capability [21] and greater visitor information systems [14] should provide additional positive impacts.

Scenic Resources

Scenic resources would experience moderate to major negative impacts from Actions that promote development of a north shore campground [10], a launch ramp [11], Big Island developments [9b,9c], by not restricting launching or storage of water craft [20a], allow expansion of long-term uses [24b], allow storage of materials on the shoreline with minimal restrictions [26a], etc.

Some of the scenic intrusions associated with new development Actions or by allowing existing developments to remain in highly visual areas might not be completely mitigated. However, as a result of the implementation of such Preferred Actions as resort master planning [27], land planning and development criteria [28], and facility development and design standards [29], development and activity areas will be screened, located in less sensitive areas, and otherwise constructed to blend into the environment. In addition, any new developments will be placed to minimize impacts to water quality, vegetation, and wildlife, etc.

Socio-economic Impacts

1. Recreation Visitors

Only Actions [40b] and [41b] where franchise fees may be significantly increased or where approvals for all concession fees and charges would be discontinued, would have a moderate or major socio-economic impact on recreation visitors.

The two Alternative Actions above might result in increased fees. Preferred Action [36], converting long-term sites into short-term sites, will have positive impacts in the form of increased recreational opportunities within the resort for the day or overnight user. Most of the remaining Preferred Actions would tend to improve the overall visit of a recreation visitor to a resort in the form of better facilities and general resort conditions. This would be accomplished by requiring master planning [27] and facility design and development standards [28,29,38].

No direct mitigation measures have been identified to compensate for possible fee increases.

2. Resort Tenants

None of the Land Management, Water Surface Management, or Compliance Management Actions are expected to have a moderate or major negative socio-economic impact on resort tenants.

a. Concession Management - Prior to Resort Reorganization

Requiring floodproofing and/or anchoring, or removal of structures and facilities including long-term sites in the base floodplain (440 to 450 feet msl) [22,22b] would result in major negative impacts to tenants who will be required to pay for floodproofing and/or anchoring, or relocating their personal property such as coaches and decks. Approximately 195 long-term sites are currently in this zone and may be subject to the above requirements. Floodproofing costs cannot be determined until site-specific information has been obtained. Estimated cost for each anchor point is $75. The number of points is determined upon the size of the travel trailer or mobile home.

Relocation costs have been estimated at $2,600 for relocation outside the resort to $1,200 - $2,300 for inside the resort. Assuming a worst case scenario where all 195 long-term sites would have to be discontinued because floodproofing and/or anchoring, or relocations are impractical, total tenant losses could range from $1,629,615 to $5,057,910. This is based upon weighted average retail values and selling prices of shoreline sites of approximately $8,357 and $25,938, respectively, for travel trailers and mobile homes at the lake.

Floodproofing and/or anchoring, or removals [22] would be required within one year after completion of the RAMP or as directed by a new operational policy. In addition to economic losses, negative social impacts may occur should tenants need to relocate to another lake. Floodproofing and/or anchoring, or relocations may result in less damage to tenant-owned improvements or prevent the loss of life in the event of flooding.

b. Concession Management - Associated with Reorganization of Resorts

Under Preferred Action [34], all long-term sites located in the base floodplain would be removed during a reorganization of a resort. For six of the resorts this may not occur until after the year 2009. For Steele Park Resort this may occur earlier due to a term in its negotiated concession agreement that requires a reorganization after the RAMP process is completed.

As noted above, approximately 195 sites are currently located in this area and would have to be relocated or removed from the resort and be subject to the above costs and/or losses. In addition, an estimated 300 long-term sites located from 450 to 455 feet msl would be floodproofed and/or anchored, or removed. Under Alternative Action [34c], all 495 long-term sites located in the reservoir floodplain (440 to 455 feet mean sea level) would have to be removed or relocated.

In addition to removing or protecting long-term sites from flooding, under Action [36] approximately 220 long-term sites located in desirable shoreline locations may be converted to short-term sites. Preferred Action #36, as modified, may reduce the number of sites to be converted. Alternative Action [36b] would require all 758 long-term sites located in the water influence zone and reservoir floodplain to be removed or relocated while Alternative [36c] would require all 1,540 long-term sites to be removed. Costs and/or losses to tenants would be as described above.

Social repercussions would result for tenants required to relocate as a result of the above Actions. Floodproofing and/or anchoring, or relocations may result in less damage to tenant-owned improvements or prevent the loss of life in the event of flooding.

Moderate negative impacts to tenants could result if franchise fees were maximized [40b] or if changes in the current appraisal of long-term rental fees were made [41,41b].

Resort tenants hold no vested interest in the land they occupy in a resort at Lake Berryessa. They have entered into either a yearly rental agreement, or in some cases maintain a month-by-month rental agreement with the resort. These agreements do not convey any permanent right to occupy the site and the tenants should not conclude that their privilege to occupy public land for recreational purposes would continue indefinitely. As such, with any land use change they could expect their rental agreements to be terminated at any time after being given suitable notice (in most cases California law requires a one year notice).

Prior to the implementation of any Preferred Action that may result in the displacement of a tenant [22,34,35] or cause the tenant to undertake additional site protection activities [22,34], each tenant will be given appropriate notification of pending land use changes so as to amortize their investment. In addition, there may be opportunities to relocate trailers to other sections of the resort if space is available [37]; the tenant can sell the trailer with the understanding that it is to be removed; or the tenant could buy another trailer in the resort.

Most of the Preferred Actions would benefit the remaining tenants in the same manner as they would the recreation visitor as noted above. Facilities will be maintained or developed to provide quality services, roads and other structures will be improved, and use opportunities will be optimized.

3. Resort Owners

The development of a resort/convention center on Big Island [9c] could have a major impact on existing concessions by increasing competition. No other Land Management, Water Surface Management, or Compliance Management Actions would be expected to cause major or moderate negative impacts to the concessionaires.

a. Concession Management - Prior to Resort Reorganizations

Similar to those impacts on resort tenants, floodproofing and/or anchoring [22], could result in moderate negative impacts to resort owners, depending upon the number and extent of structures affected. The costs associated with floodproofing and/or anchoring of affected resort improvements is unknown and requires site-specific planning. Actions affecting revenue generation [22b,30c,33b], could also cause moderate negative impacts. Floodproofing and/or anchoring, or relocations could prevent or minimize future flood-induced losses.

b. Concession Management - Associated with Reorganization of Resorts

Removal of all the 195 long-term sites from the base floodplain [34] or the 495 sites from the reservoir floodplain [34c] would cause minor to major negative impacts to resort owners depending upon the resort impacted and how many sites are located in these zones. Requiring all improvements in the reservoir floodplain to be floodproofed [35] or requiring their removal [35b] would necessitate capital improvements by the resort owner or loss in revenue generation capability of the improvements. Costs or loss estimates would require site-specific data.

The following table was prepared for the draft EIS at a time (1985) when the lake was at normal levels and without impacts of a recession. Even though the average rental rates are not current, the conditions of the lake make the impacts more representative of what should occur versus what may be occurring in 1990 and 1991. It displays the estimated rental income losses incurred by owners under a worst case scenario where no relocation opportunities are possible and no immediate short-term rental income replaces the long-term rental income. Average monthly rental income was calculated from information supplied by resort operators and from annual financial statements.

Long-Term Use Rental Losses and Percentage of Potential Resort Income Associated With Various Actions (1985 figures)

Action Area Impacted	Long-Term Sites Rental	Potential Loss Resort	% of Total Income
Base Floodplain [1/]	195	$304,000	4.3%
Reservoir Floodplain	495	772,000	11.0%
Short-Term Conversion Area [1/]	220	343,000	5.0%
Water Influence Zone and Reservoir Floodplain	758	1,182,000	17.0%
Entire Resort Area	1,540	2,400,000	34.0%

[1/] *Preferred actions (total 415 sites impacted lake-wide)*

Based upon the above table, implementation of the Preferred Actions involving the removal of long term sites [34,36] could potentially decrease total resort income by approximately 9.3 percent. Individual resort impacts would vary depending upon actual number of sites impacted, specific rental income, period of time prior to implementation of Actions and whether relocation or replacement opportunities were available.

Implementation of removal Actions would occur only during reorganization of the resorts. For many of the resorts, reorganizations probably will not occur

until the year 2009 when existing concession agreements are due to expire. For Steele Park Resort this may occur earlier due to a term in its negotiated concession agreement that requires a reorganization after the RAMP process is completed. In addition to any economic losses, any removals or relocations of long-term sites could have negative social impacts upon resort owners who may share a sense of community affiliation and social interaction with those tenants which may be displaced.

If no relocation of displaced long-term sites were allowed [37b], minor to major negative impacts on resort owner's revenue capabilities could occur depending upon individual resort situations.

By allowing the resorts to create short-term sites out of certain long-term sites that are eliminated, the resorts should not experience any long-term impacts due to lost revenues from the displaced tenants. If space is available [37], tenants might be able to relocate into other areas of the resort, in most instances to full-service sites, which are usually rented at a higher rate than most shoreline sites located within the floodplain zone. In addition, any sites slated for removal will be phased out over a period of time sufficient to allow the tenant to amortize their investments.

As a result of those Preferred Actions that require master plans [27] and development of planning and design criteria for new and existing facilities, making the resorts even more desirable, resorts should experience increased use which will result in additional revenues.

4. Local Economy

The only Actions expected to cause moderate or major negative impacts to the local economy would be those associated with reorganizations of resorts. As with both resort owners and tenants, the local economy can be expected to incur moderate negative impacts if long-term sites were removed without replacement facilities or relocation opportunities, thereby decreasing potential retail sales. It is possible that replacement facilities could generate greater retail sales than the long-term use facilities which were replaced.

With increased development [10,11,36], broadening and expanding uses [3,6,7,8], and improved conditions within the resorts through master planning and building and development criteria, public use of Lake Berryessa should increase. This will directly benefit the local economy more than the loss of long-term sites due to Preferred Actions [22,25,34,36].

5. Mitigation for Socio-economic Impacts

Following are some of the mitigation features which have been included in the Preferred Actions to lessen the socio-economic impacts associated with some of the Concession Management Actions. Alternative Actions do not generally contain mitigation features and could have a greater or lesser impact depending upon the individual Action.

a. Allowing long-term sites to remain until one year after a reorganization of a resort as long as those sites in the base floodplain (440 to 450 feet mean sea level) are floodproofed and/or anchored. This would allow many of the long-term sites targeted for removal or relocation to remain until the year 2009.

b. Floodproofing and/or anchoring Actions will not be required until one year after the RAMP is completed or as directed by a new operational policy.

c. During reorganization of a resort, most long-term sites between 450 to 455 feet mean sea level would be allowed to remain if they are floodproofed and/or anchored, and are not part of a conversion to short-term uses or not part of the resort owner's alternate plans for the area.

d. The removal of long-term sites for eventual conversion to short-term sites will generally be limited to shoreline areas selected during master planning and resort reorganizations.

e. Long-term sites subject to removal will be able to relocate, provided space is available in approved areas.

Health and Safety

The development of Big Island [9b,9c] could have moderate to major impacts on visitor health and safety by allowing nontraditional uses such as an airstrip on the island. Allowing additional houseboats to overnight on the lake [30,30a,30b] could increase fire hazards, debris, and wastes.

Even though some of the Preferred Actions may produce some negative impacts, most, if not all, were designed to improve conditions at the lake by controlling and regulating use [15,16,17,18, etc.]. Those Actions which are shown to have some negative impacts [8,10,30] will ultimately produce more positive impacts lakewide due to their regulative aspects. By establishing a boat access camping program [8], a north shore campground [10], or allowing houseboats [30], Reclamation can effectively manage and control where those activities occur.

Proper control and enforcement of appropriate rules and regulations [21] and an aggressive signing program could offset most negative impacts.

Law Enforcement

Actions that increase visitor use of specific areas or plan new developments [5a,6b,8,8b,9,9b,9c,10, etc.] may have moderate negative impacts on existing law enforcement capabilities. These Actions may increase violations, increase the number of areas to be patrolled, and could necessitate additional rules and regulations.

However, as with the health and safety issues discussed above, most, if not all, of the Preferred Actions will ultimately produce more positive impacts than negative. By setting standards or limits, or by controlling and regulating uses, law enforcement agencies should have a less difficult time doing their job. However, with more areas developed or opened to the public, and with a more vigorous attitude toward protection and enforcement, law enforcement agencies will need greater staffing.

The above impacts could be mitigated by the implementation of Actions [14] and [21] which provide for greater visitor informational services and additional law enforcement capability.

PUBLIC INVOLVEMENT

The public had the opportunity to provide written comments on the draft EIS from December 28, 1989 to March 28, 1990. In addition, oral testimony was collected at public hearings which were held at: the Best Western Motor Hotel in Berkeley, on February 10, 1990; the Clarion Inn in Napa, on February 13, 1990; and the Fairfield Community Center in Fairfield, on March 8, 1990.

As a result of the public involvement process, Reclamation received 140 letters, and 60 oral testimonies. These respondents represent members of the general public, special interest groups, and other Federal, state and local agencies.

The letters and oral testimonies were reviewed by Reclamation staff and salient comments, questions and concerns were identified. Where applicable, the EIS was modified to reflect public input.

As required by NEPA, copies of all letters received and a summary of relevant comments or points provided during oral testimonies, and Reclamation's responses to these are provided with the final EIS in the Public Involvement Report.

CONDENSED MATRIX
(Summary of Major/Moderate Negative Impacts)

ALTERNATIVE ACTIONS	MAJOR/MODERATE NEGATIVE IMPACTS	IMPACTS	MITIGATION
Land Management Actions			
3.b. Return dispersed areas to semiprimitive areas	Mod.	Recreation — loss of quality and quantity of opportunities	Manage existing recreation areas for greater quantity and quality of use
4.c. Develop campground (or Administration Point) primarily for special needs populations – approximately 15 acres	Mod.	Vegetation and Wildlife — decrease in vegetation and habitat from construction	Implement planting program, signing program, and visitor information service, restore land to original condition when and where possible
5.b. Convert area (Smittle Creek) to a concession-operated campground and RV Park — approximately 15 acres now being used for short-term day use activities	Mod. Maj.	Scenic Resources — presence of vehicles and structures on landscape Law Enforcement — increases enforcement responsibilities Soils and Topography — increases soil erosion and compaction potential Vegetation and Wildlife — decrease in habitat and vegetation	Harden all roads and trails, reseed and replant vegetation, increase law enforcement presence, implement signing program and visitor information services, build on slopes less than 25%, use existing contours and vegetation for screening materials
6.b. Develop area primarily for special needs populations – approximately 5 - 10 acres	Mod.	Law Enforcement — increases enforcement responsibilities	Increase law enforcement presence, implement signing program and visitor information service
8.b. Concessionaire to operate boat access camping program — 50 - 100 sites lakewide	Mod.	Law Enforcement — same as above	Same as above
9.b. Construct recreation air strip on Big Island with short-term facilities	Mod. Maj.	Soils and Topography — increases soil erosion and compaction potential Vegetation and Wildlife — decrease in habitat and vegetation Scenic Resources — presence of airplanes and structures on landscape Law Enforcement — increases enforcement responsibilities	Harden all roads and trails, reseed and replant vegetation, increase law enforcement presence, implement signing program and visitor information services, build on slopes less than 25%, use existing contours and vegetation for screening materials
9.c. Develop resort/convention center on Big Island	Mod. Maj.	Water Quality — increases potential for water polution Traffic — increased traffic congestion Soils and Topography — increases soil erosion and compaction potential Vegetation and Wildlife — decrease in habitat and vegetation Fish Resources — potential destruction of habitat and fish resources Scenic Resources — transformation of landscape into high density urban setting Law Enforcement — increases enforcement responsibilities Concessionaires — may decrease revenues from competition	See above, and develop guidelines on development of facilities, water treatment and discharge, designate shoreline areas used by fish for no or nominal use No mitigation for loss of revenues to other concession operations
10.b. Develop campground on west shore near Rancho Monticello Resort 50 - 100 sites developed on 30 - 40 acres	Mod.	Soils and Topography — increases soil erosion and compaction potential Scenic Resources — presence of structures and vehicles on landscape Law Enforcement — increases enforcement responsibilities	Harden all roads and trails, reseed and replant vegetation, increase law enforcement presence, implement signing program and visitor information services, build on slopes less than 25%, use existing contours and vegetation for screening materials
10.c. Develop campground on west shore at Smittle Creek 50 -100 sites developed on 30 - 40 acres	Mod.	Soils and Topography, Scenic Resources, Law Enforcement — same as above	Same as above
11.b. Develop boat launching for campers only at north shore campground — 1½ acres	Mod.	Soils and Topography, Scenic Resources, Law Enforcement — same as above	Same as above
13.b. Establish Fish and Wildlife Management Area for all Lake Berryessa lands — excluding resort areas and Reclamation-developed day-use recreation lands	Mod.	Recreation — may decrease recreational area opportunities Land Use — possible reduction of available lands for grazing permits	Maximize use opportunities in recreation areas, new use guideline may be developed, no mitigation for loss of grazing lands
Water Surface Management Actions			
20.a. No Action: do not limit launching/storage of watercraft	Maj.	Scenic Resources — allows unlimited use and activities of water surface	Where possible, use screening materials to hide storage areas

CONDENSED MATRIX
(Summary of Major/Moderate Negative Impacts)

PREFERRED ACTIONS	MAJOR/MODERATE NEGATIVE IMPACTS	IMPACTS	MITIGATION
Land Management Actions			
8. Boat access camping program administered by Reclamation 50 - 100 sites developed lakewide no sites yet identified	Mod.	Law Enforcement — increases enforcement responsibilities	Increase law enforcement presence, implement signing program and visitor information services
9. Small and Big Island improvements, changing them to Dispersed Recreation Areas — approximately 450 - acres	Mod.	Law Enforcement — increases enforcement responsibilities	Same as above
10. Develop north shore campground 50 - 100 sites developed on 30 — 40 acres, no specific site on north shore identified at this time	Mod.	Soils and Topography — increases soil erosion and compaction potential Scenic Resources — land disturbance, presence of structures and vehicles on landscape Law Enforcement — increases enforcement responsibilities	Harden all roads and trails, reseed and replant vegetation, increase law enforcement presence, implement signing program and visitor information services, build on slopes less than 25%, use existing contours and vegetation for screening materials
11. Develop boat launching on the north shore — approximately 1½ acre	Mod.	Soils and Topography, Scenic Resources, Law Enforcement — impacts are the same as noted on 10 above	Same as above
13. Establish Fish and Wildlife Management Area for east shore lands — approximately 1400 acres excluding Gunn Ranch	Mod.	Land Use — possible reduction of available land for grazing permits	No mitigation available
Water Surface Management Actions			
18. Allow limited special uses of specific water - surface areas	Mod.	Law Enforcement — increases enforcement responsibilities	Increase law enforcement presence, implement signing program and visitor information services
Concession Actions Prior Reorganizations			
22. Floodproof and/or anchor, or remove structures and facilities in the base floodplain (440' - 450') – 195 long-term sites affected, unknown number of resort-owned facilities or structures	Maj.	Resort Tenants – increased costs due to removal/relocation or floodproofing/anchoring, possible loss of site occupancy and investments, - unknown floodproofing/anchoring costs, removal/relocation costs approximately $1,200 - $2,300 each, average trailer retail value $7,177, average sales price $20,112 Concessionaires - increased building costs, possible loss of rent fees and investments, – unknown costs for removal/relocation or floodproofing, loss of average rent fee of approximately $191 per month	Provide appropriate advanced notice, relocate facilities, structures, and tenant trailers if space is available
25. Remove structures and facilities for environmental causes — sites not yet identified	Mod.	Concessionaires — loss of revenues if sites are elimintated — average rent fee approximately $191 per month	Relocate resort facilities, relocate tenant trailers if space is available
32. Allow 75 private houseboats/OOVS	Mod.	Law Enforcement — increases enforcement responsibilities	Same as above
Concession Actions After Reorganizations			
34. Remove all 195 long-term uses from base flood plain (440' - 450') floodproof/anchor or remove all 300 long-term uses in 450' -455' zone	Mod. Maj. **	Concessionaires — increased building costs, loss of rent fees and facilities Economy — may dislocate uses and decrease retail sales Resort Tenants — increase costs due to removals/relocation or floodproofing, loss of site occupancy and investments see 22 above for associated costs	Provide appropriate advanced notice, relocate facilities, structures, and tenant trailers if space is available
35. Floodproof or remove all permanent structures in reservoir flood plain (440' - 455') — unknown number of resort owned facilities impacted	Mod.	Concessionaires — increased building costs or loss of resort improvements, — unknown floodproofing costs or removal/ relocation costs	Same as above
36. Create short-term sites from existing long-term sites (cluster concept) — approximately 220 sites	Mod. **	Resort Tenants — increased costs due to removals, loss of site occupancy, and investments see 22 above for associated costs	Same as above
37. Relocate long-term sites which have been converted to short-term sites or removed	Mod.	Soils and Topography — increases soil erosion and compaction potential Vegetation and Wildlife — loss of vegetation and habitat Scenic Resources — increase of built environment on the landscape	Harden all roads and trails, reseed and replant vegetation, implement signing program, build on slopes less than 25%, use existing contours and vegetation for screening materials
41. Review long-term use fees if reimbursed by concessionaire	Mod.	Resort Tenant — Concessionaire may increase rent fees without control	No mitigation can be identified at this time

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CONDENSED MATRIX
(Summary of Major/Moderate Negative Impacts)

ALTERNATIVE ACTIONS	MAJOR/MODERATE NEGATIVE IMPACTS	IMPACTS	MITIGATION
Concession Actions Prior Reorganizations			
22.b. Remove all structures from base flood plain (440' - 450') — 195 long-term sites and an unknown number of resort-owned facilities	Maj. **	Resort Tenants — increased costs due to removals/relocation, loss of site occupancy and improvements, Concessionaires — increased building costs, loss of rent fees and investments see 22 above for associated costs	Provide appropriate advanced notice, relocate facilities, structures, and tenant trailers if space is available
24.b. Allow expansion of long-term uses (within resort boundries)	Mod. Maj.	Vegetation and Wildlife — loss of habitat and vegetation, disturbance of wildlife Traffic — increases in traffic Soils and Topography — increases soil erosion and compaction potential Scenic Resources — increases built environment on shoreline areas	Harden all roads and trails, reseed and replant vegetation, increase law enforcement presence, implement signing program and visitor information services, build on slopes less than 25%, use existing contours and vegetation for screening materials
26.a. No Action: allow storage to occur in shoreline areas with minimal restrictions	Mod.	Scenic Resources — increase presence of built materials on shoreline	Where possible, use screening materials to hide storage areas
27.a. No Action: no master plans required	Maj.	Scenic Resources — no organized planning for scenic resources	Mitigation measures for each new development must be approved prior to any construction — see 10 and 9.c. above for types of mitigation measures
30.a. No Action: allow maximum of 65 commercial houseboats as provided in concession agreements	Mod.	Visitor Health and Safety — increases overnight use, generating debris and fire danger	Implement signing program and visitor information service, increase ranger contacts, inspection of vessels, use of permits, implement health and safety standards
30.b. Allow 150 houseboats per 1982 policy	Mod.	Scenic Resources — increases visibility of built structures in landscape Visitor Health and Safety — increases overnight use, generating debris and fire danger	See above
30.c. Prohibit all commercial houseboats	Mod.	Recreation — decreases recreational houseboating opportunities Concessionaires — decreases revenue potential	Develop alternate sources of revenue-producing activities within the marina area
32.a. No Action: continues existing policy	Mod. Maj.	Law Enforcement - increass enforcement responsibilities Concessionaire — Markley Cove — decreases major revenue source	Implement Signing
33.a. Prohibit shoreline modifications below 440' elevation	Mod.	Concessionaire — prevents all development below normal full pool (440')	No know mitigation measures at this time
33.b. Allow shoreline modifications without restrictions below 440' elevation	Mod./ Maj.	Scenic Resources — increase built environment on shoreline	Mitigation measures for each new development must be approved prior to any construction — see 10 and 9.c. above for types of mitigation measures
Concession Actions After Reorganizations			
34.c. Remove all 495 long-term uses from reservoir flood plain (440' - 455')	Mod. Maj. **	Economy — may dislocate users, reducing retail sales Resort Tenants — increased costs due to removals, loss of site occupancy and investments Concessionaires — increased building costs, loss of rent fees and investments see 22 above for associated costs	Provide sufficient notice so investments can be amortized, relocate facilities, structures, and tenant trailers if space is available
35.b. Remove all permanent facilities and structures from reservoir floodplain — unknown number of resort owned facilities	Mod.	Concessionaires — increased building costs, loss of investments and facilities — costs unknown Economy — may dislocate users, reducing retail sales	Same as above
36.b. Convert long-term uses in water influence zone and reservoir flood plain to short-term uses — 758 sites impacted	Maj. **	Resort Tenants — increased costs due to removals, loss of site occupancy and investments, — see 22 above for associated costs	Same as above
36.c. Convert all long-term uses to short-term uses — 1540 sites impacted	Maj.	Resort Tenants — same as above	Provide sufficient notice so investments can be amortized
37.b. No relocation for long-term sites eliminated — 195 sites in base flood plain (440' - 450') and possibly an additional 300 sites in the reservoir floodplain (450' - 455') depending upon the number floodproofed	Mod. Maj. **	Economy — dislocates users, reducing retail sales Recreation — decrease in specific exclusive long-term uses and opportunities Resort Tenants — increased costs due to removals, loss of site occupancy and investments Concessionaire — loss of revenues, investments and facilities see 22 above for associated costs	Same as above, long-term sites may be converted to short-term sites
40.b. Set franchise fee to maximize fair market return to Reclamation	Mod.	Recreation Visitors — potential for significant increase in fees Resort Tenants — may cause concessionaire to pass higher fees on to tenants	No mitigation measures at this time
41.b. Discontinue all concession fee review and approvals	Mod.	Recreation Visitors — potential for significant increase in fees Resort Tenants — concessionaire may increase fees without control	Same as above

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GLOSSARY & ABBREVIATIONS

DFG	Department of Fish & Game
EIS	Environmental Impact Statement
NEPA	National Environmental Policy Act
PUP	Public Use Plan
RAMP	Reservoir Area Management Plan
ROD	Record of Decision
USBR	United States - Bureau of Reclamation (Reclamation)
Alternative Action(s)	Other Action(s) that are viable but not as representative as the preferred action(s).
Base Floodplain	Those lands that would be inundated by a 100-year (one-percent chance) flood (base flood). All lands up to the 450 foot elevation mark are included.
Black Water	Waste water that is produced as a result of human excretion (sewage). Also includes oil, grease, toxic substances, and biodegradable and nonbiodegradable solids.
Concessionaire	The person(s) issued a concession agreement/contract for the operation of a resort area.
Concession Agreement/Contract	The agreement/contract entered into between Reclamation and an individual authorizing the operation of a resort area.
Disclosure Statement	A form used by Reclamation to disclose pertinent information to the potential buyer of a long-term site improvements.
Floodproof/Anchoring	The process of securing a mobile home, travel trailer or other improvements to the foundation or site; turning off electrical, water, and sewage to the site; etc., in order to minimize flood related damages. (See Section VI.K.1.b.2)
Gray Water	Waste water that is produced as a result of washing, showering, or other cleaning activities.
Long-term Use	The private exclusive use of an area by an individual(s) for an extended period of time. Blocked travel trailers and mobile homes are examples of long-term use.
Mitigation	The process of limiting, reducing, or eliminating an adverse impact.
Preferred Action(s)	Action(s) recommended by Reclamation as most representative of the goals and objectives of the Department of the Interior.
Reservoir Floodplain	Those lands which are subject to flooding. All lands up to the 455 foot elevation mark are included. The reservoir floodplain includes those lands in the base floodplain as described above.
Scoping	The process of obtaining public input on significant issues that need to be addressed in environmental documentation to ensure that important considerations are not overlooked and to discover aspects which might go unrecognized.
Short-term Use	The non-exclusive recreational use of an area by the public for short periods of time (usually for 2 weeks or less). Campsites, RV sites, day use areas are examples of short-term use.
Surcharge Zone	A term previously used to describe those lands around the reservoir between the 440 and 455 foot elevation mark.
Water Influence Zone	That area extending 100 horizontal feet beyond the 440 foot elevation mark.

I. INTRODUCTION

A. GENERAL

This Environmental Impact Statement (EIS) is prepared in compliance with the National Environmental Policy Act, Public Law 91-190; Council on Environmental Quality Regulations (40 CFR, Part 1500-1508); Department of the Interior Manual 516, Implementing Procedures; Bureau of Reclamation, National Environmental Policy Handbook; Floodplain and Wetlands Executive Orders 11988 and 11990, respectively; the Fish and Wildlife Coordination Act; the Endangered Species Act; and the National Historic Preservation Act. This EIS addresses the impacts from several actions being considered as part of a Reservoir Area Management Plan (RAMP) for Lake Berryessa, Napa County, California.

B. HISTORICAL BACKGROUND

In 1948 Lake Berryessa was authorized as part of the U.S. Bureau of Reclamation (Reclamation) Solano Project. The Solano Project was authorized for flood control and to supply water for irrigation, municipal, and industrial uses. The primary project facility was the Monticello Dam which was constructed on Putah Creek in 1957. Lake Berryessa has a total storage capacity of 1.6 million acre-feet and is approximately 23 miles long and 3 miles wide, at the widest point.

Lake Berryessa is located approximately 35 air miles west of Sacramento County in the northeast portion of Napa County. The lake is within 2-1/2 hours travel time from the San Francisco Bay metropolitan area and within 1 hour from Napa, Fairfield, and Davis (Figure 1).

Due to anticipated radically fluctuating water levels, recreational use of Lake Berryessa was initially considered not important. However, by August 1958, recreation demand was high as was evidenced by the 800 or more boats which operated on the lake despite the lack of public facilities.

Lake Berryessa became officially available for public use in 1959. A Public Use Plan (PUP) was prepared for Reclamation by the National Park Service (NPS). It designated the initial land uses for approximately 28,916 acres of Federally-owned land, including 19,250 acres of surface water area. The PUP included a General Development Plan to guide development according to: (1) the capacities of the land and water to accommodate public use, and (2) the recreation needs and desires of the people who would use the area.

Under an agreement signed in 1958 with Reclamation, Napa County entered into a Management Agreement to administer the development of Federally-owned lands at Lake Berryessa. The management agreement included a preliminary general development plan which was subsequently included as part of the PUP.

Because of the county's limited resources, and because a large majority of the public recreation use was by non-county residents, Napa County chose to rely on concessionaires to provide most of the recreation services and facilities. Revenue from these concessionaires was used by the county to fund the recreation management function at the lake.

Under concession agreements, the following seven resorts were developed on 1,700 acres of land and water under the terms of the 1959 PUP: Lake Berryessa Marina, Putah Creek Park, Rancho Monticello, Spanish Flat, South Shore (herein after known as Pleasure Cove Resort), Markley Cove, and Steele Park.

In general, the initial recreational development of Lake Berryessa did not adhere to the recommendations of the 1959 PUP. Improvements were made which did not always follow the original designations of areas and uses. In 1971 the United States General Accounting Office (GAO) completed a study of public recreation facilities at Lake Berryessa and found them not adequately developed. The study was a result of public concern that the lake had become inaccessible to the general public and virtually private in its administration.

The GAO report found that all seven concessionaires had concentrated on the development of mobile home parks instead of the PUP's recommendations for campground and day use areas. In general, the mobile home development had occurred on prime public access areas encumbering the shoreline with exclusive long-term uses. The development of these sites were not only on gentle sloping levels but also on steep hillsides creating massive road cuts and spills degrading the physical and visual environment and accelerating erosion.

In 1972 at the request of Reclamation, the NPS completed an update to the earlier 1959 PUP. The new plan recommended that the lake become either a National Recreation Area or a State Recreation Area with the Federal Government purchasing and controlling all existing access improvements (roads, launch ramps, etc.). The plan was never officially adopted and no funds were appropriated to reimburse concessionaires for their improvements.

In March 1974 Napa County informed Reclamation of their intent to withdraw from the management of the lake in 1975. In October 1974, Congress passed Public Law 93-493 of which Title VI authorized Reclamation to assume the management role of Lake Berryessa and authorized the appropriation of $3 million for developments described in the Act. Public Law 93-493 (Appendix A), among other things, directed the Secretary of the Interior to:

"develop, operate, and maintain such short-term recreation facilities as he deems necessary for the safety, health, protection, and outdoor recreational use of the visiting public; to undertake a thorough and detailed review of all existing developments and uses on Federal lands to determine their compatibility with preservation of environmental values and their effectiveness in providing needed public services; to implement corrective procedures when necessary; and to otherwise administer the Federal land and water areas associated with said Lake Berryessa in such a manner that in his opinion, will best provide for the public recreational use and enjoyment thereof all to such an extent that said use is not incompatible with other authorized functions of the Solano Project."

When Reclamation assumed management in 1975, the PUP and all existing developments were reviewed. The PUP was found to be suitable as long as it was amended to acknowledge the existing facilities in the resorts and to better define recreation and land use objectives for the lake. Currently three amendments to the PUP have been implemented.

Amendment No. 1 states the authority for Reclamation to develop and adopt amendments to the plan.

Amendment No. 2 entitled "Management Objectives and Policies for the Lake," states that:

"It is the objective of the Bureau of Reclamation to provide outdoor recreation facilities and services for the visiting public at Lake Berryessa which will accommodate a variety of aquatic-related recreation experience opportunities, to the extent and quality and in such combination that will protect the aesthetic and recreational values and assure optimum short-term recreational use and enjoyment and social benefit."

Generally, water-related recreation facilities will be given preference over intensively developed urban-type recreation facilities. Reclamation developments will cater to those recreationists not desirous of high convenience facilities such as those found in the resorts and will, therefore, be supplemental and noncompetitive with the concessionaire operations.

Amendment No. 3 recognizes past commitments of Napa County and Reclamation that authorized such long-term uses such as mobile home and trailer sites. It establishes the policy regarding long-term uses and sets the stage for reconciling existing and future conflicts between long-term and short-term recreation uses.

In addition to amending the PUP, several operational policies have been implemented as part of Reclamation's management direction at Lake Berryessa. Operational policies established specific standards for day-to-day operation and maintenance of existing recreation areas and facilities. Current policies regulate the use of individual docks, operation and use of houseboats, resort accounting systems, length of stay, development plans, and maintenance criteria, etc. Additional operational policies will be developed as a result of those actions described in this EIS which may ultimately be selected.

As authorized by Public Law 93-493, Reclamation developed the first non-resort public day-use facilities at Oak Shores, and a no-fee boat launch ramp at Capell Cove. These improvements were immediately accepted by the public demonstrating a demand for short-term use facilities at the lake.

Further discussions of these and other recreational facilities are provided in Section V.

II. PURPOSE AND NEEDS

A. PURPOSE

Currently Reclamation is responsible for the overall administration and management of Lake Berryessa including the seven privately operated resorts located on Federal lands. This responsibility includes the preservation and conservation of natural resources and providing a wide range of outdoor recreational opportunities in a healthy and safe environment consistent with other authorized functions of the Solano Project.

The purpose of this EIS is to address the impacts from several land management, water surface management, and concession management actions Reclamation is considering for eventual adoption and expansion in a Reservoir Area Management Plan (RAMP) for Lake Berryessa. A RAMP is a comprehensive land and water use document that establishes development and use priorities for specific areas. The RAMP will be prepared after completion of the final EIS and the filing of a Record of Decision (ROD) which lists those preferred or alternatives actions selected for implementation. It will serve to update the Public Use Plan (PUP) which was prepared in 1959 by the National Park Service (NPS).

This EIS and subsequent RAMP are meant to be "GENERIC" or "PROGRAMMATIC" documents which will provide the overall direction for planning, development, and management of Lake Berryessa while allowing flexibility to make decisions and commit resources to meet contemporary needs. All actions eventually selected will be subject to subsequent environmental analyses and reports if necessary as they are considered for implementation. The planning period for this EIS and ultimately the RAMP will extend to the year 2009 when all existing concession agreements for privately developed resort areas will have expired.

B. NEEDS

After several years of directly managing Lake Berryessa, Reclamation has determined the need to update the previous 1959 PUP for Lake Berryessa. Recreation developments have been made which have not always followed the original designations for specific areas and some lands have not been fully developed as specified in the PUP. The demand for day use and other short-term facilities has increased while a majority of the development is still oriented towards long-term use. These and other issues or needs identified below are those which have prompted the new planning effort for Lake Berryessa and this EIS.

1. Additional Land Acquisition:

Reclamation owns most of the land from the shoreline to the road(s) encircling the lake. Some privately owned lands are situated within this "boundary". In at least two areas, the public trespasses on private property to gain access to public lands. Private development directly adjacent to Lake Berryessa lands, in areas of critical concern to lake users and Reclamation, is increasing. Based upon studies as noted in the Recreation Section, Affected Environment, demand for usable recreational lands and a greater number and variety of opportunities is increasing.

2. Land Disposal:

Certain public lands held by Reclamation, due to their location, are of little value to Reclamation. They are not located in areas that promote or are developed for public use, or are not required for watershed protection. The lands provide little or no benefit to the general public or Reclamation for recreation.

3. Additional Short-term Recreation Opportunities And Public Access:

The counties located in Lake Berryessa's primary service area represent some of the fastest growing population areas in the State. Studies have shown demand for recreation is increasing, and at a faster rate than the population (see Appendix J). Few new reservoir recreation areas are being developed statewide.

Comments from Lake Berryessa users have shown an increasing demand for hiking and biking trails, day-use areas, fishing accesses, and most importantly, for quality overnight camping. The demand for overnight camping extends to boat-in access camping which is occurring with increasing regularity even though it is unauthorized.

Handicapped populations are voicing greater demand for equal access and increased opportunities. Existing day-use facilities, including boat launch ramps, are not equally distributed along the lakeshore. This has resulted in some areas receiving little or no use while others are very congested. Dispersed recreation areas are receiving increased uses but have not been supplied with appropriate sanitation or other minimal facilities.

4. Land and Water Use Zoning and Restrictions:

Congestion, over use, and unauthorized use of Lake Berryessa and its resources is occurring on a regular basis. Increasing demand for recreational opportunities is resulting in more users and more different types of uses. Conflicts between users and uses are increasing. Visitors are using the land and water surface in ways that weren't originally considered. Houseboating, jet skiing, parasailing, motorbiking, mountainbiking, etc., are examples of some newer uses which conflict with other traditional uses such as fishing, camping, water skiing, and picnicking. Unauthorized wood cutting, wildlife poaching, camping in non-designated areas, off road vehicle use and vandalism is increasing.

5. Wildlife Management and Resource Protection:

Lake Berryessa is utilized by numerous wildlife species including endangered or threaten species such as the bald eagle, American peregrine falcon, and the Aleutian Canada goose. Currently there are no formal plans for the management of wildlife, or habitat and fisheries improvements.

Construction activities such as the placement of mobile home sites, recreational facilities, etc., have occurred in environmentally sensitive areas with little or no concern for resources. As noted above, poaching and unauthorized off-road vehicle use is occurring which has impacted wildlife populations. Increased uncontrolled access to dispersed recreation areas, which have not been developed to support such uses, is creating resource conflicts and habitat damage such as disturbance to wildlife, soil compaction, erosion, vegetative damage and the accumulation of litter and debris. Excessive boat speeds in narrow channels has created shoreline erosion in some locations.

6. Law Enforcement Presence:

The increased recreational use of Lake Berryessa has resulted in a greater demand placed on existing law enforcement agencies. At times, even during high use periods, there are no sheriff deputies, boat patrol officers, or park rangers on duty at the lake. Response time to emergency situations can be excessive, sometimes as great as one hour.

7. Resort Master Planning:

The Public Use Plan (PUP) was not closely followed in the early development of recreational facilities at Lake Berryessa. Resorts were developed primarily for long-term uses at the exclusion of short-term opportunities. Previous construction activities have occurred on environmentally sensitive lands or prime shoreline locations, often with little regard to existing environmental features or aesthetic considerations. Growth and development have been relatively unrestricted with minimal planning.

8. Protection of Improvements in Floodplain:

Resort developed facilities and long-term sites have been placed within the Reservoir Floodplain (440 - 455 foot elevation). Flooding of these facilities and long-term sites has occurred and they continue to be subject to flooding. Equipment and hazardous chemicals such as oils, gasoline, pesticides, etc., which could add pollution to Lake Berryessa's water are stored in the Reservoir Floodplain.

9. Fee Assessments:

Reclamation conducts appraisals of other mobile home parks and resorts, then reviews and authorizes the fees charged by Lake Berryessa's seven resorts for long-term site rentals, camping, day use, and boat launchings. Reclamation also performs a variety of other special activities and services to the public and the resorts such as: master planning (input and review); inspections for building permits, health and safety, etc.; boat inspections; land use reviews; grazing permits; special use permits; dredging activities; etc. Historically, Reclamation has not charged for these services although it is authorized to do so under Reclamation Instructions, part 215.4.

III. THE PLANNING PROCESS AND DEVELOPMENT OF ACTIONS

A. INTRODUCTION - SCOPING AND ENVIRONMENTAL ISSUE IDENTIFICATION

The preparation of this EIS for the Lake Berryessa RAMP has involved a comprehensive planning process. This process is illustrated in Figure 2. Integral to the planning effort has been the involvement of the public. As further discussed in Section VII, "Consultation and Coordination", the public was initially involved through advisory committee meetings and then at public scoping workshops. As a result of these meetings and workshops, Reclamation received numerous comments and letters expressing concerns and identifying a variety of issues and alternatives.

A complete summary of the scoping process, including copies of comments and letters, a listing of participants, and issues and scope of analysis, can be found in the "Scoping Report, September 1987 with addendum, August 1988." This is available for public review at the Lake Berryessa Recreation Office, each of the seven resorts at Lake Berryessa, the Public Library in Napa, the Bureau of Reclamation's Sacramento Regional Office, and Denver Office.

1. Environmental Issues to be Analyzed.

From the comments and recommendations received, and during the analysis of alternatives, many issues were identified for further analysis in the EIS. Many of the issues were related and therefore grouped together. Following are the key issues discussed and analyzed in this EIS:

► *Soils and Topography* - How will actions such as new development of trails and campgrounds or structures in the floodplain, construction of new roads, alterations of the land, grazing, removal of long-term sites, and prohibiting storage in the reservoir floodplain affect soil compaction and erosion, sedimentation, and terrain stability.

► *Water Resources* - How will actions such as allowing houseboats to discharge gray water into the lake, unrestricted boat access to the lake, continued placement of long-term trailers and mobile homes in the floodplain zone, allowing continued storage in the floodplain, or making modifications to the shoreline impact water quality. Also, how will actions allowing land use changes impact water supplies needed for municipal, industrial, or agricultural uses.

► *Vegetation and Wildlife* - How will actions such as allowing boat-in camping, development of additional campgrounds or day-use areas including the eastside and Big Island, relocating or removing long-term sites, or opening new areas for dispersed recreation use affect vegetation, wildlife and more specifically endangered species.

► *Fish Resources* - How will actions such as allowing unrestricted use of the water surface, increasing or eliminating houseboats, implementing a boat access camping program, or entering into a agreement with the Department of Fish and Game to manage fish population, impact the lake.

► *Recreation* - How will actions such as allowing increased development of recreation areas to meet increased recreation demand, converting long-term sites to short-term sites, improving handicap access, setting restrictions on land or water surface uses, altering existing fee structures, or increasing access to formerly inaccessible areas affect the recreational opportunities of the lake user. Also, what carrying capacity conditions are present and how does it affect recreation.

► *Land Use* - How will actions such as land disposal or acquisition, redesignation of land classifications, eastside or Big Island changes, or establishment of competing interests affect the current status and uses of Reclamation or privately owned lands.

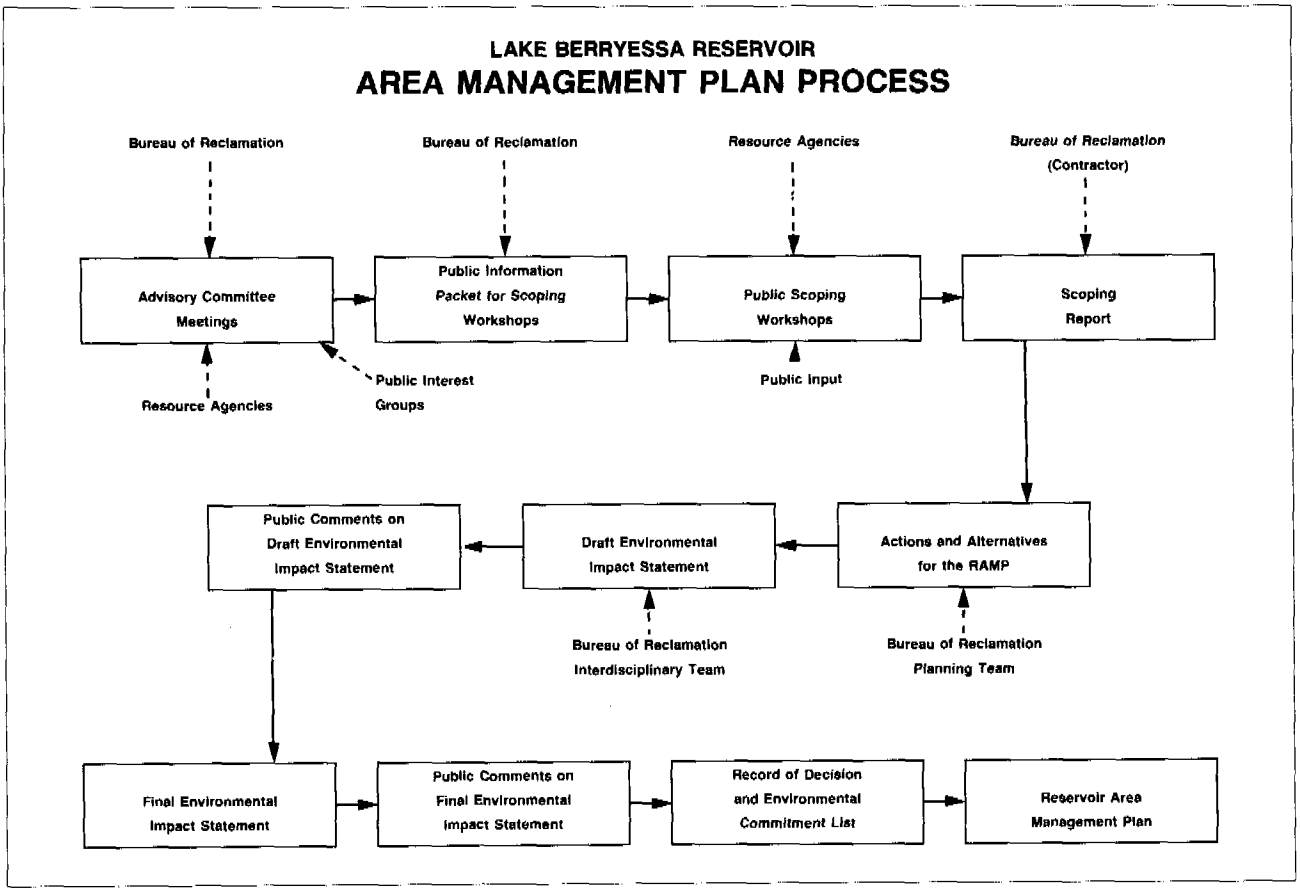
► *Cultural Resources* - How will actions such as allowing disturbance of surface areas through increased building activities or other related activities impact the cultural or historical resources of the lake area.

► *Traffic and Circulation* - How will actions such as increasing recreational activities on the lake or surrounding land, thus, the number of recreation visitors to the lake impact congestion and road systems to the lake.

► *Scenic Resources* - How will actions that allow such activities as shoreline modifications, development of design criteria for concession facilities, relocation of long-term sites, development of new facilities or day use areas impact the scenic quality of the lake and surrounding lands.

► *Socio-economic Setting* - How will actions such as increasing user fees, requiring structures in the floodplain zone to be floodproofed and/or anchored or removed, converting long-term sites to short-term uses, requiring master planning and the establishment of design criteria affect the financial

FIGURE 2



status of short-term recreationists, resort tenants, resort operators, the local economy, and the social institutions that have been developed by the resort tenants.

► *Visitor Health and Safety* - How will actions such as establishing carrying capacities on the water surface, restricting uses on the land or water, imposing design criteria on new buildings and increasing law enforcement activities create a safer environment for the visiting public. Also, will additional development with increased recreational use of dispersed or semi-primitive recreation areas create greater fire dangers and burden local service agencies.

► *Law Enforcement* - How will actions such as developing new campgrounds and boat launching ramps, improving access to dispersed recreation areas, and allowing new uses to occur, which result in more lake use, create greater demands on local law enforcement agencies.

Flooding is one issue that received considerable comment. This issue did not receive individual category consideration. However, it was a primary focus point in the development of several preferred and alternative actions, and is discussed quite thoroughly in many of the categories.

Comments on flooding dealt with such concerns as how often will facilities and structures located in the floodplain be subject to flooding, what floodproofing measures may be required, etc.

2. Issues Rejected From Further Consideration

As noted previously, many issues were identified and analyzed after receiving comments and recommendations during the scoping process and during the development of the preferred and alternative actions. There are a few issues which were identified that Reclamation has rejected from further consideration or deferred until a later date. These issues were beyond the scope of this EIS or could not be controlled through the RAMP process. Examples of these issues and the reason for their rejection follows:

► *Issues dealing with the quality or construction of roads or control over the use of roads* - Reclamation has no control of or authority to make changes on state or county roads leading to the lake.

However, road studies conducted by the state are reviewed in this EIS.

► *Issues concerning whether Reclamation land use classifications are consistent with Napa County Land Use Policies* - Reclamation did take into consideration the County's Zoning Plan when developing the Land Use Classification for Lake Berryessa (described later in this EIS). Federal lands must be managed to standards and mandates as provided for in rules, regulations, laws, or Executive Orders, which may be different than local jurisdictions.

► *Issues dealing with the placement of permanent or other non-public facilities on public land being a violation of public trust* - Reclamation policy does allow for the placement of permanent or other non-public facilities on its land.

► *Issues dealing with site specific development proposals* - Many of these issues are beyond the scope of this "generic" document and will be considered in subsequent environmental documentation.

► *Issues dealing with hunting on Reclamation owned or controlled lands* - This issue may be addressed if and when an agreement for a fish and wildlife management area has been entered into with the Department of Fish and Game. In the interim, Reclamation's current policy of no hunting shall remain in effect.

► *Issues dealing with whether or not state or county building codes, trailer park standards, health warnings, etc., apply to Lake Berryessa* - Reclamation has already determined that state or county codes, standards, warnings, etc., shall apply at Lake Berryessa when they are not in conflict with Federal laws, rules and regulations, Executive Orders, Reclamation Instructions or Operational Policies. Acceptance of such codes is described in amendment 3 of the PUP and reflective wording is included in concession agreements.

► *Issues addressing the sale of Lake Berryessa, Monticello Dam, or other government-owned resources* - The potential sale of the lake has not been considered a part of the ongoing land management planning efforts for Lake Berryessa. Regardless of the outcome, the management plan must be completed.

B. PRECEPTS FOR PLANNING

After the Advisory Committee meetings and scoping workshops, Reclamation's planning team assigned to the RAMP effort reviewed all issues and concerns identified by the public and conducted additional studies on the recreational uses of the lake. From the above, "Planning Precepts" for the future management of Lake Berryessa were developed. These precepts represent the direction and intent of Reclamation for managing the lake and provided the basis for the development of the preferred actions listed in this EIS. The precepts represent a synthesis of research, public input, and accepted recreation planning objectives for Federal lands at Lake Berryessa and reflect those needs identified in Section II. Following is a brief discussion of the precepts:

► *Overall Goal* - The overall goal in the management of Lake Berryessa will be to accommodate and provide for a wide range of outdoor recreational opportunities in a natural environment while optimizing visitor experience levels and safety, consistent with other authorized functions of the Solano Project.

► *Resource Protection* - Reclamation has recognized that fish and wildlife resources have become a unique addition to the lake and will be protected and enhanced. Reclamation will also work closely with other appropriate agencies to ensure that recreational use is consistent with other authorized functions of the Solano Project and other resources management objectives including the protection of cultural resources and endangered species.

► *Public Access* - Public access to Lake Berryessa and its shoreline will be maintained and improved to meet the expanding demand for recreation, and to disperse uses to minimize congestion and use conflicts. This will mean that various existing uses may evolve to achieve this objective, especially within the concession areas. In the future, day use and other short-term uses will take precedent as demand continues to increase from surrounding counties. This may require the elimination or conversion of some long-term sites. Access for special needs populations will be emphasized.

► *Improvement of Short-term Uses* - Short-term uses and their accompanying facilities will be improved in quality and quantity both in the concession areas and on other Reclamation lands. These short-term facilities will be designed for varying degrees of density but will emphasize low density as preferable. Short-term site development will be located in suitable shoreline areas to provide close proximity to water-oriented recreational opportunities.

► *Continued Long-term Uses* - Long-term exclusive uses will be allowed in concession areas. Current long-term exclusive uses assist in supporting necessary services for the short-term users and low cost public access. Some long-term exclusive uses may be located or relocated to areas that are neither prime shoreline locations that are desirable for short-term uses or are areas which conflict with other greater public needs. Long-term uses will be designed to blend in more effectively with the natural environment.

► *Floodproofing* - Structures and facilities in the 100-year floodplain (base floodplain) will be floodproofed and/or anchored, or removed to avoid possible short-term and long-term adverse impacts on human life, health, safety, and property that can be caused by flooding and to minimize Reclamation's liability in accordance with the Floodplain Management Executive Order and subsequently developed Reclamation Instructions.

► *Protection of Water Resources* - Good water quality is a value that has always been associated with Lake Berryessa and which enhances the recreational values currently experienced on the lake. All resource and recreational developments will be designed and constructed to minimize impacts on water quality. Safeguards will be instituted to ensure sewage, toxic materials, and other harmful substances are not allowed to contaminate the lake.

► *Maintenance of Visual Resources* - Reclamation recognizes Lake Berryessa as a regional recreation area that has inherent aesthetic and recreational values that should be enhanced and maintained. Existing development and new projects will be designed to conform and blend with the natural features and visual resources of the area at a level consistent with the density approved. This will include extensive efforts to naturally screen developments from the viewshed of the road and water surface as well as maintain the shoreline in a natural configuration and shape.

► *Encourage Water-Oriented Outdoor Recreational Uses* - Management of water uses and activities at Lake Berryessa is an integral element of Reclamation's responsibility. Decisions and actions by Reclamation will provide for the health and safety of users, protection and enhancement of resources, and compatibility of uses on the water surface. Incompatible exclusive uses of any specific land or water area will not be allowed that diminish general water-oriented outdoor recreational opportunities. A wide spectrum of opportunities will be encouraged at the lake which could include special events to promote various types of water-oriented activities.

► *Improve Enforcement Capabilities* - Paramount to Reclamation's effectiveness in managing uses and activities at Lake Berryessa is the ability to regulate and enforce decisions and policies. Through agreements with local enforcement agencies or through additional authorities, law enforcement presence will be expanded to provide for the health and safety of visitors and protection of resources.

► *Expand Visitor Information Services* - Reclamation will endeavor to expand visitor awareness of the lake's environment, wildlife, resources, management, and safety issues. This will be attained by developing centrally located visitor information services in concession areas and in other public use areas.

► *Periodic Review of the RAMP* - The RAMP will be reviewed and modified, if necessary, every five years to keep the Reservoir Area Management Plan a useful tool to provide management direction for Lake Berryessa. Assistance from other land managing agencies, local universities and colleges, and the public will be encouraged to provide information on current and future recreational uses and needs.

C. LAND USE CLASSIFICATION SYSTEM

A key element of planning for recreation at Lake Berryessa is the land use classification system. This system has been developed to designate planned appropriate uses and/or development for all lands under the jurisdiction of Reclamation. Under this system, lands can be designated in one of five classification categories which depict the highest use and level of development which can be allowed in a given area.

The system is based on the principle that by providing specific types of recreation settings, a manager can ensure a balance between different types of recreational opportunities without one activity becoming predominant. In addition, the quality of the environment can be maintained without fear of piecemeal development causing significant cumulative impacts.

Although individual classes describe the highest level of use or development which can be allowed in a particular area, lesser levels of development and use can occur. Table 1 depicts the land use

classification system which has been used by Reclamation for the RAMP. Figure 3 describes the typical activities and setting types for each category (except Class V).

The classification system has been used not only to designate the existing land uses and developments which currently occur but those which would be allowed in the future. Using the previous Planning Precepts as a general guide, the above classification system was applied to the available lands to begin moving toward a balance in recreation uses and development. The planning team for this EIS carefully analyzed and considered existing land uses, accessibility, topography, wildlife and other resource concerns, scenic resources, public health and safety, and potential recreation demand and demographics prior to classifying any lands. The resulting classifications can serve as a framework for controlling decisions regarding future use and development at the lake.

TABLE 1

LAND USE CLASSIFICATION SYSTEM

CLASSIFICATION CATEGORIES

CLASS I HIGH DENSITY RECREATION AREAS

Intensely developed and managed areas intended for mass public use, such as resorts with restaurants, marinas, mobile home parks, campgrounds, restrooms, day use areas, etc.

CLASS II GENERAL OUTDOOR RECREATION AREAS

Substantially developed areas intended for specific recreation uses, e.g., camping, picnicking, boat launching; but of lower density than Class I.

CLASS III DISPERSED RECREATION AREAS

Minimally developed areas, generally with road access, minimal sanitation facilities, road pullouts, and trails, intended for unintensive use with no major improvements.

CLASS IV SEMIPRIMITIVE AREAS

Undeveloped natural areas, with limited or constrained access, intended for limited recreational use; minimal improvements, such as fencing and trails would be allowed.

CLASS V RESTRICTED AND EASEMENT AREAS

Areas which have restricted recreation potentials due to their use for project administration and operation, or where flood easements are involved.

IV. PREFERRED ACTIONS AND ALTERNATIVES

The EIS planning team developed 41 Preferred Actions which conform to the planning precepts in Section III and also reflect many of those concerns and issues provided by the public during the scoping process. An additional 73 Alternative Actions (including "no action" alternatives) were also developed from the concerns and issues identified during scoping. In some cases applicable mitigation measures are included as part of the actions. A more complete listing of mitigation measures is included in the sections on Environmental Consequences and Environmental Commitments.

To facilitate their review and consideration, all Preferred and Alternative Actions have been placed in 4 categories depending upon their relationship to "Land Management, Uses, and Facilities"; "Water Surface Management"; "Compliance Management"; or "Concession Management". Under "Concession Management" the actions and alternatives have been further divided into those which would be implemented prior to a resort reorganization and those which would be implemented after a resort reorganization.

The following is a general outline of the four categories and the related Preferred Actions. This outline is then followed by a description of each Preferred Action and their alternatives:

A. Land Management, Uses, and Facilities

1. Land Acquisition
2. Land Disposal
3. Dispersed Recreation Area Improvements
4. Administration Point Day Use Area
5. Smittle Creek Day Use Area
6. Facilities for Special Needs Populations
7. Trail Development
8. Boat Access Camping
9. Island Uses and Improvements
10. North Area Campground
11. Boat Launching
12. User Fees
13. Fish and Wildlife Management Area
14. Visitor Information Services
15. Limited Special Uses of Lands
16. Special Events on Land

B. Water Surface Management and Uses

17. Water Surface Zoning and Restrictions
18. Limited Special Uses of the Water Surface
19. Special Water Use Events
20. Water Craft Carrying Capacity

C. Compliance Management

21. Establish Law Enforcement Capabilities

D. Concessions Management - Prior to Resort Reorganization

22. Floodproofing and/or Anchoring of Structures and Facilities in the Base Floodplain
23. Prohibit Construction and Placement of Facilities in Reservoir Floodplain
24. Limitation on Long-term Uses
25. Removal of Structures and Facilities for Environmental Causes
26. Storage in Shoreline Areas
27. Resort Master Plans and Limitation on Development
28. Land Planning and Development Criteria
29. Facility Development and Design Standards
30. Commercial Houseboats/Overnight Occupancy Vessels (OOVs)
31. Sewage and Gray Water Holding Facilities
32. Private Houseboats/Overnight Occupancy Vessels (OOVs)
33. Limitations on Shoreline Modifications Below 440 Feet Mean Sea Level

E. Concessions Management - Associated with Reorganization of Resorts

34. Removal of Long-term Uses from Base Floodplain Area and Floodproofing and/or Anchoring Long-term Uses Between 450 - 455 Feet
35. Floodproof or Remove Permanent Structures and Facilities in the Reservoir Floodplain
36. Create Short-term Sites from Existing Long-term Sites
37. Relocation of Long-term Sites
38. Facility Development and Design Standards
39. Deletion of Land from Concessions Areas
40. Variable Rate Franchise Fees
41. Fee Reviews and Approvals

A. LAND MANAGEMENT, USES, AND FACILITIES

The following actions reflect the public's demand for additional short-term recreation use opportunities (see Affected Environment, Visitation and Recreation Demand) and access, concern for preserving and enhancing cultural and natural resources including water supply, wetlands, and riparian habitats, the need for information services, and the need for new programs to solve existing problems at Lake Berryessa. These are land-based

actions which can be cross-referenced with the land-use classification system and corresponding map (Figure 4). Operational policies, as required, will be developed to implement the selected actions.

1. Land Acquisition.

Preferred Action:

Acquire additional lands to provide recreational access and services to public lands and minimize impacts to adjoining lands. Priority acquisitions include the following sites:

Private lands between Putah and Eticuera Creeks southeast of the Knoxville-Berryessa Road. Two parcels involving 200 acres may be ultimately involved.

Private land south of Spanish Flat Resort adjacent to Knoxville-Berryessa Road. Two parcels totaling approximately 2-1/2 acres may be ultimately involved.

Alternative:

a. No Action: Do not acquire additional lands.

2. Land Disposal.

Preferred Action:

Dispose of or exchange lands around Lake Berryessa not required for either the operation of the Solano Project, watershed protection, or recreational or wildlife purposes. Only lands separated from the lake by highways would be considered in this action. As lands are identified for disposal, appropriate public involvement and environmental documentation procedures will be followed. Approximately 500 acres could ultimately be involved.

Alternatives:

a. No Action: Do not dispose of lands.

3. Dispersed Recreation Area Improvements.

Preferred Action:

Develop and/or improve dispersed recreation areas (Class III) which could include access trails, sanitation facilities, garbage collection, parking, visitor information signing, etc. to provide for the health and safety of the public and protection of resources. In some cases, improvements would only involve a replacement of existing deteriorated facilities. Sites to be developed and/or improved generally would include areas with existing improvements and those areas being used frequently by the public which lack any improvements.

Alternatives:

a. No Action: Maintain existing dispersed recreation areas as is.

b. Return dispersed recreation areas to semi-primitive status which would include removing existing facilities.

4. Administration Point Day Use Area.

Preferred Action:

Improve access to Administration Point to provide a dispersed/semi-primitive day use experience. Access will normally be limited to walk-in users. Provision for limited motor vehicle access will be available for special needs populations. The site totals 30 acres of which only a limited portion of the land would be disturbed for site development.

Alternatives:

a. No Action: Continue to provide limited access only on a permit basis.

b. Close Administration Point to the public.

c. Develop Administration Point into a campground/day use facility primarily for special needs populations. Approximately 15 acres or one-half of the point may be developed for this purpose.

5. Smittle Creek Day Use Area.

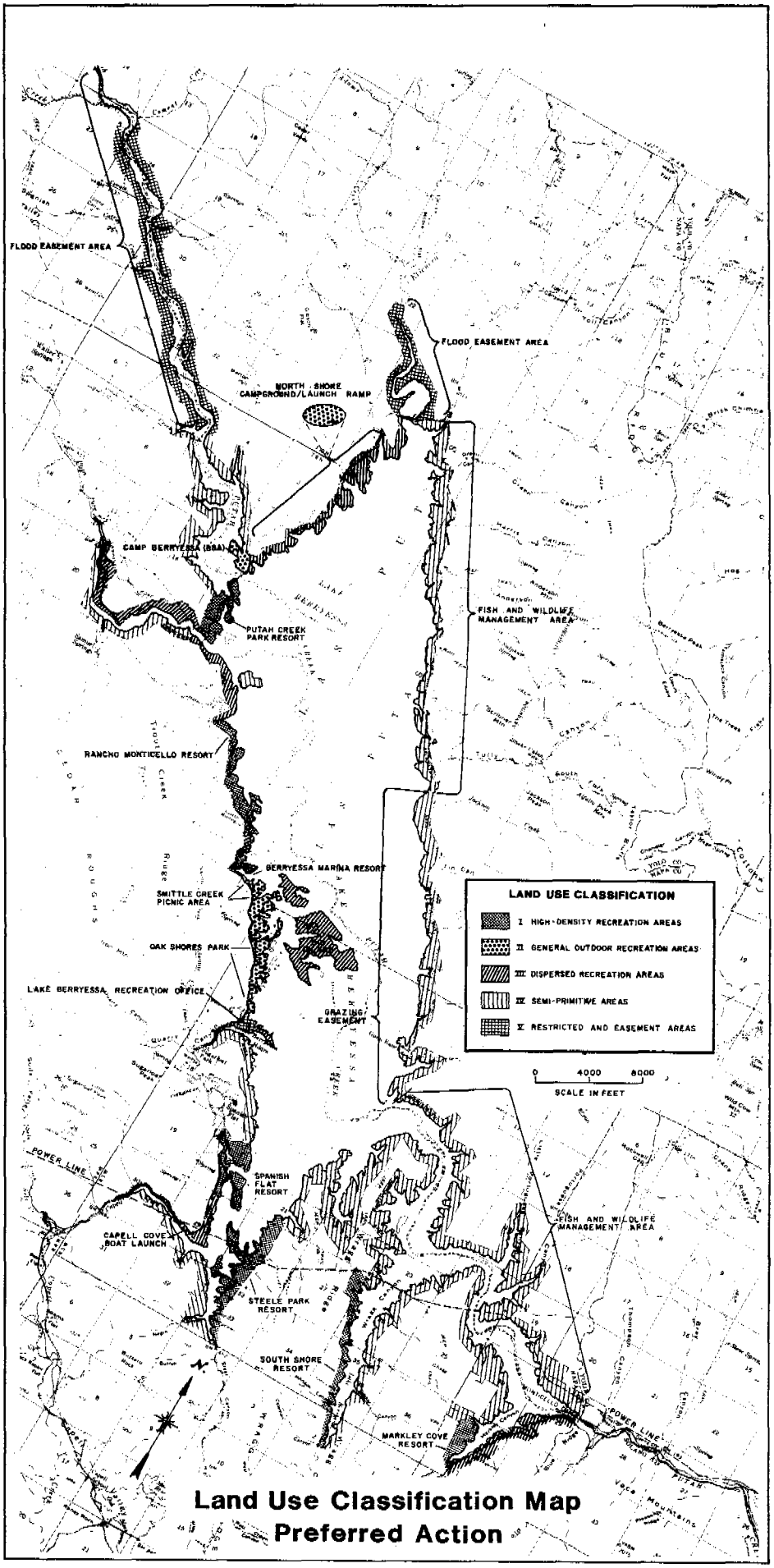
Preferred Action: No Action

Maintain Smittle Creek Day Use Area in accordance with the Oak Shores Plan which retains it as a day use area. No campground development would be allowed.

Alternatives:

a. Leave part of Smittle Creek Day Use area in day use and convert part of it into a walk-in camping area. Approximately 5 acres may be developed for this purpose.

b. Convert Smittle Creek Day Use Area into a campground and RV park to be operated by a concessionaire. Approximately 15 acres may eventually be developed for this purpose.



Land Use Classification Map
Preferred Action

FIGURE 4

6. Facilities for Special Needs Populations.

Preferred Action:

Improve accessibility for special needs populations in all facilities at Lake Berryessa including concession areas. In some cases, retrofitting of appropriate facilities may be required in accordance with Section 504 of the Rehabilitation Act of 1973 as amended.

Alternatives:

a. No Action: Per existing Federal laws and policies, improve accessibility in some facilities to meet minimum standards and provide accessibility to all new facilities.

b. Develop areas primarily for special needs populations at existing Reclamation-administered sites converted for this use. A total of 5 to 10 acres could eventually be converted for this use.

7. Trail Development.

Preferred Action:

Develop a predominantly unsurfaced multi-purpose riding and hiking trail system (30 to 50 miles) in dispersed recreation (Class III) and semi-primitive areas (Class IV). Trails could accommodate a variety of uses, but would not be available to motorized vehicles. Any development of trails on the eastside would have to conform with a management plan for that area to be developed as a result of Preferred Action 13.

Alternatives:

a. No Action: Maintain existing trails.

b. Develop trail system for single purpose use; i.e., equestrian, mountain bikes, hiking, etc.

8. Boat Access Camping.

Preferred Action:

Establish a boat access camping program for areas designated as semi-primitive (Class IV) and dispersed recreation (Class III) which will be administered by Reclamation. Under a permit system, resorts could provide parking and launching for a fee. Initially only 50-100 sites would be established. If Alternative Action 9a is selected, development of development of boat-in campsites on the islands shall be precluded regardless of the selection of this action.

Alternatives:

a. No Action: Continue enforcing "no boat-in" camping. (Except as may be provided in Preferred Action #9.)

b. Allow a concessionaire to administer and operate a boat access camping program for a semi-primitive experience within resort boundaries.

9. Island Uses and Improvements.

Preferred Action:

Provide dispersed recreation area improvements such as boat access camping sites on Small and Big Island (450 + acres). This would change the existing land-use classification from semi-primitive (Class IV) to dispersed recreation (Class III). If selected, Alternative Action 8a may not preclude the development of boat-in camping on the islands.

Alternatives:

a. No Action: Maintain as a semi-primitive area emphasizing wildlife values with possible preserve status. No boat-in camping allowed.

b. Construct a turf base, recreational air strip on Big Island. No aircraft services would be provided; however, an adjoining campground could be developed.

c. Develop a resort/convention center on Big Island to include an air strip, golf course, swimming pool, hotel accommodations, etc.

10. North Area Campground.

Preferred Action:

Develop a low density, high quality campground and day use area on the west shore, north of Putah Creek. The exact location would be made in consideration of minimizing potential impacts to bald eagles. Approximately 50-100 individual sites plus a group site on 30-40 acres of rolling grass oak woodland would be provided for tent camping and/or recreational vehicles. This would result in a land-use classification change from dispersed recreation (Class III) to general outdoor recreation (Class II) for the actual campground site. The remaining north shore lands would continue to be in the dispersed recreation classification.

Alternatives:

a. No Action: Continue current land uses and management (i.e., dispersed recreation).

b. Develop campground as above on the west shore, north of Rancho Monticello Resort.

c. Develop campground as above on the west shore at Smittle Creek (see Alternative 5b).

11. Boat Launching.

Preferred Action:

Develop additional boat launching opportunities in conjunction with the proposed north shore campground to disperse use. It will be utilized by day users and campground users. Fees may be charged, depending upon applicable policies or legislation at the time of construction.

Alternatives:

a. No Action: Do not provide additional boat launching opportunities on the north shore.

b. Develop boat launching opportunities for campers only at the proposed north shore campground.

12. User Fees.

Preferred Action:

Where legally authorized, charge user fees in areas where improvements have been made or a special service is provided. Semi-primitive (Class IV) and dispersed recreation (Class III) areas around the lake will remain open to the public at no charge. Fees could be charged for:

- Houseboat inspections.
- Boat access camping program services.
- Special events.
- Special permit processing.

Alternatives:

a. No Action: Continue to charge only at the Oak Shores day use area.

13. Fish and Wildlife Managemet Area.

Preferred Action:

Plan and establish a fish and wildlife management area under an agreement with the California Department of Fish and Game (DFG) for lands on the eastshore of Lake Berryessa, extending from Eticuera Creek to the Monticello Dam (approximately 1,400 acres). The non-exclusive grazing easement area (Gunn Ranch) may preclude certain management activities above the 440 elevation mark. This action will be coordinated with the F&WS and a special Focus Group will be established and may consist of representatives from F&WS, Reclamation, adjacent landowners, and special interest groups. For the remainder of the lake, management of fish and wildlife resources will be retained by Reclamation with technical input provided by DFG. As a fish and wildlife area, a variety of actions could be implemented such as:

- Cattle enclosures and/or cattle grazing restrictions.
- Waterfowl nesting habitat.
- Roosting and nesting sites for eagles, ospreys, great blue herons, etc.
- Native tree planting.
- Fertilization and seeding of the fluctuation zone to provide waterfowl food.
- Establish riparian vegetation along water courses.
- Continue fishery related management efforts and habitat improvement projects.

Alternatives:

a. No Action: Continue management of the area by Reclamation with limited technical assistance from DFG.

b. Establish a fish and wildlife management area under a management agreement with DFG for all Lake Berryessa lands, excluding resort and other developed recreation areas.

14. Visitor Information Services.

Preferred Action:

Expand visitor information services which could include:

- Interpretive center facilities and activities.
- Develop mini interpretive center in the dam area.
- Overlooks at appropriate locations along roads.
- Interpretive trails.
- Interpretive displays in developed access points and concession areas.
- Additional signing.

Alternatives:

a. No Action: Leave visitor information services at present level with minimum facilities.

15. Limited Special Uses of Lands.

Preferred Action:

Allow limited special uses of Reclamation lands around Lake Berryessa, including those shoreline areas exposed due to extreme drawdowns, only if such uses are not exclusive nor incompatible with other recreational activities. Off road vehicle use will continue to be prohibited. Lands may not be closed to the public to accommodate limited special uses. However, general public access to an area where limited special uses have been approved may be restricted temporarily for reasons of public health and safety. Specific guidelines and procedures, and mitigation measures may be developed for each special use to minimize impacts on resources including water supplies.

Alternatives:

a. No Action: No policy or direction regarding limited special uses.

b. Prohibit any limited special uses on Reclamation land at Lake Berryessa.

16. Special Events on Land.

Preferred Action:

Allow special events and/or activities (equestrian activities, races, bicycling events, etc.) which may temporarily displace other recreational uses on a limited irregular basis through a permit system. The temporary closure of lands to the general public for reasons of public health and safety may be authorized for the duration of the event. Specific guidelines and procedures, and mitigation measures may be developed for each special use to minimize impacts on resources including water supplies.

Alternatives:

a. No Action: No specific direction or policy.

b. Prohibit special events.

B. WATER SURFACE MANAGEMENT AND USES

The following actions concern recreational use of the water surface. Their intent is to disperse use throughout the lake area, minimize congestion, promote water safety, promote cooperation between user groups, protect cultural and natural resources including water supplies, wetlands and riparian habitat, and allow flexibility for future needs. Operational policies, as required, will be developed to implement the selected Actions.

17. Water Surface Zoning and Restrictions.

Preferred Action:

Establish and implement after coordination with the Napa County Sheriffs Dept. specific zoning and/or restrictions for water surface uses and activities to promote public health and safety, foster compatibility of recreational uses and protect and enhance natural resources including water supplies, wetlands, and riparian habitats. Activities or areas subject to zoning restrictions could include but are not limited to the following:

- Water skiing and similar activities in Neither Cove.
- Parasailing around power lines in the Narrows, Wragg Canyon, and Neither Cove.
- Jet skiing in Oak Shores.
- Closure of specific areas because of water supply intakes, endangered species issues, approved construction projects, etc.
- Aircraft operations.
- Speed zones for specific areas.
- Floating structures.
- Establishment of boat traffic patterns on lake surface.

An analysis of the water surface uses of the lake was conducted which assessed recreational uses and conflicting use patterns. It also assessed problem areas and recommended solutions to optimize recreational opportunities and minimize conflicts. Results from the analysis are provided in Appendix B.

Alternatives:

a. No Action: Continue current restrictions.

b. Allow zoning and restrictions to be established by Napa County.

18. Limited Special Uses of the Water Surface.

Preferred Action:

Allow limited special uses (such as water skiing instruction or slalom courses) of designated coves and other specific water surface areas only if such uses are not exclusive nor incompatible with other recreational activities. The closure of coves or other

areas for limited special uses is prohibited. However, general public access to an area where limited special uses have been approved may be restricted temporarily for reasons of public health or safety. Additional public involvement and necessary environmental documentation may be required prior to restricting public access for limited special uses.

Alternatives:

a. No Action: Retain special use areas (slalom courses and water skiing instruction) without a policy change.

b. Eliminate all special use areas regardless of compatibility with other user groups.

19. Special Water Use Events.

Preferred Action:

Allow special water use events and/or activities (races, regattas, swims, fishing derbies, etc.) which may temporarily displace other recreational uses on a limited irregular basis through a permit system. The temporary closure of coves or other areas for reasons of public health and safety may be authorized for the duration of the event.

Alternatives:

a. No Action: No specific direction or policy.

b. Do not allow special events to occur at Lake Berryessa.

20. Water Craft Carrying Capacity.

Preferred Action:

Limit the total launching, marina capacity, and storage capabilities of water craft (power boats, sail boats, etc.) on Lake Berryessa to 3,000 based upon recommendations presented in the 1959 Pubic Use Plan. The carrying capacity will be revised if research shows that additional watercraft may be safely accommodated. The additional launching capabilities of the north shore boat ramp (Preferred Action No. 11) are to be included in the carrying capacity limit of 3,000.

Alternatives:

a. No Action: Do not limit launching and storage capabilities.

C. COMPLIANCE MANAGEMENT

The following action is concerned with the responsible management of recreational resources, public and employee health and safety, and resource protection and enhancement. The implementation of other actions identified in this document is dependent in most cases on adequate law enforcement capabilities.

21. Establish Law Enforcement Capabilities.

Preferred Action:

Obtain additional law enforcement support to fully administer Public Law 93-493. This may involve contracting with Napa County to increase enforcement activities at the lake and establishing specific Federal rules and regulations.

Alternatives:

a. No Action: No change from current situation.

D. CONCESSIONS MANAGEMENT - PRIOR TO RESORT REORGANIZATION

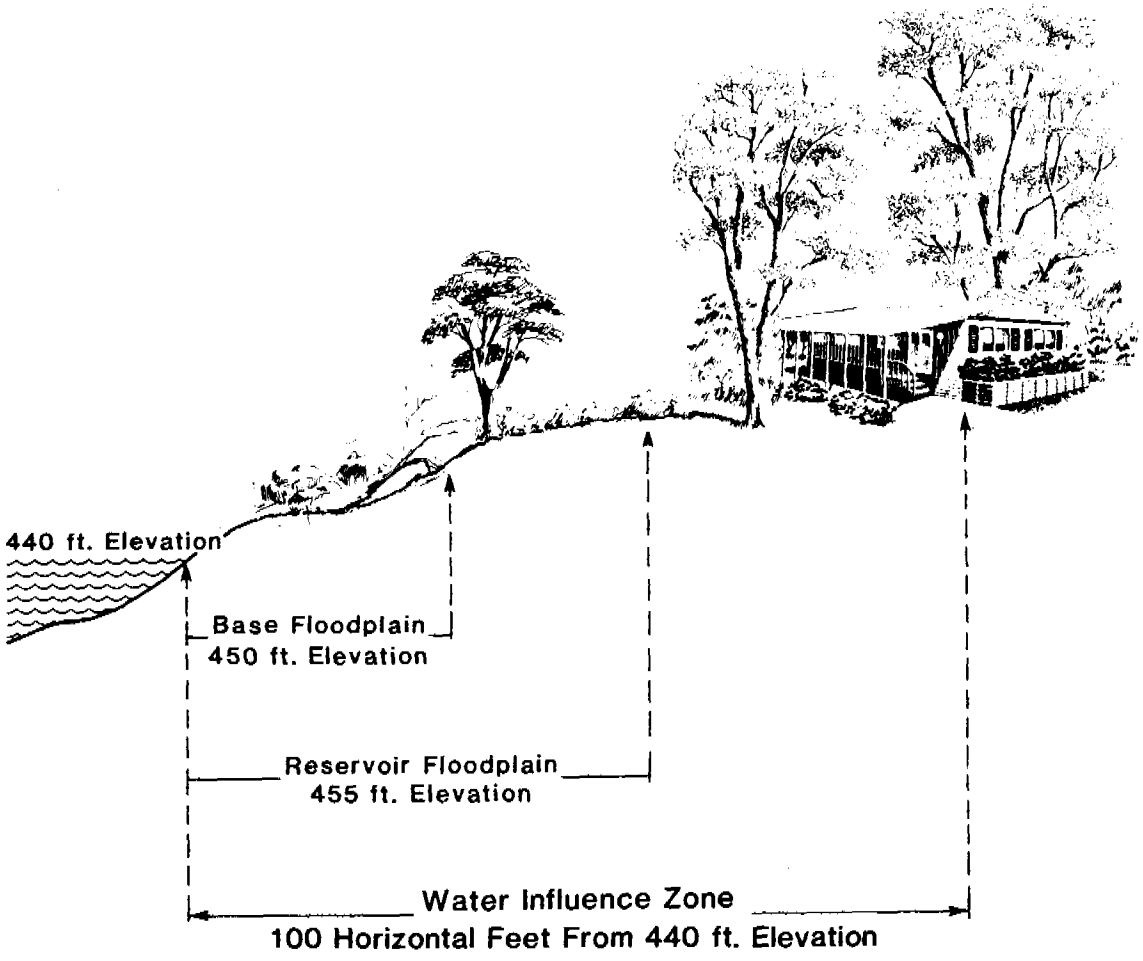
The following actions will be implemented upon the adoption of the RAMP or as directed. They serve to improve resort planning and development, provides for a houseboat program, and impose controls over portions of the concession areas such as the shoreline and floodplain areas (Figure 5) to reflect land use policies for recreational purposes in the future. Operational policies, as required, will be developed to implement the selected actions. Restrictions or requirements imposed by the various actions will apply to all Reclamation lands whether they are within or outside a resort.

22. Floodproofing and/or Anchoring of Structures and Facilities in the Base Floodplain.

Preferred Action:

Generally, all structures and facilities, including those for long-term uses, located in the Base Floodplain (440 feet to 450 feet mean sea level) will be floodproofed per Reclamation Instructions or removed. However, mobile homes travel trailers and their additions which cannot be easily floodproofed per Reclamation Instructions, will, as a minimum, be securely anchored and have all sewage systems floodproofed.

Criteria for floodproofing and/or anchoring of all structures and facilities, including mobile homes, travel trailers, and their additions, will be determined in a subsequent Operational Policy to be



Base Floodplain, Reservoir Floodplain and Water Influence Zone

developed after appropriate public involvement and environmental documentation procedures. Within one year after issuance of the Operational Policy, any structure or facility failing to meet the requirements of the Operational Policy must be removed or relocated above the reservoir floodplain (455 foot elevation).

Resort operators shall develop a Reclamation approved emergency floodproofing plan for securing water, sewage and utility systems within the reservoir floodplain against contamination due to high water. Structures and facilities which are floodproofed and/or anchored may remain in the Base Floodplain provided: (l) their value is amortized over a period no longer than that remaining until a resort-wide reorganization (period varies with individual concessions); and, (2) all applicable leases and agreements (including rental agreements) are modified to contain a "hold harmless" provision removing Reclamation from liability in case of a base or greater flood.

Alternatives:

a. No Action: Floodproofing and/or anchoring requirements would not be imposed.

b. Remove all structures and facilities in the Base Floodplain prior to reorganization whether or not they can be adequately tied-down and floodproofed.

23. Prohibit Construction and Placement of Facilities in Reservoir Floodplain.

Preferred Action:

Prohibit the construction or placement of new or additional permanent structures and facilities, including those for long-term uses to be located within the Reservoir Floodplain (440 feet to 455 feet mean sea level), except items which have been authorized in master plans for water or related activities. This prohibition does not apply to normal routine maintenance required for existing structures and facilities. Temporary facilities serving day and short-term uses may be allowed in the Reservoir Floodplain provided they can be floodproofed or removed on short notice.

Alternatives:

a. No Action: No clear policy or direction with respect to improvements in the Reservoir Floodplain.

24. Limitation on Long-term Uses.

Preferred Action:

Prohibit any increase in the total number of long-term uses within any resort. Uses eliminated due to other actions may be relocated, provided space is available and approved by Reclamation (see Preferred Action 37).

Alternatives:

a. No Action: No additional long-term sites or facilities will be developed, with no policy for relocation opportunities.

b. Allow expansion of long-term uses with consideration for each concession.

25. Removal of Structures and Facilities for Environmental Causes.

Preferred Action:

Structures and facilities, including long-term uses, will be eliminated in unstable or environmentally unacceptable areas provided no effective mitigation measures can be implemented. This action will be implemented through periodic reviews of each resort, affected long-term sites may be relocated provided space is available and approved by Reclamation (see Preferred Action 37).

Alternatives:

a. No Action: No clear policy or direction with respect to elimination of structures or facilities for environmental causes.

b. Require no removals for environmental causes.

26. Storage in Shoreline Areas.

Preferred Action:

Prohibit storage of solid wastes, materials, equipment, and other inappropriate items in shoreline areas to protect water supplies, eliminate clutter and aesthetic incompatibility, improve public access, and minimize safety hazards unless specifically approved by Reclamation.

Alternatives:

a. No Action: Allow storage to occur in shoreline areas with minimal restrictions.

27. Resort Master Plans and Limitation on Development.

Preferred Action:

No development actions which require significant environmental documentation and public involvement will be approved prior to completion of an approved master plan for the resort. This limited moratorium will not preclude development actions which:

- Are needed to alleviate health and safety problems or are the result of emergency situations.
- Involve the general maintenance or replacement of deteriorated facilities.
- Could be approved as per the "Decisions for Lake Berryessa Actions" dated April 14, 1987.
- Are required by actions in this document and are otherwise directed by Reclamation.

Alternatives:

a. No Action: Developments can continue without the required Master Plans.

28. Land Planning and Development Criteria.

Preferred Action:

All new projects within concession/special use areas will generally adhere to the basic planning and development criteria included in Appendix C. Such criteria will minimize the impacts of new development on existing resources and will require some changes over the previous patterns of development occurring within concession/special use areas.

Alternatives:

a. No Action: Specific planning and development criteria will not be implemented other than those which already may apply.

29. Facility Development and Design Standards.

Preferred Action:

Whenever feasible, establish and implement facility development and design standards for resorts including size restrictions, density, architectural styles, lot development, resort motif, and utility service standards to upgrade facilities. These would supplement existing State of California "Title 25" Standards.

Alternatives:

a. No Action: Continue compliance with Title 25 and other existing applicable requirements with minimal restrictions on development.

30. Commercial Houseboats/Overnight Occupancy Vessels (OOVs).

Preferred Action :

Allow 75 commercial houseboats or other types of commercial OOVs to occupy Lake Berryessa. A higher quota may be imposed if supported by sufficient studies.

Alternatives

a. No Action: Allow a maximum of 65 commercial houseboats/OOVs as provided in existing concession agreements.

b. Allow 150 commercial houseboats/OOVs as provided for in the 1982 Houseboat Operational Policy.

c. Prohibit all commercial houseboats.

31. Sewage and Gray Water Holding Facilities.

Preferred Action:

All vessels, including houseboats, cruisers, patio boats, etc., capable of discharging sewage and gray water shall be equipped with holding tanks that can be discharged by vacuum pumping only. Resorts having moored vessels capable of holding and discharging sewage and gray water shall provide sufficient pumpout facilities. All existing houseboats/OOVs on Lake Berryessa shall fully comply with sewage and gray water holding criteria within three years after adoption of a houseboat/ OOV operational policy. Houseboats/OOVs to be placed on the lake in the future, for short-term or long-term use shall fully comply with this action.

Alternatives:

a. No Action: Do not require resorts to have adequate pumpout facilities even if they moor vessels with sewage holding capabilities, and houseboats will not be required to hold gray water.

32. Private Houseboats/Overnight Occupancy Vessels (OOVs).

Preferred Action:

A maximum of 75 privately owned houseboats (noncommercial vessels) will be allowed at Lake Berryessa. Houseboats will be authorized for placement on the lake by permit issued by Reclamation and moorage agreements with those resorts capable of providing pumpout services. Houseboats and OOVs will be regulated by size, sewage and gray water holding capabilities, etc.

Alternatives:

a. No Action: Continues existing policy regarding private houseboats at Lake Berryessa.

33. Limitations on Shoreline Modifications Below 440 Feet Mean Sea Level.

Preferred Action:

Modifications of the shoreline (dredging, filling, earth shaping, revetment work) below 440 feet mean sea level will only be allowed as required for maintenance of existing facilities, to improve aesthetics, day-use public access, or to alleviate health and safety problems. Modifications could include improvements to provide for additional day use activities such as swimming, picnicking, shoreline access and minor marina facilities. The original shoreline configuration will not be altered to accommodate additional overnight facilities, storage areas, etc. Reclamation approval is subject to receipt of appropriate Napa County, Department of Fish and Game, Army Corps. of Engineers, or other Federal or state agency permits as may be required.

Alternatives:

a. No Action: Prohibit shoreline modifications below 440 feet mean sea level.

b. Allow shoreline modifications without restrictions below 440 feet mean sea level.

E. CONCESSIONS MANAGEMENT - ASSOCIATED WITH REORGANIZATION OF RESORTS

The following actions would be undertaken during reorganization of a resort when a concession agreement nears expiration or earlier when such actions would be mutually agreeable to the concessionaire and Reclamation. All resorts are subject to a reorganization and the following actions by no later than one year after the expiration of the concession agreement, but by no later than the year 2010. Operational Policies, as required, will be developed to implement the selected actions. Restrictions or requirements imposed by various actions will apply to all Reclamation lands whether within or outside a resort.

34. Removal of Long-term Uses from Base Floodplain Area, and Floodproofing and/or Anchoring Long-term Uses between 450 - 455 feet.

Preferred Action:

Remove all structures and facilities used for tenant occupancy or habitation (long-term uses) from the Base Floodplain (440 feet to 450 feet mean sea level) within one year after resort reorganization. Long-term uses located at elevations 450 feet to 455 feet may remain so long as they are: (l) floodproofed and/or securely anchored per Reclamation Instructions; and (2) are not subject to removal for other reasons. This action applies to all mobile homes, travel trailers, and their additions and improvements located in the base or reservoir floodplain. Perferred Action No. 23, no new long-term uses will be constructed or placed in the Reservoir Floodplain (440 to 455 feet mean sea level).

Alternative Actions:

a. No Action: Allow all long-term uses in the entire Reservoir Floodplain (440 feet to 455 feet mean sea level) to remain until sites are required for short-term uses when public needs develop.

b. Allow existing long-term uses to remain in the entire Reservoir Floodplain (440 feet to 455 feet mean sea level) provided structures and facilities are floodproofed and/or securely anchored per Reclamation Instructions to prevent flotation and/or dislocation by floodwater.

c. Remove all long-term uses out of the Reservoir Floodplain (440 feet to 455 feet mean sea level).

35. Floodproof or Remove Permanent Structures and Facilities in the Reservoir Floodplain.

Preferred Action:

All existing permanent structures and facilities located in the Reservoir Floodplain (440 to 455 feet

mean sea level), other than those associated with long-term uses (covered in Action No. 34), will be floodproofed per Reclamation Instructions or removed. Per Action No. 23, no new permanent structures or facilities will be constructed within the Reservoir Floodplain (440 to 455 feet mean sea level).

Alternatives:

a. No Action: Leave all permanent facilities as is and require no floodproofing.

b. Remove all permanent facilities from the Reservoir Floodplain (440 feet to 455 feet mean sea level) whether or not they can be adequately floodproofed.

36. Create Short-term Sites from Existing Long-term Sites.

Preferred Action:

Provide additional short-term facilities (day use, camping, etc.) in designated shoreline locations (cluster concept) currently occupied by long-term uses. Locations which are desirable for conversion from long-term to short-term uses will be determined during master planning and resort reorganizations. Conversions to short-term will be based upon a number of criteria and not just on where the sites are located. Per Preferred Action No. 37, relocations of displaced long-term sites may be permitted provided space is available and is approved by Reclamation. This action does not preclude the development of needed short-term facilities at other undeveloped areas within the resort.

Alternatives:

a. No Action: Do not require additional short-term facilities in areas occupied by long-term uses.

b. Convert long-term uses in the water influence zone (100 feet horizontal distance from 440 feet mean sea level) and Reservoir Floodplain (440 feet to 455 feet mean sea level) to short-term uses.

c. Convert all long-term uses to short-term.

37. Relocation of Long-term Sites.

Preferred Action:

Long-term uses (mobile homes, travel trailers, etc.) which are eliminated during a reorganization may be relocated to another site in the resort provided space is available and approved by Reclamation. Sites may be identified in subsequent resort master plans or reorganization plans. No net increase in the total number of long-term sites will be allowed. The number of relocation opportunities will depend upon existing situations at each resort.

Alternatives:

a. No Action: Do not develop a policy on relocation opportunities.

b. Long-term sites once eliminated will not be relocated in another portion of the resort.

38. Facility Development and Design Standards.

Preferred Action:

Establish and implement facility development and design standards for resorts including size restrictions, density, architectural styles, lot development, resort motif, and utility service standards to upgrade facilities. This would supplement portions of existing State of California "Title 25" Standards.

Alternatives:

a. No Action: Continue compliance with "Title 25" minimal restrictions on existing and new development.

39. Deletion of Land from Concession Areas.

Preferred Action:

Delete undeveloped, unused, and/or inappropriately used recreation land and water areas from within the concession boundaries and modify concession agreements as appropriate.

Alternatives:

a. No Action: Leave all land and water areas as is under current concession agreements.

40. Variable Rate Franchise Fees.

Preferred Action:

Establish and implement variable rate franchise fees within concession areas as an incentive to emphasize capital investment, health and safety, maintenance levels, public access and/or other Reclamation recreation objectives.

Alternatives:

a. No Action: Maintain current franchise fee structure as provided for in existing agreements.

b. Establish franchise fees to maximize the fair market value return to Reclamation.

41. Fee Reviews and Approvals.

Preferred Action:

Adjustment of long-term use fees will not require review and approval by Reclamation. Long-term use fees may be reviewed and approved by Reclamation at the request of a concessionaire provided all administrative costs involved are reimbursed. Adjustment of fees and charges for other resort services would continue to be subject to Reclamation review and approval prior to implementation.

Alternatives:

a. No Action: Continue current concession fee review and approval processes.

b. Discontinue all concession fee review and approvals.

F. ALTERNATIVES ELIMINATED FROM FURTHER STUDY

During the public scoping process, many alternatives were developed that were reviewed by Reclamation for inclusion in this EIS. Most of the alternatives were directly incorporated into or used to formulate the Preferred or Alternative Actions. However, a few alternatives were eliminated from further study for one reason or another. Following is a listing of those alternatives eliminated and an explanation as to why.

"Facilities for handicapped and elderly users should be developed only at the USBR administrative site or at the existing Boy Scout Campground."

In compliance with Section 504 of the Rehabilitation Act of 1973, as amended in 1978, and in conjunction with the Architectural Barriers Act of 1968, all federally conducted programs and programs provided with federal financial assistance shall be accessible to disabled persons. To limit handicap accessible facilities only at Administration Point or Boy Scout Campground would not be in keeping with Department of the Interior policy.

"Wildlife habitat should be managed by a non-profit wildlife organization."

Wildlife and wildlife habitat management is a function of the California Department of Fish and Game. The Preferred and Alternative Actions under No.13 provide for Fish and Wildlife Management areas to be administered by the California Department of Fish and Game.

"User fees should be charged for use of Knoxville-Berryessa Road. A toll road could be established between Turtle Rock and the Napa-Lake County line. Local residents and services could have passes."

Reclamation has no control or authority over county or state owned roads leading to or surrounding Lake Berryessa.

"Military flights should be restricted over Lake Berryessa."

The Federal Aviation Administration has the authority to administer flight routes. At this time there does not appear to be any significant hazards caused by the military to warrant restricting flights over Lake Berryessa.

"Existing short-term rentals should be used as a demonstration of need for additional short-term uses."

Many of the existing short-term uses would not be appropriate as demonstration sites due to their distance from shore, type of development, and maintenance standards. Existing data (see chapter on Recreation) clearly shows a demand for more and better quality short-term uses than currently exist at the lake.

"Long-term users should be reimbursed if required to move or relocate."

Long-term users of recreational sites located at Lake Berryessa are occupying federal land under monthly or yearly lease agreements with a resort. Leases do not convey any property rights to long-term users, provide reimbursement for improvements made, or guarantee long-term use of the site. At the expiration of a lease, long-term users can be expected to be evicted under the terms of Title 25, a state law governing the use and occupancy of mobile home parks.

V. AFFECTED ENVIRONMENT (EXISTING)

A. INTRODUCTION

Before an evaluation of impacts to the environment can be completed, a review must be made of the "Affected Environment". For the purpose of this EIS the review includes existing soils and topography, water resources, vegetation and wildlife, fish resources, recreation (uses), land use, cultural resources, traffic and circulation, scenic resources, socio-economic setting, visitor health and safety, and law enforcement. This review sets the groundwork for the EIS and provides the means to measure the degree of impact the preferred or alternative actions may have.

A land use classification map of the existing situation (Figure 6) depicts the classification of each land area. Please refer to the explanation of the land use classification system previously provided for review.

B. SOILS AND TOPOGRAPHY

Lake Berryessa is located in the northeastern portion of Napa County, among the hilly to steep mountains of the California Coast Range. Formed behind Monticello Dam, the lake is fed by Putah Creek and Pope Creek, and their tributaries. The eastern shores and both ends of the lake are underlain predominantly by Cretaceous Knoxville sandstone and shale, over which the Bressa, Dibble, Los Gatos, Maymen, Sobrante, and Tehama soils series formed. The western side of the lake is bounded by Jurassic Franciscan sedimentary and associated intrusive rocks, such as serpentine and dolerite. The Montara, Hambright, and Henneke soils developed over those materials.

The coast ranges between Monticello Dam and the Pacific Ocean are cut by numerous faults. The Wragg Canyon fault is located three miles from the dam. The dam is located within Algermissen Seismic Risk Zone 2, in which major damage could result from strong earthquake shocks. Despite recorded earthquakes with Richter magnitudes as high as 5.6, no damage has been reported on the dam or its associated structures.

Soils on level to moderately steep terrain (0-30 percent slopes) have only a slight potential for erosion. These include Bressa-Dibble soils, Contra Costa loam, Hambright-Rock Outcrop complex, Los Gatos loam, and Tehama silt loam. Encompassing a variety of textures, loam, silt loam, silty clay loam, and gravely loam, these soils are found on old alluvial fans and terraces, and on upland plateaus, benches and slopes.

Soils with slight to moderate erosion potentials are on gently sloping to moderately steep terrain (5-30 percent slopes). They include Bressa-Dibble soils, Los Gatos loam, Montara clay loam, and Sobrante loam. Soil textures include clay, clay loam, silty clay loam, loam, silt loam, and gravely loam. These soils are found on upland foot slopes, side slopes, and ridge tops.

Soils with moderate to high erosion potentials have moderately steep to very steep slopes (30-75 percent). They include Bressa-Dibble soils, the Hambright-Rock Outcrop complex, Henneke gravely loam, Los Gatos loam, Millsholm loam, and Montara clay loam. Situated on upland plateaus, ridge tops, side slopes, and foot slopes, these soils are comprised of an assortment of clay, clay loam, silty clay loam, loam, silt loam, and gravely loam.

The Maymen-Los Gatos and the Maymen-Millsholm-Lodo soil complexes have high to very high erosion potentials. Located on moderately steep to very steep slopes (30-75 percent) these upland soils consist of loam, gravely loam, and clay loam.

Bressa-Dibble soils on very steep slopes (50-75 percent) have moderate to severe erosion potentials. Located on upland side slopes and foot slopes, this soil complex is composed of loam, silty clay loam, clay loam, clay, and silty clay.

There are 11 soil types and complexes identified by the USDA Soil Conservation Service along the shores of Lake Berryessa. A thorough description of each (which includes a description of major vegetation types found on such soils) is provided in Appendix D.

C. WATER RESOURCES

1. Hydrology

The water supply for Lake Berryessa is derived from the 568 square mile drainage basin above the dam. The elevation of the basin ranges from 182 feet at the dam to 4,722 feet at the upper end of Putah Creek with most of the basin lying below 1,500 feet. There are four principal creeks that flow into Lake Berryessa: Capell Creek, Pope Creek, Eticuera Creek, and Putah Creek-the main drainage of the basin. The climate of the basin is mild and composed of two seasons, a warm dry season from May through October and a cool wet season from November through April. Most of the precipitation occurs as rain during the cool wet season with only minor amounts of snow on the upper portions of the basin.

Lake Berryessa has a storage capacity of 1,600,000 acre-feet (AF) at elevation 440 feet, the top of the conservation pool. The average annual inflow to the reservoir is 369,000 AF and the annual firm yield is 201,000 AF. An additional release of 22,000 AF is required annually to meet prior downstream water rights along Putah Creek. An upstream reservation of 33,000 AF was established by the State Water Resources Control Board to provide water for future development of the area above Monticello Dam. Reclamation has appropriated 7,500 AF of the 33,000 AF to provide for future development around the reservoir.

The reservoir water level may fluctuate from 455 feet to a minimum elevation of 253 feet. A water level of 309 feet is considered dead storage elevation. During the severe drought of 1977 the level was lowered to 388 feet.

The latest Probable Maximum Flood (PMF) approved August 28, 1984 (and signed in January, 1986) has a peak inflow of 275,000 cfs, a 2-day volume of 586,000 acre-feet, and a 10-day volume of 873,200 acre-feet, and is preceded by the 100 year flood. Flood routing studies indicate the PMF would overtop the dam parapet walls by six (6) feet (elevation 462') for 51 hours. Floods equal to or larger than 80 percent of the PMF will overtop the dam. Such overtopping is not expected to affect the safety of the dam.

The Reservoir Floodplain, from elevation 440 feet to 455 feet, can be encroached at various times. The following table, based on an analysis completed in 1986, depicts the water elevation that on the average can be expected to be reached or exceeded for various time periods.

TABLE 2

WATER ELEVATION FREQUENCY

Frequency (years)	Elevation (feet)	Confidence Range
1.25	440	+ 0.5
5	445	+ 1.5
10	446.5	+ 2.0
25	448	+ 2.5
50	449	+ 2.75
100	450	+ 3.0

2. Water Quality

Water quality of Lake Berryessa is documented in reports by Reclamation (1976) and DWR (1979). Reclamation presently collects monthly common chemical and trace element samples from several sites above and below the lake. Table 3 summarizes data measured from 1968 to the present, taken from the mouths of two major tributaries (Putah and Pope Creek), two locations within the lake, and at one site below Monticello Dam. Water quality criteria for drinking water supplies and fisheries are also shown. The data shown on the table indicates that water quality above, within, and below Lake Berryessa currently meets the standards for drinking water supplies and fisheries.

Section V.L. Health and Safety, has a discussion on monitoring of resort and Reclamation drinking water and wastewater treatment systems by Napa County, and the California Regional Water Quality Control Board - Central Valley Region (CRWQCB).

Sections V.E. Fish Resources and V.L. Health and Safety, also have a discussion on a health warning issued by Napa County Department of Environmental Health titled: "Organic Mercury in Fish - Guidelines for Lake Berryessa Fish Consumption". As is noted in the warning, lake water does not contain mercury, but it is found in lake sediments where it enters the food chain. Appendix I contains the full warning.

D. VEGETATION AND WILDLIFE

1. Vegetation

The rolling hills surrounding most of the lake are vegetated with oak, chaparral and digger pine. North-facing slopes are generally about 90 percent covered with black oak, scrub oak and chaparral. South-facing slopes are approximately 60 percent covered with more heat-resistant shrubs such as ceanothus, toyon, chamise, coyote brush, manzanita, and poison oak. Forbs and grasses (fescue, wild oats, soft chess, mountain brome, and foxtails) compose much of the understory unless precluded by shade, rodents, rock, or chemical releases of the shrubs. Plant species common in the Lake Berryessa area are listed in Appendix E.

Six major habitat types that occur in the Lake Berryessa area include: Blue Oak Woodland, Valley Oak Woodland, California Mixed Chaparral, Chamise Chaparral, Cismontane Introduced Grassland, and Mixed Northern Riparian Woodland.

Blue Oak Woodland is the dominant habitat type surrounding the lake. It occurs both as thick stands

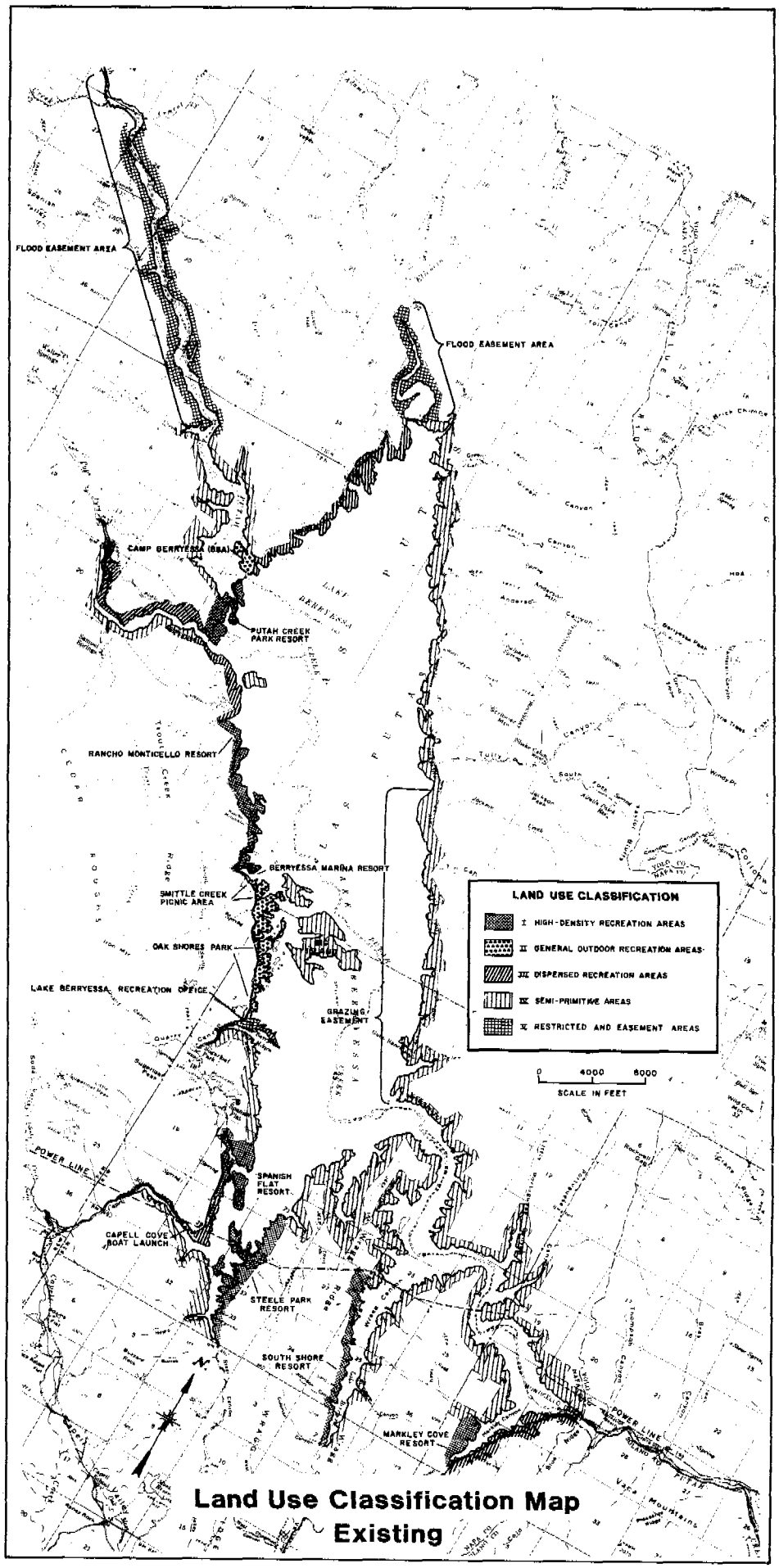

FLOOD EASEMENT AREA
FLOOD EASEMENT AREA
CAMP BERRYESSA (BSA)
PUTAH CREEK PARK RESORT
RANCHO MONTICELLO RESORT
BERRYESSA MARINA RESORT
SMITTLE CREEK PICNIC AREA
OAK SHORES PARK
LAKE BERRYESSA RECREATION OFFICE
GRAZING EASEMENT
POWER LINE
SPANISH FLAT RESORT
CAPELL COVE BOAT LAUNCH
STEELE PARK RESORT
SOUTH SHORE RESORT
MARKLEY COVE RESORT
POWER LINE
LAND USE CLASSIFICATION
I HIGH-DENSITY RECREATION AREAS
II GENERAL OUTDOOR RECREATION AREAS
III DISPERSED RECREATION AREAS
IV SEMI-PRIMITIVE AREAS
V RESTRICTED AND EASEMENT AREAS
0 4000 8000
SCALE IN FEET
Land Use Classification Map
Existing

FIGURE 6

TABLE 3

LAKE BERRYESSA
WATER QUALITY

PARAMETER [a]	WATER QUALITY [b] CRITERIA	PUTAH CREEK AT MOUTH $\bar{x}$	PUTAH CREEK AT MOUTH N [c]	POPE CREEK AT MOUTH $\bar{x}$	POPE CREEK AT MOUTH N	9 MI. ABOVE DAM $\bar{x}$	9 MI. ABOVE DAM N	1,000 FT ABOVE DAM $\bar{x}$	1,000 FT ABOVE DAM N	PUTAH CREEK BELOW DAM $\bar{x}$	PUTAH CREEK BELOW DAM N
Turbidity — NTU	1-5 D	2.3	12	—	—	3.7	243	3.5	293	4.8	16
Conductivity	-	295	66	266	59	312	177	317	215	299	76
TDS — MG/L	500 D	185	45	193	43	203	14	195	16	183	52
DO	5-7 F	9.1	12	—	—	7.9	404	7.8	564	10.7	16
PH	6.5-8.5 DF	8.3	28	8.0	19	7.9	301	7.9	298	7.9	33
Bicarbonate	-	160	60	171	63	177	22	175	19	160	69
Ammonia	.5 D	.015	12	—	—	.040	210	.037	251	.011	16
Nitrate	10 D	.024	12	—	—	.098	209	.088	249	.124	16
Phosphorus	-	.015	12	—	—	.030	149	.025	194	.028	16
Calcium	-	16.5	64	15.9	67	18.2	22	19.1	18	16.3	73
Magnesium	-	28.9	64	30.0	67	26.5	22	25.8	18	27.1	73
Sodium	-	9.6	63	9.6	66	9.3	22	10.3	18	9.8	72
Potassium	-	1.3	64	1.4	67	1.4	22	1.1	18	1.4	71
Chloride	250 D	5.9	63	5.8	65	5.5	23	5.8	23	6.1	72
Sulfate	250 D	23.0	63	24.2	65	17.4	22	18.4	18	23.9	71
Barium — UG/L	1,000 D	147	20	134	37	—	—	—	—	118	34
Boron	750 D	167	12	167	12	—	—	—	—	142	12
Cadmium	10 DF	2.1	12	2.1	12	—	—	—	—	2.1	12
Chromium	50 DF	4.7	16	7.7	12	—	—	—	—	2.0	12
Copper	10 F	6.8	12	7.4	12	—	—	—	—	7.3	12
Iron	300 D	555	14	368	19	—	—	—	—	300	19
Lead	50 D	2.7	12	2.7	11	—	—	—	—	2.7	12
Manganese	50 D	19.0	10	19.5	15	—	—	—	—	18.3	15
Zinc	100 F	25.9	62	25.3	68	—	—	—	—	25.2	67
Selenium	10 F	1.2	37	1.1	37	—	—	—	—	1.1	38
Chlorophyll A	-	.7	9	—	—	1.6	271	1.2	339	1.9	17
Mercury	2 D	1.5	57	0.6	50	—	—	—	—	0.8	49

a/ Physical and common chemical parameters in MG/L, heavy metals and Chlorophyll in UG/L.
b/ Water quality criteria from EPA and SWRCB standards for drinking water (D) and fisheries (F).
c/ $\bar{x}$ - Mean; N - Number of Samples.

along the west and south shores and as open forests along the east shore, throughout the valleys, and on lower slopes of the surrounding hillsides. At Lake Berryessa, Blue Oak Woodland occurs with Cismontane Valley Grassland and intergrades with Valley Oak Woodland and the chaparral habitat types.

Valley Oak Woodland is found on soils that retain more moisture than those that support the Blue Oak Woodland. Typically, this habitat type occurs in the valley bottoms and along intermittent stream banks.

California Mixed Chaparral covers many of the south-facing slopes and the higher ridges. It is often found adjacent to oak woodland and grassland habitats. At Lake Berryessa it is commonly associated with steep rock outcroppings.

Chamise Chaparral is found on the most shallow and dry soils, exclusive to south-facing slopes. It is a homogeneous habitat type consisting almost entirely of Chamise with some Manzanita and Buckbrush.

Cismontane Introduced Grassland covers nearly all of the northeast shore. Historically, this area was probably oak woodland but past brush clearing and livestock grazing has converted it to a grassland with a few remnant oaks. As in many parts of the region that have received the same treatment, oak regeneration is not evident. This could be caused by competition from the grasses and/or grazing pressure by livestock and wildlife.

Mixed Northern Riparian Woodland usually occurs in a narrow band along the streambanks. The transition to adjacent oak woodland is usually

abrupt. Riparian habitat makes up a small percentage of the total vegetation in the area.

All of these habitats are maintained or influenced by fire. Periodic natural fires clear brush and promote the growth of grasses which creates the savanna-type woodlands and open grasslands. Natural fires also rejuvenate decadent chaparral stands and promote the sprouting of fire-resistant seeds. Because human caused fires are normally associated with hot, dry conditions, they burn hotter and have a tendency to cause more harm.

Due to yearly fluctuations in lake elevations, there are no true wetlands at Lake Berryessa. The lake's shoreline does not support typical wetlands vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and development.

2. Wildlife

Mammalian species present include black-tailed deer, mountain lion, coyote, black bear, bobcat, gray fox, raccoon, striped skunk, jackrabbit, California ground squirrel, and various other small mammals. Several species of songbirds, birds of prey and waterfowl are either resident, winter resident or migrate through the area.

Birds of prey include red-tailed hawk, prairie falcon and kestrel. Turkey vultures and crows are common residents. Rattlesnake, king snake and gopher snake are present and fence lizards are common. Amphibian species include skink, salamander, toad, and various frogs. A growing population of wild turkeys and feral hogs have become established in recent years. A more detailed listing of animal species common to the Lake Berryessa area is provided in Appendix F.

Hunting, which occurs on adjacent private property, is prohibited on Reclamation lands surrounding Lake Berryessa.

3. Endangered Species

Endangered and threatened species which may be present in the area are listed in Appendix G.

The peregrine falcon is a resident species in the area. Remote, rocky cliffs could be suitable (or made suitable) for peregrine falcon nesting.

Bald and Golden eagles, and Aleutian Canadian geese winter on and near the lake. Waterfowl and fish attract eagles, and open water and sprouting grasses provide habitat for the geese.

No known endangered, threatened or rare plants occur in the area which could be the result of past grazing practices. Further surveys may be required before any development actions are undertaken which might disturb vegetation.

E. FISH RESOURCES

The California Department of Fish and Game (DFG) introduced largemouth bass, smallmouth bass, and red-eared sunfish to Lake Berryessa in 1957. Largemouth bass was intended to be the reservoir's principal game fish, supported by Red-eared sunfish as its primary food source.

Eventually cold water species including Kokanee salmon, silver salmon, brown trout, and rainbow trout were introduced. Threadfin shad were then introduced as the primary forage fish. During this same period, channel catfish, white crappie and black crappie were introduced to the lake which increased the warm water fisheries. A list of fish species known to currently inhabit the lake is provided in Appendix H.

In addition to emphasizing warm water fish, the DFG began a trophy trout program by stocking additional rainbow trout, brown trout and silver salmon. The only type of trout presently being planted in the lake is the rainbow. Brown trout were last stocked in 1982 and silver salmon in 1976. Neither has been reported in recent years. Approximately 100,000 trout are planted in the lake each year, usually in the spring. Half of the releases are of the Coleman Kamloops strain and the remainder are the Eagle Lake strain.

After several years the vegetation inundated by the rising lake waters decayed, causing a significant reduction in available habitat with a corresponding decline in the warm water fish resources. Recognizing the importance of the littoral zone habitat to those populations, Reclamation entered into an agreement with DFG in 1978 to establish additional temporary and permanent cover consisting of willow plantings and brush shelters.

In 1981 a "planning aid report" prepared by FWS recommended other fishery measures, including the placement of catfish spawning structures, reduction of boat speeds in sensitive areas, spring water level manipulations, construction of nursery coves, and fertilization of the inundation zone for spring grasses which fish use for food and cover.

To date, the following fishery improvement measures have been implemented by Reclamation.

Brush shelters and catfish spawning structures have been placed along major portions of the shoreline, and boat speeds have been reduced in many narrow cove areas that have steep banks. Willows have been planted in numerous coves but with only limited success. Recently additional willow plantings have been conducted on Big Island with approximately a 50 percent success rate. Controlling deer depredation is a key to success.

In 1987 the Napa County Department of Environmental Health, issued warnings advising people to limit their consumption of certain Lake Berryessa fish due to potential mercury contamination. As with most health warnings concerning the eating of fish, the limitations are greater for pregnant women and children. A copy of the public health warning is provided in Appendix I which provides additional information on potential sources of contamination, sampling processes, and the amount of fish recommended for consumption.

F. RECREATION

Recreational activities at Lake Berryessa are predominantly water dependent and seasonally oriented. An estimated 75 percent of the total visitation occurs from the Memorial Day to Labor Day weekend. The majority of the annual 1.4 million plus visitors (1987) to the lake reside within the San Francisco and Sacramento metropolitan areas, a two hour drive from the lake.

During the prime recreation season, use is characterized by weekend campers and day users seeking outdoor-oriented recreation activities such as water-skiing, boating, fishing and swimming. Generally, recreation use during weekdays is much reduced over weekend levels with a substantial portion of that visitation attributable to the long-term tenants who own mobile homes or travel trailers located in one of the resorts. During winter and other off-season months, most use comes from fishermen and long-term tenants.

Day users not utilizing resort facilities and services may use the Government-developed facilities at Oak Shores and Smittle Creek Day Use Area and/or Capell Cove Launch Ramp. The public is also demonstrating that they will utilize and recreate in dispersed, undeveloped day use areas adjacent to County and State highways located around the lake. Currently only minimal facilities are available in these areas and visitors must park their vehicles in roadside turnouts.

Fishing activities is generally greater in the fall, winter and spring, but usually tapers off as summer progresses. Picnicking and sightseeing is popular from March through October. However, picnicking does occur during the winter months which generally are mild. December air temperatures often reach 65 - 75 degrees F.

Aerial reconnaissance has recorded approximately 1,000 to 1,200 vessels on the lake's surface at any one time during a typical weekend day. During midweek this use diminishes to 300 or 400 vessels a day. However, aerial reconnaissance has recorded up to 3,700 vessels utilizing the lake's surface at one time during peak holiday weekends such as Memorial Day or Labor Day. While holiday weekend use may be approaching the upper limits of the lake's carrying capacity, it is evident that space still exists during regular use periods for additional boating.

Authors Note: The tables located in this section represent visitation figures for 1987. Since that time northern California has experienced a drought lasting, at the time of this publication, five years. In addition to the drought, a mild recession has occurred for the last two years. The combined impact of these two actions has reduced visitation to the lake by approximately 37 percent. Under normal conditions, the 1987 use figures are more representative of average use, and as such, the tables have not been updated.

1. Concession Operated Facilities

The present composition of the seven resort areas evolved under the management tenure of Napa County, and more recently, Reclamation. Each resort is operated under a concession agreement which is administered by Reclamation. These agreements will generally remain in effect until the year 2009. After completion of the RAMP, portions of the 1985 Concession Agreement and Reorganization Plan for Pleasure Cove Resort will be renegotiated, and a new Reorganization Plan for Steele Park Resort will be negotiated.

The resorts offer a variety of high convenience facilities in a total resort concept which fulfills most people's needs. Contributing over $10 million in investments, the concessionaires have established facilities such as camping and picnicking sites, travel trailer and mobile home parks, boat launching ramps, marina facilities, restaurants, food stores, and related support facilities for public use. Each resort offers a variety of marina services including moorage, gas service, boat rentals, etc. Limited boat

TABLE 4

CONCESSION-OPERATED FACILITIES
AT LAKE BERRYESSA

RESORT	LONG-TERM TRAILER SITES	TOTAL NO. CAMPING SITES	RV SITES	PICNIC TABLES	BOAT LAUNCH	MOORAGE SLIPS	BOAT RENTALS	MARINA HOUSEBOAT RENTALS	FUEL SERVICE	ROOM RENTALS	FOOD SERVICE	STORE	(1987 FIGURES) REC. VISIT LONG-TERM	REC. VISIT SHORT-TERM
LAKE BERRYESSA MARINA	176	71	YES	20	YES	YES	YES	NO	YES	NO	YES	YES	14080	53500
STEELE PARK	153	150	YES	25	YES	YES	YES	NO	YES	41	YES	YES	6426	91732
SOUTH SHORE	244	56	YES	6	YES	YES	NO	NO	YES	NO	YES	YES	25620	42784
SPANISH FLAT	187	122	YES	22	YES	YES	YES	NO	YES	NO	YES	YES	34216	176336
RANCHO MONTICELLO	570	130	YES	36	YES	YES	YES	NO	YES	NO	YES	YES	61446	26733
PUTAH CREEK	156	150	YES	18	YES	YES	YES	NO	YES	27	YES	YES	9000	21600
MARKLEY COVE	54*	NO	NO	10	YES	YES	YES	YES	YES	NO	YES	YES	4886	43635
TOTAL	1540	679		137						68			155674	456320

* All long-term sites will be eliminated by the year 1991.

repair services exist within the resorts and full marine repair services exist throughout the lake area. Houseboat rentals are currently only offered at Markley Cove Resort. (Please see Table 4 for a listing of facilities and services.)

The major development effort at all the resorts has been oriented towards the construction of extensive mobile home parks for long-term uses. Approximately 1,540 such long-term sites have been provided, generally occupying some of the more desirable shoreline locations. Generally, short-term facilities have been relegated to secondary locations with often poor or minimal access to the lake.

Short-term campgrounds presently exist in six of the resort areas. Most of the sites are in close proximity to one another and only offer the bare necessities such as picnic tables, a cooking or barbecue grill, parking place, and room to pitch a tent. In many cases, the sites have been located in areas with conflicting uses, adjacent to nearby mobile homes or in high activity areas such as parking lots, boat ramps, and main access highways. Demand for camp sites has increased to the point that even these less desirable facilities are filled to capacity on weekends during the recreation season. High quality, lower density camp sites typical of those offered at other state or federal recreation areas are not available.

Reclamation administration of resort operations is accomplished through enforcement of concession contracts with resort owners. Each multi-year contract sets forth certain requirements, understandings, and procedures the resort owner must conform to while operating on Government land. Within the text of the contract there are particular clauses which give Reclamation some management control over the resort owner and provides the means to enforce Reclamation policies. In addition to Reclamation-mandated policies, the resort operator must also comply with rules and regulations, and ordinances established by the state (such as Title 25 standards), county building codes, OSHA standards, etc.

A few of the newer resort contracts provide for a variable rate franchise fee structure. If the resort does an excellent job providing services to the public and readily complies with Reclamation policies and requirements, a lowering of the yearly franchise fee may occur. On the other hand, resorts which do not provide quality services or delay implementing changes required by Reclamation, may be assessed a higher fee. For major violations of the contract or when a resort fails to comply with Reclamation requirements or other rules and regulations, or ordinances, a default action may be taken which could result in the termination of the concession agreement. In addition, the resort owner might be subject to punitive actions from other regulatory agencies.

Within the resort organization, Reclamation exercises certain controls to ensure quality services. All resorts are required to support and comply with all laws dealing with equal employment opportunities, fair labor standards, etc. In addition resorts must comply with operational policies which are periodically implemented. Reclamation also

reviews resort requests for price increases. If the resort owner wishes to enter into a subconcession agreement with another business or person to operate an aspect of the resort, Reclamation has the right of final approval.

Reclamation can use some of these opportunities to encourage early operational and developmental changes as preconditions to approval. Otherwise, the opportunity to encourage change might not be available to Reclamation until an early reorganization or when the contracts are up for renewal in the future.

Reclamation can also apply its management policies to a resort when the owner wishes to make any major changes. Prior to new development or replacement of existing facilities, the resort owner must request permission from Reclamation to implement the changes. At this point Reclamation can require the submission of master plans and environmental documentation and through this process can mandate new planning and development standards. Reclamation uses this authority to ensure that the needs of the using public is best satisfied and to prevent continued unprogrammed development.

2. Government Operated Facilities

In order to provide recreational opportunities other than those offered by the resorts, Reclamation constructed recreational day use areas as directed by Public Law 93-493.

Capell Cove Launch Ramp was constructed between 1977 and 1978. Parking for 65 vehicles and boat trailers, and 19 single vehicles was provided. Since the State of California contributed a substantial portion of the funds for its construction, a provision required that the public be allowed to use the ramp without charge. Capell Cove was an instant success and during most summer weekends the parking spaces fill by mid-morning. However, boaters continue to use the ramp even when the parking facilities are filled, parking their vehicles and boat trailers along the county road, as far away as half a mile or more from the ramp entrance. Because of the congestion this caused along the road, Reclamation has installed traffic control devices and gates which can be closed when the facility is full. This has helped to alleviate congestion problems.

Construction of Oak Shores and Smittle Creek day use facilities began in 1978 and were completed in the spring of 1980. Prior to construction the public utilized the area for day use by parking within the county road right-of-way and walking down to the shoreline. These facilities now provide just under 500 parking spaces, many of which are located close to the water. Picnic tables, barbecues and garbage receptacles are scattered throughout the area, and modern, conveniently spaced public

TABLE 5

RECLAMATION-OPERATED FACILITIES
AT LAKE BERRYESSA

FACILITY LOCATION	CAMPING	PICNICKING	DAY USE AREA	ENTRY FEE	REST ROOMS	BEACH AREA	BOAT LAUNCH	COURTESY MOORING SLIPS	FOOD/ FUEL SERVICE	DRINKING WATER	(1987 FIGURES) SHORT-TERM USE VISITS
CAPELL COVE	NO	3 TABLES	YES	NO	YES	NO	YES	4	NO	NO	196914
OAK SHORES/ SMITTLE CREEK DAY USE AREAS	NO	108 TABLES	YES	YES/NO	YES	YES	YES*	NO	NO	YES	254733
BSA CAMP	19**	NO	NO	NO	YES	NO	NO	NO	NO	YES	3198
MISC. SHORE-LINE LOCATIONS	NO	3	YES	NO	NO	NO	NO	NO	NO	NO	680553

* Hand launch ramps only.
** Organizational camping allowed in addition to Boy Scout Troops, reservations must be made prior to use. Little or no formal development in these dispersed areas
Includes vistor center.

restrooms are provided. See Table 5 for a listing of Reclamation-operated facilities and services.

A designated swimming area was constructed and is staffed with lifeguards during the recreational season to provide public safety services to those seeking water-oriented activities. Reclamation has placed considerable emphasis on a water safety program. During their use of the facilities, the public is contacted by lifeguards and Park Rangers who patrol the shoreline areas. The public contacts may have contributed significantly to the reduction of drownings around the lake.

Reclamation has permitted the public to use dispersed, undeveloped areas for recreational use. The majority of these areas are located between Monticello Dam and Markley Cove, along Highway 128 and Knoxville-Berryessa Road on the south and west sides of the lake. For the most part, these areas are composed of turnouts with an occasional garbage can. Boating has also opened shoreline areas to dispersed recreational use. Although no facilities have been made available this type of use has become very popular.

In 1975 Napa County returned management control of Lake Berryessa to Reclamation under the authority of Public Law 93-493 (as mentioned previously). Through this authority a series of policies were formulated to assist in the management of the lake. However, with no direct law enforcement authority, no formal rules and regulations (similar to the NPS title 36) were enacted. As a result, Reclamation is limited in its ability to effectively manage the lake surface and surrounding areas without assistance from other agencies. To provide for added protection and enforcement, the Napa County Sheriffs Department has the authority to enforce county and state laws and ordinances within Reclamation lands. In addition Reclamation can request representatives from other regulatory agencies to investigate and respond to a variety of infractions. (See the Section M, Law Enforcementfor more detail.)

3. Miscellaneous Facilities and Uses

In 1975 approval was given to the Monticello Ski Club to operate a public ski slalom and jump course. The facility is located in Skier's Cove north of Steele Park Resort. During weekends, ski club members are on hand to demonstrate the proper use of the facilities to club members and the general public. A charge is made for use of the facilities and it is on a first-come, first-served basis with club members not receiving any proprietary treatment. Due to increasing popularity of this activity, a demand exists for the establishment of additional areas for advanced water-skiing opportunities.

A professional water-skiing school, "World Class Water Ski Center", is operated in Steele Park Resort. The school uses a cove at the back of the resort which can be temporarily closed or restricted to public use while sessions are being conducted. For a fee, students can receive professional instruction on basic water skiing, slalom skiing, ski jumping, barefoot skiing and trick skiing.

The Silverado Council of the Boy Scouts of America (BSA) constructed and operates an organized camp for scouts as the only other major, miscellaneous recreational facility on the lake. The site is located on the north side of the Putah Creek arm of the lake and on the west side of the Knoxville- Berryessa Road north of the Putah Creek Bridge. Because of its exclusiveness and the desirability of the location as an organizational campsite, Reclamation has stipulated in the BSA permit that the camp will be made available to other organizations and groups when it is not being used for scouting programs.

All races, regattas, bass fishing tournaments, swim-a-thons or other events which may occupy large sections of the lake surface or surrounding land, or otherwise exclude general public participation, must be approved by Reclamation's Recreation Manager. A temporary permit may then be issued if necessary. Generally a fee is charged to cover administrative costs. Another major special use that occurs is the military's use of the lake and Big Island for exercises. Reclamation is notified when the Army or Navy would like to use the area and unless there is a conflict of use, permission is granted. A log is kept for this purpose.

In addition to the more traditional recreational activities at Lake Berryessa, hanggliding has generated some interest, and proposals for use of Reclamation lands have been received. A recent request from one club proposed launching off Berryessa Peak (the land is administered by the Bureau of Land Management), overflying private properties, and landing on the eastshore of the lake. For this to occur, permission from various Federal, state and county agencies, and private property owners must be obtained.

Various business enterprises featuring recreational opportunities have requested permits or agreements to provide services and/or facilities to

the public from areas outside of the resorts. Reclamation's policy has been to encourage individuals to contact the resorts to discuss the practicality of entering into a subconcession agreement and conducting their business through them. Such business opportunities include boat rentals, jet ski rentals, wind surfing rentals, tour boats, and a variety of other water related activities.

For any club or organization to establish a special use area, whether for long-term use or short-term use, they must enter into a special agreement with Reclamation. If their proposal is acceptable a special use permit is issued after an agreement is signed. Reclamation's management control over the special user is that the permit can be canceled at any time if the user fails to adhere to the terms of the agreement.

As noted above, there are instances when a resort owner might enter into a sub-concession agreement with another party to operate an activity within the resort area. The World Class Ski School is an example of a sub-concession that has also become an exclusive, special use on the lake surface. All sub-concession agreements must be approved by Reclamation and are subject to applicable requirements as may be established.

4. Water Surface Uses

Lake Berryessa has been a popular boating lake since its completion. Such traditional activities as pleasure boating, sailing, fishing, and water skiing have been augmented with paraskiing, parasailing, jet skis, hover craft, surf sailing, and a variety of other uses that have generated interest in recent years. Boat-in camping has become a very popular yet unauthorized activity along certain undeveloped, dispersed recreation shoreline locations. There are no designated boat-in campsites on the lake except for a few campsites located near the water within the boundaries of a resort. However, on a busy weekend up to 300 boat-in campers have been counted along the lake's shoreline. Boat-in picnicking is also a very popular activity that occurs along most shoreline locations.

Houseboating was first introduced to Lake Berryessa in 1981 when a commercial houseboat fleet was authorized at Markley Cove Resort. Because of public concern about direct discharge of gray water (sink and shower discharge) into the lake, Reclamation analyzed its effects on water quality. Studies indicated that the potential volume of gray water discharged from houseboats and other boats is not harmful to lake waters. However, discharging gray water, as well as black water (sewage) is a violation of Section 5650(f) of the Fish and Game Code. DFG also has conducted a number of studies of chemicals commonly found in gray water discharges and have found them to be deleterious to aquatic life. Existing regulations prohibit any discharge of black water (sewage) into inland waters.

Boating patterns on the lake tend to be concentrated in certain areas rather than dispersed over the total surface area of the lake. "Neither Cove" (between Spanish Flat Resort and Steele Park Resort) ranks as one of the most congested areas on the lake. This situation is aggravated by boats pulling water skiers or inner tubes intermixed with jet skiers, all occurring within an extremely limited area. Parasailing has also occurred with disastrous results. One individual was pulled into power lines resulting in injury to that person.

Other congested locations include the narrows from the Dam to the main body of the lake, Pope Creek Bridge, and that portion of Putah Creek from the bridge up to the 5 mph buoy line. The south portion of the main lake can also be active as large numbers of boaters operate out of the southern resorts and the public facilities at Capell Cove.

Besides congestion there are conflicts that exist between the various user groups. This is particularly true of the conflicts that exist between water skiers and fishermen. Steele Canyon Cove can be blocked off on a limited basis from all other users for a portion of the year to provide a safe area for students taking advanced water skiing instructions. Fishermen have objected to this since the cove is only used for a portion of the day by the ski school. However, Skiers Cove has demonstrated that water skiers and fishermen can coexist if the public is not completely excluded from the area in question all of the time. Attempting to designate additional coves for this type of exclusive use has not been successful.

Seaplanes are allowed to land and take off in a designated area north and south of the islands. Seaplanes are not allowed to remain overnight except when moored in the water in a marina, and they must stay 500 feet away from beaches frequented by people.

During the past several years highly publicized swimming events have been held at the day use facilities at Oak Shores. Each year several hundred swimmers have entered the event to swim a defined course that has included swimming around Goat

Island. People of all ages have participated in these events.

Every effort has been made to mark with buoys any manmade and natural navigational hazards. Some areas of the lake are marked with 5 mph spherical buoys in an effort to reduce boat speeds in narrow inlets and coves, reduce boating accidents in congested areas and preventing undesirable shoreline erosion. These buoys may be moved as water levels fluctuate during the year. Waterway signs are used to warn boaters of hazards such as floating debris, reefs or shoals and areas of congestion.

In an effort to better understand the interrelationship of water surface uses at lake Berryessa, a "carrying capacity" analysis was conducted in 1987. The analysis identified 44 separate activities for compatibility, conflict, neutrality, and intraspecific competition among each other. Findings and recommendations are provided in Appendix B. The study was completed in May 1988.

5. Visitation and Recreation Demand

Lake Berryessa's major service area includes the following twelve counties: Alameda, Contra Costa, Lake, Marin, Napa, Sacramento, San Francisco, San Mateo, Santa Clara, Solano, Sonoma, and Yolo. In 1986 the population for this area was approximately 6,794,700 people, or 25 of the state's total population. Visitation at the lake was approximately 1.4 million visitors, occurring mostly during the peak recreation season (Memorial Day through Labor Day). Primary activities engaged in are: boating (water-skiing and power boating), camping, fishing (from shore or a boat), picnicking, and beach-related activities.

During the off-season months visitation to the lake is light. Only on a few occasions are recreation areas filled to capacity and then it might be only one or two resort areas due to a large fishing derby or programmed group activity.

During the peak recreation season, use on weekdays is fairly heavy but not to the point where a user arriving later in the day might be excluded. On some weekends and particularly holiday weekends, users arriving late on Saturday morning will find the resorts full, Reclamation operated day use areas full, Capell Cove full, and most of the turnouts located along the major roads filled to overflowing. Under circumstances such as this it is impossible to determine how many users were turned away, or decided not to make the trip because they expected the facilities to be filled.

Pursuit of recreational activities and opportunities has increased over the past few years and it is expected to continue to increase through the year 2000 and beyond. As the population continues to grow and the public becomes more mobile, has more leisure time, more expendable income, experiences more stresses, or develops a greater awareness of the health benefits received while participating in recreational activities, the demand for more opportunities and areas will become intensified.

In 1987 the California Department of Parks and Recreation released a new report, "Public Opinions and Attitudes on Recreation in California 1987" summarizing a recent survey in which respondents were asked questions regarding recreation. One set of questions measured those activities in which the respondents would increase their participation if good opportunities were available. Of the ten activities having the greatest response, camping came in number one. The following is a list of the ranked activities:

*1. Camping in developed sites with tent or vehicles,
2. Visiting museums, zoos, historic sites, arboretums,
3. Walking (excluding trail walking),
4. Attending outdoor cultural events like concerts, etc.,
5. Bicycling,
*6. Picnicking in developed sites,
*7. Birdwatching, general nature study, visiting natural areas,
*8. Freshwater fishing,
*9. Beach activities including sunning and games,
*10. Swimming in lakes, rivers, and the ocean (not pools).

It is important to note that six of the ten activities (identified by an "*") which the public indicated more of a need for, are the primary types of activities engaged in, or what people would like to engage in while visiting Lake Berryessa.

To further support this, another set of questions measured respondents' desire for more facilities. Three questions and the responses are as follows:

Statement	Agree	Neutral	Disagree
Providing more picnic areas.	72.8%	19.8%	7.4%
Constructing more primitive campgrounds with picnic tables, cold water, pit toilets, etc.	65.3%	17.7%	17.0%
Constructing more developed campgrounds with flush toilets, hot showers, etc.	58.6%	25.8%	15.6%

The above data indicates that there is a demand for more of these types of recreational opportunities. Combined with statements received by Reclamation during the public input period, Lake Berryessa would receive increased use if additional, quality short-term facilities were developed.

The lake's service area has one of the fastest growing populations in the entire state. By the year 2000 it is anticipated that 7,147,700 people will reside in the twelve surrounding counties, an increase of 1,000,000 over the 1986 figure. Not only will the population size increase, but trends indicate recreation participation per capita will increase. This means people will recreate more often in the future than they do now. For a more detailed report on recreation use please see Appendix J.

Based upon projected growth, by the year 2000 Lake Berryessa's annual visitation is expected to be approximately 1,650,880, an increase of 228,900 over 1986's 1,412,900 visitors. By the year 2010 visitation is projected to be approximately 1,768,900 visitors. This is an increase of 347,000 visitors over the 1986 figure.

If use projections are based upon the growth of recreational participation, the increase in use at Lake Berryessa by the year 2000 could be 1,799,200. This is an increase of 377,270 visitors. Again, this figure is not based upon population growth but the growth in recreational participation.

G. LAND USE

1. Existing Reservoir Lands

Lands owned in fee and withdrawn by Reclamation at Lake Berryessa total approximately 28,916 acres. Of this acreage, 19,328 acres comprise the lake's water surface at full pool and 9,588 acres are in lands surrounding the water. A total of 8,135 acres of land is currently available for recreational use. While the unimproved gravel road servicing the east side is open for public use, recreational development on that side is nonexistent. Flood easements comprise an additional 1,372 acres of land. Reclamation has no rights to these lands except for inundation purposes.

Several parcels of public land near the reservoir previously under the administration of Bureau of Land Management were withdrawn and are now under the control of Reclamation. The limits of Federal ownership known as the "take-line" extends approximately 300 feet or greater horizontally from the surcharge elevation of 455.5 feet. Reclamation owns most of the land between the road and shore along the north and west shoreline and a couple of small parcels on the out-side of the road. Within this zone there are a few, relatively small parcels in private ownership.

As previously discussed, a land use classification system was developed to designate the planned use and level of development for all lands under Reclamation jurisdiction at Lake Berryessa. Under this system lands were designated in one of five classifications to provide a balance between different types of uses and levels of development.

2. Adjacent Lands

Most of the private land adjacent to the Federal take-line has been zoned by Napa County as "AW" Agricultural Watershed. Other smaller areas have been zoned as "PD" Planned Development, "CL" Commercial Limited, "RS:B-1" Residential Single, Building Sites, and "RC" Residential Country. A zoning map, a listing of building restrictions, and a definition of the letter codes can be found in Appendix K. Napa County has an additional zoning status that identifies areas as "Marine Commercial". Areas with this designation are located adjacent to marine areas and the lands are to be used for a variety of marine related activities.

Because of the relatively poor soil conditions and steep topography of lands surrounding Lake Berryessa, most lands are utilized primarily for ranching and cattle grazing operations. In addition, several long-established hunting clubs are located on these lands.

The Quail Ridge Wilderness Conservancy (RWC) is located east of Wragg Canyon and west of Markley Canyon, and boarders Federal lands administered by Reclamation and the Bureau of Land Management (BLM). The non-profit QRWC was established to preserve the natural biota of a chaparral, foothill woodland and savannah grasslands, which is native to the interior California Coast Range. The area contains over 200 species of

plants including one of the best examples of pristine native bunchgrass in the state.

The QWRC project began in 1984 with the purchase of 150 acres of land. Today, QWRC has placed conservation easements on nearly 1,000 acres and plans on expanding into an additional 1,500 acres. The University of California Natural Reserve System (UCNRS), which comprises some 30 reserves statewide, has accepted QWRC into their system. This makes it more accessible for study by university students, professors, and the public. UCNRS has approached Reclamation and BLM to enter into a Memorandum of Understanding (MOU) for the management of the adjacent Federal lands.

A number of commercial establishments are located along the highways leading to the lake including food stores, a boat repair and supply store, restaurants, mobile home parks, service stations and taverns. There is also a small school located on the north side of the Knoxville-Berryessa Road, on the northern end of the lake, and another school is located north of the Highway 128 and 121 intersection.

The nearest city offering typical community services is Napa. It has an approximate population of 60,000 and is located 26 miles to the southwest. Several small, unincorporated subdivisions are located on or near the lake. These include Berryessa Estates on the northern end of Putah Creek, Berryessa Pines on the western shoreline just south of Pope Creek, the community of Spanish Flat north of Capell Creek, and Berryessa Highlands on the southern shoreline overlooking Steele Park Resort. All of these developments are on private land and have limited access to the lake.

3. Acquisition and Disposal

Public lands and land rights administered by Reclamation at Lake Berryessa were acquired as a part of the Solano Project. These lands and land rights were acquired from private landowners or were withdrawn from existing public lands under the jurisdiction of the Bureau of Land Management. A discussion of Reclamation acquisition and disposal procedures is provided in Appendix L.

4. Grazing

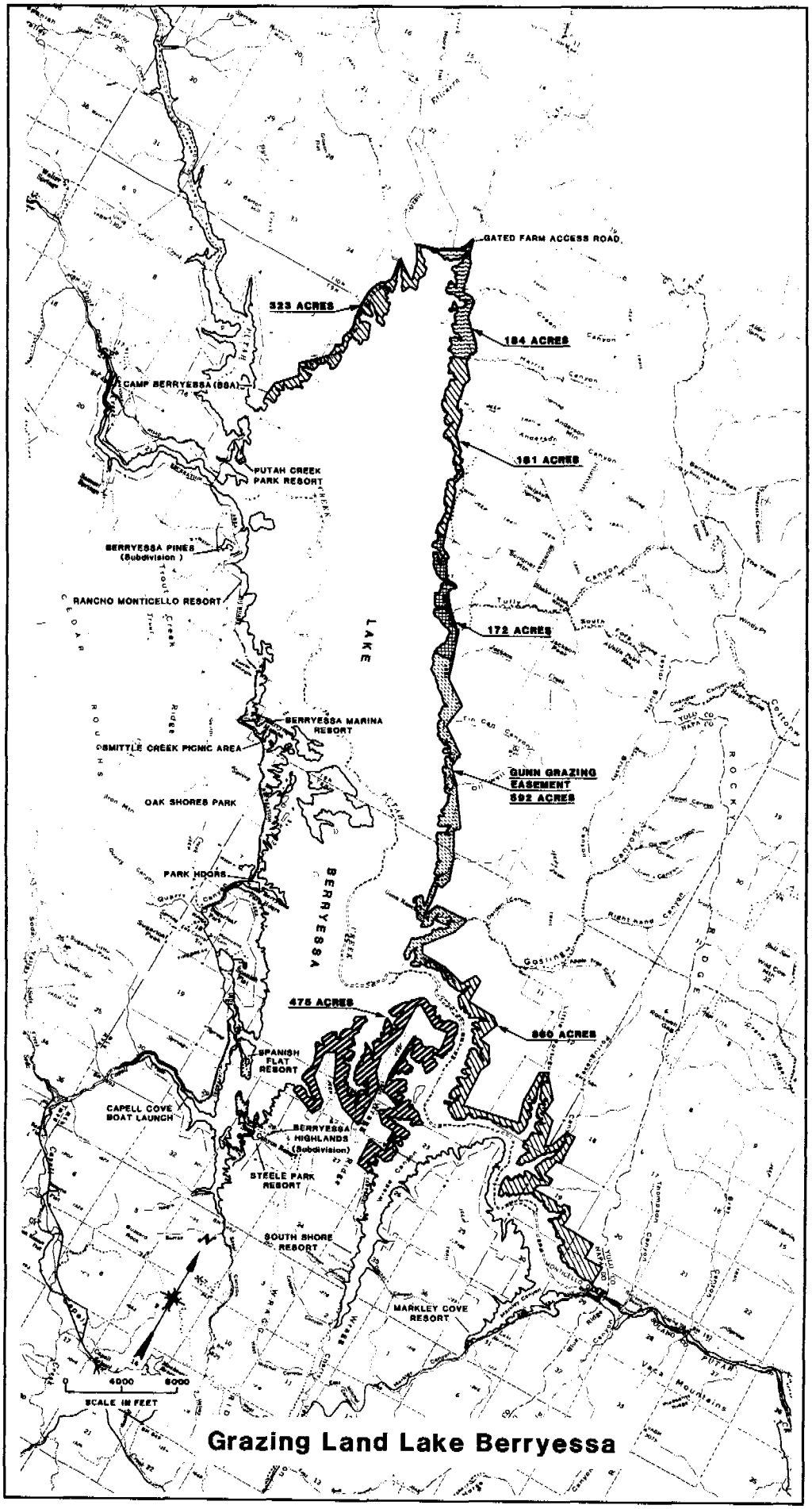
Grazing was traditionally associated with the Berryessa area prior to the Dam and resulting reservoir. Reclamation's interest in managing grazing activities became necessary once it assumed management responsibilities of the lake in 1975. An evlauation of existing allotments indicated that the areas were severely over grazed, resulting in erosion problems and affecting the aesthetic and wildlife resources of the area. The decision was made to abandon the grazing allotments until those areas had sufficiently recovered. During the moratorium, a grazing plan was implemented which established criteria for continued grazing on Government lands around Lake Berryessa.

A 592-acre parcel located on the east side of the lake has been reserved to the adjacent land owner property (Gunn Ranch) for cattle grazing. This non-exclusive easement may preclude certain management actions within the area. However, fish habitat management activities may be conducted below the 440 foot elevation mark which is outside the easement. The remainder of the east side is divided into four sections and is leased out for grazing easements on a yearly basis. There also exists grazing easements on the northwest and southern shoreline (see Figure 7).

In recent years Reclamation has solicited the assistance of the local Farm Advisor to determine range conditions of the various allotments. On some occasions, based on his advice, Reclamation has disallowed grazing on the allotment until the following year because of the deteriorated condition of the range. In the last few years Reclamation has not dictated how many cattle should occupy an allotment or for how long. The lessee has had the option to determine these factors, provided he does not abuse the range. Judicious use of the range has been the guiding criteria for the lessees.

Some effort has been made over the last eight years to enhance wildlife habitat within the grazing allotments on the east side. Several enclosures were constructed to keep cattle out of the area and a variety of shrubs and trees were planted. Although their survival rate has been low, several of the shrubs have been quite successful. In addition, 15-20 oak trees have become established with varying degrees of success along with two digger pines. It is anticipated that efforts will be made to continue the wildlife habitat improvements.

The local Farm Advisor has been conducting experiments to see what methods are effective in controlling Star Thistle. This weed pest has become established around the lake and is in competition with desirable grass plant species. It is interesting to note that inside the enclosures which have not been grazed for eight years Star Thistle is practically nonexistent. The desirable grass species completely dominated the area.



Grazing Land Lake Berryessa

FIGURE 7

H. CULTURAL RESOURCES

The first systematic cultural resource studies in the reservoir area were conducted during construction of Monticello Dam. Two subsequent investigations were conducted in the 1970's and 1980's. To date a large portion of the recreation lands have been surveyed for cultural resources. As a result of the most recent surveys it has been found that many of the resources are buried; therefore, in most instances, only where the surface area has been eroded or disturbed are cultural resources found.

Prior to and during construction of the lake, 53 archaeological sites were recorded. Of these, 48 were inundated with the filling of the lake. Subsequently an additional 29 archaeological sites have been recorded. Many of these sites are partly or fully covered during periods of high water. The archaeological sites consist of isolated artifacts, artifact scatters, artifact concentrations, campsites, and large village sites. The large village sites were located adjacent to the major drainages and are now well below low water levels.

1. Prehistoric

At least two periods of occupation are represented in the archaeological remains - an early occupation from 5,000 to 2,000 years ago and a late occupation from 2,000 years ago to protohistoric times. The early sites are characterized by large milling tools and choppers/scrapers. Late sites are characterized by clam shell disc beads, obsidian arrowheads, mortars and pestles, and, in protohistoric times, glass trade beads.

2. Ethnohistoric

The area upon contact with Euroamericans was occupied by Patwin speaking Native Americans. This group's territory covered the southwestern portion of the Sacramento River and included Berryessa Valley. At least one ethnographic village, Topayto or Topai, and possibly one other, Chemoco or Chemocu, was located in the reservoir area. Stephen Powers reported in 1877 that Topai- di-sel was the name of the group living in Berryessa Valley, but it is likely the area's native culture was destroyed by the late 1830's. The suffix "sel" means people, thus the name most likely refers to the people of Topai.

3. Historic

Rancho Las Putas, located on Putah Creek and covering most of Berryessa Valley, consisted of eight square leagues. It was granted by the Mexican Governor Micheltorean in 1843 to Jose and Sixto (Sisto) Berryessa. The land grant contained 35,515.82 acres and was confirmed by the United States Court in 1855.

By 1866 the ownership of the rancho was in other hands and was being subdivided. In the same year the town of Monticello was laid out. By 1867 a hotel and store were in operation and in 1868 another hotel was under construction. At the end of 1867 the whole valley was taken up by new settlers. On September 17, 1874 the last of the Berryessa brothers died.

I. TRAFFIC AND CIRCULATION

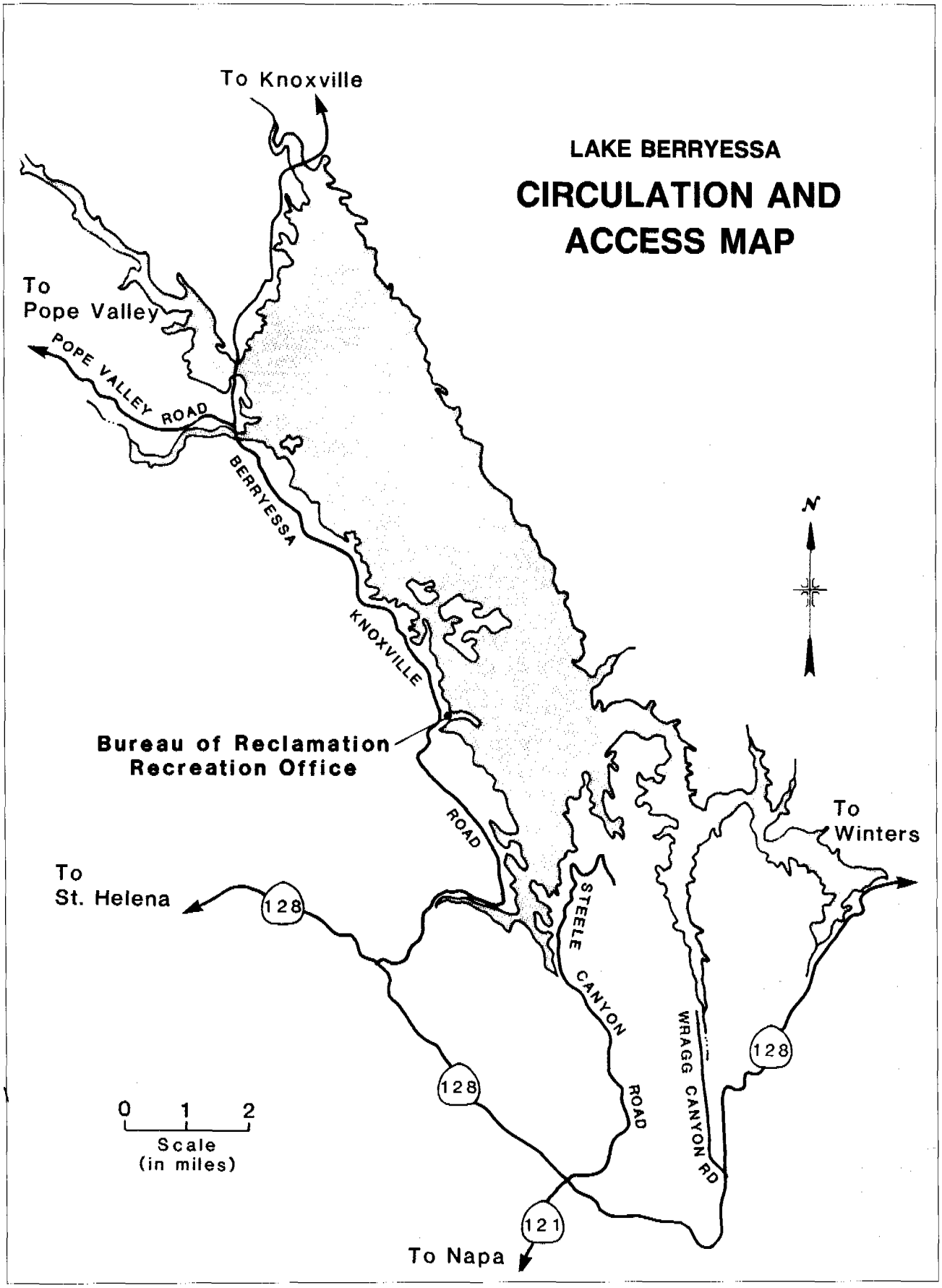
Lake Berryessa is accessed by county roads (Berryessa-Knoxville Road, Pope Canyon Road, Steele Canyon Road and Wragg Canyon Road) and state highways (Highway 121 and 128) (see Figure 8). The roads tend to be the two-lane conventional-type serving vehicles within the 25 - 55 mph speed range. The four main feeder routes into the lake area originate from Winters, Fairfield, Napa, and Rutherford. The Winters, Napa, and Rutherford routes are state highways and the Wooden Valley Road/Fairfield route is a county road.

The various routes, although rural in nature, tend to have multi-use functions and can be characterized as commuter, commercial, and recreational. During weekdays traffic is mainly commuter and commercial in nature with only a minor amount being recreational. However, during weekends and holidays, and during the peak recreation season, these routes experience considerable increases in recreational use.

The main routes feed traffic onto additional county roads that provide direct access to the lake or to remote areas beyond the lake. Knoxville-Berryessa Road is a county road that provides access to the west and north shores of the lake. It serves four resorts, two public day-use areas, a public launch ramp, several small stores, and three private residential developments. Two additional county roads of lesser importance providing access to resorts are Wragg Canyon Road and Steele Canyon Road. A private residential development is also located at the termination of Steele Canyon Road.

Pope Canyon Road intersects Knoxville-Berryessa Road at the northwest corner of the lake and serves Lake County and other northern areas. Wooden Valley Road provides access from Vacaville and Fairfield and is maintained in part by Napa and

FIGURE 8


LAKE BERRYESSA
CIRCULATION AND ACCESS MAP
To Knoxville
To Pope Valley
POPE VALLEY ROAD
BERRYESSA KNOXVILLE ROAD
N
Bureau of Reclamation Recreation Office
To Winters
To St. Helena
128
STEELE CANYON ROAD
WRAGG CANYON RD
128
128
0 1 2
Scale (in miles)
121
To Napa

Solano County. There is a section of Wooden Valley Road that is located in Solano County which is generally narrow and poorly developed; and at one point becomes a single lane bridge.

The northern portion of the east side of Lake Berryessa is serviced by a gravel road maintained by Reclamation. The purpose of the road is to provide access to east side ranchers, serves as a fire access route for CDF, and can be utilitized by Reclamation for administrative and recreational uses. In previous years, particularly during Napa's management of the lake, the east side road was closed to public use. Since Reclamation assumed management of the lake, public use of the road and previous restrictions have not been formally addressed.

A transportation/traffic corridor analysis has been prepared using information compiled from the California Department of Transportation (Caltrans) and the Napa County Conservation and Development Department. The analysis indicates that the roads leading to and within the Lake Berryessa area are currently being used below their capacity although traffic congestion does occur on weekends and holidays during the peak recreation season from May to October (Appendix M). However, the roads were not designed to serve occassional peak use and Caltrans has recognized the need to add passing lanes and pullouts, and to improve roadway visibility in specific problem areas.

Accident rates within the area are considered to be near the state average for most road segments. There are a few specific segments that have rates above the state average where the roads are narrow, curved, and/or have poor visibility. The accident rate is believed to be more a function of use type (recreational) and terrain than of capacity.

Neither Napa County or Caltrans have plans to increase the capacity of their roads, but Caltrans does have plans to make some minor improvements as mentioned above.

J. SCENIC RESOURCES

Lake Berryessa possesses significant scenic qualities analogous to many Northern California lakes. However, it is somewhat unique in that it is a large lake reasonably close to a major urbanized area which affords visitors a natural outdoor recreation experience in a wildland setting. The varied configuration and topography of the land, coupled with the water and other scenic resources, attract visitors from the metropolitan areas of San Francisco and Sacramento as well as the counties surrounding Lake Berryessa.

1. Primary Scenic Elements

The primary scenic elements are those forms and shapes of topography, water, vegetation, and other natural components that define the landscape. These elements can be viewed differently, depending on the position of the visitor. Scenic elements in the background, being farther away, are less distinct while elements in the foreground can be quite distinct and contribute to the quality (both positive and negative) of the scene. Consequently, intruding elements that are near to the viewer will have a greater impact than ones that are at a distance. Scenic resources can be viewed from a number of different vantage points at the lake including from access roads and highways, the water surface, and/or the shoreline. Generally positive qualities are those that reflect the natural landscape, whereas negative qualities are those that reflect more human influence that distracts from the natural landforms and processes. The following is a description of the scenic resources that are found at the lake.

The east shore is comprised of two distinct forms which serve as a pastoral backdrop to the lake. The southern section is composed of steep high hills dropping directly into the lake. Vegetation is dense, but scattered small sloping grasslands occur throughout. The northern section begins with flat grasslands entering the lake and extending eastward some distance to the hills. Ranch houses and associated outbuildings are spread over this area, but no housing is visible on either the hills or ridges. Cattle can be seen grazing in the grasslands, and occasionally boats are beached at the shoreline.

The west shore is comprised of steep hills dropping directly to the water and several lesser sloped areas where most of the recreational facilities have been developed. There are four resort areas located on the west shore which have extensive developments such as sea walls, docks, marinas, and mobile homes which visually dominate the shoreline. The foreground views in these resorts can be characterized as a highly built, man-altered environment that significantly interrupts the surrounding natural landscape.

The Capell Cove boat launch area, Oak Shores day use area, Park Administration Headquarters, Boy Scout Camp, and Berryessa Pines subdivision are located in the area as well. These developments also contribute to the altered appearance of the natural landscape. Predominate vegetation includes

those common to the digger pine, oak woodland and sloping grasslands interspersed with large expanses of chaparral. Coves and inlets are numerous along this shore and form framed views for both water and land users. The resultant sense of enclosure and separation from other lake activities is a quality sought by many recreationists.

The undeveloped north shore has two small deltas formed by Eticuera and Putah Creeks as they enter the lake. These form the foreground and are backdropped by gradually rising, well-vegetated terrain. There are no homes visible in the background. The north shore also has a number of coves and inlets providing a visual quality similar but more open than the west shore since no developments are present.

The south shore is comprised of steep canyons including Wragg and Steele canyons which combine with the main course of Putah Creek to form the greatest variety of coves, scenic variations, secluded spaces, and well-defined enclosures to be found anywhere on the lake. Three concession operations have developed here, the most extensive being Steele Park. The privately-owned lands of Berryessa Highlands with extensive home development, may be seen along the south shore from a number of locations. Some homes have been built on the ridgelines and consequently interrupt the vegetated skyline. The tree canopy combined with steep slopes provides a secluded environment for recreationists that frames very striking panoramas.

The lake, including its major arms, is wide enough to provide an impressive scale to water surface users. Oak Shores Park on the west shore, including Big Island and Small Island, represent important resource elements. Other elements include the peninsulas between lake arms as well as the entire shoreline. Indian and Schoolhouse Islands form lesser features near Pope Creek. For water surface users, the panorama of mobile homes and attendant facilities presented by each of the concessions becomes a significant intrusion upon the otherwise natural and pastoral landscape.

2. Other Scenic Influences

The soils around the lake are composed of shale and disentegrate easily when wave and shoreline runoff impact them. Consequently, exposed shoreline banks, with undercut tree roots, may be seen at all parts of the lake where steep terrain reaches the water, especially on north-facing slopes. This is even more noticeable during severe drawdown of water in the reservoir which exposes an increasingly greater number of steep eroded banks. A major powerline crosses the lake in the vicinity of Capell Cove and Steele Park, creating a negative visual impact interrupting the backdrop of vegetated hills and skyline.

The vegetation of the lake is similar to many other foothill lakes. Pastoral grasslands form a soft understory texture for the landscape which is in contrast to the more coarse overlay of chaparral shrubs and trees which form the backdrop and canopy. The temporal dimensions of the landscape is emphasized by the annual grasses which seasonally change from vibrant greens in the late winter and spring to golden browns in the summer and fall.

Visual impressions of the lake environment can be significantly affected by wind and other weather phenomenon, migrating bird species, water surface uses, fires on adjacent lands, the construction of manmade features, and the operation of the reservoir (the combination of rainfall runoff and reservoir operations determine the degree to which unvegetated shoreline may be exposed). The number and type of watercraft on the lake can have a dramatic influence on scenic resources by transforming the water surface from a flat calm uninterrupted surface to an occupied and populated interrupted place. Loud motor noises also disrupt the serenity of the lake and surrounding lands.

3. Scenic Descriptions of Visitor Use Areas and Facilities

a) Semi-primitive and Dispersed Recreation Areas: These are the natural, generally unaltered portions of the lakeside landscape used by fishermen, hikers, and others whose recreation activities are unstructured. Natural scenic variations are usually sought and enjoyed by these visitors. These lands are generally unencumbered by built improvements other than those which may be provided for basic health and safety, and tend to portray the landscape in its natural state (oak woodland, annual grassland, chaparral) with the lake as an addition.

b) Outdoor Recreation Areas: Generally close attention has been given to the formal blending of the built environment (roads, parking areas, restrooms, beaches, etc.) with the natural scenery. Consequently, the visitor experiences natural features, (i.e. vegetation, rock outcrops, open spaces, views framed by trees, coves, etc.) and

scenic resources that prevailed prior to construction in the area. In cases where severe grading was required, revegetation using indigenous species has been accomplished to restore some sense of the original vegetative character of the area. Signs have been used which express the textures of a woodland and blend with this environment.

Camp Berryessa (Boy Scout Camp) has minimal development which informally blends with the surrounding environment. Placement of facilities has not always been planned to favor the natural setting; however the level of development is not imposing.

c) Administration Area Developed by Reclamation: Careful attention has been given to the formal blending of large structures with the natural environment. The buildings, although large, have been situated to blend into the hillside using earth tone colors and intervening topography. Vegetation has been planted to replace losses during construction using native or native-appearing plantings. Open spaces between structures give a feeling of low density design. The structures can be viewed from the lake but generally not from Knoxville-Berryessa Road.

d) High Density Recreation Areas Developed by Concessionaires: Some concession developments have included construction of roads, buildings, mobile home sites, marinas, restaurants, motel units, residences, comfort stations, boat repair buildings and storage areas in a manner that has not always retained or supported the scenic character of the lake. This practice has contributed to a highly cluttered foreground. Mobile homes are too close to one another and often contrast severely in color with the surrounding vegetation. Heavy shoreline construction of "sea walls", decks, etc. and the storage of boats and other items adjacent to mobile homes contribute to a cluttered foreground. Shoreline access is preempted by mobile homes in some areas. Some efforts have been made to mitigate this condition such as tree planting and using earth tone colors and textures for structures. The resorts generally represent a heavily built environment that has not conformed to, nor do they reflect, the pre-development landforms and vegetation or density patterns that existed.

Notwithstanding some harsh scenic intrusions created by human actions, the general scenic character of the lake does remain as a strong attraction for the general recreating public. Existing developed areas vary in their location appropriateness in relation to scenic resources and public needs. In the future, however, concessions and land use practices will require modification, and much closer attention should be focused on preserving scenic qualities to help restore the foreground and middleground landscapes, especially those along the shoreline, and where scenic views from the road are obstructed by development in concession areas.

K. SOCIO-ECONOMIC SETTING

For purposes of this analysis, the primary social and economic impact area was defined as being those census tracts (designated by the U.S. Bureau of the Census) directly contiguous to Lake Berryessa. Census tract 2018 was the only census tract which met this criteria. Bounded by Lake County to the north, Yolo County to the east, State Highway 128 to the south, and Chiles and Pope Valley Road to the west, census tract 2018 comprises approximately 40 percent of the total land area of Napa County.

1. Population

In 1980, the U.S. Bureau of Census estimated that were approximately 740 permanent full-time residents in census tract 2018. There were a total of 1,902 permanent housing units, of which 1,506 (or about 79.2 percent) were occupied for some duration during the year. Of the occupied housing units, approximately 54 percent were single, detached units, while 40 percent were mobile homes. The remaining six percent were multiple units.

Between 1980 and 1987, the Napa County Planning Department estimated that an additional 158 single units were constructed within this census tract. Utilizing the average household population of 2.5 for Napa County, these 158 new units are estimated to translate into an additional population increase of approximately 400 persons. As a result, in 1987, the total estimated permanent population residing in census tract 2018 was approximately 1,100.

The accompanying tabulation represents the estimated populations for both Napa County and census tract 2018 between 1987 and 2020, and was developed by proportioning the estimated population of census tract 2018 in 1987 against the 1987 estimated population of Napa County:

TABLE 6

PROJECTED POPULATION ESTIMATES

Year	Napa County	Census Tract 2018	Population Increase Tract 2018
1980	99,200	740	--
1987	105,200	1,100	360
1990	110,000	1,150	50
2000	123,200	1,300	150
2020	147,500	1,550	250

Overall, between 1987-2000, the permanent population within census tract 2018 is estimated to increase by 18.2 percent while the population increase between 1987-2020, is estimated to increase by 40.1 percent. In addition to the permanent population residing in census tract 2018, as a result of resort operations at Lake Berryessa, there is a large number of temporary and seasonal residents.

2. Employment

The California Employment Development Department has estimated that between 1983-1987, the average unemployment rate in Napa County was approximately 6.8 percent while the average labor force participation rate for the same period was 47.6 percent. Applying these county-wide averages to census tract 2018 results in the following population projections:

TABLE 7

EMPLOYMENT DATA

Year	Estimated 2018 Population	Estimated Civilian Labor Force	Estimated Total Employed	Estimated Required New Jobs
1987	1,100	520	480	--
1990	1,150	550	510	30
2000	1,300	620	580	70
2020	1,550	740	690	110

Overall, between 1987-2000, the total number of new jobs would have to increase by 20.1 percent in order to sustain the present unemployment and labor force participation rates in census tract 2018. Between 1987-2020 the total number of new jobs would have to increase by 43.8 percent.

3. Income

In 1980, the estimated median family income for full time residents in census tract 2018 was $20,600. This was approximately $1,700 (8.3 percent) higher than the median family income for the rest of Napa County.

During 1985, total gross receipts generated within resort areas was approximately $7.0 million. Of the total gross receipts, approximately $2.4 million (34 percent) was generated from long-term activities; $1.8 million (26 percent) was generated from short-term activities; while the residual $2.8 million (40 percent) was generated at other concessionaire-operated activities which were used by both long and short-term users (e.g. convenience stores, snack bars).

Within each individual resort area, the percentage of income generated from long-term activities ranged from a low of six percent to a high of 78 percent, while the percentage of income generated from short-term activities ranged from a low of six percent to a high of 60 percent.

Due to drought conditions over the past five years (1987 to 1991) and a recession for the past two years, the percentage ratio of total income to the resort from long-term uses versus short-term uses can be expected to change. Rent rates for long-term sites have gone up over the years and the number of sites has generally not changed. Income from long-term sites can be expected to increase regardless of the drought or recession. On the other hand, short-term use has decreased dramatically resulting in less income to the resort, and representing a smaller percentage of the resort's total gross. Generally, a greater percentage of income may now be attributable to long-term use than was experienced in 1985.

In addition to the resorts, there are other businesses in and around the Lake Berryessa area which are heavily dependent upon recreation visitors. For instance, these include the convenience store, gas station, and snack bar at Sugarloaf Park; the gas station, beauty parlor, restaurant, laundry, and convenience store at the Spanish Flat Village Center; the marine service and boat storage on Knoxville Road; the marine service, motel, and restaurant at Turtle Rock; the boat storage facility in Capell Valley; the Pridmore boat storage facility; the gas station, store-restaurant and beauty shop at "Moskowite Corner"; the Lakeside gas station and convenience store; the towing service near Pope Valley, and the boat storage facility near "Moskowite Corner", and miscellaneous real estate offices.

The total amount of annual income generated from visitors on their way to and from recreational activities at Lake Berryessa was not available. Based

upon Reclamation's survey, there were a total of 22 independent businesses in and around the Lake Berryessa area which are not located within the resort areas.

4. Long-Term Site Rents and Values

Long-term users (tenants) who occupy a travel trailer or mobile home in a resort on Lake Berryessa do not possess any entitlement or right to the government-owned land. Rather, they have entered into a year-to-year (or in some cases, month-to-month) rental agreement with the resort owner which entitles them only to occupy a site with their trailer and appurtenances, and access to the resort with unlimited boat launchings and use of other resort facilities and amenities. In some cases on-site boat storage is also provided as well as gate passes for friends and relatives.

Depending upon the resort, location of the site within the resort, resort provided amenities such as water, sewer, parking spur, the size of the trailer or mobile home, and the size of the site, base monthly rental rates range from a low of $92 to a high of $263 (based upon 1991 rental rates). Additional fees may be charged for such things as shoreline locations, resort electricity and/or gas, and the number of parking passes issued. The following table depicts weighted rental rates for the seven resorts, and the total weighted average. The figures represent rates for travel trailers and single wide and double wide mobile homes, located along the shore or inland.

TABLE 8
1990 AVERAGE MONTHLY RENT FOR LONG-TERM SITES

Resort	Total Nunber Of Sites Reported *(Includes T.T. & M.H.)*	Weighted Average(s)
Spanish Flat	180	$134
Pleasure Cove	257	$146
Berryessa Marina	172	$162
Markley Cove	54	$180
Steele Park	144	$212
Rancho Monticello	548	$218
Putah Creek	141	$256
Lake Total	1496	$191

The following table summarizes long-term trailer sales at Lake Berryessa Marina, Pleasure Cove, Putah Creek, Rancho Monticello, Spanish Flat, and Steele Park. There were a total of 145 units used in this most recent (April 1991) analysis. The units have been divided into travel trailers, single-wide mobile homes, and double-wide mobile homes, and whether the unit is inland or on the shoreline.

Retail valuations were based exclusively on the "Kelly Blue Books" and did not take into consideration such items as site location, decking, carports, patios, storage sheds, awnings, utility connections, family transactions, foreclosures, etc. More exacting retail figures would require extensive inspection of each unit and complete confirmation of each sale. The selling prices include such variables as site location, decking, carports, patios, storage sheds, awnings, utility connections, family transactions, foreclosures, etc.

TABLE 9
APPRAISED AND ACTUAL TRAVEL TRAILER AND MOBILE HOME SALES PRICES

	Actual Selling Price	Actual Retail Value
Travel Trailers--Shoreline Locations--16 Units Sold		
High	$19,000	$14,145
Low	1,100	815
Average	7,730	4,275
Single-Wide Mobile Homes--Shoreline Locations--24 Units Sold		
High	$55,000	$12,075
Low	1,100	3,800
Average	26,065	8,005
Double-Wide Mobile Homes--Shoreline Locations--12 Units Sold		
High	$97,500	$23,925
Low	15,000	7,490
Average	49,960	14,505
Weighted Average-Shoreline Locations	$25,938	$ 8,357
Travel Trailers--Inland Locations--33 Units Sold		
High	$13,750	$6,330
Low	400	815
Average	4,515	3,050
Single-Wide Mobile Home--Inland Locations--54 Units Sold		
High	$64,000	$17,725
Low	1,500	2,915
Average	22,390	7,555
Double-Wide Mobile Homes--Inland Locations--6 Units Sold		
High	$50,000	$21,800
Low	19,000	10,400
Average	34,915	16,250
Weighted Average-All Locations	$20,112	$ 7,177

Most travel trailers and mobile homes are sold at prices far exceeding their estimated appraised retail value. A portion of the higher costs can be attributed to exterior improvements and whether or not the site has utility hookups. Generally, the selling price appears to be a reflection of where the travel trailer or mobile home is located. Those that are close to the water or have an excellent view of the lake may have a higher selling price regardless of their age, or, whether or not it is a travel trailer or mobile home. There are cases where an older travel trailer will sell for a higher price than a much newer mobile home. However, this trend may not always prove consistent.

Reclamation's policy is that travel trailers and mobile homes located within a resort are to be used for recreational purposes and not as primary residences. Therefore, tenants are restricted from using their travel trailers or mobile homes for more than two weeks at a time. The only exceptions are employees who work on Federal lands at Lake Berryessa, either for the government or a concession, may live on-site full time.

Contrary to Reclamation policy and resort rental agreements, some tenants may be using their travel trailers or mobile homes as primary residences and others may be using them for rental properties. It is becoming apparent that a purchase of a travel trailer or mobile home is not necessarily for recreational purposes but for financial investment, using the investment opportunity value of the site location not the value of the unit as the primary selling factor.

5. Social Institutions

a) Short-Term User

Short-term users visit the lake to engage in a recreational activity and not necessarily to interact in or as a community. While the user may be a member of a group of individuals, a family or even several families the group is developed for a recreational excursion. After the excursion is over, the user may become a member of an entirely different user group on the next trip to the lake. Any action that affects one group member will affect the whole group. Examples of short-term user groups are bass clubs, boat and ski clubs, and camping clubs.

b) Long-Term Use

Long-term users not only visit the lake to enjoy recreational opportunities but also to partake in other social aspects. In most cases the tenants have owned their travel trailer or mobile home for many years, visit their site regularly, and have usually formed bonds of friendship with their neighbors. For many of the tenants, their travel trailer or mobile home is regarded as a secondary residence and the acquaintances they have made are considered close friends. Recreating may not be a primary reason for visiting the lake.

Visiting with friends and neighbors at the lake seems to be an important element of a tenant's visit as well as recreating on the lake. There are instances where people purchase specific trailers or mobile homes just to be near their friends. They have formed their own community within the resort and it may be as cohesive as the communities in which they normally live. In some cases the unity may even be stronger and tenant associations have been formed. Tenants also visit their sites to get away from the pressures of their job or homelife, or to provide them and/or their children with the opportunity of living in the country. In some instances second generation families are continuing to utilize travel trailers or mobile homes purchased years ago.

c) Resort Owners

While some of the resort owners may live within the resort and might enjoy a sense of community unity, they are not members of any tenant associations. The primary relationship is that of tenant (long-term user) and landlord (concessioner). If a tenant community group dissolves, the landlord would remain.

L. HEALTH AND SAFETY

Basic responsibility for the health and safety of the visiting public is shared among the State of California, Napa County, and Reclamation. Even though Lake Berryessa is Federally-owned, Reclamation has stated that State andCounty ordinances will apply to all resorts at the lake. The County enforces Title 25 of the State Administrative Code which covers trailers and mobile home parks. All resorts at Lake Berryessa must obtain a yearly operating permit from the County.

Water quality monitoring is done on a routine basis. Drinking water at the resorts and Reclamation facilities are monitored constantly to insure good water quality. Lake water is sampled routinely to determine any potential pollution problems.

The State of California Water Quality Control Board and Napa County routinely inspects the sewage systems in the resorts and surrounding areas to insure their safe operation. Current sewage treatment systems consists of fully contained holding tanks for solids, and evaporation ponds for gray water.

Reclamation and Napa County are actively engaged in a land and water safety program which emphasizes public education through individual contacts and informational signing. Boating safety is a joint responsibility of the Napa County Sheriffs Department and Reclamation. The Sheriffs Department enforces state boating laws which in turn contribute to public safety. Reclamation also has a boat patrol with a function similar to the County's. At this time it cannot enforce any laws although it can warn individuals of potential violations.

Fire protection and suppression activities around Lake Berryessa are provided primarily by California Department of Forestry (CDF), and by the Capell Valley Volunteer Fire Department and Pope Valley Volunteer Fire Department. Due to the size of the Lake Berryessa area and isolated conditions, response time can vary. Generally, each resort and Reclamation's developed day use recreation areas have water stanchions available, and fire protection and suppression plans have been established. Furthermore, Reclamation vehicles are generally equipped with portable backpumps for quick response in emergency situations.

In 1987 the Napa County Department of Environmental Health issued warnings advising people to limit their consumption of certain Lake Berryessa fish due to potential mercury contamination. As with most health warning concerning the eating of fish, the limitations are greater for pregnant women and children. A copy of the public health warning is provided in Appendix I, which provides additional information on potential sources of contamination, sampling processes, and the amount of fish recommended for consumption. For additional information on health and safety, please see the section on Law Enforcement.

M. LAW ENFORCEMENT

Enforcement of laws, ordinances, and rules and regulations at Lake Berryessa is the responsibility of Napa County Sheriffs Department, the State of California (including the Highway Patrol, CDF, and DFG), and Reclamation. In addition to the traditional law enforcement agencies, other regulatory agencies such as the Napa County Building Department and the Department of Environmental Health can enforce certain laws and ordinances within Reclamation lands.

Reclamation has concurrent jurisdiction for law enforcement with Napa County and the State of California. As a result, Napa County (Lake Berryessa is located almost entirely within Napa County) and the State of California have authority to enter Reclamation lands to enforce their rules and regulations. Hunting and fishing laws are primarily enforced by state game wardens; civil and traffic laws, and ordinances are primarily enforced by the Sheriff's Department and the Highway Patrol; fire safety and enforcement by CDF; regulatory laws through agencies such as the Building Department; and California Boating Safety Laws through the Sheriffs Department. Currently, Napa County has a resident Deputy living near the lake who is available to respond to emergencies or for enforcement actions.

At this time Reclamation has no law enforcement authority to enforce its management policies and must rely on the above-mentioned agencies. However, Reclamation does field uniformed park rangers whose presence tends to discourage most inappropriate behavior. In most situations the employee makes personal contact which usually leads to compliance. The employee also has the authority to issue written warning notices which are used as the next step in obtaining compliance. For major violations the Sheriff's Department is contacted. Their response time can be anywhere from a couple of minutes to one hour depending upon a Deputy's location. In such a situation, after the employee makes the call they are not to become involved any further. The employee is not to make a citizens arrest nor act as a witness.

In situations that deal with unauthorized building, health and safety violations, or environmental concerns, Reclamation must contact the regulatory agency responsible for enforcing compliance of those laws and ordinances. It then becomes their responsibility to witness the violation and act accordingly. In the event a concessionaire violates a clause in their contract or are in violation of any laws or ordinances, Reclamation can enforce compliance only through administrative actions, which can lead to default proceedings followed by contract termination.

VI. ENVIRONMENTAL CONSEQUENCES (IMPACTS) - MITIGATION

A. INTRODUCTION

This EIS is intended to be a broad-based programmatic document that assesses broad conceptual plans for Lake Berryessa and describes ranges of impacts for those general plans. The specific actions selected as a result of this EIS will be subject to further environmental documentation prior to their implementation.

The following twelve sections (resource categories) correspond to those described in Section V. Affected Environment. Each is a narrative of how the forty-one (41) Preferred and seventy-three (73) Alternative actions might impact the affected environment. The narratives were compiled by an interdisciplinary team with each specialist working within their area of expertise. Consensus on the impacts was reached by reviewing them with each specialist and the EIS coordinators. Integral to the preparation of each narrative was the Environmental Impact Matrix (Appendix N) which serves as a complete record of potential impacts. A Condensed Matrix (Table 13) summarizing the major or moderate negative impacts which may result from all Preferred and Alternative Actions is provided at the end of this Section.

Each Preferred or Alternative Action has been numbered. In this Section the clustering of numbers, such as [5,9b,18a] etc., is used to identify those Actions which are being discussed or referenced. To facilitate review, a foldout is provided at the end of this Section that lists all the Preferred and Alternative Actions by number. By using this foldout a reader can identify what a specific number represents. For example: [5] is "Smittle Creek Day Use Area"; [18a] is "No Action, Retain Special Use Areas Without Policy Change."

Positive impacts have not been given relative values. Negative impacts have been given three levels of value: minor, moderate, or major. These levels are meant to be relative to one another only within a specific resource category.

Minor impacts may be characterized as having lesser importance, low detectability, generally negligible, and mitigation efforts when necessary may greatly lessen the impact. Major impacts may be characterized as being substantial, highly detectable, consequential, and may require significant mitigation measures. Moderate impacts are related closer in intensity to major impacts than minor impacts. Therefore, they could also require significant mitigation measures.

In this EIS impacts have been addressed qualitatively, or, qualitatively and quantitatively when information is available. Actions which could cause positive impacts, no new impacts, or minor negative impacts have generally been assessed qualitatively.

After the consequences for each resource category are discussed, a general narrative describes various mitigation measures that could be implemented to reduce or alleviate the severity of negative impacts for all 114 actions being considered. Often, reference is made that implementation of a particular Preferred or Alternative Action may mitigate the impacts caused by other Actions. The implementation of an Action in itself is not meant to be or represent the sole mitigative efforts when addressing impacts cause by other Actions. Mitigative measures, where reasonable or possible, will be developed and implemented for each specific action, regardless of the selection of other Actions.

For example: Implementation of Island Uses and Improvements [9] may impact soils, vegetation, animal populations, etc. At the site specific mitigation efforts will be implemented. However, implementation of a Fish and Wildlife Management Area [13] on the eastshore, while a separate Action, would provide indirect mitigative measures that could be applied to Preferred Action #9. Implementation of Preferred Action #13 would result in enhancement of vegetation and improved habitat conditions for wildlife. Indirectly, the improvements could be designated as supplemental mitigative efforts to Preferred Action #5. You are enhancing one area to compensate for losses in another.

Following the Condensed Matrix a list of Environmental Commitments is provided which describes those mitigative actions which will be taken if the Preferred Actions are implemented.

B. SOILS AND TOPOGRAPHY

1. Consequences

Soils will be affected by any activity which disturbs the land surface. Removal of vegetation exposes soils to the danger of erosion, and soil compaction can increase the difficulty of re-establishing plant cover. Activities that require steep cuts in slopes can cause slope failure and earth flows. Wave action on steep shoreline areas can also cause slope failure and earth flows. Soil sensitivities to surface impacts range from slight to severe, with slope steepness the major factor affecting susceptibility to erosion.

Proposed actions that encourage increased use of any area are likely to produce negative impacts on soils such as erosion and compaction. Boat launching

ramps, camping areas, and the development of new facilities [5b,9b,9c,10,10b,10c, 11,11b] will require construction of roads, parking areas, etc., which may cause the types of impacts mentioned above. Intensified foot traffic in those areas can heighten potential for erosion if people disturb protective plant cover and form unauthorized paths.

Actions which promote controlled boat-in camping opportunities along the shore [8,8b,9,9b,10,10b] may increase the chance of wildfire if use and maintenance is not regulated closely. Actions [8a,9a] which do not address controlling such shoreline uses do not provide protection against wildfire. Wildfire can increase the opportunity of soil erosion due to the removal of ground cover.

New trails or expansion of existing trails [7,7b] would remove plant cover and open avenues for erosion. This could impact 10 to 18 acres of land if a 3 foot wide trail is constructed 30 to 50 miles in length. However, a good trail system can positively impact soils if previously indiscriminate uses are directed to the improved system. Of the alternatives considered, a resort-convention center on Big Island [9c] would create the greatest potential for damage to the soils because of the size of such a project.

The possibility of slope failure resulting in earthflows is also increased by activities that require soil removal from side slopes. Slopes with clay-rich soils on top of relatively impermeable bedrock (see Appendix D) are most susceptible to failure. Road cuts or site leveling for structures [24b,37] on such slopes can de-stabilize backslope material and increase the chances for earthflows during the wet winter months.

Proposed Actions likely to produce positive impacts are those which decrease the level of use, or inform the public of the proper uses of Lake Berryessa resources [14,17,21]. For example, removing or altering structures [22,22b,34,34c,35, 35b,] from the floodplain and eliminating uses [25] in sensitive areas would allow the land to return to a more natural, stable state. However, the removal of structures [22, 34,35,36] especially retaining walls, may increase soil erosion potential. The ultimate number of structures eliminated in the floodplain is dependant upon the success of floodproofing activities and whether or not the sites are to be converted to short-term recreational opportunities. Establishing fish and wildlife management areas [13, 13b] could reduce human and livestock activities in the management areas, reducing erosion and soil compaction.

There are those occasions in which the impacts of the Actions are unknown at this time. In these instances, before any work or changes were to be made, appropriate environmental documentation would be required. Most no Action options would result in no new impacts. Any existing erosion and compaction problems would continue.

2. Mitigation

Parking areas and roads will be graveled or paved to minimize erosion. Plant cover will be re-established to replicate the prior natural state and to help protect exposed soils. Appropriate signing and education will encourage foot traffic along specific trails, and warn against the causes and danger of wildfire. Careful design of trails and facilities [7,27, 28,29], placement of barriers, and regular maintenance should alleviate soil compaction and erosion potential. Campsites will be hardened and fire rings shall be provided to reduce the potential of wildfire. During critical fire months, campfires would be prohibited. Locations for structures and routes for roads will be selected to avoid areas with high potential for slope failure.

C. WATER RESOURCES

1. Hydrology

None of the preferred actions or alternatives will cause an appreciable impact to the reservoir water supply. No mitigation measures will be required.

2. Quality

a) Consequences

Those land management Actions or Alternatives which maintain or increase control over land recreational uses [1,2a,3,13,13b,39] would beneficially impact water quality by increasing the potential for water quality protective measures. Those protective measures may include preventing uncontrolled development, upgrading sanitation facilities, restricting cattle grazing, and preventing or reducing erosion due to fires or uncontrolled development. Expanding visitor information services [14] could have beneficial impacts to the extent that it increases public awareness of water quality and pollution control.

Land management Actions or Alternatives which involve development of new campgrounds and related facilities [4c,5a,5b,10,10b,10c,11,11b] could result in increased traffic. This may cause minor negative impacts from runoff containing oil and tire residues. Estimations of deposition are 2.0 to 2.5 lbs. of oil/

grease per year and 1.6 to 2.1 lbs. of rubber per year for Actions involving a campground and launching ramp. Similarly, 4.0 to 4.5 lbs per year of lead and .04 to .046 lbs. per year of copper would be deposited with these actions. These estimates are based on studies conducted in an urban setting and would tend to be higher in magnitude than for a rural low speed surface as in a campground access road. Water quality impacts resulting from the above mentioned deposition rates are unknown but are thought to be insignificant compared to the deposition occurring from the extensive road system surrounding and leading to the lake along major tributaries.

Increased recreational use [10,10b,10c], trail development [7,7b], etc., may result in minor water quality impacts due to potential increases in bacterial and nutrient contamination. Minor erosion impacts could also result from boat access camping [8,8b] and Small and Big Island recreation areas [9,9b]. Moderate negative impacts could occur with development of a resort/convention center on Big Island [9c]. Intensive use could create erosion and additional oil and tire residue deposition problems. Actions which promote controlled boat-in camping opportunities along the shore [8,8b,9,9b,10,10b] may increase the chance of wildfire if use and maintenance is not regulated closely. Actions [8a,9a] which do not address controlling such shoreline uses do not provide protection against wildfire. Impacts of wildfire increase the opportunity of soil erosion due to removal of ground cover, which may subsequently impact water quality.

Water surface management actions or alternatives which restrict uses [17,17b] may reduce bank erosion and turbidity from wave action to the extent that water skiing, jet skiing, and speed boating are restricted in sensitive areas. Establishing limits for water craft carrying capacity [20,30c] may beneficially impact water quality by limiting the potential for human waste contamination of the lake and oil and gas residues from boat engines.

The compliance management action concerning additional law enforcement support [21] could increase the potential to regulate activities causing water pollution or violating applicable laws.

Those Actions or Alternatives prior to resort reorganization which control or limit development [22,22b,23,24,24a,25,26,27,28,29,33,33a] may benefit water quality by decreasing flood-related pollution, reducing erosion, reducing demands on existing sewage facilities, upgrading sewage treatment facilities, and improving waste management. Sewage and gray water holding facilities on vessels [31] would benefit lake quality by preventing contamination. Continuing or augmenting commercial houseboat numbers [30,30a,30b] and private houseboats [32] without requiring sewage and gray water holding facilities may cause minor negative impacts by increasing potential bacterial and nutrient contamination of the lake.

Actions associated with resort reorganization which control or limit development [34,34b,34c,35, 35b,37b,39] could benefit water quality in similar ways to prior Actions discussed above.

b) Mitigation

Negative impacts associated with new campgrounds and other recreational development would be mitigated by providing appropriate erosion controls and planning facilities in accordance with Land Planning and Development Criteria, preferred action [28]. Erosion control measures would include the planting of trees and vegetation, and the establishment of buffer zones. During construction, erosion control berms would be used to contain soils.

Equestrian trails would be placed a minimum distance from the maximum lake surface elevation (100-500 feet, depending on slope). Off-road vehicular use will continue to be prohibited. Campsites will be hardened and fire rings shall be provided to reduce the potential of wildfire. Appropriate signing and education can warn against the causes and danger of wildfire. During critical fire months, campfires could be prohibited.

Appropriate sanitation facilities which would be provided would minimize bacterial and nutrient contamination from recreation areas. Prohibiting black and gray water discharges to the lake would minimize pollution impacts from houseboats and other vessels. Sewage holding facilities in water craft is already provided. Sewage and gray water pumpouts at resorts would be required under action [31] if implemented. Additional floating toilets would be provided as necessary.

D. VEGETATION & WILDLIFE

1. Vegetation

a) Consequences

The acquisition of additional lands [1] would have a beneficial effect on vegetation. Natural, undisturbed areas could be maintained where vegetation could regenerate.

Construction of campgrounds, day-use areas, trails, parking (turnout) areas, visitor information services, boat ramps, and visitor use to these areas [4,6,7,8,9,10,11,24,37, etc.] would cause minor to moderate loss of vegetation. The boat ramp and campground actions may impact approximately 3 to 5 acres of vegetation. This would mainly impact annual grasslands and scrub oak plant communities. The removal of native trees would be avoided wherever possible; however, a few may have to be removed. As noted in Section V.D.1., there are no true wetlands at the lake. However, any actions in the shoreline area would be evaluated to determine if impacts would occur to riparian habitats. Impacts to all vegetation would be addressed when more specific plans are available prior to development. The proposed development of trails could impact 10 to 18 acres of land if a 3 foot wide trail is constructed 30 to 50 miles long.

Most of these improvements would be widely dispersed and involve upland vegetation. Restricting intensive use (such as camping) to designated sites would benefit vegetation in sensitive areas which are presently being damaged by unauthorized and uncontrolled uses. While actions which promote controlled boat-in camping opportunities along the shore [8,8b,9,9b,10,10b] may increase the chance of wildfire if use and maintenance is not regulated closely, actions [8a,9a] which do not address controlling such shoreline uses do not provide protection against wildfire. Impacts of wildfire may result in damage to vegetation and loss of habitat. However, some plant species require fire as part of their natural life cycle, and wildfire may reduce congestions of chaparral, chemise, etc, thus improving forage quality and quantity for many animals.

Generally the "no-action" Alternatives [3a,7a,21a, 23a,25a,27a,28a, etc.] would not provide additional direction for the improvement of vegetation. Due to the unknown impacts of some actions [39a] further environmental documentation may be required at a future date or before any changes might occur. Activities such as unauthorized camping, grazing and off-road vehicle use would cause further destruction of vegetation. With law enforcement authority, Reclamation would be more effective in stemming such destruction.

Closing areas and protecting them from further human intrusion and development [4b,23,24,34, 34c, 35b,etc.] would allow native vegetation to re-invade sites. These Actions would have a positive impact for each site with significant positive cumulative impacts lake-wide.

Due to the level of development required for elaborate recreation facilities [4c,5b,9b,9c] moderate to major impacts on the vegetation could be expected. The resort/convention center action [9c] could impact over 450 acres of vegetation consisting of grasses and oaks. The airstrip campground action [9b] could impact 2 to 4 acres of vegetation. The construction of specialized campgrounds could impact up to 15 acres each. The removal of native trees would be avoided wherever possible, however these types of development would necessitate some removal because of the extent of development.

If the California Department of Fish and Game (DFG) took over management of Federal lands on the eastside [13] or all lands exclusive of Class I or II areas [13b], vegetation could be enhanced. Grazing restrictions would tend to improve ground cover which would promote wildlife use and reduce erosion. Propagation of valley oak and riparian species, and grass seeding could be possible.

Restricting uses on the water [17,17b] would reduce wave action and its erosive force on the shoreline. This could permit the establishment and further propagation of riparian plant communities.

Indigenous species could be reestablished in those areas where long-term uses and other structures [22b, 23,24a,25,34,35b] have been removed within the floodplain areas. Any expansion [24b] or relocation [37] of mobile homes and other buildings could require removal of vegetation in moderate amounts. The total number of sites impacted is unknown at this time.

b) Mitigation

Baseline data should be documented prior to implementation of actions with monitoring of the growth and development of habitats continuing after implementation. Any enhancement noted could be applied to future mitigation requirements at Lake Berryessa or elsewhere.

Construction of campsites and other structural improvements [4,6,7,8,9,10,11,24,26,28,29, 33,36, 38, etc.] would be designed to minimize upland disturbances and prevent damage to riparian and wetland communities. Campsites will be hardened and fire rings shall be provided to reduce the potential of wildfire. Appropriate signing and education can warn against the causes and danger of wildfire. During critical fire months, campfires could be prohibited. Where appropriate, native vegetation will be planted to replace vegetation that had to be removed or to

restore areas where developed uses have been removed.

Should other actions with moderate to major negative impacts be selected [4c,5c,6b,9b,9c, etc.] a complete analysis of predicted losses and an associated U.S. Fish & Wildlife Service Habitat Evaluations Procedure (HEP) may be necessary. A follow-up investigation to determine actual losses could also be warranted. Further acquisition of land and more habitat improvements for mitigation could be required.

2. Wildlife

a) Consequences

All species utilize one or more of the habitats described in the VEGETATION section above. For that reason, impacts on wildlife habitat are similar to those on vegetation. Therefore, only differing impacts will be discussed here.

With implementation of the preferred actions increased traffic on Highway 128 and the Lake Berryessa-Knoxville Road may increase the incidence of road kills.

Restriction of human activities to specific sites controlled by Reclamation [3,7,8,10,11,17,21 etc.] would benefit wildlife. Preventing uncontrolled human use (i.e. unauthorized camping) would minimize disturbance to wildlife and their habitats. This would promote increased wildlife use of undisturbed habitat at numerous locations. Limiting grazing would provide more food and cover for wildlife.

Specific impacts on wildlife that would result from management of Federal lands by DFG [13] cannot be determined at this time because specific management plans have not been developed. It is anticipated that an overall improvement in habitat conditions would occur due to management activities.

Conversion of long-term sites to short-term uses [36] and other actions requiring removal of long-term sites would promote revegetation and a more natural usage of the land by wildlife. This is based on the concept that more open land would be available between sites with planted native vegetation. This usage would be most apparent during the off-season recreation period from September through April. When the lake is at its lowest levels, there would be a reduced risk of predation because the new vegetation would help hide wildlife approaching the water to drink.

b) Mitigation

Mitigation requirements for wildlife would be similar to those described under VEGETATION above.

If Preferred Actions are implemented and appropriate mitigation measures are taken, an overall enhancement of wildlife habitat is expected. As described in the VEGETATION, mitigation section above, baseline data should be established and any improvements which could be credited toward future mitigation requirements should be recorded.

A management plan for the proposed Fish and Wildlife Management Area has not been developed at this time. If management of Federal lands at Lake Berryessa are turned over to DFG, an approved management plan will be required. Such a management plan will be subject to further environmental documentation and public involvement as necessary. Management projects that would be addressed in such an environmental documentation would include:

- Further fish and wildlife management techniques not proposed in the RAMP
- Boating restrictions
- Controlling access (i.e. guided tours)
- Grazing restrictions

In addition, the following would have to be addressed in the environmental documentation if sport hunting seasons were proposed:

- The availability of emergency services
- Law enforcement
- Seasons, bag limits and firearm restrictions
- Transportation of firearms
- Hunting from boats
- Buffer zones around buildings, pastures and recreation areas
- Control of hunter numbers

3. Endangered Species

a) Consequences

Overall, there would be little impact on endangered species if the preferred actions were implemented. Development of the Dispersed Recreation areas on Big and Small Islands [9], North Shore Campground and Boat Launching Ramp [10,11] could have a negative effect on wintering bald eagles unless proper mitigation steps were taken.

The bald eagle could benefit from regulated waterfowl hunting. Hunting would increase the availability of food sources in the form of crippling

losses and animal remains discarded by hunters. Any hunting program would have to be limited in some form to protect the Aleutian Canadian goose.

Some Aleutian Canadian geese feeding areas would be lost if a tree planting program was instituted (geese prefer to feed in open areas). This could be more than offset by a grass seeding program within the drawdown reservoir and establishment of oak and brush screens along access roads.

The airstrip/campground or resort/convention center [9b,9c] actions would have numerous impacts on endangered birds. Each action would destroy a significant amount of habitat. People and aircraft would have a disruptive influence. Mid-air collisions with birds and aircraft could result in fatalities.

Increasing law enforcement capabilities [21] would positively impact endangered species by providing additional protection. Actions [13,17] would also benefit endangered species by providing management additional tools to control use of land or water for specific times and locations.

b) Mitigation

Mitigation measures for endangered species will be incorporated into those stated for VEGETATION and WILDLIFE. Any documented enhancements could be used for future mitigation.

Prior to design of the Dispersed Recreation Areas on Big and Small Islands [9], North Shore Campground and Boat Launching Ramp [10,11], Reclamation will meet with the U. S. Fish & Wildlife Service (USF&WS) and DFG to minimize or eliminate impacts on bald and golden eagles. This will be part of further environmental documentation which could include mitigation measures such as: winter park closures, habitat improvements within the developed areas, and other measures suggested by the fish and game agencies consulted. If necessary, plans for both areas will be abandoned if they would cause unavoidable impacts on bald and golden eagles.

The only other alternatives which would require further mitigation would be the airstrip/campground and resort/convention center [9b,9c] Alternatives for Big Island. In addition to the studies required under VEGETATION and WILDLIFE, further consultation with the USF&WS would be necessary if these alternatives were selected.

E. FISH RESOURCES

1. Consequences

Most of the Actions being considered would not have a significant impact on the lakes' fish resources. Those Actions which could have a negative impact on fish resources would tend to adversely affect the littoral zone or shoreline areas which are important for food production, cover, and spawning habitat. Other Actions could negatively impact fish resources through changes in water quality.

Warm water fish such as bass and other sunfish are most sensitive to littoral zone influences since this is where they spend a majority of time. Cold water species may not be as impacted by littoral zone impacts unless forage fishes or other food sources are adversely affected. Cold water species are more susceptible to shoreline impacts during the winter when they frequent those areas.

Actions such as [11,17a,23a,26a,33, etc.] could affect the growth of aquatic vegetation, which provides food and cover for a number of species. Water quality and quantity could be negatively impacted by Actions [22a,23a,26a, 33b,34a,35a] which allow the placement of structures or the storage of materials within the floodplain area which might release toxic substances (gasoline, oil, paints, etc.) if inundated during periods of high water.

Protection of fish species, particularly those which feed near the surface could be negatively impacted by Alternatives [17a,20a] which place no limitations on the number of boats on the lake or where they may operate. The Alternative Action involving the development of a resort/convention center on Big Island [9c] could create major negative impacts if filling or dredging operations were involved.

Those Actions which positively impact fish resources [13,17,20,21], do so by providing Reclamation with the management controls necessary to respond to problems as they are identified. They also provide protective measures. Other Actions [22,23,26,27, etc.] limit the placement of facilities or materials within littoral and inundation zones which would minimize the threat of water contamination.

Many of the Actions noted in this paragraph would serve more than one purpose if implemented. Reducing boat speeds in coves will benefit fish resources by preventing erosion and siltation, disruption of aquatic vegetation, and harassment or dislocation of spawning fish. Placing an ultimate limit on the number or watercraft could also benefit fish

resources by minimizing some of the boat-induced impacts discussed above.

2. Mitigation

Generally, Preferred Actions would benefit fish resources at the lake. Most of the Alternatives which could cause negative impacts are those which are in the "no action" category. This is because without additional controls on shoreline uses and activities, there is less chance of providing improvements and a greater chance of littoral zone impacts which can disrupt key fish habitats.

Mitigation measures include reducing water level fluctuation during spring spawning periods, placing brush piles and catfish spawning structures in spawning areas where use might increase, continued willow plantings, and conducting scientific monitoring and studies of fish populations and habitat. Entering into the management agreement with DFG and providing additional law enforcement support would greatly benefit fish resources and minimize impacts of most actions and alternatives.

F. RECREATION

1. Consequences

Implementation of most of the Preferred Actions or Alternatives improve existing recreation facilities [3,6, 14] and/or provide new recreation opportunities [1,4, 5a,5b,6b,7,8,8b,9,10,10b,10c,11, 30,32,36, etc.].

The establishment of controls or restrictions on existing uses will positively impact recreation by improving the quality of recreation experiences but could negatively impact opportunities if certain uses were eliminated or restricted [15,15b,16b,17,18,18b, 19,19b,20].

Obtaining additional law enforcement capabilities [21] could increase patrol activities and enforcement presence thereby promoting greater compliance with rules and regulations.

Many of the concession related actions could both positively and negatively impact recreation if long-term uses in shoreline areas were removed, allowing more short-term use opportunities [22b,25,34,34c] to occur. Limiting storage in shoreline areas [26], requiring resort master planning [27], establishing planning and development criteria [28], and limiting shoreline modifications [33], could positively impact recreation by improving facilities and conditions in resort areas. Developing standards and guidelines [29,38] could have positive impacts as noted above, and minor negative impacts due to less intensive developments which might then limit opportunities.

Minor negative impacts to recreational uses and opportunities could result if actions were implemented that reduce the land base [2], close areas [4b], cause an increase in user fees which could reduce recreational opportunities for certain users [12,40b,41, 41b] or continues limitations on existing private houseboats [32a].

None of the Preferred Actions would create moderate or major negative impacts on recreation opportunities or uses. Alternative Actions prohibiting all commercial houseboats [30c], converting most lands into a fish and wildlife management area [13b], or returning all dispersed recreation areas to semi-primitive status [3b], could have moderate negative impacts on existing recreational uses by restricting access and removing sanitation and visitor facilities. Not allowing relocation opportunities for displaced long-term uses [37b], would result in major negative impacts upon those tenants who are affected.

2. Mitigation

Through implementation of the various Preferred Actions or Alternatives, recreation opportunities, for the most part, would be optimized requiring no mitigation measures. Some of the actions as noted above would require restrictions and some changes in existing uses or actual closure in some instances. Generally such requirements will assist in mitigating some of the existing recreational use problems such as water surface congestion, lack of adequate short-term recreational facilities or public access issues. The quality of recreational experiences should improve for most recreationists.

To mitigate some of the minor negative impacts associated with fee changes [12,40b,41,41b], implementation dates could be phased over a period of time.

G. LAND USE

1. Consequences

The development of a campground and boat launching ramp on the north shore of the lake [10,11,11b] could create a minor negative impact on existing land uses by reducing the amount of land available for grazing under lease by up to 50 acres. In addition, moderate to major negative impacts to existing grazing easements could be experienced if Reclamation were to enter into a more comprehensive fish and wildlife management agreement [13,13b] for

the east shore area. These actions could eliminate up to 1397 acres of grazing lands if the entire area was closed. In the past, grazing activities on some allotments have been restricted due to overgrazing. Changing land use from predominately grazing to wildlife management will benefit some species (those being managed for) and could possibly be a detriment to other species.

Actions which promote the development of competing uses with those offered by resort operators [5b,10b,10c] would create some minor negative impacts to the operators. The actions would provide positive benefits to a larger number of users. Actions such as [16,19] could alter existing land or water uses to accommodate new short-term uses. These Actions might produce minor negative impacts. However, impacts associated with Actions allowing limited special uses of lands and waters [15,15a,16a,19a] will be identified in subsequent site specific environmental documentation.

By controlling use through increased law enforcement capabilities [21], Reclamation could manage areas more effectively. In certain instances an Action could produce both positive and negative impacts. For example, the acquisition of more land [1] could provide additional recreational opportunities while negatively impacting existing private land uses such as grazing. Establishing a boat access camping program would help control existing unauthorized camping by providing sites that are properly designed and hardened. However, the program could also impact grazing uses and could increase threats of fire.

2. *Mitigation*

There are very few mitigation measures Reclamation could implement to reduce any of the negative impacts. Some Actions that negatively impact grazing can not be mitigated because no additional Reclamation lands are available. Even if Reclamation were to purchase certain lands along the north shore, they are already being used for grazing and there would be no net increase in grazing potential.

For those Actions creating competing uses with resort operations, one mitigation measure would be to grant the adjacent resort operator the right to operate the new facilities as part of their concession agreement. To mitigate those Actions that may allow special events or limited special uses to occur on Reclamation lands or water, guidelines will be developed to regulate and restrict the special events or uses allowed and where they could occur. These guidelines would become a part of the RAMP upon its completion.

H. CULTURAL RESOURCES

1. *Consequences*

While the major portion of the Lake Berryessa Recreation area has been inventoried for cultural resources, not all have been recorded. Those lands that have not been examined tend to have very steep slopes possessing little potential for significant finds, or, they have been covered by structures, asphalt, or fill.

Many of the cultural resources are buried and can not be found unless the surface area is disturbed. Therefore, Actions involving earthwork or other soil disturbances [4,6,9,10,11,24b,33,37, etc.] increase the chance that new, unrecorded cultural resources may be discovered, damaged, or destroyed. Without further archaeological surveys, specific potential impacts can not be identified. In these cases the impacts have been considered "unknown". Other Actions that open up new areas for walking or hiking [3,7,8] can increase the chance of exploitation due to greater numbers of people exploring and searching for artifacts.

2. *Mitigation*

Some Actions [14,21,27,28,29,38] assist in the protection of cultural resources by providing additional information to the recreational user on the values of the resource and the need to protect them, allow Reclamation to actively enforce conservation and protective measures, and provide for planning strategy for future recreational development.

Preliminary identification studies for cultural resources have been completed pursuant to the National Historic Preservation Act. Based on the decisions made regarding the Actions chosen, and as soon as a decision is made to embark on an undertaking, Reclamation will consult the California State Historic Preservation Officer for compliance with Section 106 of the National Historic Preservation Act.

Prior to development, areas that have not been inventoried for cultural resources are to be examined. With advanced planning [27], mitigation measures can be developed to minimize or eliminate any adverse impacts to cultural resources. Aggressive signing reflecting protective rules and regulations, with appropriate warnings and consequences, and interpretation of the area's cultural resources [14] will

be used to increase visitors awareness of the need to protect and preserve such resources. Additional law enforcement [21] could provide management with the tools to prevent unlawful collection of artifacts.

I. TRAFFIC AND CIRCULATION

1. Consequences

Generally the Preferred Actions and Alternatives listed would only have slight impacts on road transportation in the area, since traffic corridors are used under capacity most of the time. Continued population growth in surrounding counties will impact road usage at Lake Berryessa more than any action being considered in this document.

Actions which could promote increased recreational use [4,4c,5a,6b,8,8b, 10,11,11b,20a,24b, 30b,36, etc.] may add to roadway congestion during the peak recreation season, most specifically on holiday weekends. However, these Actions could also disperse uses thus reducing congestion which occurs near the limited number of day use areas.

Actions that propose development of a campground [10,10b,10c] and a boat launching ramp [11,11b] could increase the average daily traffic volume by approximately 100 vehicles on peak use days. Referencing a study completed by the Napa County Conservation, Development and Planning Department (1987) and the Caltrans 1986 Route Segment Report, this increase would represent approximately a five percent increase in the average daily traffic volume of approximately 2,000 vehicles on Berryessa-Knoxville Road. Actions [14,20,21] would also aid in limiting the severity of any impacts by providing improved visitor information services and controls over the use of the lake.

The development of a resort/convention center on Big Island [9c] could have a major negative impact on the transportation system depending upon the extent and level of development. As with many of the Actions, additional impact analysis would have to be conducted prior to development.

2. Mitigation

Since the impacts on traffic and circulation would be minor, and generally only occur during peak periods, mitigation measures would not have to be extensive. Periods of peak or high use do not generally prompt responsible transportation agencies such as the State and County to provide additional capacity because they are infrequent and isolated events.

Reclamation will cooperate with Caltrans and Napa County as necessary to minimize the impacts caused by increased recreational uses. Within the jurisdiction of the lake area Reclamation could provide for adequate off-road parking in dispersed recreation areas, develop proposed recreation areas so as to encourage uses away from currently congested areas, and improve signing so that motorists can easily find the most direct routing to intended recreation sites. Dispersing new as well as existing recreation uses will minimize the pockets of congestion which now occur at popular facilities.

One of the more important Actions that could resolve traffic congestion would be the implementation of a vigorous law enforcement program [21]. With authority to enforce rules, a signing program could be developed to reduce or eliminate illegal parking along those portions of Knoxville- Berryessa Road prone to congestion.

J. SCENIC RESOURCES

1. Consequences

The Actions and Alternatives described have impacts on the existing scenic resources both negatively and positively as well as no impacts. Positive beneficial impacts are noted when Reclamation can control and plan for scenic resources [1,3,8,8b,12, 21,24,27,28,29,33,33a,39]. Through proper planning of activities, use and improvements of scenic resources can be protected.

The increased presence or restoration of natural vegetation and habitat also contributes positively by providing natural views and scenery in the surrounding area [3b,4b,13,13b]. Any decrease in the presence of the built environment on the landscape including structures, mobile homes, buildings, vehicles, etc. or activity levels of the recreating public is evaluated as beneficial [15b,16b, 18b,20,22b,23,24a,25,26,30c,34, 34c,35b,36,36b,37b].

This evaluation is predicated on the principle that scenic resources have been defined as naturally occurring elements in the landscape and thus the elimination of other artificial elements enhances scenic resources. Controlling the discharge of gray water and providing sewage pumpout facilities in resorts helps to protect water quality which is viewed as a beneficial scenic resource [31]. Any Actions that promote lower density of improvements, visitor use and/or vehicles on the landscape or water surface [17,17b,19b] would positively impact scenic resources .

Impacts on scenic resources that exist presently and will continue under an Action or Alternative are

labeled as "no new impacts" on the environmental assessment matrix [5,8a,15a,16a,21a,22,22a,23a,25a, 25b,28a,29a,34a,34b,35,35a,36a,37a,38a,39a,40a,41, 41a]. Continued impacts include the presence of built structures, vehicles, visitors, mobile homes, etc. which are negative impacts on the shoreline and surrounding landscape.

Any activity that may increase visitor use density and presence on the landscape could have negative impacts on scenic resources. Minor negative impacts were associated with the following Actions: [4,4c,5a, 7,7b,9,15,16,18,18a,19,19a,30,30a,32,40b,41b].

Moderate negative impacts were associated with actions involving additional development at the lake such as a recreational vehicle park, campground, boat launching facilities, construction and storage on the shoreline, additional houseboats, shoreline modifications, etc. [5b,10,10b,10c,11,11b,23a,26a, 30b,33b,37].

Actions such as the development of a recreational vehicle park at Smittle Creek, an airstrip on Big Island, a resort/convention center on Big Island, expansion of long-term use in the resorts, unlimited use of the lake's water surface by watercraft, etc. [5b,9b,9c,20a,24b, 27a] would degrade existing scenic resources and would be very difficult to mitigate. In each one of these actions the natural unencumbered landscape would be developed into highly intensified built environment which would reduce the quality of scenic resources at Lake Berryessa.

2. *Mitigation*

Negative impacts associated with the Actions and Alternatives in most cases can be treated with mitigation measures to lessen their implications. If the land planning and development criteria under Preferred Action #28 is implemented, it will serve as a major mitigation effort for future development. The following Actions will also mitigate negative impacts on scenic resources.

- Establish natural vegetation in impacted areas.
- Establish screening of activities and the built environment with vegetation and land forms.
- Plan developments in areas that are screened from scenic viewsheds.
- Scale structures to match surrounding landscape scale.
- Restrict specific activities through operational policies to given areas to contain their presence on the landscape (e.g. parasailing, seaplanes, etc.).
- Plant native vegetation in resort areas to replace existing ornamental plants.

K. SOCIO-ECONOMIC IMPACTS

1. *Consequences*

The social and economic impacts which could accrue to permanent residents in census tract 2018, resort tenants, resort owners, and any long or short-term recreationists expecting to take advantage of recreational opportunities at Lake Berryessa are contingent upon each Action being considered. For the purposes of this analysis, the social and economic impacts associated with the implementation of each Action is summarized based on the type of Action being considered. These types of Actions have been divided into the following types of categories: [1] Land, Water Surface, and Compliance Management Actions; [2] Concession Management - prior to resort reorganization; and [3] Concession Management - associated with reorganization of resorts.

a) Land, Water Surface, and Compliance Management Actions

1) Recreation Visitors

For the most part, implementation of most of the Land Management Actions would be perceived by the recreation visitor as being positive since overall accessibility to recreational facilities at Lake Berryessa would be increased. Minor negative impacts on the recreating public would be associated with those Actions which would generate increases in the present user-fees [5b,6,6b,8,8b,9c, 12]. Increases could be viewed as being a way to restrict or limit the ability of the public to fully utilize the recreational facilities at Lake Berryessa. Other minor negative impacts could result from those Actions which might displace the existing recreation visitor as lands would be either reserved or restricted for special uses only [5b,6b,15, 16]. The number of user displace would vary according to the season, time of day, location of use, etc.

Implementation of the Preferred Actions relating to the water surface will not generate any new impacts over the existing situation. Implementation of recommendations under the Compliance Management Actions would positively impact recreation visitors as the enforcement of existing rules, regulations, and ordinances would be augmented.

2) Resort Tenants

In general, those Actions which would increase or improve short-term recreational opportunities at Lake Berryessa could be perceived as negative by resort tenants as the associated increases in visitation could result in increased congestion, increased intensity of recreational use activities in and around the lake, and disrupted status quo and recreational lifestyle enjoyed by the resort tenants. Those Actions which could negatively impact the resort tenants' perception of the quality of their present day recreational experience include [3,5a,5b,5c,7,7b,8,8b,9,9b,9c,10,10b,10c,11, 11b,15,16]. Those Actions which could negatively impact resort tenants by increasing fees include [6,8,8b].

Implementation of any of the Preferred Actions relating to the water surface will not generate any new impacts over the existing situation. To the extent that implementation of the recommendations under the Compliance Management Actions are implemented, resort tenants should perceive a positive impact as existing rules and regulations governing the safe and efficient use of existing recreational activities will be enforced.

3) Resort Owners

In general, the creation of new recreational opportunities would be viewed positively by the resort owners, to the extent that these new recreational opportunities will not directly compete against their resort operations and consequently affect their own profit margins. The increased recreational opportunities will in themselves generate additional visitation in and around the resorts. However, some of those Actions which could compete directly with the existing resort owners would be viewed negatively. These include [5a,9c,10,10b,10c,11, 11b,16c].

In particular, the implementation of an Action such as [9c] (construction of a new convention and resort center on Big Island) will be viewed particularly negatively since it would directly compete against all resorts. Some minor negative impacts associated with the implementation of retrofitting existing facilities to meet the needs of "special needs" population could be encountered by resort owners [6] since this is required by Federal standards. (Federal law requires minimum access improvements to many primary facilities.)

Implementation of the Preferred Actions relating to the water surface may be classified as those which could result in decreased concession income versus those that could result in increased concession income. Those Actions which could restrict some present uses on the lake and any associated revenues that the resort owners would receive from user fees include [17,17b, 18b,19b,20]. Those Actions which would create new uses and new activities, and generate additional revenues include [18,19]. No estimates of losses or gains in concession income which may result from these Actions is available.

Additional law enforcement capability [21] including increased patrol activities could positively impact resort owners.

4) Local Economy

The primary focus of impacts upon the local economy is either the increase or decrease in retail sales associated with increased recreation visitation. Although the majority of the Actions would increase the potential for additional retail sales within the local area's economy, the associated increases in visitation could be offset by the need for the local area to provide additional public services such as increased road maintenance, increased public safety patrols, and the need to construct new facilities to provide for water, sewer, fire, and other utility-related requirements. These negative impacts would be most pronounced for those Actions which would generate the most increases in recreational visits. Generally, very few negative impacts to the local economy would result from implementation of the Preferred Actions. Examples of Actions which would result in additional revenues for the local economy are [2,3, 4c,5a,5b,6b, 7,7b,8,8b,9,9b,9c,10,10b,11,11b,15,16].

Water surface Actions which would restrict activities [17,17b,18b,19b,20] or reduce visitation would generate minor negative impacts, while those Actions which would generate additional recreational activities [18,19] or increase visitation, would generate positive impacts.

As with the Land Management Actions, it is important to recognize that the increased visitation will not always generate aggregate positive impacts, as increased visitation will undoubtedly necessitate the expenditure of additional public sector funds to maintain a minimum level of public services such as increased road maintenance, increased public safety patrols, and the need to construct new facilities to provide for water, sewer, fire, and other utility-related requirements. Additional law enforcement capability will positively impact adjacent landowners if it results in increased patrol and enforcement of trespass.

b) Concessions Management--Prior to Resort Reorganizations

The primary purpose of Preferred Actions [22-33] is to improve resort planning, mandate floodproofing and/or anchoring requirements and control/restrict other uses in shoreline areas.

1) Recreation Visitors

With the exception of Actions [26,31] no new impacts are anticipated to accrue to recreation visitors. Action [26] restricts the use of existing shoreline areas for storage purposes, and consequently, its implementation would reduce storage capacity, ultimately increasing the competition and price for alternative storage capacity. Similarly, prohibiting the discharge of gray water would require recreation visitors who operate overnight occupancy vessels to invest in additional holding facilities. Both Actions are anticipated to result in only minor negative impacts.

2) Resort Tenants

Implementation of floodproofing or removal Actions [22,22b] will result in major negative impacts, as tenants will be required to undertake a capital improvement program or relocate structures. Actual costs associated with the floodproofing and/or anchoring Actions are unknown at this time, anticipated costs per anchoring point is $75, and the number of anchors is dependant upon the size of the travel trailer or mobile home. Costs would be significantly less than flood damage costs. The total number of resort tenants who could potentially be impacted by floodproofing and/or anchoring, or removals from the base floodplain (elevation 440-450 feet) totals 195 structures (not including those in Markley Cove which are already contractually subject to removal in 1991).

In the event that relocation outside the resort is necessary, resort tenants would be required to expend additional costs (see Table 11). These costs would vary based upon the distance moved, the condition of the mobile home, as well as the amount and type of permanent improvements that a tenant may have made. However, assuming average conditions (e.g. transport double-wide mobile homes 20 miles, and minimal amounts of permanent improvements), approximately $2,600 (1991 estimates) would have to be expended by each tenant to relocate his or her mobile home. Costs for relocation within the resort would be variable depending upon the size of the unit, location, appurtenances, etc. Information obtained from resorts indicated that typical blocking and moving costs (1991 estimates) could range between $1,200 to $2,300 (not including appurtenances).

If tenants elect to relocate, rather than floodproof and/or anchor their long-term sites, in addition to the economic losses, negative social impacts may occur. Tenants' sense of community affiliation and social interaction that they share with each other would be affected to the point that some tenants may chose not to continue their recreational uses of the lake.

As discussed in Section V.K.4., the weighted average selling price of mobile homes/travel trailers at Lake Berryessa located resort-wide is approximately $20,112, while those occupying shoreline locations is approximately $25,938. However, the weighted average retail values for mobile homes/travel trailers located resort-wide is approximately $7,177 while those occupying shoreline locations is approximately $8,357.

Assuming a worst case scenario where all 195 long-term uses would have to be abandoned because both floodproofing and relocations are prohibitive, assuming the estimated weighted average shoreline values above, tenant financial losses could range from $1,629,615 to $5,057,910 (see Table 10). It would be extremely unlikely that losses would range this high since many of the sites could be floodproofed and/or anchored, or relocated. In addition some salvage value would remain for those mobile homes and travel trailers that had to be removed. The above potential loss values have not been discounted.

Potential financial loss is contingent upon the date in which the plan is implemented (within one year after issuance of an operational policy addressing floodproofing and/or anchoring criteria). Floodproofing and/or anchoring, or relocation may result in less damage to tenant owned improvements or prevent the loss of life in the event of flooding.

Other Actions which would restrict the ability of the resort tenant from undertaking capital improvements [23], or restrict storage areas [26], or mandate the adoption of uniform facility design and construction criteria [29], or be forced to relocate facilities [25] from environmentally sensitive areas, are anticipated to result in negative financial impacts to the resort tenants as a group as their costs would increase and the value of their investment might diminish at a faster rate than under the No Action Alternatives.

3) Resort Owners

Similar to those impacts on resort tenants, floodproofing [22], could result in negative impacts

depending upon the number and extent of structures affected. Resort owners will be required to undertake a major capital improvement program to floodproof their facilities, or face the possibility of relocating or discontinuing part of their present operations. The potential costs associated with the implementation of this Action is not fully known at this time. If sites were removed [22b] which represented a loss in rental income (weighted average of $191 per site per month) that was not offset by other short-term revenues, negative impacts could be expected to accrue.

Other Actions which could also impact revenue generating activities include [23,24,25,26,27,28,30c, 31,33,33a]. Implementation of these Actions would restrict or prohibit current revenue generating activities by resort owners, and consequently could result in negative minor to moderate impacts if implemented. Positive impacts as a result of allowing additional revenue generating activities for resort owners would accrue if the following actions were selected [24b,30,32,33b]. These alternatives would either continue the present practice of allowing unrestricted development and expansion or would permit the expansion of a presently under-utilized recreational activity (houseboating).

4) Local Economy

As with resort tenants and resort owners, those Actions which would require relocation of existing activities would be expected to generate negative impacts, as relocation introduces the possibility of reduced visitation and hence a decrease in retail sales in the local economy. Additionally, implementation of those Actions which would either restrict or reduce the potential for additional growth [23,24,25,30c,33] could be viewed as a minor negative impact. Conversely, those Actions which allow additional expansion and development [24b,26,28,32,33b] would generate additional retail sales and hence generate positive impacts.

As discussed earlier, it is also important to recognize that adoption of any growth inducing Action will also generate the need for additional public services. This in turn will offset some of the benefits associated with tax revenues and retail sales associated with increased visitation. Actions which improve planning of new facilities and development may stimulate retail sales since there is a greater demand for quality, well designed facilities [27,28,29].

c) Concessions -- Associated with Reorganization of Resorts

The Actions [34 to 41b] discussed in this section would be undertaken after a reorganization of a resort. The key Preferred Actions would remove all long-term uses from the 100-year flood area, require floodproofing in other areas subject to flooding, create short-term sites from eliminated long-term sites in designated areas, and implement facility development and design standards. Affected long-term sites may be relocated to approved locations.

1) Recreation Visitors

In terms of this category, with the exception of Actions [39,40,40b,41b], the Preferred Actions are not expected to have any new socio-economic impacts. Positive impacts are associated with the potential for creation of additional non-fee recreation areas [39], while moderate negative impacts are associated with the potential for unsupervised fee rate setting by the resorts [40b,41b]. Establishment of a variable fee schedule [40] will generate both positive and negative impacts as improved services and facilities might also generate additional user fee increases.

2) Resort Tenants

Removal of all long-term sites from the base floodplain (elevation 440-450 feet) or reservoir floodplain (elevation 440-455 feet) would result in major negative impacts, as resort tenants will be required to discontinue their use or relocate. This relocation will have financial and social repercussions, as tenants could face financial losses in any investments that they have undertaken in their mobile homes. Permanent relocation would also affect their present social and community affiliation and identification.

If Preferred Action [34] is implemented, 195 sites will ultimately be removed or relocated, and an additional 300 sites are to be floodproofed and/or anchored by the year 2009 when all reorganizations have been completed. If Alternative Action [34c] is implemented, a total of 495 long term-sites would have to be removed or relocated. Other actions would allow long-term sites to remain until public needs develop [34a] or if all sites were floodproofed [34b].

In addition to removing or protecting long-term sites from flooding, under Action [36], certain long-term sites in desirable shoreline locations would be converted to short-term sites. An estimated total 220 sites may be removed or relocated for clustering short-term uses. As noted above, both economic and social

repercussions would occur as a result of implementation of this action. However, affected long-term users would still have an opportunity, as will others, to use the converted shoreline areas once new short-term facilities have been developed.

Alternative Action [36a] would not require conversions to short-term sites and therefore would have no impacts on tenants. The conversion of all long-term sites located in the water influence zone and the reservoir floodplain [36b] (an option presented at the public workshops) could eventually require removal or relocation of 758 sites. If all long-term sites were converted [36c], a total of 1540 sites would be impacted.

The potential economic impacts to tenants should long-term sites be floodproofed and/or tied-down, relocated or removed varies depending upon the value of the mobile home or travel trailer, location, appurtenances, size, availability of relocation opportunities, and the period of time remaining prior to the implementation date. As discussed earlier, the weighted average selling price of mobile homes and travel trailers at Lake Berryessa located resort-wide was approximately $20,100, while those occupying shoreline locations is approximately $25,900. However, the weighted average retail values for mobile homes and travel trailers located resort-wide is approximately $7,200 while those occupying shoreline locations is approximately $8,400.

Table 10 depicts the potential financial impacts to tenants if their long-term sites would have to be abandoned under various actions, assuming that no relocation opportunities exist or were financially feasible, and that no salvage values remained.

TABLE 10

POTENTIAL LONG-TERM USE LOSSES BASED UPON WEIGHTED AVERAGE RETAIL VALUES AND SELLING PRICE ASSOCIATED WITH VARIOUS ACTIONS

Action Area	Long-Term Sites Impacted	Average 1/ Retail Value	Average 2/ Selling Price	Range of Losses
Base Floodplain 3/	195	$8,357	$25,938	$1,629,615 to 5,057,910
Reservoir Floodplain	495	8,357	25,938	4,136,715 to 12,839,310
Short-Term Conversion Areas 3/	220	8,357	25,938	1,838,540 to 5,706,360
Water Influence Zone and Reservoir Floodplain	758	8,357	25,938	6,334,606 to 19,661,004
Entire Resort	1,540	7,177	20,112	11,052,580 to 30,972,480

1/ *Based upon accepted used mobile home and travel trailer pricing guides*
2/ *Based upon actual values reported to Reclamation*
3/ *Preferred actions (total 415 sites impacted lake-wide)*

The above table represents the worst case scenario for any action or group of actions for it assumes that a tenant's entire investment in a site has been lost. In reality, most sites would have some salvage off-site retail values and may be relocatable to other areas in the resort or other parks. In addition, the potential loss in investments has not been discounted.

The actual potential loss in values is contingent upon the date the actual implementation of a plan would occur. Since each resort has a different contract termination date, the present value of such a loss (assuming the tenant amortizes their investment) in the future would be significantly less than the values shown in the tabulation above. Additionally, if the ultimate date of implementation is far enough in the future, a significant part of any potential loss would be mitigated by any anticipated depreciation that would normally be expected to accrue.

Besides economic losses, removal of long-term sites will impact upon the sense of community affiliation

and social interaction that existing resort tenants share. Consequently, negative impacts may be expected to accrue to these individuals if they are forced to relocate away from the present social community.

Under Action [37] long-term sites which may be liminated through the implementation of other Actions may be relocated elsewhere in a resort, provided space is available and is approved by Reclamation. The ability to relocate could mitigate the loss of the shoreline site. However, additional costs would have to be born by the tenant. Costs for in-resort relocation would be variable depending upon size of the unit removed, location, blocking costs, etc. Information obtained from resorts indicates that typical moving and blocking costs would range from $1,200 to $2,300. The table below indicates the potential relocation costs which resort tenants might incur under a variety of Actions. This does not include costs associated with decks and other appurtenances.

TABLE 11

POTENTIAL LONG-TERM SITE RELOCATION COSTS ASSOCIATED WITH VARIOUS ACTIONS

Action Area	Long-Term Sites	Site Relocation Impacted	Total Costs Costs
Base Floodplain 1/	195	$1,200 - $2,300	$234,000 - $448,000
Reservoir Floodplain	495	1,200 - 2,300	594,000 -1,138,500
Short-Term Conversion Areas 1/	220	1,200 - 2,300	264,000 - 506,000
Water Influence Zone and Reservoir Floodplain	758	1,200 - 2,300	909,600 -1,743,400

1/ *Preferred actions (total 415 sites impacted lake-wide)*

Although relocation opportunities would minimize tenant economic losses should they be required to vacate shoreline sites, other negative social impacts would occur as has been described previously. If Action [37a] (prohibiting relocation possibilities) is adopted, negative impacts upon the financial and social areas of concern for resort tenants would occur as recreational lifestyles will be interrupted and may not be easily replaced.

A number of other Actions could increase fees or costs to resort tenants. Floodproofing and/or anchoring requirements [34, 34b], allowing fee increases without Reclamation approval [41] and increasing the resort franchise fees to maximize fair market prices [40b] would result in minor to moderate negative impacts to tenants. Additional impacts could occur should resort owners at the time of reorganization elect to remove more long-term sites than required under the Preferred Actions.

3) Resort Owners

Removal of all 195 long-term sites from the base floodplain [34] or the 495 sites from the reservoir floodplain [34c] will cause negative economic impacts to resort owners. The degree of impact could range from minor to major depending upon the resort impacted and how many sites are located in these zones. In addition, the removal of 220 or more long-term sites, depending upon the Action, for eventual short-term conversion will have similar negative economic impacts in that investments undertaken in the impacted zones may be lost along with rental income.

In the above cases, resort owners may be allowed to relocate all or a portion of the displaced long-term uses and incur new long-term site development costs estimated at $6,000 to $7,000 per site. In-resort relocation costs averaging $1,200 to $2,300 would most likely be absorbed by tenants who may also pay for some of the new site development costs.

In some cases, replacing vacated long-term sites with short-term recreation facilities could offset or even augment rental income lost from eliminated long-term sites. The construction of quality short-term recreation facilities (RV sites, campgrounds, cottages, cabins, motel, etc.) could yield greater income from shoreline areas than is now provided by the long-term sites. However, prior to obtaining any income from such short-term conversions, additional capital expenditures would be necessary to develop improvements. Costs would vary with the extent and number of new facilities provided.

The following table was prepared for the Draft EIS at a time (1985) when the lake was at normal levels and without impacts of a recession. Even though the average rental rates are not current, the conditions of the lake make the impact more representative of what should occur versus what may be occurring in 1990 and 1991. It displays the estimated rental income losses incurred owners under a worst case scenario where no relocation opportunities are possible and no immediate short-term rental income replaces the long-term rental income. Average monthly rental income was calculated from information supplied by resort operators and from annual financial statements.

TABLE 12

LONG-TERM USE RENTAL LOSSES AND PERCENTAGE OF POTENTIAL RESORT INCOME ASSOCIATED WITH VARIOUS ACTIONS! (1985 FIGURES)

Action Area	Long-Term Sites Impacted	Average Monthly Income	Potential Rental Loss	% of Total Resort Income
Base Floodplain 1/	195	$130	$304,000	4.3%
Reservoir Floodplain	495	130	772,000	11.0%
Short-Term Conversion Area 1/	220	130	343,000	5.0%
Water Influence Zone and Reservoir Floodplain	758	130	1,182,000	17.0%
Entire Resort Area	1,540	130	2,400,000	34.0%

1/ *Preferred actions (total 415 sites impacted lake-wide)*

Based upon the above table, implementation of the Preferred Actions involving the removal of long term sites [34,36] could potentially decrease total resort income by approximately 9.3 percent. Individual resort impacts would vary depending upon actual number of sites impacted, specific rental income, period of time prior to implementation of Actions and whether relocation or replacement opportunities were available.

In addition to economic losses, any removals or relocations of long-term sites will have negative social impacts upon resort owners who may share a sense of community affiliation and social interaction with those tenants which may have to be displaced.

Other Actions which would require the resort owner to undertake floodproofing and/or anchoring improvements [35], standardize design and construction standards [38], or the deletion of specific land areas from presently defined concession areas [39], are expected to generate minor negative impacts.

Adoption of either a variable franchise fee [40] or a fair market oriented franchise fee [40b] will generate minor negative impacts as the operating costs to the resort owners may be expected to increase. Conversely, implementation of Action [41,41b] which allows the resort owners to basically adopt an unsupervised fee schedule could generate positive impacts as the resort owners would have the flexibility to raise their fees accordingly to respond to their changing needs.

4) Local Economy

As with the resort owners and resort tenants, the local economy can be expected to face the most significant impacts if long-term sites were removed without replacement facilities or relocation opportunities. These impacts would primarily accrue as a result of decreased retail sales in the local economy. However it is likely that relocation possibilities and replacement facilities would be provided at least in some of the resorts impacted.

Implementation of those Actions which would convert long-term sites to short-term sites [36,36b], are anticipated to have both positive and negative impacts as the reductions in long-term user retail sales could be replaced by short-term user retail sales. Short-term users generally contribute more to local retail sales. However, additional services are frequently required.

Establishment of a variable franchise fee is anticipated to generate positive impacts [40], as it would generate additional visitation and retail sales. Adoption of a fair market franchise fee could generate minor negative impacts if visitation and retail sales were decreased.

2. Mitigation

As discussed above, some of the Actions being considered could have financial and social consequences. In many cases the associated negative impacts can be mitigated or lessened if certain measures are implemented. Prior to the development of the Preferred Actions, the planning team evaluated information and concerns addressed by the public during the scoping phase of the RAMP effort. As a result, various social and economic related mitigation features have been already included in the Preferred Actions presented in this document. Examples of mitigation features which have already been included to lessen negative impacts include:

- Allowing long-term sites to remain until one year after a reorganization of a resort as long as those sites in the base floodplain (elevation 440-450 feet) are floodproofed and/or anchored. This would allow many long-term sites, which have been targeted for removal, to remain until the year 2009.

- Implementing floodproofing and/or anchoring criteria in the base floodplain will not be required until one year after completion of the RAMP or as directed in appropriate operational policies.

- During reorganization of a resort, most long-term sites within the 450 - 455 foot zone would be allowed to remain if they are floodproofed and /or anchored and not part of a conversion to create additional short-term sites, or are not part of the concessioner's alternate plans for the areas.

► The removal of long-term sites for eventual conversion to short-term sites will be limited to areas selected during master planning and resort reorganizations. The complete removal of all long-term sites in the "water influence zone" (100' from gross pool) is not a Preferred Action.

► Long-term sites subject to removal will be able to relocate provided space is available.

In addition to the above there are other Actions which could be taken to mitigate the scope and magnitude of negative impacts. For instance, it may be possible that low interest loans could be provided by the government to those tenants and resort owners who cannot afford to floodproof their facilities in accordance with Reclamation Instructions.

To minimize disruption in community affiliation and interaction, it may be possible to relocate existing resort tenants in clusters to maintain the existing community infra-structural relationships. Delaying the implementation of use fee changes could also minimize impacts.

L. HEALTH AND SAFETY

1. Consequences

Those Land Management Actions which outline future developments [3,4c,5a,5b,6,6b,7,7b,11,11b,14, 16b] would generally be beneficial to visitor health and safety. Under these Actions new development would improve existing access, relieve congestion at major recreation areas by offering similar uses at other noncongested locations; provide areas for special needs populations who now use regular facilities; develop trail systems where informal trails currently exist; expand visitor services to inform the public of the resources and facilities at Lake Berryessa.

There are four actions which would have negative impacts on visitor health and safety. These range from minor impacts [3b,16] for allowing special events which may displace traditional types of uses, to major impacts [9b,9c] for allowing an airstrip on Big Island which would permit nontraditional uses that could be a hazard to normal recreation activities.

Some Actions would result in mixed - positive and negative impacts. These Actions [8,8b,9,10,10b, 10c] allow for controlled activities to occur where none were authorized before. Positive impacts may result from better control measures required by these Actions. Negative impacts could be derived from increased use, congestion, and a greater threat of wildfire.

Actions related to water surface management are generally positive with the only exception being minor negative impacts which could result by allowing special water use events [19]. Positive impacts result from zoning and setting carrying capacities. These would benefit the overall health and safety of the visiting public in three ways. First zoning [17,17b] would help eliminate conflicts between user groups by establishing user areas or specific times the public could use areas. Secondly, the elimination of special uses [18b,19b] from the lake would reduce the probability of conflicts with traditional uses thus decreasing the possibility of incidents. Third, the establishment of a carrying capacity [20] for boats on the lake would decrease future overcrowding conditions thus making the lake a safer place to boat.

Obtaining additional law enforcement authorities [21] would have a positive impact on health and safety. Increasing law enforcement presence would encourage increased compliance with rules and regulations at the lake.

The Alternative Action [21a], no Action, would be to seek no additional law enforcement authority, thereby maintaining the status quo. This may limit the ability of Reclamation to meet the needs of providing additional coverage as use increases.

Actions under Concessions Management - Prior to Resort Reorganization would generally have positive impacts on health and safety. Their implementation would control uses within the floodplain, require resort planning actions, develop land management plans and facility development criteria and control the use of houseboats on the lake. Moderate negative impacts (additional fire hazards) could result if houseboat activities [30,30a,30b,32] are greatly increased. There would also be minor health and safety impacts if the concessionaire were not able to modify the shoreline [33a] below the 440 elevation level.

Actions under Concessions Management - Associated with Reorganization of Resort would have positive impacts on health and safety or no impact. Positive impacts would result from the Actions which remove all facilities from the floodplain [34,34c,35]. The removal of these sites would eliminate a potential source of pollutants (such as common household cleaning solvents, gasoline, batteries, etc.) from the lake. It would also reduce any health and safety problems associated with the flooding of structures and facilities.

Positive impacts would also result from the establishment of concession development design

criteria and master planning. Through development criteria Reclamation would be better able to insure the overall safety of the development. The variable franchise fee [40] would also have a side benefit of improving health and safety. The fees could be structured in such a way as to reward the concessionaire with a lower franchise fee should the overall health and safety of the resort improve.

2. Mitigation

Mitigation measures for most Actions under the land management section would include measures taken by both Reclamation and the concessionaires. Impacts associated with boat access camping areas [8] could be mitigated through an information program on the danger of wildfires and safe use of campfires, and the provision of appropriate facilities such as firerings. Boat-in camping permits could be printed with this type of information on the reverse side of the permit.

Mitigation activities under water surface management would include measures to mitigate for the impacts of allowing special water use events. These mitigation measures could include the following:

- Provisions in the agreement to allow for the control of crowds, sanitation and parking.

- Reclamation approval of special events based on an analysis to determine the compatibly of the event with other uses at the lake.

Mitigation under Concessions Management - Prior to Resort Reorganization involves measures taken by the concessionaire and Reclamation. Actions that allow houseboats [30,32] on the lake could be mitigated by the following:

- Yearly inspections of houseboats by Reclamation or resort employees to insure compliance with minimum standards.

- A permit and reservation system to monitor use.

- Require any resort that allows any houseboat launching or moorage to have support facilities (waste disposal systems, etc.).

- Implementation of a trash pick up program for inaccessible areas of the lake.

The prohibition of shoreline modifications below the 440 foot level [33a] could prevent actions to relieve health and safety problems. In such cases, the Recreation Manager could approve minor shoreline modifications which could mitigate the potential impacts. As actions are implemented that increase the number of users to a resort, create new camping areas, or provide for developments on the islands, new or improved sewage treatment systems will be provided. Existing systems which utilize holding tanks and evaporation ponds may have to be expanded. As such, the California Regional Water Control Board and Napa County Health and Safety Department shall be consulted and provided the opportunity to review and comment on any future or expanded sewage treatment systems.

M. LAW ENFORCEMENT

1. Consequences

In most instances, any Preferred Action or alternative that increases the opportunity for use or places greater restrictions on the user, will place greater demands on law enforcement agencies. While some of these Actions and Alternatives may increase the need for more law enforcement initially, they may also reduce future law enforcement problems. The "no action" Alternative [8a] may not affect law enforcement initially but could ultimately cause additional law enforcement problems as future use and abuse increases.

Those Actions which outline entirely new developments or define new uses [5c,6b,8,8b,9,9b,9c, 10, etc.] may cause moderate to major negative impacts. These Actions may increase violations, thereby increasing the areas to be patrolled or protected and could necessitate the development of new or additional rules and regulations. This would directly impact all enforcement agencies.

Other Actions that increase or improve existing facilities or uses [1,3,4,4c,5b,7,7b,15,16,32, etc.] may tend to create minor negative impacts. Agencies are already providing enforcement activities to existing areas. With the improvement or increase in size or number of units, there will be a need for more enforcement.

There are some Preferred Actions and alternatives that produce both positive and negative impacts. Those actions which assist existing law enforcement efforts [12,13,13b,17,20,20b,30,30a,30b,30c,31,31b, 32a] do so by placing restrictions on types of use, numbers of use, and where the use may occur. However, there may be an initial period of time when a greater degree of enforcement will be required to implement the changes.

Two Actions will greatly assist law enforcement agencies in their ability to provide protection for the lake. By providing a more aggressive information system [14] the visitor will be better informed as to

where to recreate and what is acceptable behavior. Entering into a formal contract with an agency [21] for specific law enforcement Actions will also aid in the total protection of the lake.

2. *Mitigation*

There are very few mitigation options available to reduce the impact on law enforcement agencies as recreation use increases. The implementation of an aggressive information system [14] should encourage willful compliance of rules and regulations. When users are aware of where to go and what behavior is acceptable, the demand on law enforcement staff is reduced. Obtaining additional law enforcement capabilities [21] could reduce demand on existing law enforcement agencies. Other mitigation measures might include careful analysis as to where new developments will be placed, constructing facilities to be more vandal proof, and increasing the amount of signing.

N. ENVIRONMENTAL CONSEQUENCES

1. Tiering

When finalized, the EIS will provide the overall programmatic direction for developing specific plans and operational policies for the Lake Berryessa Reservoir Area Management Plan (RAMP). Preferred or Alternative Actions ultimately selected for future implementation will be identified in a Record of Decision (ROD) on the EIS. In most cases these actions will be programmatic in nature and form the basic framework for the RAMP. In the RAMP, specific plans and operational policies will be developed to implement the programmatic objectives identified in the EIS. These specific operational policies or plans will be subject to further environmental analysis and public involvement as necessary. Under National Environmental Policy Act (NEPA) and the Council on Environmental Quality (CEQ) guidelines, this sequence of analysis is termed "tiering" and is appropriate when the implementation of specific actions may not occur for several years but where general (programmatic) direction and guidance is needed.

Because the Final EIS is programmatic and analysis of impacts will be tiered and assessed sequentially, and due to the large number of Preferred and Alternative Actions being considered and the number of commutations which could occur, cumulative impacts for each combination of Actions was not considered practical at this time. For this reason Table 13 - "Condensed Matrix" was developed to describe moderate to major negative impacts associated with each Action. Negative impacts for each Action are described by resource categories and associated proposed mitigation measures are provided as well. Therefore, the Condensed Matrix can be used to create a modified listing of cumulative impacts. For example, to determine the cumulative impacts associated with a variety of Preferred and/or Alternative Actions, the Condensed Matrix can be consulted to find specific impacts associated with each action, which can then be combined to form a summary of cumulative impacts.

Impacts

As noted above, cumulative impacts for each possible combination of Actions has not been provided. However, generalized cumulative impacts of the Preferred Actions, and the "No Action" Actions are provided below:

a. Many Preferred Actions listed within this EIS were developed to provide for current and projected increased demands for short-term recreation opportunities, to ensure greater health and safety protection, and to comply with a number of Public Laws, Executive Orders, and agency rules, regulations, and operational policies.

Regardless of what actions Reclamation does or does not take, or what facilities may be provided, visitation is expected to increase each year. Uses are occurring on the lake which have not been approved, uses are occurring in areas which have not been properly prepared or developed, and facilities have been developed in areas that are unsafe. These uses are having negative impacts on the environment now, and the impacts will become more pronounced as use increases. To effectively administer the lake, Reclamation must prepare plans for future development, establish programs that reflect current and future recreation management philosophies, and as may be required by law, to develop, implement and enforce additional rules, regulations, and operational policies.

If the Preferred Actions are selected for implementation, minor to major negative impacts will be experienced. To construct additional use facilities, etc., soils will be compacted, vegetation and habitat will be damaged or destroyed, certain wildlife may be displaced, and water quality diminished. As use increases, greater demands will be placed on local law enforcement and public safety agencies.

To protect private property located within environmentally sensitive areas or the floodplain, floodproofing and/or anchoring or complete removal of privately owned property located on Federal land will have a financial impact on long-term resort users and resort operators. Conversion of long-term sites to short-term uses will also have a negative financial impact on tenants and initially to resort operators. Where long-term

sites are converted or eliminated, resort operators may realize a reduction of approximately $191 a month in rental fees per site. To floodproof/anchor a mobile home or travel trailer the tenant may realize a $75 per tie down fee (the number of tie downs is dependant upon the size of the mobile home or trailer). If site improvements have to be moved, relocation costs could be approximately $2,300. And, if the tenant is forced to sell their improvements because no relocation sites are available, the tenant may only realize an off-site sales price averaging $7,177 versus an onsite average sales price of $20,112 (actual sales prices vary based upon resort and location).

Establishing a fish and wildlife management area on the eastside of the lake may have an impact on grazing permittees if grazing activities are completely eliminated. And, if Reclamation does not control rental rate fee schedules, resort tenants may be financially impacted by rates that are more reflective of what the market may bear.

Many if not most of the impacts can be mitigated through careful planning and construction. Limited construction activities would prevent soil compaction, vegetation would be replanted, campsites and trails would be located in less sensitive areas to avoid conflicts with wildlife. Many of these mitigation measures would also prevent soil erosion thereby protecting water quality. For those sites located within the floodplain, anchoring of sites would alleviate many health and safety concerns, relocation of sites within the resort would ensure the continued use of the resort by the tenant, and where no relocation site exists or anchoring is not effective, extended notices of removal actions would provide the tenant time to amortize their investments.

These same Preferred Actions could have significant positive impacts as well. The additional campground and/or boat-in campsites will be developed to protect the environment by providing hardened sites with appropriate facilities, thereby restricting uses to specific areas that can be properly maintained. Mitigation actions will prevent uncontrolled soil compaction, damage or destruction of vegetation and habitat, displacement of wildlife, and loss of water quality. Resort operators will be allowed to convert some long-term sites located in the floodplain to short-term uses which will provide replacement revenues.

Some of the actions will protect the health and safety of lake users. Limiting the number of vessels on the lake reduces congestion and the threat of collision. Requiring houseboats to hold black and gray water protects water quality. By securing or removing improvements from the floodplain, there is greater protection against the loss of life or property damage during flooding. Implementation of such actions complies with Executive Order 1988 and Reclamation Instructions.

b. The "No Action" actions would allow all current uses and developments to continue as is, e.g. the status quo remains. No new discretionary provisions would be developed to regulate recreation use, control resort development, etc.

It may appear that the "No Action" actions would result in less negative impacts to the environment, resort operators, resort tenants, etc. However, not changing the status quo, does not equate to no increases in visitation or no new negative impacts. On the contrary, use of the lake will continue to increase as surrounding populations grow, increasing negative impacts which are now being experienced. By not formally addressing current and future use and management of the lake, the potential for greater negative impacts to the environment will escalate as use increases. Furthermore, selection of some "No Action" actions may not be consistent with certain Public Laws, Executive Orders, or agency rules, regulations, or policies.

As greater demands are placed on the lake unauthorized shoreline uses in undeveloped areas will increase. This will result in greater damage to soils, vegetation and wildlife, water quality, scenic resources, wildlife populations, and overburden local law enforcement and public safety agencies unless the activity is controlled. Without floodproofing and/or anchoring requirements, flooding could cause significant damage to private property located on Federal land and may result in the loss of life. Reclamation would be in non-compliance with Public Law 11988 and Reclamation Instructions if the "No Action" actions which do not require floodproofing and/or anchoring were selected.

O. ENVIRONMENTAL COMMITMENTS MITIGATION MEASURES

Implementation of Preferred Actions may result in a variety of negative impacts to the physical and socioeconomic environment. To mitigate the negative impacts, mitigation measures will be undertaken, where and when appropriate, to relieve or negate that impact.

As noted in other sections, this EIS is a Generic or Programmatic document. In most cases impacts and mitigation measures have been discussed in a generalized manner. For example, impacts of road construction may include cuts that degrade scenic values in general, increase potential of erosion, or decrease native vegetation. As such, mitigation

measures are generalized as well; no construction on slopes of 25 percent or greater, revegetate the area when construction is completed, and construct berms in areas where ground cover has been damaged to reduce soil erosion. As site specific impacts are identified, site specific mitigation measures will be developed based upon the mitigation measures presented in this section.

After each of the following mitigation measures a listing of numbers [3,4,6,10, etc.] appears. The numbers represent those Preferred Actions that when implemented may create negative impacts which will be relieved or mitigated by the mitigation measure. Many of the Preferred Actions, if implemented, may serve to mitigate ongoing negative impacts, or reduce or eliminate future impacts. Such Preferred Actions are emphasized by ()'s where applicable.

► Parking areas, roads, and trails will be paved, graveled, or hardened as required to reduce soil erosion and compaction, and to funnel use through specific corridors. [3,4,5,6,7,10,11,21,27,29,36,37,38]

► Areas will be revegetated to reduce soil erosion and compaction and water pollution, to act as screening and barrier devices, to improve habitat conditions, and to replicate prior natural states. [3,4,5,6,7, 8,9,10,11,21,22,23,25,26,27,28,29,33,34,35,36,37,38]

► Signing and an aggressive visitor information system (Preferred Action 14) will be implemented to direct correct use of areas or to identify closed areas, warn of fire danger, etc.. [3,4,5,6,7,8,9,10,11,14,15,16,17, 18,19,20,21,31,32]

► Guidelines and criteria for the planning and construction of new facilities or the rehabilitation of existing facilities will be developed to reduce scenic intrusions, soil erosion and compaction, water pollution, to protect environmentally sensitive areas, to promote safety and health, etc. (Preferred Actions 27,28,29,38 mandate resort master planning and the development of planning guidelines and criteria.) [3,4,5, 6,7,8,9,10,11,14,15,16,26,27,28,29,33,37,38]

► Berms and dikes will be constructed to prevent soil erosion, protect water quality, restrict or control access to closed areas. [3,4,5,6,7,9,10,11, 15,16,21,27,28,29,33,36, 37,38]

► Inspections of houseboats and overnight occupancy vessels (OOVs) will be conducted by Reclamation or resort employees to ensure compliance with existing policies requiring sewage holding tanks. (Preferred Actions 31,32 provides for this requirement.)

► Special closures or restrictions will be initiated for use of certain areas to protect habitat and sensitive shoreline locations, and to provide for health and safety concerns caused by inappropriate or excessive use. (Preferred Actions 15,16,17,18,19,20 provides for closures and restrictions.) [3,4,5,6,7,8,9,10,11,13,15,16,17, 18,19,20,21,26,30,31]

► Studies and reviews will be conducted, when appropriate, for monitoring recreation uses, range and habitat conditions, fish and wildlife populations, etc. [1,2,3,4,5,6,7,8,9,10,11,15,16,17,18,19,20,21,25,30,31,32,36, 40,41]

► Law enforcement presence will be increased as a management tool to ensure compliance with rules and regulations, special closures or restriction, etc. that effect use of Federal lands and water areas. (Preferred Action 21.) [3,4,5,6,7,8,9,10,11,14,15,16, 17,18,19,20,21,22, 23,25,26,30,31,32,33,34,35]

► Annual work plans will be developed for use of Federal lands and water areas to promote safety and health, and reduce scenic intrusion and conflicts between wildlife and human uses. [1,3,4,5,6,7,8,9,10, 11,13,14,15,16,17,18,19,20,21,30,32,39]

► Facilities and long-term sites may be relocated in the resort, if space permits and if it is not prohibited for other reasons. (Preferred Action 37 provides for this.) [22,23,34,37]

► Adequate notification will be given to those tenants whose sites are located within the 440' - 455' elevation to floodproof and/or anchor their sites, or to those tenants whose sites will be terminated to amortize their investments. [22,25,26,34,35,36]

CONDENSED MATRIX
(Summary of Major/Moderate Negative Impacts)

PREFERRED ACTIONS	MAJOR/MODERATE NEGATIVE IMPACTS	IMPACTS	MITIGATION
Land Management Actions			
8. Boat access camping program administered by Reclamation 50 - 100 sites developed lakewide no sites yet identified	Mod.	Law Enforcement — increases enforcement responsibilities	Increase law enforcement presence, implement signing program and visitor information services
9. Small and Big Island improvements, changing them to Dispersed Recreation Areas — approximately 450 - acres	Mod.	Law Enforcement — increases enforcement responsibilities	Same as above
10. Develop north shore campground 50 - 100 sites developed on 30 — 40 acres, no specific site on north shore identified at this time	Mod.	Soils and Topography — increases soil erosion and compaction potential Scenic Resources — land disturbance, presence of structures and vehicles on landscape Law Enforcement — increases enforcement responsibilities	Harden all roads and trails, reseed and replant vegetation, increase law enforcement presence, implement signing program and visitor information services, build on slopes less than 25%, use existing contours and vegetation for screening materials
11. Develop boat launching on the north shore — approximately 1½ acre	Mod.	Soils and Topography, Scenic Resources, Law Enforcement — impacts are the same as noted on 10 above	Same as above
13. Establish Fish and Wildlife Management Area for east shore lands — approximately 1400 acres excluding Gunn Ranch	Mod.	Land Use — possible reduction of available land for grazing permits	No mitigation available
Water Surface Management Actions			
18. Allow limited special uses of specific water - surface areas	Mod.	Law Enforcement — increases enforcement responsibilities	Increase law enforcement presence, implement signing program and visitor information services
Concession Actions Prior Reorganizations			
22. Floodproof and/or anchor, or remove structures and facilities in the base floodplain (440' - 450') – 195 long-term sites affected, unknown number of resort-owned facilities or structures	Maj.	Resort Tenants – increased costs due to removal/relocation or floodproofing/anchoring, possible loss of site occupancy and investments, - unknown floodproofing/anchoring costs, removal/relocation costs approximately $1,200 - $2,300 each, average trailer retail value $7,177, average sales price $20,112 Concessionaires - increased building costs, possible loss of rent fees and investments, – unknown costs for removal/relocation or floodproofing, loss of average rent fee of approximately $191 per month	Provide appropriate advanced notice, relocate facilities, structures, and tenant trailers if space is available
25. Remove structures and facilities for environmental causes — sites not yet identified	Mod.	Concessionaires — loss of revenues if sites are elimintated — average rent fee approximately $191 per month	Relocate resort facilities, relocate tenant trailers if space is available
32. Allow 75 private houseboats/OOVS	Mod.	Law Enforcement — increases enforcement responsibilities	Same as above
Concession Actions After Reorganizations			
34. Remove all 195 long-term uses from base flood plain (440' - 450') floodproof/anchor or remove all 300 long-term uses in 450' -455' zone	Mod. Maj. **	Concessionaires — increased building costs, loss of rent fees and facilities Economy — may dislocate uses and decrease retail sales Resort Tenants — increase costs due to removals/relocation or floodproofing, loss of site occupancy and investments see 22 above for associated costs	Provide appropriate advanced notice, relocate facilities, structures, and tenant trailers if space is available
35. Floodproof or remove all permanent structures in reservoir flood plain (440' - 455') — unknown number of resort owned facilities impacted	Mod.	Concessionaires — increased building costs or loss of resort improvements, — unknown floodproofing costs or removal/ relocation costs	Same as above
36. Create short-term sites from existing long-term sites (cluster concept) — approximately 220 sites	Mod. **	Resort Tenants — increased costs due to removals, loss of site occupancy, and investments see 22 above for associated costs	Same as above
37. Relocate long-term sites which have been converted to short-term sites or removed	Mod.	Soils and Topography — increases soil erosion and compaction potential Vegetation and Wildlife — loss of vegetation and habitat Scenic Resources — increase of built environment on the landscape	Harden all roads and trails, reseed and replant vegetation, implement signing program, build on slopes less than 25%, use existing contours and vegetation for screening materials
41. Review long-term use fees if reimbursed by concessionaire	Mod.	Resort Tenant — Concessionaire may increase rent fees without control	No mitigation can be identified at this time

TABLE 13

CONDENSED MATRIX
(Summary of Major/Moderate Negative Impacts)

ALTERNATIVE ACTIONS	MAJOR/MODERATE NEGATIVE IMPACTS	IMPACTS	MITIGATION
Land Management Actions			
3.b. Return dispersed areas to semiprimitive areas	Mod.	Recreation — loss of quality and quantity of opportunities	Manage existing recreation areas for greater quantity and quality of use
4.c. Develop campground (or Administration Point) primarily for special needs populations — approximately 15 acres	Mod.	Vegetation and Wildlife — decrease in vegetation and habitat from construction	Implement planting program, signing program, and visitor information service, restore land to original condition when and where possible
5.b. Convert area (Smittle Creek) to a concession-operated campground and RV Park — approximately 15 acres now being used for short-term day use activities	Mod. Maj.	Scenic Resources — presence of vehicles and structures on landscape Law Enforcement — increases enforcement responsibilities Soils and Topography — increases soil erosion and compaction potential Vegetation and Wildlife — decrease in habitat and vegetation	Harden all roads and trails, reseed and replant vegetation, increase law enforcement presence, implement signing program and visitor information services, build on slopes less than 25%, use existing contours and vegetation for screening materials
6.b. Develop area primarily for special needs populations — approximately 5 - 10 acres	Mod.	Law Enforcement — increases enforcement responsibilities	Increase law enforcement presence, implement signing program and visitor information service
8.b. Concessionaire to operate boat access camping program — 50 - 100 sites lakewide	Mod.	Law Enforcement — same as above	Same as above
9.b. Construct recreation air strip on Big Island with short-term facilities	Mod. Maj.	Soils and Topography — increases soil erosion and compaction potential Vegetation and Wildlife — decrease in habitat and vegetation Scenic Resources — presence of airplanes and structures on landscape Law Enforcement — increases enforcement responsibilities	Harden all roads and trails, reseed and replant vegetation, increase law enforcement presence, implement signing program and visitor information services, build on slopes less than 25%, use existing contours and vegetation for screening materials
9.c. Develop resort/convention center on Big Island	Mod. Maj.	Water Quality — increases potential for water polution Traffic — increased traffic congestion Soils and Topography — increases soil erosion and compaction potential Vegetation and Wildlife — decrease in habitat and vegetation Fish Resources — potential destruction of habitat and fish resources Scenic Resources — transformation of landscape into high density urban setting Law Enforcement — increases enforcement responsibilities Concessionaires — may decrease revenues from competition	See above, and develop guidelines on development of facilities, water treatment and discharge, designate shoreline areas used by fish for no or nominal use No mitigation for loss of revenues to other concession operations
10.b. Develop campground on west shore near Rancho Monticello Resort 50 - 100 sites developed on 30 - 40 acres	Mod.	Soils and Topography — increases soil erosion and compaction potential Scenic Resources — presence of structures and vehicles on landscape Law Enforcement — increeses enforcement responsibilities	Harden all roads and trails, reseed and replant vegetation, increase law enforcement presence, implement signing program and visitor information services, build on slopes less than 25%, use existing contours and vegetation for screening materials
10.c. Develop campground on west shore at Smittle Creek 50 -100 sites developed on 30 - 40 acres	Mod.	Soils and Topography, Scenic Resources, Law Enforcement — same as above	Same as above
11.b. Develop boat launching for campers only at north shore campground — 1½ acres	Mod.	Soils and Topography, Scenic Resources, Law Enforcement — same as above	Same as above
13.b. Establish Fish and Wildlife Management Area for all Lake Berryessa lands — excluding resort areas and Reclamation-deveolped day-use recreation lands	Mod.	Recreation — may decrease recreational area opportunities Land Use — possible reduction of available lands for grazing permits	Maximize use opportunities in recreation areas, new use guideline may be developed, no mitigation for loss of grazing lands
Water Surface Management Actions			
20.a. No Action: do not limit launching/storage of watercraft	Maj.	Scenic Resources — allows unlimited use and activities of water surface	Where possible, use screening materials to hide storage areas

TABLE 13

CONDENSED MATRIX
(Summary of Major/Moderate Negative Impacts)

ALTERNATIVE ACTIONS	MAJOR/MODERATE NEGATIVE IMPACTS	IMPACTS	MITIGATION
Concession Actions Prior Reorganizations			
22.b. Remove all structures from base flood plain (440' - 450') — 195 long-term sites and an unknown number of resort-owned facilities	Maj. **	Resort Tenants — increased costs due to removals/relocation, loss of site occupancy and improvements, Concessionaires — increased building costs, loss of rent fees and investments see 22 above for associated costs	Provide appropriate advanced notice, relocate facilities, structures, and tenant trailers if space is available
24.b. Allow expansion of long-term uses (within resort boundries)	Mod. Maj.	Vegetation and Wildlife — loss of habitat and vegetation, disturbance of wildlife Traffic — increases in traffic Soils and Topography — increases soil erosion and compaction potential Scenic Resources — increases built environment on shoreline areas	Harden all roads and trails, reseed and replant vegetation, increase law enforcement presence, implement signing program and visitor information services, build on slopes less than 25%, use existing contours and vegetation for screening materials
26.a. No Action: allow storage to occur in shoreline areas with minimal restrictions	Mod.	Scenic Resources — increase presence of built materials on shoreline	Where possible, use screening materials to hide storage areas
27.a. No Action: no master plans required	Maj.	Scenic Resources — no organized planning for scenic resources	Mitigation measures for each new development must be approved prior to any construction — see 10 and 9.c. above for types of mitigation measures
30.a. No Action: allow maximum of 65 commercial houseboats as provided in concession agreements	Mod.	Visitor Health and Safety — increases overnight use, generating debris and fire danger	Implement signing program and visitor information service, increase ranger contacts, inspection of vessels, use of permits, implement health and safety standards
30.b. Allow 150 houseboats per 1982 policy	Mod.	Scenic Resources — increases visibility of built structures in landscape Visitor Health and Safety — increases overnight use, generating debris and fire danger	See above
30.c. Prohibit all commercial houseboats	Mod.	Recreation — decreases recreational houseboating opportunities Concessionaires — decreases revenue potential	Develop alternate sources of revenue-producing activities within the marina area
32.a. No Action: continues existing policy	Mod. Maj.	Law Enforcement - increass enforcement responsibilities Concessionaire — Markley Cove — decreases major revenue source	Implement Signing
33.a. Prohibit shoreline modifications below 440' elevation	Mod.	Concessionaire — prevents all development below normal full pool (440')	No know mitigation measures at this time
33.b. Allow shoreline modifications without restrictions below 440' elevation	Mod./ Maj.	Scenic Resources — increase built environment on shoreline	Mitigation measures for each new development must be approved prior to any construction — see 10 and 9.c. above for types of mitigation measures
Concession Actions After Reorganizations			
34.c. Remove all 495 long-term uses from reservoir flood plain (440' - 455')	Mod. Maj. **	Economy — may dislocate users, reducing retail sales Resort Tenants — increased costs due to removals, loss of site occupancy and investments Concessionaires — increased building costs, loss of rent fees and investments see 22 above for associated costs	Provide sufficient notice so investments can be amortized, relocate facilities, structures, and tenant trailers if space is available
35.b. Remove all permanent facilities and structures from reservoir floodplain — unknown number of resort owned facilities	Mod.	Concessionaires — increased building costs, loss of investments and facilities — costs unknown Economy — may dislocate users, reducing retail sales	Same as above
36.b. Convert long-term uses in water influence zone and reservoir flood plain to short-term uses — 758 sites impacted	Maj. **	Resort Tenants — increased costs due to removals, loss of site occupancy and investments, — see 22 above for associated costs	Same as above
36.c. Convert all long-term uses to short-term uses — 1540 sites impacted	Maj.	Resort Tenants — same as above	Provide sufficient notice so investments can be amortized
37.b. No relocation for long-term sites eliminated — 195 sites in base flood plain (440' - 450') and possibly an additional 300 sites in the reservoir floodplain (450' - 455') depending upon the number floodproofed	Mod. Maj. **	Economy — dislocates users, reducing retail sales Recreation — decrease in specific exclusive long-term uses and opportunities Resort Tenants — increased costs due to removals, loss of site occupancy and investments Concessionaire — loss of revenues, investments and facilities see 22 above for associated costs	Same as above, long-term sites may be converted to short-term sites
40.b. Set franchise fee to maximize fair market return to Reclamation	Mod.	Recreation Visitors — potential for significant increase in fees Resort Tenants — may cause concessionaire to pass higher fees on to tenants	No mitigation measures at this time
41.b. Discontinue all concession fee review and approvals	Mod.	Recreation Visitors — potential for significant increase in fees Resort Tenants — concessionaire may increase fees without control	Same as above

TABLE 13

P. NUMERICAL LISTING OF PREFERRED AND ALTERNATIVE ACTIONS

Land Management

1. Land Acquisition
1.a. No Action: no acquisitions

2. Land Disposal
2.a. No action: no land disposal

3. Dispersed Recreation Area Improvements
3.a. No Action: maintain as is
3.b. Return Dispersed Areas to Semi-Primitive Areas

4. Administration Point Day Use Area
4.a. No Action: limited access only
4.b. Close Administration Point
4.c. Develop Campground for Special Needs

5. Smittle Creek Day Use Area - no action
5.a. Combination Day Use and Walk-in Campground
5.b. Convert Area into a Concession Operated Campground and RV Park

6. Improve Access for Special Needs Population in All Areas
6.a. No Action: improve access for special needs populations in new area only
6.b. Develop Areas Primarily For Special Needs Populations

7. Trail Development
7.a. No Action: maintain existing trails
7.b. Develop Trails for Single Purpose Use

8. Boat Access Camping Program Administered by the Bureau
8.a. No Action: continue enforcing "no boat-in" camping enforcement
8.b. Concessionaire to Operate Boat Access Camping

9. Small & Big Island Improvements Changing them to Dispersed Rec. Areas
9.a. No Action: continue current land uses
9.b. Construct Rec. Air Strip on Big Island with Short-term Facilities
9.c. Develop Resort/Convention Center on Big Island

10. Develop North Shore Campground
10.a. No Action: continue current land uses
10.b. Develop Campground on West Shore Near Rancho Monticello Resort
10.c. Develop Campground on West Shore at Smittle Creek

11. Develop Boat Launching on the North Shore
11.a. No Action: no new boat launching on north shore
11.b. Develop Boat Launching for Campers Only at North Shore Campground

12. Charge User Fees Where Services areProvided
12.a. No Action: continue to charge at Oak Shores only

13. Establish Fish & Wildlife Management Area for East Shore Lands
13.a. No Action: continue management by Bureau with Fish & Game technical assistance
13.b. Establish Fish & Wildlife Management Area for All Lake Berryessa Lands Except Class I & II Areas

14. Expand Visitor Information Services
14.a. No Action: present facilities only

15. Allow Limited Special Uses of Reclamation Lands
15.a. No Action: no specific policy
15.b. Prohibit Any Limited Special Uses

16. Allow Special Events on Reclamation Lands
16.a. No Action: no specific policy
16.b. Prohibit Special Events

Water Surface Management

17. Establish Specific Zoning & Restriction for Uses & Activities on Water
17.a. No Action: continue current restrictions
17.b. Allow Restrictions to be Established

18. Allow Limited Special Uses of Specific Water Surface Areas
18.a. No Action: retain special use areas without policy change
18.b. Eliminate All Special Use Area

19. Allow Special Water Use Events
19.a. No Action: no specific policy
19.b. Prohibit Special Events

20. Establish Carrying Capacity for Water Craft
20.a. No Action: do not limit launching/storage of watercraft

Compliance Management

21. Obtain Additional Law Enforcement Support
21.a. No Action: no change in current situation

Concession Management: Prior to Resort Reorganization

22. Floodproof and/or Anchoring of Structures & Facilities in the Base Floodplain
22.a. No Action: no floodproofing and/or anchoring requirements
22.b. Remove All Structures From the Base Floodplain

23. Prohibit Construction & Placement of Facilities in Reservoir Floodplain
23.a. No Action: no policy or direction

24. Prohibit Increase in Total Number of Long-term Sites, Allow Relocation
24.a. No Action: no additional long-term sites with no relocation opportunities
24.b. Allow Expansion of Long-term Uses

25. Remove Structures & Facilities for Environmental Causes
25.a. No Action: no policy or direction
25.b. No Removals for Environmental Causes

26. Prohibit Storage in Shoreline Areas
26.a. No Action: allow storage to occur with minimal restrictions

27. Require Resort Master Plans
27.a. No Action: no master plans required

28. Establish & Implement Land Planning & Dev. Criteria for New Projects
28.a. No Action: do not establish specific criteria

29. Establish & Implement Facility Development & Design Standards
29.a. No Action: minimal standards with Title 25

30. Allow 75 Commercial Houseboats/Overnight Occupancy Vessels (OOVs)
30.a. No Action: allow maximum of 65 commercial houseboats per concession agreements
30.b. Allow 150 Commercial Houseboats/OOVs per 1982 Policy
30.c. Prohibit All Commercial Houseboats

31. Require Sewage and Gray Water Pumpout Facilities at Resorts with Houseboats/OOVs
31.a. No Action: no requirements for resort facilities

32. Allow 75 Private Houseboats/OOVs, Requires Permit for Placement
32.a. No Action: continues existing policy

33. Allow Minor Modifications of the Shoreline Below 440 ft.
33.a. No Action: prohibit shoreline modifications below 440 ft.
33.b. Allow Shoreline Modifications without Restrictions below 440 ft.

Concession Management: Associated With Resort Reorganization

34. Remove All Long-Term Uses From Base Floodplain Areas, Floodproof and/or Anchor of Long-term Uses between 450 - 455 feet.
34.a. No Action: allow long-term uses in Res. Floodplain until public needs develop
34.b. Allow Long-term Uses if Floodproofed and Secured
34.c. Remove All Long-Term Uses From Reservoir Floodplain

35. Floodproof or Remove All Permanent Structures in Reservoir Floodplain
35.a. No Action: no floodproofing or removal required
35.b. Remove All Facilities & Structures From the Reservoir Floodplain

36. Create Short-term Sites From Existing Long-term Sites in Shoreline Areas
36.a. No Action: no conversion of long-term to short-term
36.b. Convert Long-term in Water Influence Zone & Reservoir Floodplain to Short-term
36.c. Convert All Long-term Uses to Short term

37. Relocate Long-term Sites which have Been Converted or Removed
37.a. No Action: no policy on relocation
37.b. No Relocation For Long-term Sites Eliminated

38. Establish & Implement Facility Development & Design Standards
38.a. No Action: continued compliance with Title 25

39. Delete Specific Land from Concession Areas
39.a. No Action: no deletions

40. Establish & Implement Variable Franchise Fees
40.a. No Action: maintain franchise fee as is
40.b. Set Franchise Fee to Maximize Fair Market Value Return to Bureau

41. Review Long-term Use Fees If Reimbursed by Concessionaire
41.a. No Action: continue current concession fee review & approval
41.b. Discontinue All Concession Fee Review & Approvals

VII. CONSULTATION AND COORDINATION

A. ENVIRONMENTAL REVIEW AND CONSULTATION REQUIREMENTS

This EIS has been prepared concurrently with environmental review and consultation required by Federal environmental law other than NEPA, as required by 40 CFR 1502.25. Compliance with specific environmental review and consultation requirements is described below.

1. Fish and Wildlife Coordination Act (16 USC Sec. 661 et seq.)

The Fish and Wildlife Coordination Act (FWCA) requires Federal agencies to consult with the Fish and Wildlife Service (FWS) and state fish and game agencies before undertaking water projects which will cause a loss of or damage to fish and wildlife resources.

During discussions with FWS in September 1987 and March 1989, it was determined that a FWCA report would not be required for the Actions proposed in this EIS since they are associated with a management plan. Continued consultation with the FWS is being maintained as needed, including the opportunity to comment on the draft and final EIS as they are prepared and distributed for review.

In addition to coordination with FWS, Reclamation maintains close lines of communication with the California Department of Fish and Game (DFG) and consults with them on a regular basis. A representative of DFG participated on the Lake Berryessa Advisory Committee, and they have attended and provided comments at the agency scoping meeting and public hearings held on the Draft EIS. DFG in-stream modification permits are required for any work on the shoreline within the reservoir. Reclamation and DFG currently have a habitat management agreement for establishing additional temporary and permanent cover consisting of willow plantings and brush shelters.

2. Endangered Species Act (16 USC Sec. 1531 et seq.)

Section 7 of the Endangered Species Act (ESA) requires Federal agencies, in consultation with the Secretary of the Interior, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species.

The following activities have occurred, or will occur, as part of the Section 7 consultation process for this EIS:

- On January 20, 1988, Reclamation requested the FWS to provide information regarding listed species and species proposed for listing in the vicinity of Lake Berryessa.

- On January 28, 1988, the FWS responded and identified listed species and species proposed for listing (Appendix G). An assessment of the effects of proposed Actions on listed or proposed species is provided in Chapter VI of this EIS.

Additional consultation with FWS will be made prior to any Action taken in areas utilized by endangered or threatened species. Formal consultation procedures will be followed if a determination is made that proposed Actions will affect listed species.

3. National Historic Preservation Act (16 USC Sec. 470 et seq.)

Section 106 of the National Historic Preservation Act (NHPA) requires Federal agencies to evaluate the effects of Federal undertaking on historical, archaeological, and cultural resources.

Preliminary identification studies for cultural resources were completed in July 1988, pursuant to NHPA, and a report titled "Archeological Investigations at Lake Berryessa, California" was sent to the State Historic Preservation Officer (SHPO) on July 12, 1988. Based on decisions made regarding the actions chosen (in this EIS), Reclamation will consult the SHPO for compliance with Sec. 106 of NHPA before Actions are implemented.

4. Floodplain Management (Executive Order 11988) Protection of Wetlands (Executive Order 11990)

Executive Order (EO) 11988 requires Federal agencies to prepare floodplain assessments for proposals located within or affecting floodplains. Reclamation Instructions part 215.13 sets forth procedures for implementing Executive Orders that are applicable to all Reclamation actions.

In this EIS several proposed actions, [22,23,26,33, 34,35] address floodplain management and protection or removal of developments within the floodplain. These latter Actions address existing situations. Additionally, Action No. 11 is a proposal to construct a boat-launch ramp within the floodplain. The boat-launch ramp is further discussed under EO 11990 below.

Executive Order 11990 requires Federal agencies to prepare wetlands assessments for proposals located within or affecting wetlands. Reclamation Instructions part 376.5 sets forth procedures for implementing Executive Orders that are applicable to all Reclamation actions.

The boat-launch ramp can only be constructed in a shoreline area. While Lake Berryessa shoreline areas frequently experience high and low water surface level fluctuations due to accumulated inflows and drawdowns, they do not support typical wetlands vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and development. No reasonable alternative exists for the placement of a launch ramp other than in a shoreline location.

The boat-launch ramp will conform to applicable state or local floodplain or wetlands protection standards. Its construction is of a limited, isolated nature and will not affect the natural or beneficial values of the floodplain or wetlands. The construction of the boat-launch ramp will conform to development criteria as identified in this EIS such as paving roads and launch ramp, replanting vegetation in disturbed areas that have been impacted adjacent to the launch ramp site, etc, and as approved and adopted by other involved agencies. Involvement by other agencies may include the EPA, Fish and Wildlife Service, Army Corps of Engineers, California Department of Fish and Game, and the California Department of Boating and Waterways.

If future decisions are made which could affect wetlands, Reclamation will prepare necessary assessments as required by EO 11988 and 11990.

B. PUBLIC INVOLVEMENT

Public involvement activities for this EIS have included an "Advisory Committee," scoping, public information meetings, and opportunities to comment on both the Draft and Final EIS.

1. Lake Berryessa Advisory Committee

Preliminary work for this Environmental Impact Statement (EIS) and eventual Reservoir Area Management Plan (RAMP) began with the selection and appointment of an "ad hoc" Lake Berryessa "Advisory Committee" in September 1979. The committee consisted of eleven persons representing a cross-selection of various points of view or inherent responsibilities within the Lake Berryessa Recreation Area. Ten of the group represented governmental agencies, business interests, associations, and citizen action groups. The eleventh was an individual selected at large. The group met periodically during 1980 to assist Reclamation in the investigation of various management and development options for the lake.

a) Lake Berryessa Advisory Committee Members

Dick Hanson, Lake Berryessa Resort Operators Association
Ernestine Heywood, Lake Berryessa Tenants Council
Russell Cahill, California Department of Parks and Recreation
Philip Stewart, Napa County Sheriff's Department
Eugene Tossoli, California Department of Fish & Game
Jame Hickey, Napa County Conservation, Development and Planning Department
Sam Chapman, Napa County Board of Supervisors
Volker Eisele, Citizens Council for Napa
Tomorrow Portia Hill, League of Women Voters
Dr. Seymore Gold, Division of Environmental Planning and Management
Herbert Gunn, Land Owner, Public at Large

2. Scoping

CEQ Regulations (40 CFR 1500-1508) for implementation of NEPA requires scoping which is an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed Action.

The basic goal of scoping is to make the EIS more meaningful and useful to persons in government who must make management decisions as well as to the people who may be affected by these decisions. Scoping is designed to explore the breadth and depth of issues to be addressed in the EIS to ensure that important considerations are not overlooked, and to discover aspects which might go unrecognized.

a) Scoping Workshops:

News releases inviting the public to attend scoping workshops were distributed to newspapers and radio and television stations in and near the study area on May 27, 1987. At the same time notices were also sent to Federal, state and local agencies, and special interest groups. An information packet was made available prior to the meetings which provided a variety of Alternative Actions Reclamation is considering for inclusion in the RAMP. More than 300 information packets were

mailed directly to individuals, groups and organizations.

Reclamation held three scoping workshops to discuss issues, concerns, or impacts which should be addressed in an environmental document for the RAMP. The first scoping workshop, held on May 4, 1987, was primarily an agency scoping workshop, although several members of special interest groups attended. The second scoping workshop, held June 4, 1987, provided an opportunity for the public to provide comments on the Land and Water Use Management Actions to be considered in the EIS. The third scoping workshop, held June 6, 1987, provided an opportunity for the public to provide comments on the concessionaire management actions to be considered in the EIS. Approximately 425 people attended the workshops, all of which were held in Napa County.

Following opening presentations by representatives of Reclamation at each scoping workshop, a question and answer period was held to respond to technical questions prior to obtaining comments regarding the scope of the environmental documents. During the second and third scoping meetings, the audience was divided into several small discussion groups for the scoping portion of the workshop. During the scoping process, participants had the opportunity to comment on Alternative Actions and suggest new Alternatives for inclusion in the environmental document for the RAMP.

At each workshop, a court stenographer recorded the presentations by Reclamation representatives and the technical questions and concerns addressed at the beginning of each workshop. Concerns voiced in the workshops were recorded on flip charts. To document the comments and suggestions received at the scoping meetings a response summary was made available to all workshop participants June 23, 1987.

A final scoping report including all comments received during the scoping period was made available for public review October 15, 1987.

After the initial scoping meetings, environmental assessment procedures were begun during which a decision was made to prepare an EIS due to the number of complex issues and concerns raised by the public. In further compliance with NEPA, an additional thirty (30) day scoping period was provided. This new scoping period began on July 1, 1988, and ended on August 1, 1988. The final scoping report discussed above was modified with an addendum describing comments received from the public.

b) Informational Meetings

During the preparation of this EIS, several meetings were held with various groups and interested parties to discuss the Lake Berryessa RAMP process and EIS, and to respond to any questions or concerns which they may have. The meetings were generally open to the public. Following is a list of those meetings and dates on which they were held:

Lake Berryessa Tenants Council - May 16, 1987
Lake Berryessa Concessionaires - May 27, 1987
Napa County Planning Commission - June 3, 1987
Napa County Board of Supervisors - June 16, 1987
Solano County Water Policy Advisory Committee - Oct.28, 1987
Solano County Water Policy Advisory Committee - April 27, 1988
Citizen Action to Save Public Entrusted Resources (C.A.S.P.E.R.) - September 14, 1988

c) Opportunities to Comment on the Draft EIS and Final EIS

The public had the opportunity to provide comment on the draft EIS from December 28, 1989 to March 28, 1990. During this period public hearings were held at: the Best Western Motor Hotel in Berkeley, on February 10, 1990; the Clarion Inn in Napa, on February 13, 1991; and the Fairfield Community Center in Fairfield, on March 8, 1990. The public had the opportunity to provide written as well as oral comments.

During the public review period for the final EIS the public will again have the opportunities to provide comments in writing, or to ask questions during a meeting.

C. AGENCIES AND INDIVIDUALS RECEIVING COPIES OF THE DRAFT AND FINAL EIS

The following agencies received copies of the draft EIS. Those agencies with an "*" next to their name provided a response to the draft, whether by letter or while participating in one or more of the three public hearings. All agencies listed in the following subsections no. 1., 2., and 3. shall receive a copy of the final EIS.

1. Submitted by the Commissioner, Bureau of Reclamation (for review and comment)

a) U.S. Department of the Interior

Bureau of Land Management
*Fish and Wildlife Service
Geological Survey
Western Region Office - Secretary of the Interior

b) Other Federal Agencies

*Advisory Council on Historic Preservation
Department of Agriculture
Department of the Army
Department of Energy
*Department of Transportation
*Environmental Protection Agency

2. Submitted by the Commissioner, Bureau of Reclamation (for information only)

a) U.S. Senators

Honorable Alan Cranston
Honorable Pete Wilson

b) U.S. Congress

Honorable Doug Bosco
Honorable Vic Fazio
*Honorable Walley Herger
Honorable Robert Matsui
Honorable George Miller
Honorable Norman Shumway

3. Submitted by the Regional Director, Bureau of Reclamation, Mid-Pacific Region, for review and comment

a) U.S. Department of the Interior

Assistant to the Secretary, DOI, Sacramento, CA
Bureau of Land Management, Sacramento, CA
*Fish and Wildlife Service, Portland, OR; Sacramento, CA (2)
Geological Survey, Sacramento, CA: Menlo Park, CA
National Park Service, San Francisco, CA (2)
Regional Environmental Officer, DOI, San Francisco, CA

b) Other Federal Agencies

Army Corps of Engineers, Sacramento, CA; San Francisco, CA
*Environmental Protection Agency, San Francisco, CA (3)
Federal Emergency Management Agency, San Francisco, CA
Forest Service, San Francisco
Federal Highway Administration, San Francisco, CA
Soil Conservation Service, Davis, CA
Western Area Power Administration, Sacramento, CA

c) State Senate

Honorable John Doolittle
Honorable John Garamendi
Honorable Leroy Greene
Honorable Barry Keene
Honorable James Nielsen

d) State Assembly

Honorable Chris Chandler
Honorable Lloyd Connelly
Honorable Thomas Hannigan
Honorable Bev Hansen
Honorable Dan Hauser
Honorable Philip Isenberg
Honorable Patrick Johnston
Honorable Tim Leslie
Honorable Stan Statham
Honorable Norm Waters

e) State Agencies (State of California)

Air Resources Board, Sacramento
Assembly Committee on Agriculture, Sacramento
Assembly Committee on Water, Parks and Wildlife, Sacramento
Assembly Natural Resources Committee, Sacramento
Board of Aeronautics, Sacramento
California Water Commission, Sacramento
Chamber of Commerce, Sacramento
Department of Boating and Waterways, Sacramento
Department of Conservation, Sacramento
*Department of Fish and Game, Sacramento (4)
Department of Food and Agriculture, Sacramento
*Department of Forestry, Sacramento, Spanish Flat Station (2)
Department of Parks and Recreation, Sacramento
*Department of Transportation, Sacramento
Department of Water Resources, Sacramento
Native American Heritage Commission, Sacramento
Office of the Governor, Sacramento
*Office of Historic Preservation, Sacramento
*Regional Water Quality Control Board, Central Valley Region, Sacramento
State Clearing House, Sacramento (20)
State Lands Commission, Sacramento
State Reclamation Board, Sacramento
*Water Resources Control Board, Sacramento
Wildlife Conservation Board, Sacramento

f) Local Agencies

City of Benecia
*City of Dixon
*City of Fairfield: Dept. of Public Works
City of Rio Vista
City of Suisun: Dept. of Public Works
City of Vallejo: Dept. of Public Works
*City of Vacaville: Dept. of Public Works
*County of Napa: Conservation, Development & Planning Dept; Department of Environmental Health; County Counsel; Department of Public

Works; Sheriff's Department; Boat Patrol; Board of Supervisors; Planning Commission
County of Solano: Board of Supervisors; Parks Dept
County of Yolo
Maine Prairie Water District
Napa County Land Trust
Reclamation District # 2068
*Solano Irrigation District
Solano County FC & WCD
*Solano County Water Policy Advisory Committee

4. Submitted by Recreation Manager, Lake Berryessa Recreation Office, Bureau of Reclamation, Mid-Pacific Region, (for review and comment)

The following businesses, groups, or clubs received a direct mailing of the draft EIS. Those with an "*" next to their name provided a response to the draft, whether by letter or while participating in one or more of the three public hearings. All of the following businesses, groups, or clubs will be notified when the final EIS is released for public review. Unless those without an "*" next to their name specifically request a copy, only those with an "*" will receive a direct mailing of the final EIS.

a) Groups, Businesses, & Organizations

Accent on Service
American Water Ski Association
Anheuser-Bush, Inc.
AWSA
Bass Reapers
Bay Area Hog Hunters
Berryessa Highland Property Owners Association
Black Bass Action Committee
Boy Scouts of America
California Sportsmen's Lobby
*CASPER - Citizen Action to Save Public Entrusted Resources
Cole & Marley
Cooperative Extension
Defenders of Wildlife
Delta Bass Busters
Dickenson, Peatmen & Fogarty
James Warren & CO. Realtors
KVON
*Lake Berryessa Chamber of Commerce
Lake Berryessa Marina Resort
Lake Berryessa News
Lake Berryessa Senior Citizens Center
*Lake Berryessa Soaring Association
Lake Tenants Council
Less, Weaver & Winer
*Markley Cove Resort
Markley Cove Tenants Association
McDonough, Holland & Allen
Monticello Ski Club
Napa Chamber of Commerce
*Napa County Farm Bureau
Napa County Taxpayers
Napa Register
Napa/Solano Audubon Society
Native Plants Society
Neumiller & Beardslee
*Putah Creek Resort
Putah Creek Tenant Association
Rancho Monticello Boatworks
*Rancho Monticello Resort
Rancho Monticello Tenants Association
Sierra Club
South Shore Resort
*Spanish Flat Resort
Spanish Flat Tenants Association
Spanish Flat Water District
*Sportsmen for Equal Access
Steele Park Owners of Mobile Homes Association
Steele Park Resort
The Bayshore Group
The Spink Corporation
The Research Farm/Quail Ridge Wilderness Preserve
Vacaville Reporter
*Warm Water Fishery Board
Water Skiers of Marin
World Class Water Ski Center

b) Individuals

Due to the amount of time that elapsed between the scoping process and the release of the Draft EIS, and to determine continued interest, a "Draft EIS Interest Form" was sent to all individuals on the Lake Berryessa RAMP mailing list (those participating in scoping meetings or who made written comments, or who have since indicated an interest). The form requested verification that the individual was interested in receiving a copy of the Draft EIS. Those not responding to the "Draft EIS Interest Form" will be maintained on the mailing list for notice of release of the Final EIS.

The following individuals received a direct mailing of the draft EIS. Those with an "*" next to their name provided a response to the draft, whether by letter or while participating in one or more of the three public hearings. All of the following individuals will be notified when the final EIS is released for public review. Unless those without an "*" next to their name specifically request a copy, only those with an "*" will receive a direct mailing of the final EIS.

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*Ashmore, Agnes

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*Bartolo, Guido
Berger, Harvey and Beth
Bins, Carol
Blocker, James
Booze, Courtland
Botts, Pat
Brehm, Don
Bunefield, Larry
Cabral, Margaret
Campbell, William
Carter, Ray
Carver, Joseph
Castro, Frank
Chain, Steven
Colombo, Jerry
Cooper, Joseph
Davis, Jim
*Dawe, Cherrie
DePew, Catherine
Desmond, Tony & Kamrin
Doherty, J. J.
*Doyle, Owen P., M.D.
Duke, Patrick
Eisele, Volker
Elam, Patti & Earl
Enis, Ruth
*Erwin, Allen
Faria, Carol L.
Fentress, James
*Fielder, Joe
Francis, Ted
Freeman, Sue
Freitas, Frank
*Fryer, Harvey
*Gamble, George
Gardner, Larry
*Geib, J. Edward
Giles, Lee
*Gravelle, Howard
Green, Herbert J.
*Greenslate, Ron
Gruber, Joe
Guglielmini, Carlo M.
*Gunn, Herb
Harris, Joseph R.
Henning, Raymond
Heywood, Ernestine
Hickman, Theodore
Hodge, Steve
House, Donald
Howes, Donald
*Hughes, Jim & Susan
Hurdle, Richard
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Klarer, Kingsley
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Lencioni, Gene
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Place, R. L.
Poister, Clyde
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Wach, Fred & Patricia
Walsh, Ronald
Watcher, Allan
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Wood, Richard
Woods, Loraine

In addition to those listed above, the following individuals also provided a response to the draft, whether by letter or while participating in one or more of the three public hearings. The following will receive a direct mailing of the final EIS.

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Alford, Patrick W.
Anders, Floyd
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Boersema, Jay
Bohnen, Mrs. Robert
Bray, Mr. & Mrs. James
Brown, Frances H.
Brown, Willie L. Jr.
Bruyioni, Robert
Byrd, Robbie
Campbell, Anna
Carver, Geraldine
Carver, Joseph E.
Charles
Cleveland, Edward & Barbara
Collard, Paul
Coughlin, James
Cowan, Zach & Nancy Black
Dacquisto, Mr. & Mrs.
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DeFrici, Mr. & Mrs.
Derr, Phillip R.
Des Roches, Hilton & Alice
Dias, Ron
Douglas, Russell
Elliott, Gerri
Ennen, Gary (West Coast Bass, Inc.)
Ennis, Scott
Etzback, Donald
Fedesico, Mr. & Mrs.
Fernandez, Rolando
Fisher, Melvin
Forbes, Mark
Ford, Allison
Ford, Allison
Freschi, Tom
Frutell, Doug
Fullerton, Jacki & Gary
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Hewitt, Jim
Hickey, Kay
Hurdle, Nancy
Hutchinson, Drue & Christin
Hyde, Ralph Jr. (Sonoma Wings)
Hynds, Johns
Jahn, Bruno
Jenson, Bernie
Johnson, Elgin
Johnstone, Douglas
Joy, Rich
King, Carol
Klatt, E. G.
Klay, Kristen
Koenig, Marge
Koenig, Mark
Koenig, Mr. & Mrs. Doug
Koenig, Mr. & Mrs. Michael
Koenig, Mr. & Mrs. Louis Jr.
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Koloboff, Constantine & Ekaternia
Kordick, Harold & Ruth
Lanoie, Mr. & Mrs. David
Lans, Randy
Larson, Philip
Laurer, Glen
Lautamo, Roy
Long, Robert
Margiotta, Peter
Martin, Mr. & Mrs. R.
Maurer, Frank
McArthur, Don & Bette
McClure, Edgar & Beverly
McPherson, III, Fred
Melter, Alexander
Miller, Elizabeth
Molsberry, Joseph & Theresa
Moskowsky, Walter
Muthe, Norma
Overacker, Donald & Janet
Oviatt, R. M.
Owen, Ivan & Dolores
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Plunkett, Elsie (Spanish Flat Resort)
Quigg, Daniel & Catherine
REL LTD (Spanish Flat Resort).
Raphael, Victor
Ratcliff, Marie
Reid, Robert
Reiker, Charles
Reiter, Robert
Schill, William
Schneider, Kay
Shasky, John
Shegoleff, Paul & Nina
Sobrato, John
Stachowiak, Patricia
Stadelhofer, Ed
Stephenson, Susan
Stoll, Raymond
Storz, Jerry (Storz Realty)
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Swickard, Dennis
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Voropaeff, Leda & Victor
Walker, William & Martha
Waslohn, Ron
Weatherly, Michael & Judy
Weichert, H. G.
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Wetherall, Robert
White, Robert

Wright, Gale
Yates, Gus
Young, Mrs. Marie
Young, Rich
Zacher, Kristine
Zerkel, Mr. & Mrs. Charles

VIII. UNAVOIDABLE ADVERSE (NEGATIVE) IMPACTS

Mitigation measures are intended to minimize or eliminate adverse (negative) impacts that might be caused by implementing an action. However, some actions may cause adverse impacts that are unavoidable and may not be effectively or completely mitigated. Examples are:

1. The construction of new roads, trails, campgrounds, day use areas, boat-launch ramps, buildings or other facilities may cause: soil compaction and erosion problems, require the alteration of the topography due to bank cuts and earth movements, reduce the visual quality of the land by allowing a more built appearance, disrupt recreational activities because of temporary closures and relocation of facilities, and disturb, displace, or destroy grasses, shrubs, trees, fish and wildlife, etc.

2. Increasing or altering recreational opportunities on the lake and surrounding lands may: increase the incident of trespass, add additional pollutants to the water, increase congestion in popular areas, place a greater burden on local law enforcement agencies, and reduce the visual quality of the area due to more boats, cars, tents, etc.

3. Upgrading, floodproofing and/or anchoring, or removing long-term sites and facilities may result in: increased costs and/or loss of recreational opportunities for long-term users, some revenue losses, and additional costs for resort operators.

4. Entering into an agreement with California Department of Fish and Game for management of Reclamation-owned lands may result in the elimination of certain grazing leases.

Irreversible commitments are associated with resources that cannot be renewed or replenished.

IX. IRREVERSIBLE OR IRRETRIEVABLE COMMITTMENTS OF RESOURCES

Irretrievable commitments result in a loss of opportunity to produce or use resources; the opportunity can be recovered but the period of loss cannot be regained. Examples are:

1. Some irreversible and irretrievable soil loss results from land disturbing activities such as constructing additional roads, campgrounds, or other facilities. The accidental excavation of archeological sites (cultural resources) is also an irreversible and irretrievable loss of resources. Once disturbed, none of these sites can be completely recreated in situ;

2. Altering or eliminating uses such as grazing leases, short-term uses, long-term uses, etc., produce irretrievable losses. The use might be eliminated for now, but it could be reinstituted at a later date. The loss occurs only during the time when the opportunity is not available.

X. CONFLICTS WITH FEDERAL STATE, OR COUNTY AGENCIES

Prior to and during the preparation of this document, other Federal agencies, the state, and surrounding counties were given the opportunity to present their comments and provide information pertinent to their operations. The comments and information received was taken into consideration during the development of the preferred and alternative actions. As a result, no management conflicts are anticipated. To minimize any unforeseen conflicts additional review and commenting opportunities will be provided.

XI. BIBLIOGRAPHY

SOILS AND TOPOGRAPHY

Adams, Randy S., *Examination of Foundation Settlement, Slope Movement at Markley Cove Resort, Lake Berryessa, Solano Project, California,* a memorandum to the technical files, December 13, 1985.

Lendenmann, E.C., *Lake Berryessa Eticuera Creek Landslide Solano Project, California,* a memorandum to the technical files, April 12, 1984.

U.S. Department of Agriculture, Forest Service, *Proceedings of a Workshop on Slope Stability: Problems and Solutions in Forest Management,* USDA, April 1985.

U.S. Department of Agriculture, Soil Conservation Service & Bureau of Reclamation office memorandum: *Geologic Seismic Factors, Earthquake Evaluation, Monticello Dam, Solano Project, California,* USDA, April 23, 1976.

WATER RESOURCES

McCune, J. Williams *Central California Lakes Limnologic Investigation - Drought Years 1976-77,* Department of Water Resources, Central District Report, Sacramento, CA, June 1979.

Rowell, J.H., *Analysis of Gray Water Impacts on Lake Water Quality Resulting from Houseboat Use, Lake Berryessa, Solano Project,* memorandum from MP-700 to MP-420, USBR, Sacramento, CA, December 30, 1985.

Rowell, J.H., *Lake Berryessa Water Quality Monitoring Program Data Summary and Evaluation 1968-1975,* USBR Report, Sacramento, CA, August 1976.

U.S. Bureau of Reclamation, *Lake Berryessa Water Quality Data,* STORET Retrieval, Sacramento, CA 1968-1987.

U.S. Environmental Protection Agency, *Urban Stormwater Management and Technology: Update and User's Guide,* prepared by Metcalf and Eddy Inc. for the Municipal Environmental Research Laboratory, Cincinnati, Ohio, September 1977.

VEGETATION AND WILDLIFE

Brockman, Ronald L., Personal observations.

LSA Associates, Inc., *Preliminary Environmental Assessment, Putah Creek Resort Master Plan,* Prepared for the U.S. Bureau of Reclamation, Sacramento, CA. 1987.

Spiegel, L. and Anderson, R., *Bald Eagle Study: Lake Berryessa Study Area Interim Report for the Geothermal Public Power Line, California Energy Commission,* Sacramento, CA. 1986.

Steenhof, K., *Management of Wintering Bald Eagles,* U.S. Fish & Wildlife Service, Eastern Energy and Land Use Team. Harpers Ferry, WV. 1978.

FISH RESOURCES

U.S. Fish and Wildlife Service, *Fish and Wildlife Improvement Program for Lake Berryessa,* A Planning Aid Report, Sacramento, CA. October, 1981.

RECREATION

Center for Continuing Study of the California Economy, *Recreation Activity in California 1980 with Projections to 2000,* Palo Alto, CA. 1982.

Crysdale, R.A. and Scullin, J.C., An Analysis of the Water Recreation Carrying Capacity of Lake Berryessa. Bureau of Reclamation, Sacramento, CA. 1988.

Market Opinion Research, Participation in Outdoor Recreation Among American Adults and the Motivations Which Drive Participation for the President's Commission on Americans Outdoors, Washington, D.C. 1986.

State of California, Report 86 P-1, Report 87 E-1, Department of Finance, Population Research Unit, Sacramento, CA. 1986 & 1987.

State of California, Public Opinions and Attitudes on Outdoor Recreation in California 1987 an Element of the California Recreation Plan, Department of Parks and Recreation, Sacramento, CA. 1987.

State of California, Recreation Outlook in Planning District 4 an Element of the California Outdoor Recreation Resources Plan, Department of Parks and Recreation, Sacramento, CA. 1979.

U.S. Bureau of Census, 1980 Census of Population and Housing, Department of Commerce, Washington, D.C. 1980.

CULTURAL RESOURCES

Arnold, B.A. and Reeves, R.,Archaeological Investigations in the Monticello Reservoir Area, California. Report on file at the National Park Service Office, San Francisco, CA. 1959.

Napa County Board of Supervisors, Conservation, Development and Planning Department, Napa County General Plan. Napa, CA. 1986.

True, D.L. and Baumhoff, M.A., Archaeological Investigations at Lake Berryessa, California: Berryessa II. Journal of California and Great Basin Anthropology. Vol. 1, pp. 21-45. 1985

True, D.L., and Baumhoff, M.A. and Hellen, J.E., Milling Stone Cultures in Northern California: Berryessa I. Journal of California and Great Basin Anthropology. Vol. 1, No. 1, pp. 124-154. 1979.

TRAFFIC

Napa County Board of Supervisors, Conservation, Development and Planning Department. Lake Berryessa, 1987 Development Study, unpublished report, Napa, CA. 1987.

State of California, Department of Transportation. 1986 Route Segment Report: A Report on the Operation and Performance of the State Highways. Sacramento, CA. 1986.

State of California, Department of Transportation. Route Concept Report for Route 121 & 128, unpublished report. Sacramento, CA. April 1985.

SCENIC RESOURCES

Litton, R. Burton, Water and Landscape, An Aesthetic Overview of the Role of Water in the Landscape, University of California, Berkeley, for the Water Information Center, Inc. Port Washington, NY. 1974.

SOCIO-ECONOMICS

California Department of Finance, California Statistical Abstract, Sacramento, CA. 1986.

California Employment Development Department, Annual Planning Information, Napa County 1987-1988, Sacramento, CA. 1987.

Napa County Conservation, Development and Planning Department, Record of Dwelling Units Constructed and Demolished 1980-1987. Napa, CA. 1987.

U.S. Bureau of the Census, Bureau of the Census, 1980 Census of Population and Housing for Census Tracts, for Vallejo, Fairfield and Napa, California. Volume PHC80-2-360, 1980.

U.S. Bureau of Reclamation, by James Montgomery & Associates, Scoping Report: Reservoir Area Management Plan, Lake Berryessa, California, Sacramento, CA. 1987.

U.S. Bureau of Reclamation, Survey of Trailer/Mobile Home Sales, unpublished, Sacramento, CA. 1987.

GENERAL PLANNING

U.S. Bureau of Reclamation, The Plan for Recreation Development, Lake Berryessa, California, Developed by the National Park Service, Sacramento, CA, August 1972.

U.S. Bureau of Reclamation, Public Use Plan, Monticello Reservoir, Lake Berryessa, Solano Project, California, Developed by the National Park Service, San Francisco, CA, 1959.

U.S. Bureau of Reclamation, Recreation Resource Planning Study for Three Resort Areas, Lake Berryessa, Developed by EDAW Inc., Sacramento, CA, 1976.

U.S. Bureau of Reclamation, Lake Berryessa Aquatic Safety Study, Developed by URS Company, Sacramento, CA, September 1985.

U.S. Bureau of Reclamation, Finding of No Significant Impact, Lake Berryessa Recreation Program, Solano Project, California, Sacramento, CA, January 1980.

U.S. Bureau of Reclamation, by James Montgomery & Associates, Scoping Report: Reservoir Area Management Plan, Lake Berryessa, California, Sacramento, CA. 1987.

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APPENDIX

THE
RECLAMATION DEVELOPMENT ACT OF 1974
PUBLIC LAW 93-493
OCTOBER 27, 1974

TITLE VI

Solano Project Recreational Facilities, California

Sec. 601. In order to provide for the protection, use, and enjoyment of the aesthetic and recreational values inherent in the Federal lands and waters at Lake Berryessa, Solano project, California, the Secretary of the Interior is hereby authorized to develop, operate, and maintain such short-term recreation facilities as he deems necessary for the safety, health, protection, and outdoor recreational use of the visiting public; to undertake a thorough and detailed review of all existing developments and uses on Federal lands to determine their compatibility with preservation of environmental values and their effectiveness in providing needed public services; to implement corrective procedures when necessary; and to otherwise administer the Federal land and water areas associated with said Lake Berryessa in such a manner that, in his opinion, will best provide for the public recreational use and enjoyment thereof, all to such an extent that said use is not incompatible with other authorized functions of the Solano project.

Sec. 602. The Secretary of the Interior shall make such rules and regulations as are necessary to carry out the provisions of this title and may enter into an agreement or agreements with the State of California, or political subdivision thereof, or a non-Federal agency or agencies or organizations as appropriate, for the development of a recreation management plan, and for the management of recreation including the operation and maintenance of the facilities within the area. The agency performing the recreation management functions is authorized to establish and collect fees for the use of recreation facilities.

Sec. 603. There is authorized to be appropriated to the Secretary of the Interior the sum of $3,000,000 (April 1974 price levels) plus or minus such amounts, if any, as may be justified by reason or ordinary fluctuations in development costs as indicated by cost indexes applicable to the types of development involved herein. There is also authorized to be appropriated such sums as may be necessary for administration of existing facilities and for operation and maintenance of the facilities authorized by this title.

Sec. 604. All funds authorized to be appropriated by this title shall be nonreimbursable.

ANALYSIS OF WATER RECREATION OPPORTUNITIES AT LAKE BERRYESSA

Condensed Findings and Recommendations

"An Analysis of the Water Recreation Carrying Capacity at Lake Berryessa. Sept. 1988"

FINDINGS

1. Lake Berryessa is a Federal water development that assures public access to project lands and water for recreation purposes. The lake is a valuable recreation resource which provides fresh water recreation opportunities to a service area of approximately 6.8 million people.

2. Lake Berryessa has experienced increased recreation use which will continue as the population of the region and the popularity of water activities increases.

3. Lake Berryessa has a shortage of day use facilities for short-term visitors. Additional day use facilities are badly needed to provide access to the water surface.

4. Lake Berryessa's water surface receives pockets of concentrated use in proximity of the concession and public use access areas along the western and southern portions of the lake. The northern portions of the lake do not receive as much use as the rest of the lake.

5. Lake Berryessa accommodates 44 different water activities year-round. The lake also has the unique capability of providing solitude experiences even during peak use periods.

6. Carrying capacity on Lake Berryessa occurs on land and water access facilities, and on the water surface. Water access facilities for short-term day use are the limiting factor. Short-term facilities are used at or near capacity during the recreation season. Land and water surfaces have not reached a physical carrying capacity.

7. Carrying capacity on Lake Berryessa's water surface is dependent upon administration, biological, physical, social, and temporal factors. Management ultimately determines the "recreation carrying capacity" of a water body that is suitable for recreation use.

8. Determining carrying capacity on the water surface is difficult. Recreation users of the water surface will determine their own personal capacity and respond by either accepting the conditions, altering their recreation habits, or choosing not to visit the lake. Capacities are usually instantaneous on a water surface. Long-term users of the lake have the best opportunity to avoid experiencing crowding on the surface. They usually stay at their site and wait until the other users leave before returning to the lake.

9. Conflicts between water surface users usually cause a perception of capacity occurring. Most conflicts occur between motorized and non-motorized uses. Those seeking a solitude experience are most sensitive to potential activity conflict.

10. Conflicting uses are usually separated by space, time, regulations, and enforcement. Zoning, by time and space, reduces conflict and enables more uses to occur on the water surface. Management can ultimately prohibit certain activities on the lake to protect public health, safety, and enjoyment.

11. As the Lake Berryessa area becomes more urbanized and recreation use increases on the lake, it is inevitable some recreation activities will be eliminated or negatively impacted.

12. Speed and boat size influence perceptions of capacity and are particularly impressionable on small non-powered or low-powered watercraft.

RECOMMENDATIONS

1. Management should continue to accommodate the diversified recreation activities on the lake, provided public health and safety are not jeopardized by any one activity.

2. Develop additional day use facilities for greater public access to the water.

3. Establish boat use traffic patterns if needed after appropriate investigations.

4. Investigate boat speed restrictions in areas north of Putah Creek to accommodate users seeking solitude experiences.

5. Reclamation and/or concessions should establish a program to designate specific sites for a boat-in camping program which could involve implementing a permit system for using established sites. Such a program is essential to control litter on the shoreline, reduce the threat of fire, and eliminate sanitation hazards.

6. Corrective measures to discourage diving from highway bridges and rock formations are needed. Existing law enforcement efforts are not effective in preventing such activities.

LAKE BERRYESSA LAND PLANNING AND DEVELOPMENT CRITERIA

Land planning and development criteria have been established to minimize the impacts of new development on existing resources at Lake Berryessa which support recreational, as well as other natural resources including water quality. These criteria would require some changes over the previous patterns of development existing within the concession areas. Existing resort designs, for the most part, would not be considered appropriate examples for future development. The following is a partial list of criteria that set a base minimum standard for all future projects. In addition to the base standards, other more comprehensive and specific land planning and development criteria could be specified as needed.

1. Develop land use zones to allow for a balance between development, open space, circulation, a variety of uses, and to carry out the design criteria intent.

2. Maintain quality scenic resources by establishing non-essential recreational improvements such as storage sheds, boat shops, employee and manager housing, etc. on land areas screened and away from primary recreation areas and viewsheds.

3. Retain rural qualities and natural land forms that are easily viewed at close range by the public from the land or water surface.

4. Maintain natural features of the shoreline by locating development with setbacks appropriate to the site. Major retaining walls and breakwaters will not be developed along the shoreline, unless required to mitigate an existing problem. However this does not exclude the development of a launch ramp.

5. Develop shoreland for those uses which require a shoreline location (i.e., swimming, boat launching, picnicking). Coordinate and plan overnight opportunities (boat access camping, etc.) so as to not preclude day use opportunities. In general, day use opportunities clearly established should not be entirely interrupted by overnight development.

6. Locate vehicle parking to minimize its visual impact from the standpoint of shoreline users, boaters, road traffic, and visitors on lake islands. Use existing or install earth forms, rock, and/or vegetation for screening to provide an appropriate solution.

7. Place structures within the setting to minimize physical and visual impacts. Structures will adhere to the visual aesthetics of the area and use the forms, color, tones, and textures of the natural landscape as a guide for design. Structures will be located in less visually sensitive locations; areas which are not exposed to the view from many locations.

8. Retain existing land forms that would screen any developed areas from the view of visitors along access roads or the water surface.

9. Develop recreational vehicle parks, campgrounds, storage areas, cottages, motels, etc. around existing natural vegetation. Construct sites with minimum dimensions determined by Reclamation with buffer zones between each site constructed. To retain scenic views from the roadway and other sites, sites will be located with visual corridors of the lake scene. Campground and recreational vehicle park sites will not be lined up similar to parking lot design but instead will have buffer zones between each site and will be vegetated. Access to the shoreline near developed areas will be provided by pedestrian corridors in convenient locations.

10. Avoid developments resulting in structures silhouetted on the skyline or disrupting scenic views.

11. Develop roads in a park-like character and located to permit safe, convenient and enjoyable access at restricted speeds. Proposed roadways will follow existing alignments and meander so as to retain a maximum of existing natural tree and shrub cover. The locations of roads will be selected with care and precision to minimize earthwork scars. Reduction of the magnitude of roadway cuts and fills will help to retain the pastoral character of the area.

12. Align roads and utilities to avoid existing oak trees' other large-scale vegetation and allow a generous clearance from their dripline to avoid impacting root zones. Irrigation of native oak trees will be kept to a minimum to avoid root fungus endemic to local soils.

13. Provide a clearly defined hierarchy of vehicle circulation;

   a. Access roadways (those linking public thoroughfares with commercial centers) should be two-way, with a twenty-four (24) foot minimum width of all-weather surfacing.

b. Primary circulation roadways link access roadways with recreation activity areas (e.g., boat ramp or overnight sites); they should be two-way, with a twenty (20) foot minimum width of all-weather surfacing. However these could be one-way to minimize site development impacts.

c. Secondary circulation roadways (one- way loop extensions of the primary roadways) should have a twelve (12) foot minimum width of all-weather surfacing.

14. Use rounded earth forms; avoid sharp, harsh edges and lines. Round cuts, fills, and borrow areas to conform with the prevailing topographic character of local hill forms. Avoid sharp angles, especially at the tops of cuts and the toes of fills.

15. Provide traffic barriers to minimize the liabilities and property damages which arise when vehicles deviate from roadways.

16. Develop only on slopes of less than twenty-five (25) percent (4 to 1).

17. Locate facilities subject to flood damage, or capable of degrading the water quality of Lake Berryessa, above the reservoir floodplain elevation 455 feet.

18. Locate permanent sanitation facilities and disposal systems above the reservoir floodplain elevation of 455 feet.

19. Construct wastewater disposal systems using oxidation ponds, treatment plants, or sealed pits.

20. Construct facilities that are accessible and usable by people having physical impairments.

21. Stockpile topsoil disturbed during construction activites for site replacement when work is completed. Revegetate earth surfaces disturbed by construction activities or otherwise subject to erosion. Native species will be preferred and should be selected whenever possible over non-native species. Native appearing non-native plants may be acceptable where native plants are impractical.

22. Locate new utility lines underground.

23. Provide services and facilities appropriate to the type of development and use, and base the number of such facilities on optimum capacity. Examples of such services and facilities will include, but are not limited to, such appropriate items as restrooms, showers, laundry facilities, potable drinking water, etc.

24. Locate facility support services (garbage collection, shops, maintenance yards, storage areas, boat storage, etc.) to minimize visual impacts and safety hazards away from recreation areas, entrances, and views by shoreline users, boaters, visitors to the lake, etc.

25. Provide fire control features (e.g., fuel breaks, suppression systems and road access specifications); consult with California Division of Forestry (CDF) officials during planning and design of the development.

26. Utilization of barriers and restrictive devices to control access will be accomplished by using natural barriers, vegetation and/or other devices that blend with the natural environment.

27. Plan circulation patterns to optimize the separation of vehicle traffic and pedestrian movements.

SOILS AND TOPOGRAPHY

A. Bressa-Dibble Complex

This is the most common soils complex in the Lake Berryessa area, constituting most of the shoreline, (Figure D-1 shows the location for this and all of the following soil types). The complex is a combination of the Bressa and the Dibble soils series, formed from weathered sandstone and shale. Bressa soils typically consist of 10 inches of silt loam over 23 inches of silty clay loam, atop weathered fractured sandstone. The heavier Dibble series characteristically has 9 inches of silty clay loams and 25 inches of clay and silty clay covering the sandstone. Slopes range from 5 to 75 percent, with most exceeding 30 percent. Oaks and annual grasses are the dominant plant cover. These soils are most commonly used for wildlife habitat, watershed, and grazing livestock. Homesites and recreational areas are situated on them around the lake as well.

Use of this complex is most limited by slope. The threat of erosion is moderate to severe on slopes exceeding 30 percent. The shrink-swell potential of these soils is medium to high, and the load-bearing capacity is low, affecting the design of structures and roads. The corrosive potential for concrete is moderate to high. Construction of sanitary facilities is also limited. Low permeability places a severe constraint on the use of septic tanks. Steep slopes, shallow rock, and high clay content place severe limitations on the use of sewage lagoons and solid waste landfills. The heavy textures, and particularly the steep slopes, also limit the use of these soils for campgrounds,picnic areas, playgrounds, and trails.

B. Contra Costa Loams:

This soil is found along the northeastern side of Lake Berryessa and comprises the southern half of Big Island. A representative profile consists of 5 inches of loam over 29 inches of clay loam and clay. Fractured shale and sandstone lie beneath that. Slopes range from 5 to 15 percent. Oaks and annual grasses are the dominant plant cover, with grazing being the main use. Along the shores of Lake Berryessa these soils are used for recreational areas.

With proper plant cover the danger of erosion is low. The shrink-swell potential is moderate to high and the load bearing capacity is low, which are important considerations when designing structures and roads. The corrosive potential for uncoated steel is moderate to high. Permeability is low for the use of septic tanks. Slopes and clay content are generally too high for sewage lagoons or landfills, or for use of the soil for backfill. These soils are acceptable for campgrounds and picnic areas, good for trails, but are too clayey for playground areas.

C. Hambright-Rock Outcrop Complex:

This complex forms limited areas of shoreline at the mouths of Eticuera Creek and Putah Creek. It is comprised largely of Hambright series soils with rock outcroppings and debris, intermixed with minor areas of various other soils. Hambright soils typically exhibit 12 inches of very stony loam over fractured igneous rock. Slopes along Eticuera Creek vary from 2 to 30 percent. At the mouth of Putah Creek though, this complex has slopes from 30 to 75 percent. Thick brush covers most of the rocky hillsides. Oaks, grasses, and forbs grow on the gentler slopes. Uses include recreation, wildlife habitat, watershed, and limited grazing.

The erosion hazard is high on the steep slopes, and slight to moderate on slopes of 2 to 30 percent. The shrink-swell potential is low. The danger of corrosion is high for uncoated steel, low for concrete. The shallow soil depth, presence of numerous large stones, and steep slopes place severe restraints on the placement of buildings, recreational sites, and roads. Sanitary facilities are equally limited by the shallow rocky soils. The rocky brushy terrain presents problems for the construction of trails.

D. Henneke Gravelly Loam:

This soil can be found along the west side of Lake Berryessa. Though generally set back from the lake, it forms some shoreline at the mouths of Putah Creek and Pope Creek. A representative profile exhibits 7 inches of gravelly loam over 8 inches of very gravelly clay loam. Beneath that lies fractured serpentine. Slopes are steep, from 30 to 75 percent, covered with oak, digger pine, scrub oak, manzanita, muskbrush, toyon, McNabb cypress, and annual grasses.

Grazing use is limited by the heavy brush and steep slopes. This soil serves largely as watershed and wildlife habitat. The hazard of erosion is moderate to high. The shrink-swell potential and the corrosion potential for concrete are low to moderate, with a high corrosion potential for uncoated steel. The steep slopes, low permeability and shallow depth to rock make construction of sanitary facilities undesirable. Recreational uses are similarly restricted.

E. Los Gatos Loam:

This soil is located along the western shore of Lake Berryessa, below the mouth of Putah Creek. The soil formed in material weathered from sandstone. A representative profile exhibits 16 inches of loam overlying a 29 inch thick subsoil of loam and clay loam. Massive sandstone is found at a depth of 36 inches. Slopes vary from 5 to 75 percent. Most exceed 30 percent, except on 2 small islands and a small peninsula just below Putah Creek. Brush and scattered oak cover most of this soil, with areas of annual grasses. On slopes from 5 to 30 percent this soil is used for recreation and grazing. Use of slopes steeper than 50 percent is largely limited to wildlife habitat and watershed.

Erosion problems are few on slopes of less than 30 percent, but are a serious concern on steeper hillsides. The shrink-swell potential is moderate and load bearing strength is low. The corrosion potential is high for uncoated steel, moderate to high for concrete. Construction of sanitary facilities is limited by the steep slopes, low permeability, and shallow depth to rock.

F. Maymen-Los Gatos Complex:

This soil complex, a combination of the Maymen and Los Gatos series, is limited to the southeastern branch of Lake Berryessa, south of Monticello Dam. A representative Maymen soil profile exhibits 12 inches of gravelly loam atop fractured sandstone. Slopes are 50 to 75 percent. Vegetation consists of chamise, manzanita, scrub oak, and annual grasses. These soils are used for grazing, wildlife habitat, and watershed.

Erosion hazard is high to very high on these steep soils. The shrink-swell potential is low to moderate and the corrosion potential for concrete and uncoated steel is moderate. The steep slopes, prevalence of shallow rock, and the low permeability of the soil pose serious constraints for designing buildings, roads, sanitary facilities, recreational sites, and trails.

G. Maymen-Millsholm-Lodo Complex:

This soil complex is a mixture of the Maymen, Millsholm, and Lodo series. The complex is very widespread near the southern end of Lake Berryessa, but touches on the lake itself only in limited areas in Steel Canyon, Wragg Canyon, and north of Markley Canyon. A representative Millsholm series profile consists of 4 inches of surface loam and 8 inches of clay loam atop sandstone. Lodo series soils also exhibit a shallow profile, with 3 inches of surface loam and 4 inches of heavy loam subsoil, resting on sandstone. Slopes vary from 30 to 75 percent. The vegetation consists of chamise, manzanita, annual grasses, scrub oak, and scattered oak trees. Major uses are grazing, wildlife habitat, and watershed.

The potential for erosion is high to very high. The shrink-swell potential is low. Danger of corrosion is moderate for concrete and uncoated steel. The steep slopes and shallow depth to rock make these soils a poor choice for locating sanitary facilities, buildings, or recreational sites. Hiking trails would require careful planning and intensive maintenance.

H. Millsholm Loam:

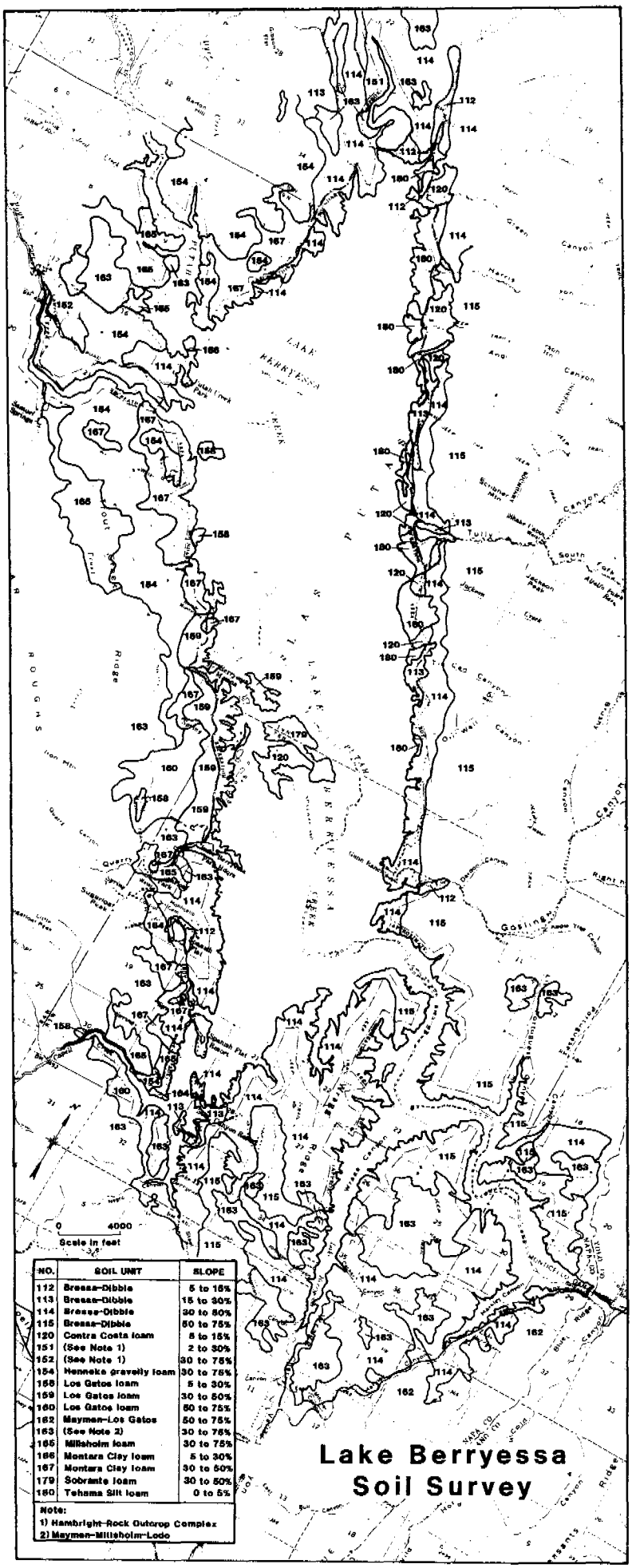
This soil is found in isolated formations below the southwest end of Lake Berryessa, and forms the north bank of Capell Creek near its mouth. A representative Millsholm loam profile is shallow, with 4 inches of surface loam and 8 inches of clay loam overlaying sandstone. Annual grasses, scattered oaks, and brush cover the 30 to 75 percent slopes typical of this soil. Grazing is the principal use.

The erosion hazard is high. The shrink-swell potential is low and the potential for corrosion of concrete and uncoated steel is moderate. The shallow soils and steep slopes provide significant constraints on the placement of buildings, recreational sites, roads, or sanitary facilities on this soil. Trails must be carefully planned and maintained to check erosion on the steep slopes.

I. Montara Clay Loam:

This soil is found along the western shore of Lake Berryessa, above and below Putah Creek. In a representative profile, 12 inches of clay loam cover serpentine. Grazing, wildlife habitat, and watershed are the main uses for this soil. Slopes range from 5 to 50 percent.

The erosion hazard is moderate on slopes of less than 30 percent, high on steeper slopes. The shrink-swell potential is moderate. The potential for corrosion is high for uncoated steel, low for concrete. Permeability is low. Placement of buildings, sanitary facilities, or recreation sites is limited on the shallow soils of the steeper slopes. Low permeability and shallow depth to rock present problems for use of septic tanks and other sanitary facilities on the gentler slopes, where trails present only moderate erosion hazards.



NO.	SOIL UNIT	SLOPE
112	Bressa-Dibble	5 to 15%
113	Bressa-Dibble	15 to 30%
114	Bressa-Dibble	30 to 50%
115	Bressa-Dibble	50 to 75%
120	Contra Costa loam	5 to 15%
151	(See Note 1)	2 to 30%
152	(See Note 1)	30 to 75%
154	Henneke gravelly loam	30 to 75%
158	Los Gatos loam	5 to 30%
159	Los Gatos loam	30 to 50%
160	Los Gatos loam	50 to 75%
162	Maymen-Los Gatos	50 to 75%
163	(See Note 2)	30 to 75%
165	Millsholm loam	30 to 75%
166	Montara Clay loam	5 to 30%
167	Montara Clay loam	30 to 50%
179	Sobrante loam	30 to 50%
180	Tehama Silt loam	0 to 5%

FIGURE D-1

J. Sobrante Loam:

The northern half of Big Island in Lake Berryessa is comprised of this soil. In a representative profile 6 inches of loam overlay 24 inches of clay loam. Massive sandstone is found at 30 inches. Slopes are 5 to 30 percent. Vegetation is annual grasses, with scattered oaks and pine. On Big Island recreation is the primary use for this soil.

With proper plant cover the threat of erosion is slight to moderate. The shrink-swell potential is low to moderate. The corrosion hazard is moderate for both concrete and uncoated steel. The shallow depth to rock makes this soil unsuitable for septic tanks and other sanitary facilities. Slow draining soils, shallow rock, and steep slopes present problems for camping and picnic and playground areas. Mitigating steps should be taken to prevent erosion on hiking trails.

K. Tehama Silt Loam:

This soil is distributed on alluvial fans and terraces along the eastern shoreline of Lake Berryessa, where it formed from sandstone and shale. A representative profile exhibits 12 inches of surface loam above a clay loam subsoil, which extends to a depth of 60 inches or greater. Slope is 0 to 5 percent. Vegetation consists of annual grasses and scattered oaks. Along Lake Berryessa this soil is used for grazing and recreation.

The erosion hazard is slight. The shrink-swell potential is low to moderate, as is the corrosion potential for concrete and uncoated steel. The low compressive strength of this soil could present problems for paved roads. Slow percolation makes septic tanks undesirable, but the soil would be suitable for sewage lagoons and landfills. In camping and playground areas slow percolation may cause puddling of rain water, but picnic areas and trails should present few problems.

PLANT SPECIES OCCURING IN THE LAKE BERRYESSA AREA

Trees and Shrubs

Chamise (Adenostoma fasciculatum)
Buckeye (Aesculus californica)
Manzanita (Arctostaphylos sp.)
Coyote Brush (Baccharis consanguinea)
Buckbrush (Ceanothus cuneatus)
Redbud (Cercis occidentalis)
Yerba Santa (Eriodictyon californicum)
Toyon (Heteromeles arbutifolia)
Sticky Monkey Flower (Mimulus auranticus)
Chaparral Pea (Pickeringia montana)
Digger Pine (Pinus sabiniana)
Blue Oak (Quercus Douglasii)
Black Oak (Q. Kellogii)
Scrub Oak (Q. dumosa)
Leather Oak (Q. durata)
Interior Live Oak (Q. wislizenii)
Poison Oak (Rhus diversiloba)

Grasses, Forbes and Ferns

Yarrow (Achillea lanulosa)
Maidenhair (Adiantum jordanii)
Fiddleneck (Amsinckia sp.)
Wild Oat (Avena fatua)
Brodaea (Brodiaea sp.)
Soft Chess (Bromis mollis)
Rip-gut (B. rigidus)
Castilleja (Castilleja sp.)
Starthistle (Centaurea sp.)
Clarkia (Clarkia sp.)
Soap Plant (Chlorogalum pomeridianum)
Medusa Head (Elymus caput-medusae)
Fescue Grass (Festuca sp.)
Tarweed (Hemizonia sp.)
Iris (Iris Douglasiana)
Wild Parsley (Lomatium utriculatum)
Madia (Madia exiqua)
Melic (Melica torryana)
Micropus (Micropus californica)
Gold Backed Fern (Pityrogramma triangularis)
Bluegrass (Poa annua)
Stipa (Stipa sp.)
Wild Grape (Vitis californica)

WILDLIFE OCCURRING IN THE LAKE BERRYESSA AREA

Mammals

Pallid Bat (Antrozous pallidus)
Coyote (Canis latrans)
Opossum (Didelphis marsupialis)
Herman Kangaroo Rat (Dipodomys heermanni)
Big Brown Bat (Eptesicus fuscus)
Mountain Lion (Felis concolors)
Red Bat (Lasiurus borealis)
Hoary Bat (L. cinereus)
Black-tail jackrabbit (Lepus californicus)
River Otter (Lutra canadensis)
Bobcat (Lynx rufus)
Striped Skunk (Mephitis mephitis)
California Meadow Mouse (Microtus californicus)
California Myotis (Myotis californicus)
Little Brown Myotis (M. lucifugus)
Fringed Myotis (M. thysanodes)
Dusky-footed Wood Rat (Neotoma fuscipes)
Black-tail Deer (Odocoileus hemionus columbianus)
Muskrat (Ondatra zibethica)
Deer Mouse (Peromyscus maniculatus)
Raccoon (Procyon lotor)
Western Harvest Mouse (Reithrodontomys megalotis)
Broad-handed mole (Scapanus latimanus)
Western Gray Squirrel (Sciurus griseus)
Ornate Shrew (Sorex ornatus)
Beechy Ground Squirrel (Spermophilus beecheyi)
Spotted Skunk (Spilogale putorius)
Wild Pig (Sus scrofa)
Audubon Cottontail Rabbit (Sylvilagus auduboni)
Brazilian Free-tailed Bat (Tadarida brasiliensis)
Sonoma Chipmonk (Tamias sonomae)
Botta Pocket Gopher (Thomomys bottae)
Gray Fox (Urocyon cinereoargenteus)

Reptiles

Western Pond Turtle (Clemmys maramorata)
Western Rattlesnake (Cortalus viridis)
Western Skink (Eumeces skiltonianus)
Northern Alligator Lizard (Gerrhonotus coeruleus)
California Mountain Kingsnake (Lampropeltis zonatay)
Striped Racer (Masticophis lateralis)
Western Fence Lizard (Sceloporus occidentalis)
Common Garter Snake (Thamnophis sirtalis)

Birds

Cooper's Hawk (Accipiter cooperii)
Sharp-shinned hawk (A. striatus)
Western Grebe (Aechmophorus occidentalis)
Northern Saw-whet Owl (Aegolius acadicus)
White-throated Swift (Aeronautes saxatalis)
American Widgeon (Anas americana)
Mallard (A. platyrhynchos)
Gadwall (A. strepera)
Scrub jay (Aphelocoma coerulescens)
Golden Eagle (Aquila chrysaetos)
Great Blue Heron (Ardea herodias)
Burrowing Owl (Athene cunicularia)
Lesser Scaup (Aythya affinis)
Canada Goose (Branta canadensis)
Great-horned Owl (Bubo virginianus)
Red-tailed Hawk (Buteo jamaicensis)
Red-shouldered hawk (B. lineatus)
Green-backed Heron (Butorides striatus)
California Quail (Callipela californica)
Anna's Hummingbird (Calypte anna)
Turkey Vulture (Cathartes aura)
Hermit Thrush (Catharus guttatus)
Canyon Wren (Catherpes mexicanus)
Brown Creeper (Certhia americana)
Belted Kingfisher (Ceryle alcyon)
Wrentit (Chamaea fasciata)
Killdeer (Charadrius vociferus)
Snow Goose (Chen caerulescens)
Northern Harrier (Circus cyaneus)
Northern Flicker (Colaptes auratus)
Band-tailed Pigeon (Columba fasciata)
Western Wood-peewee (Contopus sordidulus)
American Crow (Corvus brachyrhynchos)
Common Raven (C. corax)
Yellow-rumped Warbler (Dendroica coronata)
Black-throated Gray Warbler (D. nigrescens)
Yellow Warbler (D. petechia)
Pileated Woodpecker (Dryocopus pileatus)
Black-shouldered Kite (Elanus caeruleus)
Merlin (Falco columbarius)
Prairie Falcon (F. mexicanus)
Peregrine Falcon (F. peregrinus)
American Kestral (F. sparverius)
American Coot (Fulica americana)
Common Loon (Gavia immer)
Northern Pygmy Owl (Glaucidium gnoma)
Bald Eagle (Haliaeetus leucocephalus)
Cliff Swallow (Hirundo pyrrhonota)
Barn Swallow (H. rustica)
Loggerhead Shrike (Lanis ludovicianus)
Ring-billed Gull (Larus delawarensis)
Acorn Woodpecker (Melanerpes formicivorus)
Lewis' Woodpecker (M. lewis)
Wild Turkey (Meleagris gallopavo)
Ash-throated Flycatcher (Myiarchus cinerascens)
MacGillivray's Warbler (Oporornis tolmiei)

Mountain Quail (Oreortyx pictus)
Western Screech Owl (Otus kennicottii)
Osprey (Pandion haliaetus)
Plain Titmouse (Parus inornatus)
Double-crested Cormorant (Phalacrocorax auritus)
Black-headed Grosbeak (Pheucticus melanocephalus)
Yellow-billed Magpie (Pica nuttalli)
Nuttall's Woodpecker (Picoides nuttalii)
Downy Woodpecker (P. pubescens)
Western Tanager (Piranga ludoviciana)
Pied-billed Grebe (Podilymbus podiceps)
Blue-grey Gnatcatcher (Polioptila caerulea)
Bushtit (Psaltriparus minimus)
Ruby-crowned Kinglet (Regulus calendula)
Bank Swallow (Riparia riparia)
Say's Phoebe (Sayornis saya)
Western Bluebird (Sialia mexicana)
White-breasted Nuthatch (Sitta carolinensis)
Red-breasted Sapsucker (Sphyrapicus ruber)
Northern Rough-winged Swallow (Stelgidopteryx serripennis)
Caspian Tern (Sterna caspia)
Foster's Tern (S. fosteri)
European Starling (Sturnus vulgaris)
Tree Swallow (Tachycineta bicolor)
Violet-green Swallow (T. thalassina)
Bewick's Wren (Thryomanes bewickii)
California Thrasher (Toxostoma redivivum)
American Robin (Turdus migratorius)
Western Kingbird (Tyrannus verticalis)
Common Barn Owl (Tyto alba)
Orange-crowned warbler (Vermivora celata)
Mourning Dove (Zenaida macroura)
White Pelican (Pelecanus erythroihynchos)

ENDANGERED SPECIES OCCURRING IN THE LAKE BERRYESSA AREA

Listed and proposed ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES that may occur in the area of the Lake Berryessa Reservoir Area Project.

BIRDS

American White Pelican (Pelecanus erythrorhynchos) (CSC-1)
Double-Crested Cormorant (Phalacrocorax auritus) (CSC-2)
Aleutian Canada Goose (Branta canadensis leucopareia) (FE)
Barrow's Goldeneye (Bucephala islandica) (CSC-3)
Northern Goshawk (Accipiter gentilis) (CSC-3)
Cooper's Hawk (Accipiter cooperii) (CSC-3)
Sharp-Shinned Hawk (Accipiter striatus) (CSC-3)
Northern Harrier (Circus cyaneus) (CSC-3)
Ferruginous Hawk (Buteo regalis) (F2)
Swainson's Hawk (Buteo swainsoni) (F2,CT)
Red-Shouldered Hawk (Buteo lineatus) (AB)
Golden Eagle (Aquila chrysaetos) (CSC-3,CP)
Bald Eagle (Haliaeetus leucocephalus) (FE,CE,CP)
Osprey (Pandion haliaetus) (CSC-2,AB)
Prairie Falcon (Falco mexicanus) (CSC-3)
Peregrine Falcon (Falco peregrinus) (FE,CE,CP)
Merlin (Falco columbarius) (CSC-1,AB)
Burrowing Owl (Athene cunicularia) (CSC-2)
Sandhill Crane (Grus canadensis) (CP,CSC-3)
Black Swift (Cypseloides niger) (CSC-3)
Yellow Warbler (Dendroica petechia) (CSC-2,AB)

SENSITIVE SPECIES STATUS

Federal Status Codes

FE - Federal Endangered. An endangered species is one that is in danger of extinction throughout all or a significant portion of its range.

FT - Federal Threatened. A threatened species is one that is likely to become endangered in the foreseeable future.

F1 - Federal Candidate Species, Category 1. This category includes species for which the U.S. Fish and Wildlife Service presently has substantial information regarding a species' vulnerability. Proposals to list them as endangered or threatened may be delayed due to needs for further research and limited staffing for the large numbers under review.

F2 - Federal Candidate Species, Category 2. This category includes species for which the U.S. Fish and Wildlife Service has information indicating a species may warrant listing, but for which substantial biological information is lacking.

State Status Codes

CE - California Endangered.

CT - California Threatened.

CP - California Protected. Protected by the regulations of the California Department of Fish and Game. A fully protected species may not be possessed or taken.

California Department of Fish and Game's Species of Special Concern

CSC-1 - Highest Priority. These species face immediate extirpation of their entire California breeding population if current trends continue.

CSC-2 - Second Priority. These species are definitely on the decline in a large portion of their range in California, but their populations are still sufficiently substantial that danger is not immediate.

CSC-3 - Third Priority. These species are not in any present danger or extirpation and they do not appear to be declining seriously; however, simply by virtue of their small populations in California, they are vulnerable to extirpation should a threat materialize.

Audubon Blue List

AB - These species have shown clear, recent population declines in this region.

Note: *The above information was compiled by the Recreation Operations Division of the Lake Berryessa Recreation Office 5520 Knoxville Road Napa, California 94558, from the following sources:*

U.S. Fish and Wildlife Service
California Department of Fish and Game
Davis Audubon Society

FISH SPECIES OCCURRING IN THE LAKE BERRYESSA AREA

Fish species currently found in Lake Berryessa.

Bass, largemouth (Micropterus salmoides)
smallmouth (M. dolomieui)
Catfish, channel (Ictalurus punctatus) white (I. catus)
Black crappie (Pomoxis nigromaculatus)
Bluegill (Lepomis macrochirus)
Carp (Cyprinus carpio) (linnaeus)
Golden Shiner (Notemigonus crysoleucas) (Mitchell)
Salmon, silver (Oncorhynchus kisutch)
Squawfish (Ptychocheilus grandis) (ayres)
Threadfin shad (Dorosoma petenense)
Trout, brown (Salmo trutta) rainbow (S. gairdnerii) brook (Salvelinus fontinalis)

NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH

TRENT CAVE, R.S.
Director of Environmental Health

1195 THIRD STREET, ROOM 205 • NAPA, CALIFOR
AREA CODE 707/253-4471

ORGANIC MERCURY IN FISH
GUIDELINES FOR LAKE BERRYESSA FISH CONSUMPTION

Virtually all fresh and salt water fish contain organic mercury at some level in their flesh, including California fish, whether purchased commercially or caught as sport fish. Fish in the U.S. diet average about 0.3 parts per million (ppm) mercury, an amount that is not considered harmful, given normal consumption patterns. The U.S. Food and Drug Administration and the California Department of Health Services (CDHS) action level for commercially marketed fish is 1.0 ppm, but this action level does not apply to sport fish. Although mercury is ubiquitous in our environment, it is not equally distributed. The northern coastal mountains of California are naturally rich in mercury - containing deposits which add to the mercury burden in the region's watersheds. Historical mining operations have contributed to this burden. Periodic sampling of fish conducted in the region since the 1970's has sometimes found sport fish in excess of the 1.0 ppm action level for commercial fish, raising the question whether eating sport fish from the region would be harmful. CDHS, in conjunction with the Department of Fish and Game, has issued guidelines for sport fish consumption in a number of areas around the State, including Lake Berryessa.

RECOMMENDED FISH CONSUMPTION GUIDELINES FOR SPORT FISH FROM LAKE BERRYESSA

Because of mercury levels in fish, women who are pregnant or who may soon become pregnant, nursing mothers, and children under age 6 should not eat fish from the Lake. Adults should eat no more than the amount indicated below. Children 6-15 years of age should eat no more than one-half the amount indicated.

Largemouth bass over 15 inches: 1 pound per month
or largemouth bass under 15 inches: 2 pounds per month
or all smallmouth bass: 1 pound per month
or all channel catfish 3 pounds per month
or all white catfish: 2 pounds per month
or all rainbow trout: 10 pounds per month

It is important to keep the mercury concern in perspective. Lake water does not contain mercury. The mercury is found in Lake sediments where it enters the food chain. Dietary exposure to mercury is inevitable if one eats fish, regardless of the source. Whether consumption is harmful depends on the concentration and amount of fish eaten over an extended period of time. These guidelines provide consumers the information to make health choices about the amount of sport fish they eat. Rather than avoiding lakes which have been well studied, consumers should be heartened by the fact that if the guidelines are followed, year-around residents may eat these fish regularly for a lifetime without harm. Obviously, tourists who have short term exposure do not need to be concerned if the guidelines are followed.

TC:ew

EHD-17:3/20/87

RECREATION DEMAND ANALYSIS

Current Recreational Demand

Recreation activities at Lake Berryessa are predominately water dependent and seasonal. The lake receives a majority of its yearly 1.3 to 1.4 million visitors between the Memorial Day and Labor Day weekend. Depending upon the weather, heavy use may start as early as March and continue through October into early November, as in 1987. Use on weekends is usually greater than on weekdays, a pattern consistent year-round. The lake also experiences consistent non-peak seasonal use between September and March.

Lake Berryessa's major service area includes the following twelve counties: Alameda, Contra Costa, Lake, Marin, Napa, Sacramento, San Francisco, San Mateo, Santa Clara, Solano, Sonoma, and Yolo. To provide for the needs of the public there are seven resort areas that provide a variety of long-term and short-term recreational opportunities. In addition to the resorts, Reclamation provides a variety of short-term opportunities.

During the summer or primary recreation season, users participate in a variety of activities during theri visit to the lake. Activities receiving the highest use are power boating and water-skiing, picnicking, camping, swimming and beach activities. Fishing during the summer season does occur but not to the extent it receives in the fall, winter, and spring seasons. During the summer months visitors are more likely to engage in a number of activities during their visit. Users might water-ski, powerboat, fish, camp, and picnic all in one visit. During the off seasons use is more exclusive, that is people might only fish and/or picnic, and/or camp.

At most public lakes use occurs on a short-term basis. People will visit for the day mostly, or camp for one to two nights usually on the weekends. Some visitors may stay for longer periods of time up to two weeks. Use at Lake Berryessa is somewhat different from this classical use pattern. Many of the lake's visitors can be classified as long-term users. They own trailers or mobile homes which are kept year-round in one of the seven resorts and they use them quite extensively and consistently during the summer season, less so during the off seasons. Due to their situation, they have no need for quality campgrounds, picnic tables, or other day-use related facilities.

The resorts provide rudimentary camping facilities, picnicking areas, and other facilities for the short-term user. However, resort emphasis in the past is to provide for the long-term user, and as a result, use of Lake Berryessa is perceived by many to be exclusive. While short-term users will utilize the resort facilities to capacity on occasion, many prefer to use Reclamation developed day use areas or areas that are undeveloped. Demand for Reclamation developed day use areas is extremely high, it is not uncommon to have all facilities full on most weekends with moderate to heavy use on weekdays during the peak recreation season.

As noted above, those activities most often engaged in during a visit to Lake Berryessa are boating, fishing, swimming and beach related activities, picnicking, nature appreciation and visiting scenic areas, and camping. While boat-in camping is not authorized on the lake, it occurs often during the summer months. On a busy weekend there may be as many as 300 boat-in campers located along the shores, usually in the dispersed or primitive zones where no facilities such as picnic tables or restrooms are located.

Boating (power boating, water-skiing, and other boating related activities) is the most popular activity on the lake and receives more than one-third of the total use. Water-skiing includes several special activities such as traditional water-skiing, slalom skiing, trick skiing, parasailing, paraskiing, and, towing people on such things as innertubes, bellyboards, and inflated rafts. Due to the locations of the boat launch ramps and related facilities, boat use and its many activities has a tendency to congest in the southern sections of the lake and the coves near the marinas. Northern sections of the lake receives use but not to the extent it could or should due to the lack of related facilities.

Other recreational activities engaged in at Lake Berryessa include: house-boating, windsurfing, sailing, canoeing, scuba diving, ultralight and seaplane landings, hiking, riding, photography, etc.

Latent or Unmet Demand

Determining how many people are actually denied access to Lake Berryessa or any other recreation area for that matter is a difficult task. On certain weekends or holidays when all facilities are full, people who have made the trip to the lake have been turned away. In addition, there are those who do not attempt the trip due to a variety of reasons (they expect it to be overcrowded, the use fees are too high, facilities are inadequate, etc.), and this may

occur all year round. When people are denied access or do not make the trip when they would like to due to the above mentioned or for any other reasons, their demand for a recreational opportunity is unmet and is known as latent demand.

One way of observing latent demand can be seen by what is occurring at Lakes Berryessa, Sonoma, and Mendocino, and their greatly overlapping service areas. For some time now Lakes Berryessa and Mendocino were considered two of the primary freshwater recreational areas for use by Bay Area residents. In 1986 Lake Sonoma officially opened for business (it did receive some use prior to 1986 but its facilities were not completed). Through September of 1986 Lake Sonoma received an estimated 220,500 visitor days of use. Visitation at Lake Mendocino through the same period was 514,100, an increase over the previous year of approximately 25,300 visitor days. During this same period of time visitation at Lake Berryessa increased approximately 90,000 visitor days.

It can usually be expected that recreational use at an existing area will increase each year. However, when a new site opens within the service area of existing facilities one would expect the new site to attract its users from those people using existing facilities. It is not inconceivable that use at existing facilities should drop to reflect the loss (assuming there is no latent demand and taking into consideration weather, etc.). As can be seen from the data above, use at Lakes Berryessa and Mendocino continued to rise even though there was a tremendous increase in use at Lake Sonoma.

While population increases will account for a portion of the total increase in use, a strong case can be made that there existed prior to the opening of Lake Sonoma latent demand for recreational opportunities within the service area. With the greater availability of opportunities due to the new lake more of the latent demand was being provided for. While this doesn't indicate whether or not all latent demand has been met or at what level it still exists, it does show that at this time demand will utilize whatever opportunities are available.

Another way of observing what the degree of latent or unmet demand is, is to ask the public for their opinions on how well existing systems are satisfying their demand for recreational opportunities. The State of California, Department of Parks and Recreation, released a report "Public Opinions and Attitudes on Recreation in California 1987". The report summarizes a recent survey in which respondents were asked questions on how often they recreated, in which activities they recreated, the ways in which an area could be improved based upon their needs, are their recreational needs being met, etc.

In an attempt to measure latent demand the respondents were asked to identify and rank those activities for which they would most probably increase their own participation if good opportunities were available. Thirty-eight (38) activities were identified and ranked. Of the ten activities having the highest latent demand, camping in developed sites with tent or vehicle was rated number one. The top ten activities were:

* 1) Camping in developed sites with tent or vehicle

2) Visiting museums, zoos, historic sites, arboretums

3) Walking (excluding trail hiking)

4) Attending outdoor cultural events like concerts, theater, etc.

5) Bicycling

* 6) Picnicking in developed sites

* 7) Bird watching, general nature study, visiting natural areas

* 8) Freshwater fishing

* 9) Beach activities including sunning and games

*10) Swimming in lakes, rivers, and the ocean (not in pools)

It is important to note that of the primary short-term activities people participate in while visiting Lake Berryessa (as indicated by an "*") six of them are listed in the top ten latent activities identified by the public. The other major short-term activity participated in while visiting Lake Berryessa is boating (water-skiing, power-boating, etc.) and opportunities in this category appear to be sufficient.

To further support the premise that there is latent demand for recreational opportunities, specifically those types engaged in while visiting Lake Berryessa, under the general survey topic "Attitudes toward changes to park and recreational services" the following statements and responses appeared:

STATEMENT	AGREE	NEUTRAL	DISAGREE
Providing more picnic areas.	72.8%	19.8%	7.4%
Construction of more primitive campgrounds with picnic tables, cold water, pit toilets, etc.	65.3%	17.7%	17.0 %
Construction of more developed campgrounds with flush toilets, hot showers, etc.	58.6%	25.8%	15.6 %

Based upon these figures it appears that more than the majority of the respondents approved and a good portion were neutral to the statements that more recreational picnic and campground areas are needed. If the public feels that more of these facilities are needed, then current facilities may not be meeting the needs of the users and ultimately they must not be recreating to their fullest desires.

Future Demand for Recreational Opportunities

Pursuit of recreational activities and opportunities has increased tremendously over the past few years and it will continue to do so at least through the year 2000. As the population continues to grow and the public becomes more mobile, has more leisure time, more expendable income, experiences more work related stress, and develops an awareness of the benefits derived from participation in recreational activities, the demand for more receational opportunities and areas to pursue them will become critical. This trend is even more prevalent in California where the wide spectrum of climate, land characteristics, and recreational areas provides a multitude of year-round opportunities. The projected increases in recreational activities can be seen on Table J-1, RECREATIONAL ACTIVITIES (State Wide).

By the year 2010 the total population for the Lake Berryessa service area is expected to be 8,450,100 people. This is a 1,655,400 increase in the 1986 population of 6,799,700 people, or a 24.4 percent increase. By 2010 almost one quarter (23.3 percent) of the total population of the state will live within the service area. The growth potential for just the four counties surrounding Napa, and Napa itself is tremendous. Table J-2, POPULATION FIGURES, shows what future demographics are projected to be.

Based upon the growth in population and keeping everything else constant, by the year 2000 Lake Berryessa's annual visitation rate is projected to be approximately 1,650,875, an increase of 228,933 over 1986's 1,421,942 visitors. By the year 2010 visitation is projected to be approximately 1,768,896 visitors. This is an increase of 346,954 visitors over the 1986 figure.

If projected visitation is based upon recreational demand instead of population figures, by the year 2000 it is estimated that within those types of activities that are engaged in at Lake Berryessa, statewide participation days will go from 420,377,149 to 542,077,149. This is an increase of over 121,700,000 new participation days. Of this increase Lake Berryessa is projected to receive 377,270 new visitors which would increase annual use to 1,799,212 visitors in the year 2000. Please note that this figure reflects 148,337 more visitors than the one developed using population increases.

Summary and Conclusions

Lake Berryessa receives year-round use although a majority of it occurs during the summer months and weekends. In the summer, use is predominately boating and water-skiing, picnicking, camping, swimming and beach activities, and visiting natural areas. In the fall, winter, and spring months use is mostly fishing, picnicking, and long-term use (many trailer owners visit the lake year-round despite weather conditions or the desire to engage in any recreational activities).

There are basically two types of users, the long-term user and the short-term user. While the resorts provide services for both types of users, they were developed primarily for the long-term user. Reclamation's developments are geared for the short-term one-day user. Neither the resorts nor Reclamation provide adequate services for the short-term users looking to stay one to two nights, or up to two weeks.

Latent or unmet demand is a concept that attempts to measured the perceived availability of a recreation opportunity as viewed by the recreating

public. Because the measure is based upon interpersonal preception, the concept is not measurable. Thus, it can not be readily measured to provide an estimate on the number of people who were denied the opportunity to have their desired recreation experience met. However, latent demand does exist and can be determined by observing various situations. For example, when new opportunities are provided and they receive extensive use while existing facilities offering the same opportunities to the service area continue to receive increased use, it can be concluded that the demand for those opportunities have been unmet in the past. Latent demand can also be identified when the public overwhelmingly indicates that there exists a definite need for more recreational opportunities and if provided, they would be used more often.

From the data presented it is apparent that the demand for recreational opportunities will increase over the next several years, at a pace faster than the growth in population. This would mean that people will be increasing the number of times each year they will be actively engaged in such activities as camping, fishing, boating, swimming and sunning, picnicking, nature appreciation and visiting scenic areas.

To meet this increase in demand a number of actions can be taken. New recreational areas need to be developed that provide these types of activities, existing areas need to be converted from long-term uses to short-term users, and existing areas need to be managed to maximize their limited resources so as to provide the greatest number of opportunities while avoiding situations that cause conflicting uses or overcrowding.

It should be pointed out that the estimates generated for this analysis are conservative. Use at Lake Berryessa will generally increase each year but there may be instances due to weather, budget cutbacks, drought conditions, flooding, and/or high costs involved with traveling which may result in a decrease in use from one year to the next. However, since no additional major recreation areas are expected to be developed by the year 2010, and the population will be growing at a tremendous rate, sustained increases in use can be expected.

RECREATIONAL ACTIVITIES
(State Wide)

Activity	Participation Days 1980 (1)	1986 (2)	2000 (1)	Net Change (80 — 2000)	% Change	% of TOT. Use
Sports	527,272,720	572,512,719	678,072,718	150,799,998	28.6%	24.6%
Pedestrian Activities	283,177,570	310,447,570	374,077,570	90,900,000	32.1	13.6
Social Activities	329,457,360	354,957,360	414,457,359	84,999,999	25.8	15
Swimming and Beach	314,772,272	339,702,236	397,872,152	83,099,880	26.4	14.4
Visual Activities	225,483,870	246,453,870	295,383,870	69,900,000	31.0	10.7
Riding Activities	207,067,130	224,647,129	265,667,128	58,599,998	28.3	9.6
Boating	47,074,468	52,384,468	64,774,468	17,700,000	37.6	2.3
Fishing	53,650,793	58,720,208	70,550,793	16,900,000	31.5	2.6
Camping	61,302,681	66,102,681	77,302,681	16,000,000	26.1	2.8
Crafts and Hobbies	60,619,469	64,729,469	74,319,469	13,700,000	22.6	2.7
Winter Sports	16,500,994	18,990,994	24,800,994	8,300,000	50.3	.9
Hunting	17,592,592	18,162,592	19,492,592	1,900,000	10.8	.7
TOTALS	2,143,971,919	2,327,811,296	2,756,771,794	612,799,875	(3)	

(1) Figures developed from "Recreation Activity in California — 1980 with projections to 2000."Prepared by The Center for Continuing Study of the California Economy, Palo Alto, California.

(2) Figures developed from the information developed as noted above, and based upon a straight line percentage increase.

(3) The total percent of change in participation days from 1980 to 2000 is 28.6%.

Category:	Activities included under the category:
Sports	Field sports; court ball; wall ball; tennis; golf; gym sports; bowling; skating; frisbee; misc. sports.
Pedestrian Activities	Jogging; hiking and backpacking.
Social Activities	Picnicking; partying; games.
Swimming and Beach	Swimming in the ocean; freshwater; pool; underwater; surfing — body; surfing — board; beach and misc — sunning; beach combing; beach games; other swim and beach.
Visual Activities	Nature appreciation; visiting scenic areas; visiting museums and zoos; visiting fairs and amusements; visiting historical and cultural places; attending sports events.
Riding Activities	Bicycling; horseback riding; offroad bikes; other ORV's.
Boating	Waterskiing; power boating; sailing; other boating.
Fishing	Lake; stream; near shore saltwater; offshore saltwater; other.
Winter Sports	Downhill skiing; sledding; cross-country skiing, snowmobile, etc.
Hunting	Game and waterfowl; target shooting.

*Camping and Crafts and Hobbies — titles were all inclusive.

POPULATION FIGURES

SERVICE AREA (SA) (Counties)	1980	1986	1990	2000	2010	NET CHANGE (80—2000)	%	NET CHANGE (2000—2010)	%
Alameda	1,105,379	1,214,100	1,270,900	1,361,200	1,427,300	255,821	23.1	66,100	4.9
Contra Costa	656,380	734,500	768,800	870,600	950,200	214,220	32.6	79,600	9.1
Lake (1)	36,366	50,000	59,500	80,900	101,000	44,534	122.5	20,100	24.8
Marin	222,568	227,600	230,100	236,500	235,700	13,932	6.3	- 800	- .3
Napa	99,199	105,200	110,000	123,200	134,900	24,001	24.2	11,700	9.5
Sacramento	783,381	928,700	993,000	1,184,000	1,351,200	400,619	51.1	167,200	14.1
San Francisco	678,974	742,700	773,600	763,800	721,600	84,826	12.5	- 42,200	- 5.5
San Mateo	587,329	617,100	636,300	656,900	659,700	69,571	11.8	2,800	.4
Santa Clara	1,295,071	1,407,900	1,487,700	1,640,000	1,761,200	344,929	26.6	121,200	7.4
Solano (1)	235,203	291,300	313,800	391,400	457,900	156,197	66.4	66,500	17.0
Sonoma (1)	299,681	349,100	369,900	429,100	481,300	129,419	43.2	52,200	12.2
Yolo (1)	113,374	126,500	134,100	152,200	168,100	38,826	34.2	15,900	10.4
TOTALS	6,112,905	6,794,700	7,147,700	7,889,800	8,450,100	1,776,895	29.1	560,300	7.1
CA. TOTALS	23,667,902	27,292,300	28,771,000	32,853,300	36,277,000	9,185,398	38.8	3,423,700	10.4
SA as % of CA.		24.9	24.8	24.0	23.3	19.3			

1980 Figures obtained from 1980 "Census of Population and Housing," Bureau of Census, Dept. of Commerce.
1986 — 2010 Figures obtained from report 87 E-1, Department of Finance, Population Research Unit, State of California.
(1) Those counties directly surrounding Napa County.

TYPES OF ZONING DISTRICTS AND SPECIFICATIONS/RESTRICTIONS

The unincorporated area of the County of Napa is divided into zoning districts, each of which is identified by the letters indicated:

Designation	Letters
Agricultural Watershed	AW
°Commercial Limited	CL
Planned Development	PD
Residential Single	RS
Residential Country	RC
Building Site	B

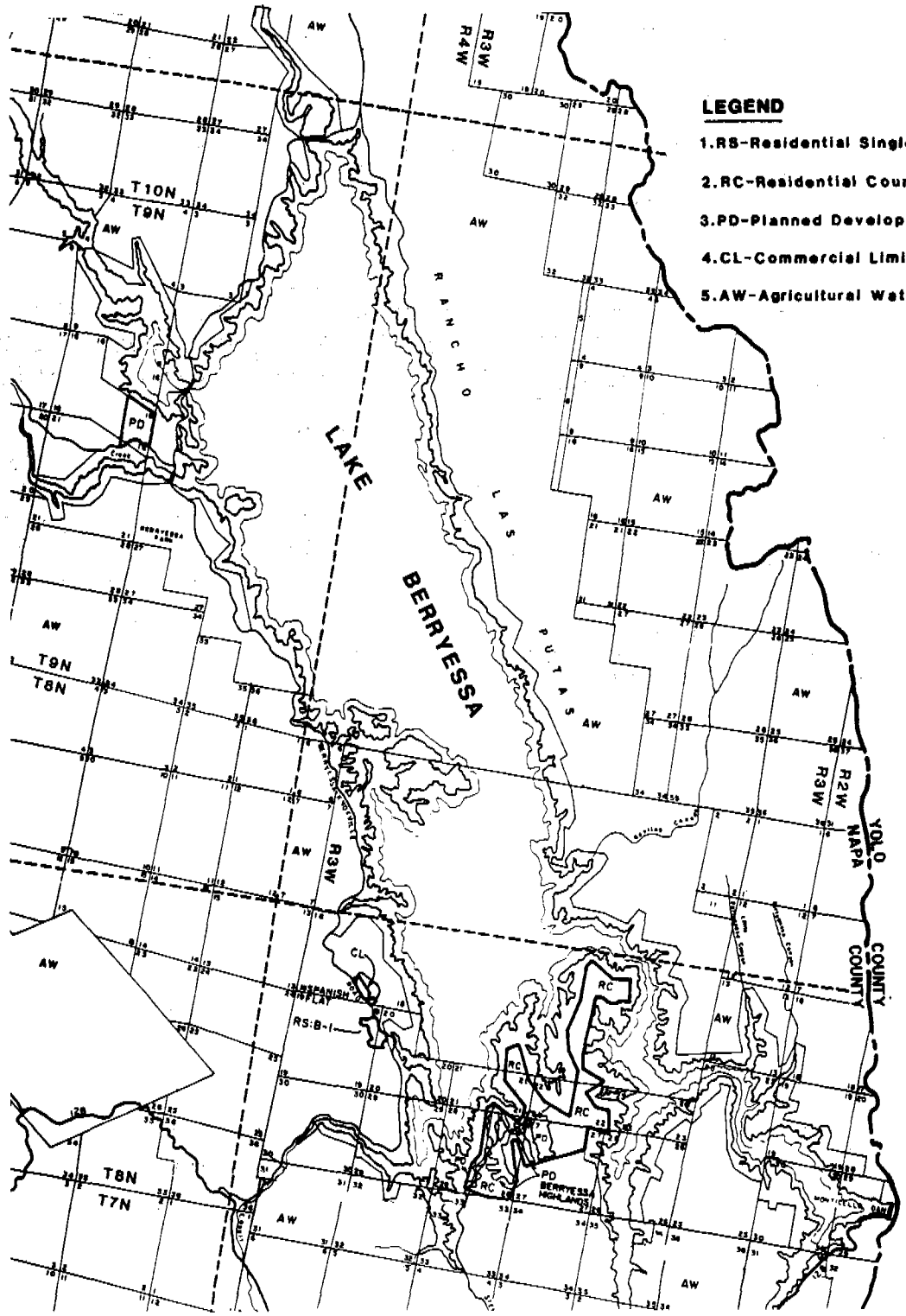
Zoning District	Minimum Lot Area (Acs)	Minimum Lot Area (Sq.Ft.)	Minimum Lot Width (Feet)	Minimum Yard (Feet) Front	Side	Rear	Maximum Main Bldg Coverage	Maximum Bldg Height
AW	40	-	-	20	20	20	-	35
CL	*1	-	-	-	-	-	-	35
PD	-	-	-	-	-	-	-	35
RS	-	8,000	60	20	**6	20	50%	3-stories
RC	10	-	60	20	20	20	-	35

* 1/2 acre if public water and sewer is available

** Three feet shall be added to each side yard for each story above first story of any building. Minimum yard on the street side of a corner shall be 10 feet.

TABLE K-1

ZONING STATUS OF PRIVATE LANDS
AT LAKE BERRYESSA



RECLAMATION'S ACQUISITION AND DISPOSAL PROGRAM

An acqusition of lands program as described in this document could be accomplished by direct purchase or exchange. Reclamation's acquisition and exchange authorities of privately owned real property and Reclamation's disposal authorities are contained in the Act of Congress, approved June 17, 1902 (32 Stat 388) and acts amendatory and supplementary, all such acts being commonly known and referred to as the Reclamation Law. Since there does not appear to be any surplus Government land held by other agencies in the area, acquisition by exchange appears unlikely.

The most probable and practical program of land acquisition at Lake Berryessa as described in the plan would be by direct acquisition from the private landowners. Such a program would most likely be by the appropriation of additional funds for acquisition. Legislation similar or adding to the authority found in Sections 601 through 603 of Public Law 93- 493 would be the logical prelude of acquisition to be described in the RAMP. The funds contained in Public Law 93-493 were declared by the Act to be nonreimbursable.

Regardless of the implementation of the RAMP Reclamation is required to inventory its holdings to determine if there are lands surplus to its needs. Should it be determined surplus lands exist at Lake Berryessa or any other facility, disposal of the surplus land must begin. Withdrawn lands must be returned to public domain status. Surplus acquired lands may be disposed of either directly by Reclamation pursuant to the Act of Congress of February 2, 1911 (36 Stat.895; 43U.S.C.374) or through authorities of the General Services Administration.

TRANSPORTATION CORRIDOR REVIEW

Lake Berryessa, situated in the hills east of Napa in Napa County, is accessed by both county roads and state highways. The roads and highways are of the 2-lane conventional type serving vehicles within the speed range of 25-55 mph. The four main feeder routes into the lake area originate from Winters, Fairfield, Napa, and Rutherford. The Winters, Napa and Rutherford routes are state highways and the Wooden Valley Road/Fairfield route is a county road.

The various routes, although rural in nature, tend to have multi-use functions and can be characterized as commuter, commercial, and recreational. During the weekdays the traffic is mainly of the commuter and commercial nature with a minor amount of recreational traffic. However, during the weekends and holidays, these routes experience an increased amount of recreational use.

These main routes feed traffic onto additional county roads that provide direct access to the lake or to remote areas beyond the lake. Knoxville-Berryessa Road is a county road that provides access to the west and north shore of Lake Berryessa. It serves 4 resorts, public day-use areas and a public launching ramp along its length. Two additional county roads of lesser importance are Steele Canyon Road and Wragg Canyon Road each providing access to a resort and in the case of Steele Canyon Road a residential subdivision. Pope Canyon Road also intersects Knoxville- Berryessa Road at the northwest corner of the lake, but it is not regarded as a main entry route.

Information and use data relating to some of the above mentioned roads can be found in the California Department of Transportation (Caltrans) 1986 Route Segment Report Volume 2 and specific route concept reports (1985) for California State Highway 121 and 128. These give a comprehensive data tabulation of the operation and performance of the state highways. The Napa County Conservation, Development and Planning Department also collects traffic counts periodically (1968, 1978, 1983) on their county routes within the Lake Berryessa area. (Figure L-1)

From the above information, California State Highway 121 out of Napa, Wooden Valley Road out of Fairfield/Suisun, and California State Highway 128 carry the main flow of traffic. A major portion of this traffic continues on the Knoxville-Berryessa Road which consequently experiences a main traffic usage especially during the summer months. Since most of the recreation traffic originates from the Bay Area, Napa and Solano counties (demographics study) Highway 121 out of Napa and Wooden Valley Road out of Fairfield/Suisun exhibit the greatest traffic load.

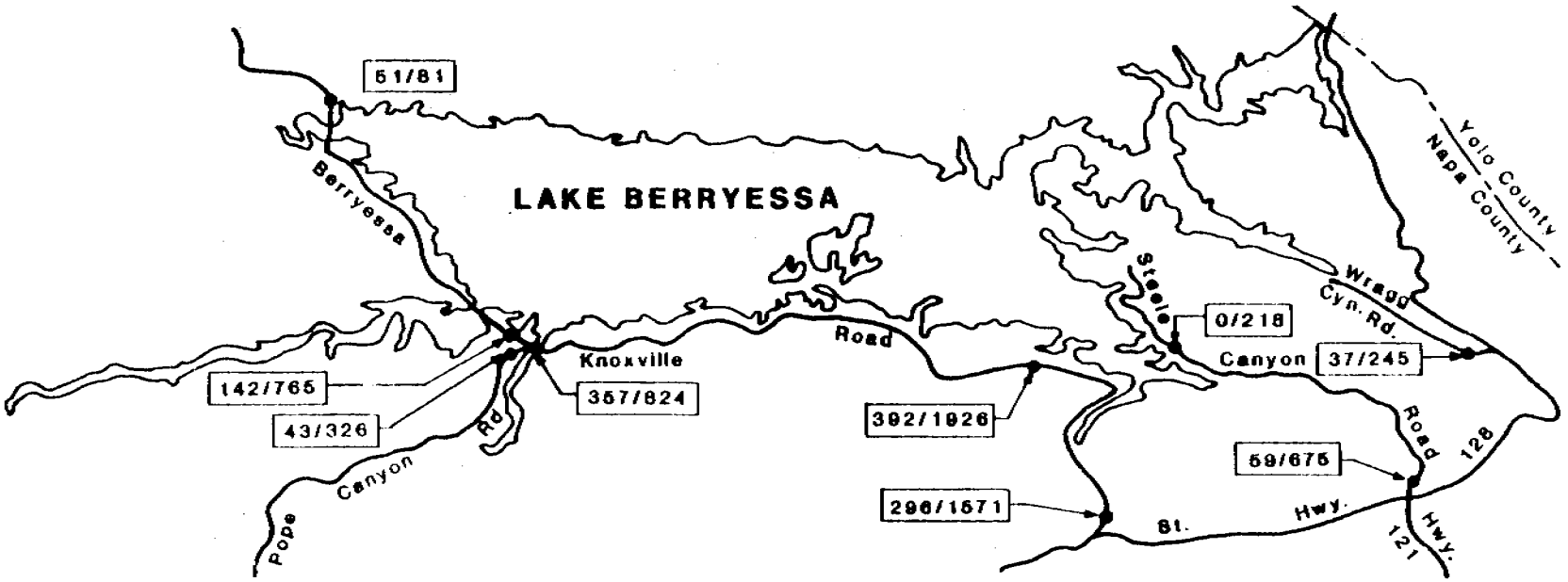
Both California State Highway 121 and 128 volume to capacity ratios (V/C), within specified road segments, are well within the acceptable standard (V/C=.50) for this type of road (rural 2-lane conventional) and the targeted Level of Service (LOS) D-35 to C-45 (see Figures L-2 & L-3). Caltrans, in its concept reports suggests adding passing lanes to these routes (especially 121) to facilitate slow moving cars and trucks pulling boat trailers. It also states that additional improvement could be made to correct problem areas where possible including widening bridges and shoulders, realigning curves, removing hazards and installing barriers. The reports recognize the problem of peak weekend and holiday traffic congestion but do not plan to make capacity changes within the next 20 year planning period. A Caltrans official, characterized these routes as basically low volume rural routes.

Caltrans also compiles the incidence of accidents on the state highways and how this compares with the state-wide average for comparable road segments. Figures M-4 & M-5 summarize this information for routes 121 and 128. No similar information is available for the Napa County roads serving Lake Berryessa.

The information indicates from Caltrans that, for most road segments investigated in this review, the actual accident rate (accidents per million-vehicle-miles) is equal to or greater than the statewide average. When comparing individual road segments with the accident data it appears that the accident rate is higher in sections of the roads that become narrow, curved, and have poor visual clearance. This may indicate that accident rates are not merely a function of too much volume. Caltrans mentions in its concept report for Route 121 that 60 of all the accidents occurred (Jan. 1981 to Dec. 1983) during the summer months and 41 occurred on weekends. Peak accident hours were reported as between 3 PM. and 5 PM. This information may indicate that recreational traffic to and from Lake Berryessa is contributing to the higher accident rate. A significant increase in recreational opportunities at Lake Berryessa may continue to elevate the accident rate.

However, the fact that the roads are not being utilized to their capacity stresses the point that no improvements to increase capacity will be made in the next 20 years. Problems with usage and specifically peak use tend to create the high accident rate. The increased population growth of not only the Bay Area counties but also in the coming 20 years Sonoma, Napa, and Solano counties will undoubtedly intensify the accident problems on these roads. It would be a corroborated guess that Knoxville-Berryessa Road has a similar accident rate as the state highways in respect to the state-wide average. Napa County has not identified these conditions as targeted problems in respect to their other areas and thus has no plans or improvements scheduled in the near future for the county roads serving Lake Berryessa.

In summary, the traffic corridors serving Lake Berryessa are not presently utilized to their capacity except during congested hours on peak weekends and holidays. The accident rate is high for this area which can be expected because of the recreational type of use the roads experience. Neither Napa County or Caltrans have plans to increase the capacity of their roads, but Caltrans has suggested minor improvements on the state highways to provide additional convenience and safety.



Data Source: 1968 - Lake Berryessa Area Plan Studies
1983 - Napa County Departmennt of Public Works

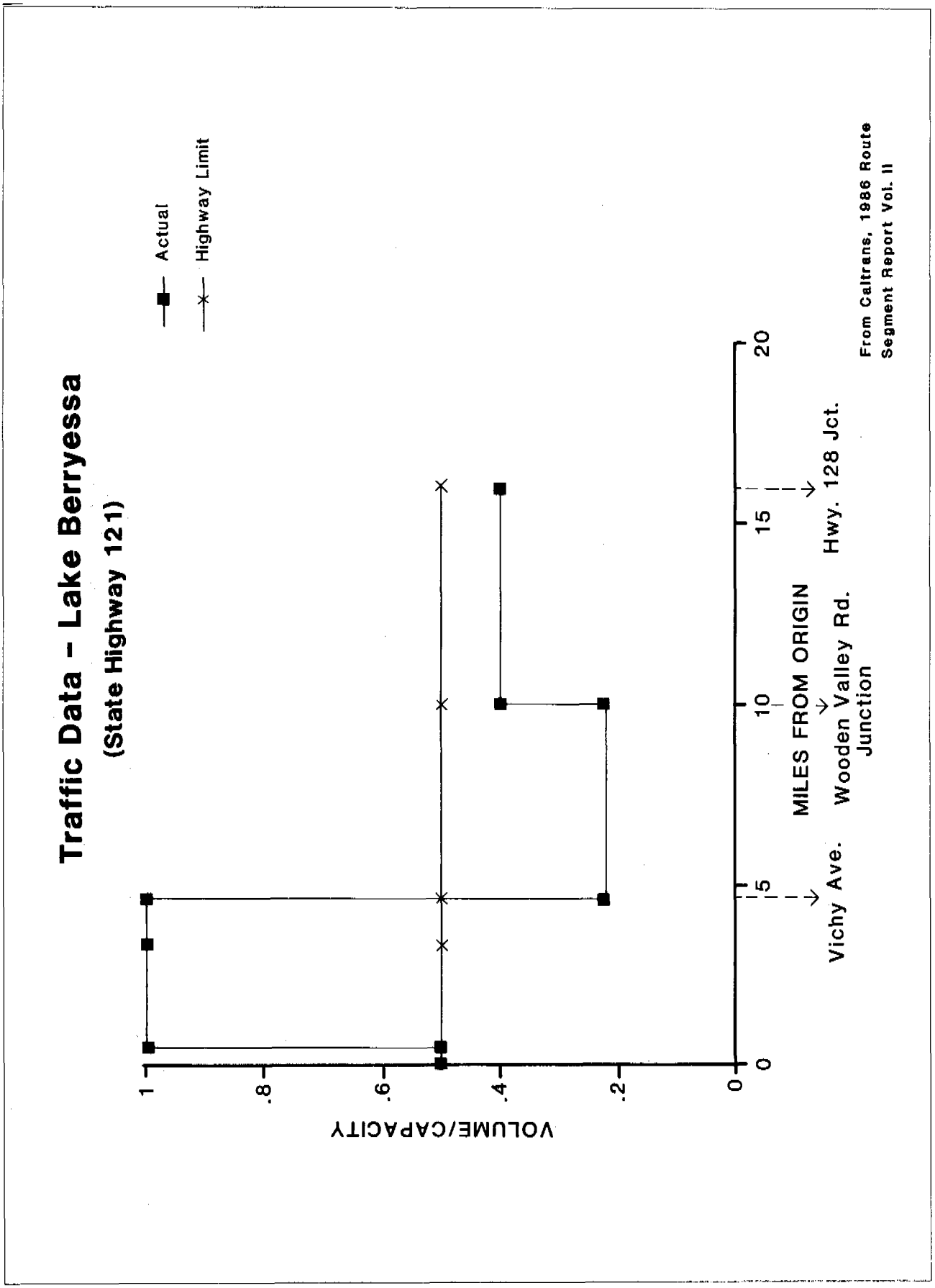
1968/1983 COMPARATIVE FIGURES

LAKE BERRYESSA-1987 DEVELOPMENT STUDY

1968/1983 DAILY TRAFFIC VOLUME COMPARSION DATA

FIGURE M-1

FIGURE M-2


Traffic Data - Lake Berryessa
(State Highway 121)
Actual
Highway Limit
VOLUME/CAPACITY
1
.8
.6
.4
.2
0
0
5
10
15
20
MILES FROM ORIGIN
Vichy Ave.
Wooden Valley Rd. Junction
Hwy. 128 Jct.
From Caltrans, 1986 Route Segment Report Vol. II

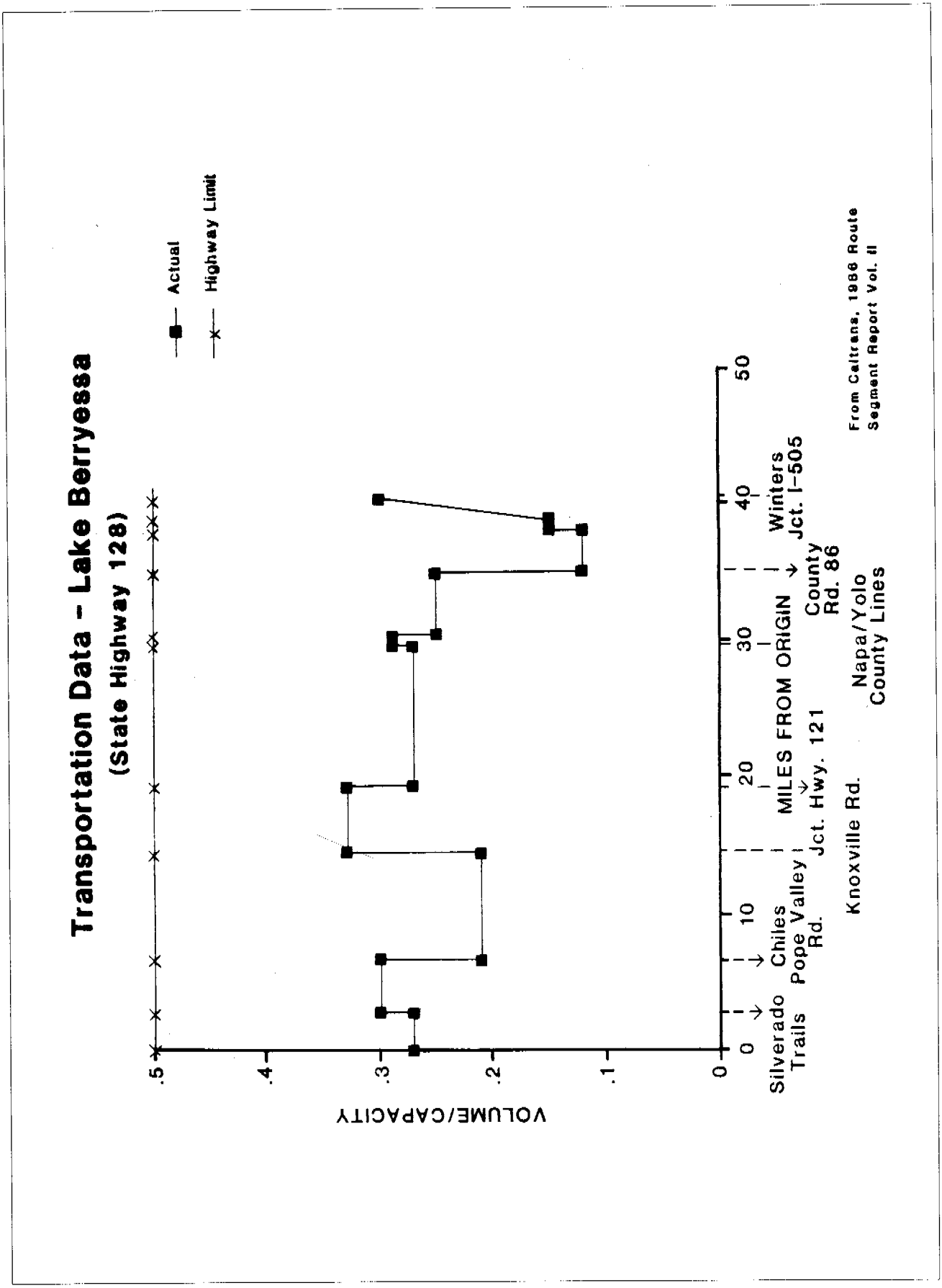
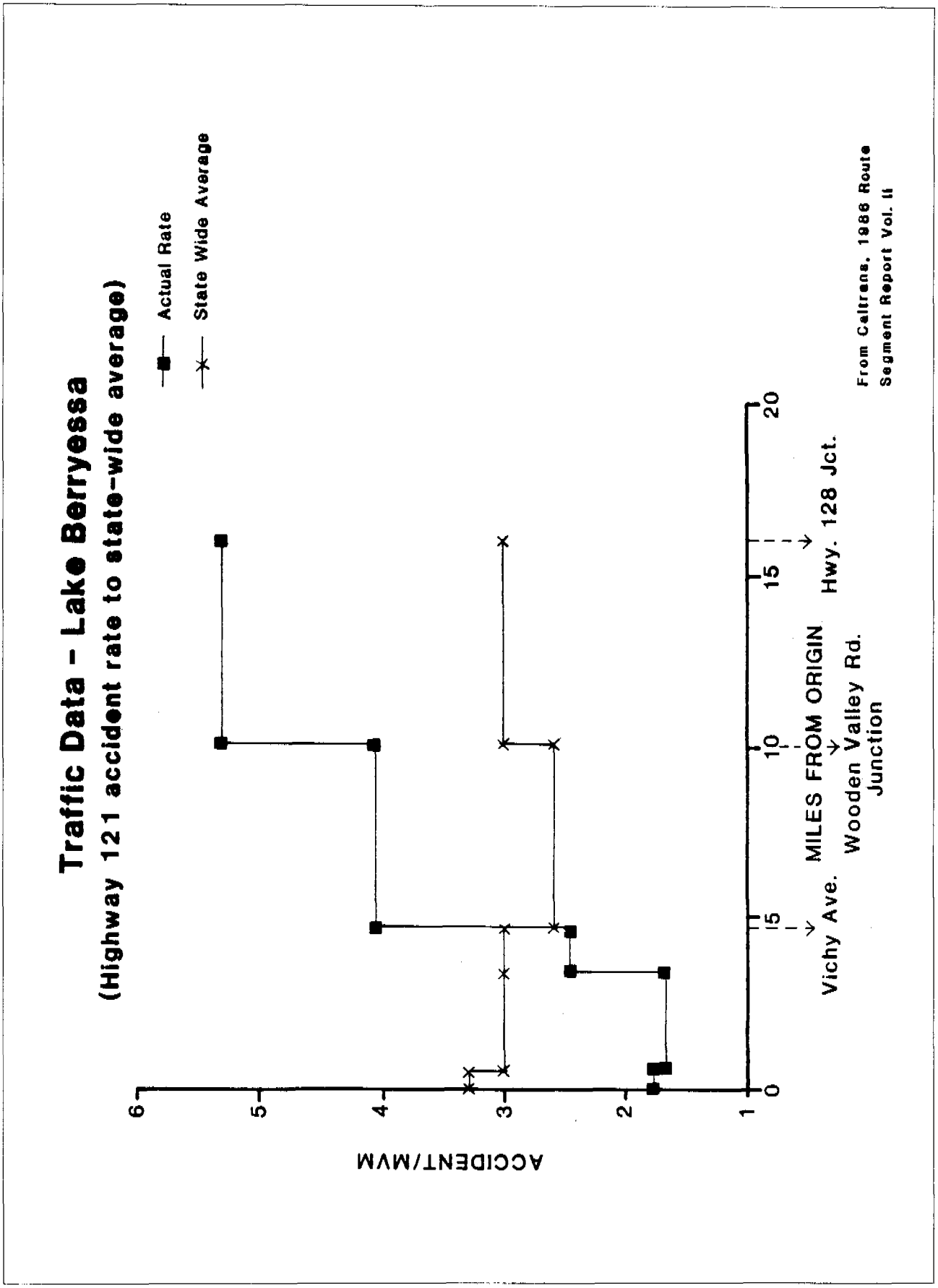
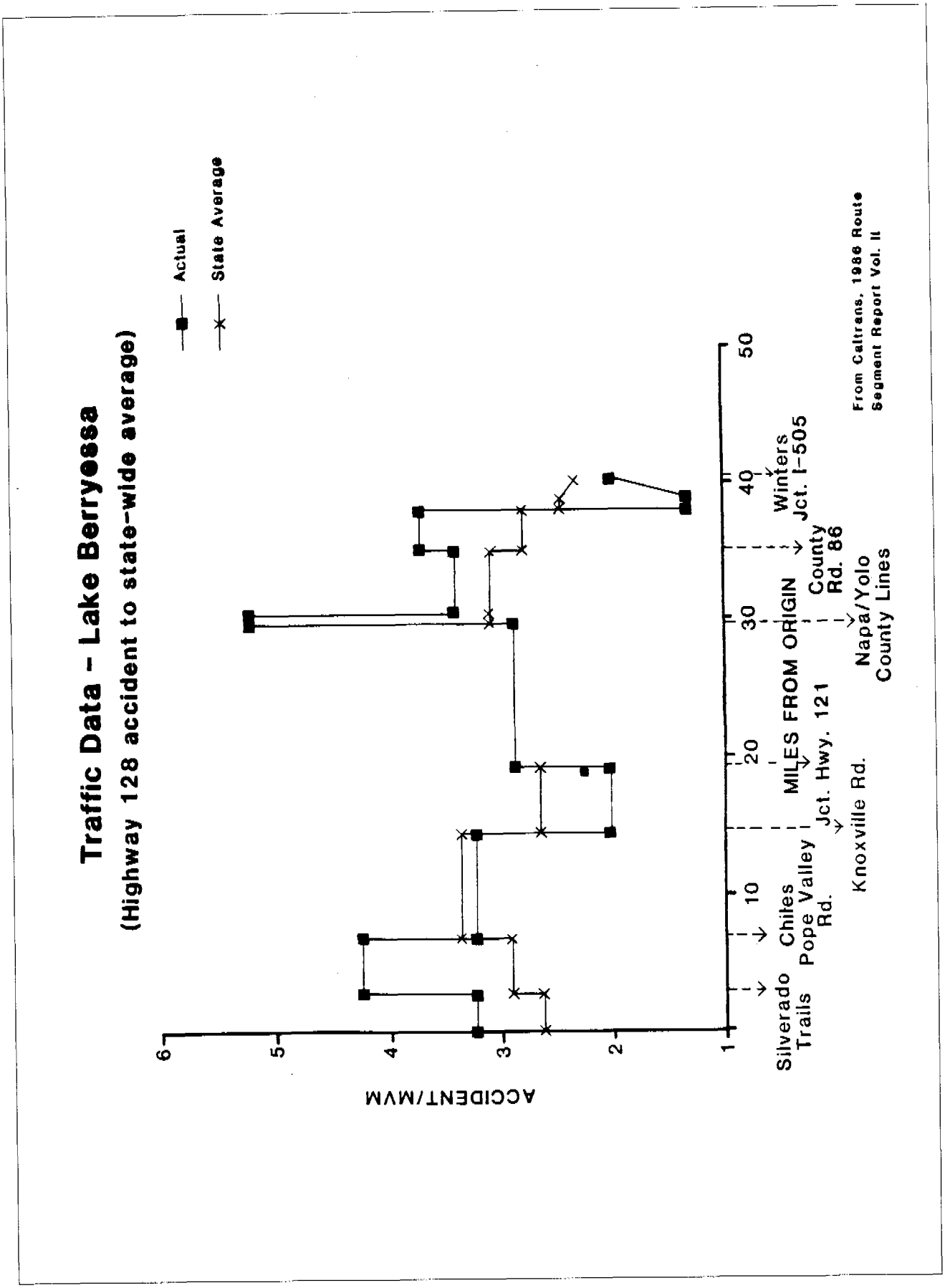

Transportation Data - Lake Berryessa
(State Highway 128)
Actual
Highway Limit
VOLUME/CAPACITY
.5
.4
.3
.2
.1
0
0
10
20
30
40
50
MILES FROM ORIGIN
Silverado Trails
Chiles Pope Valley Rd.
Jct. Hwy. 121
Knoxville Rd.
Napa/Yolo County Lines
County Rd. 86
Winters Jct. I-505
From Caltrans, 1986 Route Segment Report Vol. II

FIGURE M-4


Traffic Data - Lake Berryessa
(Highway 121 accident rate to state-wide average)
Actual Rate
State Wide Average
ACCIDENT/MVM
1
2
3
4
5
6
0
5
10
15
20
Vichy Ave.
MILES FROM ORIGIN
Wooden Valley Rd.
Junction
Hwy. 128 Jct.
From Caltrans, 1986 Route
Segment Report Vol. II


Traffic Data – Lake Berryessa
(Highway 128 accident to state-wide average)
Actual
State Average
ACCIDENT/MVM
6
5
4
3
2
1
Silverado Trails
Chiles Pope Valley Rd.
Knoxville Rd.
Jct. Hwy. 121
Napa/Yolo County Lines
County Rd. 86
Winters
Jct. I-505
MILES FROM ORIGIN
10
20
30
40
50
From Caltrans, 1986 Route Segment Report Vol. II

ENVIRONMENTAL IMPACTS MATRIX

Table N-1 presents one hundred fourteen (114) separate Preferred and Alternative Actions. These actions were assessed for their impacts on twelve (12) resource categories. The twelfth category, Socio-Economics, is divided into four subcategories: recreation visitors, resort tenants, concessionaires, and economy. Although complex at first, the matrix discloses an evaluation of impacts caused by the Actions. The Impacts Matrix enables the reader to observe how a single Action impacts all categories and to compare different impacts on the same category.

The Impacts Matrix was prepared to show both positive (beneficial) and negative (detrimental) impacts. The positive impacts are preceded by a "+" sign while the negative impacts are preceded by a "-" sign. Negative impacts have also been given three levels of value: minor, moderate, or major. These levels are meant to be relative to one another only within the specific impact category. Minor impacts may be characterized as having lesser importance, low detectability, generally negligible, and mitigation efforts when necessary may greatly lessen the overall impact. Major impacts may be characterized as being substantial, highly detectable, consequential and may require significant mitigation measures. Moderate impacts are related closer in intensity to major impacts that minor impacts. Therefore, they may also require significant mitigation measures.

Positive impacts have not been given relative values. When no impacts could be identified "no impacts" was designated. A designation of "no new impacts" indicates that impacts which are occurring currently, could continue to occur in the future. "Impacts Unknown" are unassessable impacts because they are not known and/or can not be identified at this time using existing information.

In many instances a category has both positive and negative impacts simultaneously. In these instances the negative impacts were evaluated as "minor". In other cases, there were both "+" and "-" impacts but only the greater overall impact was expressed in the matrix. A blank cell with an arrow down through it indicates a repetition of the cell immediately above it. Moderate or major negative impacts have been highlited with a "dot" for easy reference in the Impacts Matrix.

A condensed version of the matrix summarizing the Major/Moderate negative impacts which may result from any Action, including a brief description of mitigation measures can be found in Section VI.N., Consequences and Mitigation.

GPO 686-967/79124

TABLE N-1

PREFERRED ACTIONS AND ALTERNATIVES	IMPACTS ON NATURAL RESOURCES					IMPACTS ON CULTURAL RESOURCES	GENERAL IMPACTS					IMPACTS ON ECONOMIC ENVIRONMENT			
	SOILS AND TOPOGRAPHY	VEGETATION AND WILDLIFE	FISH RESOURCES	WATER QUALITY	SCENIC RESOURCES	CULTURAL RESOURCES	RECREATION	LAND USE	TRAFFIC	VISITOR HEALTH AND SAFETY	LAW ENFORCEMENT	RECREATION VISITORS	RESORT TENANTS	CONCESSIONAIRES	ECONOMY
LAND MANAGEMENT															
1) Land Acquisition	- Minor Impacts: slight increase in erosion potential and compaction	+ Impacts: increase in available habitat	No Impacts	+ Impacts: Increases potential for environmental planning & water quality protection	+ Impacts: Bureau control over planning	+ Impacts: Increase protection of cultural resources	+ Impacts: Increased recreational opportunities	Both Negative & Positive Impacts: converts private to public & reduces tresspass	No Impacts	No Impacts	- Minor Impacts: slight increase in enforcement responsibilities	No Impacts	No Impacts	No Impacts	- Minor Impacts: decrease tax revenues to county
a) No Action: no acquisition	No New Impact: continued erosion & compaction potential	- Minor Impacts: decrease in habitat possible		No New Impacts:	No Impacts	No Impacts	No Impacts	No Impacts			No Impacts				No Impacts
2) Land Disposal	Unknown Impacts: depends on future use			- Unknown Qualitative Impacts: less planning control	Unknown Impacts: partial control over planning possible	Impacts unknown: will be determined prior to disposal	- Minor Impact: land disposed would have no recreation opportunities				+ Impacts: slight decrease in enforcement responsibilities				+ Impacts: local tax base would be expanded
a) No Action: no land disposal	No New Impact: continued erosion & compaction potential	No Impacts		+ Impacts: Increases potential for environmental planning & water quality protection	No Impacts	No Impacts	No Impacts				No Impacts				No Impacts
3) Dispersed Recreation Area Improvements	Both + & - Impacts: helps to control erosion & compaction but may increase use			+ Impacts: Increases potential for planning & mitigation measures for water quality	+ Impacts: allows for control and planning for scenic resources	Impacts Unknown	+ Impacts: Increased recreational opportunities			+ Impacts: Increases visitor health & safety	- Minor Impacts: slight increase in enforcement responsibilities				Both + & - Impacts: may increase retail sales but also increase services demand
a) No Action: maintain as is	No New Impact: continued erosion & compaction potential	- Minor Impacts: continued loss in vegetation and habitat		No New Impacts: continued lack of planning to protect water quality	No Impacts	No Impacts	No Impacts			No Impacts	No Impacts				No Impact
b) Return Discarded Areas to Semi-primitive Areas	+ Impacts: decreases potential for erosion & compaction			No Impacts	+ Impacts: reduces scenic resources use degradation	Impacts Unknown	- Moderate Impacts: loss of quality & quantity of opportunities			- Minor Impacts: decreases improvements that ensure health & safety					- Minor Impacts. may reduce visitation and reduce retail sales
4) Improve Access to Administration Point	- Minor Impacts: slight increase in erosion potential and compaction	- Minor Impacts: decrease in vegetation and habitat		No Impacts	- Minor Impacts: presence of vehicles on landscape		+ Impacts: Increased recreational opportunities		- Minor Impacts: slight increase in traffic	No Impacts	- Minor Impacts: slight increase in enforcement responsibilities				No Impacts
a) No Action: Limited access only	No New Impact: continued erosion & compaction potential	No Impacts			No Impacts	No Impacts	No Impacts		No Impacts		No Impacts				
a) Chose Administration Point	+ Impacts: decreases potential for erosion & compaction	+ Impact: increase in vegetation and protection of habitat			+ Impact: restoration of natural vegetation leading to increased scenic resource		- Minor Impacts: loss of quality & quantity of opportunities								
c) Develop Campground for Special Needs Populations	- Minor Impacts. slight increase in erosion potential and compaction	- Moderate Impact: decrease in vegetation & habitat from construction		- Minor Impacts: increase runoff from paved surfaces of oils and tire residues	- Minor Impacts: presence of vehicles & structures on landscape	Impacts unknown	+ Impacts: Increased recreational opportunities for specific population		- Minor Impacts: slight increase in traffic	+ Impacts: Increases health & safety for specific population	- Minor Impacts: slight increase in enforcement responsibilities				+ Impacts: new development may generate additional retail sales
5) No Action: maintain Smittle Creek as is	No Impacts	No Impacts			No New Impacts	No Impacts	No Impacts			No Impacts	No Impacts				No Impacts
a) Combination Day Use and Walk-in Campground	- Minor Impacts: slight increase in erosion potential and compaction	- Minor Impacts: decrease in vegetation & habitat			- Minor Impacts: increase in built environment on landscape	Impacts Unknown	+ Impacts: Increased recreational opportunities		- Minor Impacts: slight increase in traffic	+ Impacts: Increases visitor health & safety	- Minor Impacts: slight increase in enforcement responsibilities				+ Impacts: new development may generate additional retail sales
b) Convert Area into a Concessior Operated Campground and RV Park	- Major Impact: construction increases compaction & erosion potential	- Major Impacts: decrease in vegetation & habitat		- Minor Impacts: increase runoff from paved surfaces of oils and tire residues	- Moderate to Major Impacts: presence of vehicles & structures on landscape		Both + & - Impacts: varying degrees of recreational opportunities lost & gained	- Minor Impacts: competes with adjacent lands with similar types of use			- Moderate Impacts: increase in enforcement responsibilities	- Minor Impact: displaces day users to fee areas		Both + & - Impacts: increased revenue for concessionaire & also increases competition	
6) Improve Access for Special Needs Population in ANY Areas	- Minor Impacts: slight increase in erosion potential and compaction	- Minor Impacts: decrease in vegetation & habitat		No Impacts	No Impacts	No Impacts	+ Impacts: Increased recreational opportunities	No Impacts	No Impacts	+ Impacts: Increases health & safety for specific population	No Impacts	- Minor Impacts: Increased cost may be recovered by increasing user fees	- Minor Impacts: Increased cost may be recovered by increasing tenant fees	+ Minor Impacts: requires additional expenditures to meet objective	No Impacts
a) No Action: improve access for special needs populations in some areas only		No Impacts					No New Impacts			No New Impacts		No Impacts	No Impacts		
b) Develop Areas For Special Needs Populations		Unknown Impacts: decrease in vegetation & habitat, depends upon location			- Minor to Moderate Impacts: presence of vehicles & structures on landscape	Impacts Unknown	+ Impacts: Increased recreational opportunities for specific population		- Minor Impacts: slight increase in traffic	+ Impacts: Increases health & safety for specific population	- Moderate Impacts: increase in enforcement responsibilities	- Minor Impact: displaces day users to fee areas		No Impacts	+ Impacts: new development may generate additional retail sales

TABLE N-1

PREFERRED ACTIONS AND ALTERNATIVES	IMPACTS ON NATURAL RESOURCES					IMPACTS ON CULTURAL RESOURCES	GENERAL IMPACTS					IMPACTS ON ECONOMIC ENVIRONMENT			
	SOILS AND TOPOGRAPHY	VEGETATION AND WILDLIFE	FISH RESOURCES	WATER QUALITY	SCENIC RESOURCES	CULTURAL RESOURCES	RECREATION	LAND USE	TRAFFIC	VISITOR HEALTH AND SAFETY	LAW ENFORCEMENT	RECREATION VISITORS	RESORT TENANTS	CONCESSIONAIRES	ECONOMY
LAND MANAGEMENT (CONT.)															
7) Develop and Improve Trail System	- Minor Impacts: slight increase in erosion potential and compaction	- Minor Impacts: decrease in vegetation and increased disturbance	No Impacts	- Minor Impacts: increases potential for bacterial & nutrient contamination	- Minor Impacts: increase in human presence and density of use	Impacts Unknown	+ Impacts: increased recreational opportunities	+ Impacts: helps protect adjacent lands from fire through permit program	No Impacts	+ Impacts: increases visitor health & safety	- Minor Impacts: slight increase in enforcement responsibilities	No Impacts	No Impacts	No Impacts	+ Impacts: new development may generate additional retail sales
a) No Action: maintain existing trails	No New Impact: continued erosion & compaction potential	No Impacts		No Impacts	No Impacts	No Impacts	No Impacts	No Impacts		As New Impacts: continues unplanned use of specific areas	No Impacts				No Impacts
b) Develop Trails for Single Purpose Use	- Minor Impacts: slight increase in erosion potential and compaction	- Minor Impacts: decrease in vegetation and increased disturbance		- Minor Impacts: increases potential for bacterial & nutrient contamination	- Minor Impacts: increase in human presence and density of use	Impacts Unknown	+ Impacts: increased recreational opportunities for specific population			+ Impacts: increases visitor health & safety	- Minor Impacts: slight increase in enforcement responsibilities				+ Impacts: new development may generate additional retail sales
8) Boat Access Camping Program Administered by the Bureau						+ Impacts: will reduce possible destruction of resources	+ Impacts: increased quality and quantity of recreational opportunities	Both + & - Impacts: increases control of uses, may impact grazing, fire danger (or other land uses)	- Minor Impacts: slight increase in traffic	Both + & - Impacts: increases health & safety, increases debris & fire danger	- Moderate Impacts: increase in enforcement responsibilities	- Minor Impacts: user fee incurred by recreationists	- Minor Impacts: user fees incurred by recreationists	+ Impacts: increased revenues from administration of program	+ Impacts: new programs & services may generate additional retail sales
c) No Action: continue enforcing "no boat-in" camping	No New Impacts	No New Impacts	No New Impacts	No New Impacts	No New Impacts	No Impacts	No Impacts	No New Impacts: continued fire danger without prevention measures	No Impacts	No New Impacts	No New Impacts	No Impacts	No Impacts	No Impacts	No Impacts
b) Concessionaire to Operate Boat Access Camping	- Minor Impacts: slight increase in erosion potential and compaction	- Minor Impacts: decrease in vegetation and habitat		- Minor Impacts: increases potential for bacterial & nutrient contamination	- Minor Impacts: increase in human presence and density of use	+ Impacts: will reduce possible destruction of resources	+ Impacts: increased quality and quantity of recreational opportunities	Both + & - Impacts: increases control of uses, may impact grazing, fire danger (or other land uses)	- Minor Impacts: slight increase in traffic	Both + & - Impacts: increases health & safety, increases debris & fire danger	- Moderate Impacts: increase in enforcement responsibilities	- Minor Impacts: concession user fees incurred in addition to Bureau fees	- Minor Impacts: user fees incurred by recreationists	+ Impacts: increased revenues from administration of program	+ Impacts: new programs & services may generate additional retail sales
9) Small & Big Island Improvements Changing them to Dispersed Rec. Areas		- Minor Impacts: decrease in habitat & disruption of wildlife	No Impacts		- Minor Impacts: increase in temporary overnight structures on land & shoreline	Impacts Unknown		Both + & - Impacts: increases control of uses, may impact grazing, fire danger (or other land uses)	No Impacts			No Impacts	No Impacts	No Impacts	+ Impacts: may generate additional retail sales
a) No Action: maintain as semi-primitive area	No New Impacts: continued potential for erosion & compaction	No New Impacts: continued decrease in habitat & disruption of wildlife		No New Impacts: continued potential for bacterial & nutrient contamination	No Impacts	No Impacts	No Impacts			No New Impacts: continues unplanned use of specific areas	No Impacts				No Impact
b) Construct Rec. Air Strip on Big Island with Short-term Facilities	- Moderate Impacts: increases compaction & erosion potential	- Moderate Impact: decrease in vegetation and habitat	No Impacts	- Minor Impacts: increases potential for bacterial & nutrient contamination	- Major Impacts: presence of airplanes and structures on landscape	Impacts Unknown	Both + & - Impacts: varying degrees of recreational opportunities lost & gained			- Major Impacts: conflicting recreational uses	- Major Impacts: increase in enforcement responsibilities			+ Impacts: may generate additional retail sales	+ Impacts: may generate additional retail sales
c) Develop Resort/Convention Center on Big Island	- Major Impacts: increases compaction & erosion potential	- Major Impact: decrease in vegetation and habitat and disturbance of wildlife	- Major Impacts: potential destruction of habitat & fish resources	- Moderate Impacts: increases potential for water pollution of varying degrees	- Major Impacts: transformation of landscape into high density urban like setting				- Moderate to Major Impacts: increased traffic with level depending upon development			- Minor Impact: displaces users to fee areas and increases cost of recreation		- Major Impact: may decrease revenues from competition	Both + & - Impacts: increases tax base, employment, sales, & requires local services
10) Develop North Shore Campground	- Moderate Impacts: increases compaction & erosion potential	Unknown to - Minor Impacts: potential for decrease in habitat & eagle roosting	No Impacts	- Minor Impacts: increase runoff from paved surfaces of oils and tire residues	- Moderate Impacts: land disturbance, presence of structures & vehicles on landscape	Impacts Unknown	+ Impacts: increased quality and quantity of recreational opportunities	Both + & - Impacts: increases control of uses, may impact grazing, fire danger (or other land uses)	- Minor Impacts: slight increase in traffic	Both + & - Impacts: varies depending upon view point & conflicting uses	- Moderate Impacts: increase in enforcement responsibilities	No Impacts		- Minor Impact: may decrease revenues from competition	+ Impacts: new development may generate additional retail sales
a) No Action: continue current land uses	No Impacts	No Impacts		No Impacts	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts			No Impacts	No Impacts
b) Develop Campground on West Shore Near Rancho Manifacello Resort	- Moderate Impacts: increases compaction & erosion potential	Unknown to - Minor Impacts: potential for decrease in vegetation & habitat		- Minor Impacts: increase runoff from paved surfaces of oils and tire residues	- Moderate Impacts: land disturbance, presence of structures & vehicles on landscape	Impacts Unknown	+ Impacts: increased quality and quantity of recreational opportunities	Both + & - Impacts: increases control of uses, may impact grazing, fire danger (or other land uses)	- Minor Impacts: slight increase in traffic	Both + & - Impacts: varies depending upon view point & conflicting uses	- Moderate Impacts: increase in enforcement responsibilities			- Minor Impact: may decrease revenues from competition	+ Impacts: new development may generate additional retail sales
c) Develop Campground on West Shore at Battle Creek															
11) Develop Boat Launching on the North Shore			- Minor Impacts: loss of habitat					Both + & - Impacts: increases control of uses, may impact grazing, fire danger (or other land uses)		+ Impacts: may relieve congestion in Neither Cove					
a) No Action: no new boat launching on north shore	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts	No New Impacts: continues congestion and problems in Neither Cove area	No Impacts			No Impacts	No Impacts
b) Develop Boat Launching for Campers Only at North Shore Campground	Moderate Impacts: increases compaction & erosion potential	Unknown to - Minor Impacts: potential for decrease in vegetation & habitat	- Minor Impacts: loss of habitat	- Minor Impacts: increase runoff from paved surfaces of oils and tire residues	- Moderate Impacts: land disturbance, presence of structures & vehicles on landscape	Impacts Unknown	+ Impacts: increased quality and quantity of recreational opportunities	Both + & - Impacts: increases control of uses, may impact grazing, fire danger (or other land uses)	- Minor Impacts: slight increase in traffic	+ Impacts: may relieve congestion in Neither Cove	- Moderate Impacts: increase in enforcement responsibilities			- Minor Impact: may decrease revenues from competition	+ Impacts: new development may generate additional retail sales
12) Charge User Fees Where Services Are Provided	No Impacts	No Impacts	No Impacts	No Impacts	+ Impacts: provides control on users which may minimize scenic impacts	No Impacts	- Minor Impact: reduces recreational opportunities for certain populations	No Impacts	No Impacts	No Impacts	+ Impacts: provides added control on public lands	- Minor Impacts: increases cost of recreation opportunities		+ Impacts: decreases competition from Bureau facilities	No Impacts
a) No Action: continue to charge at Oak Shores only					No Impacts		No New Impacts: continued minor impacts on certain populations				No Impacts	No Impacts		No Impacts	

TABLE N-1

PREFERRED ACTIONS AND ALTERNATIVES	IMPACTS ON NATURAL RESOURCES					IMPACTS ON CULTURAL RESOURCES	GENERAL IMPACTS					IMPACTS ON ECONOMIC ENVIRONMENT			
	SOILS AND TOPOGRAPHY	VEGETATION AND WILDLIFE	FISH RESOURCES	WATER QUALITY	SCENIC RESOURCES	CULTURAL RESOURCES	RECREATION	LAND USE	TRAFFIC	VISITOR HEALTH AND SAFETY	LAW ENFORCEMENT	RECREATION VISITORS	RESORT TENANTS	CONCESSIONAIRES	ECONOMY
LAND MANAGEMENT (CONT.)															
13) Establish Fish & Wildlife Management Area for East Shore Lands	+ Impacts: may decrease potential for erosion problems and grazing	+ Impacts: habitat management & resource protection	+ Impacts: increased habitat and protection	+ Impacts: increases potential control of bacterial & nutrient contamination	+ Impacts: increased vegetation & habitat providing greater scenic resources	Impacts Unknown	Both + & - Impacts: provides for or alleviates various recreational opportunities	- Moderate Impacts: possible reduction of available land for grazing permits	No Impacts	No Impacts	+ Impacts: provides added control on public lands	No Impacts	No Impacts	No Impacts	No Impacts
a) No Action: continue management by Bureau with Fish & Game technical assistance	No New Impacts: continues potential erosion & compaction problems	No New Impacts: continued problems with habitat management	No Impacts		No Impacts	No Impacts	No New Impacts: continued restricted opportunities	No New Impacts: continued potential restrictions on grazing			No Impacts				
b) Establish Fish & Wildlife Management Area for All Lake Berryessa Lands	+ Impacts: may decrease potential for erosion problems and grazing	+ Impacts: habitat management & resource protection	+ Impacts. Increased habitat and protection		+ Impacts: increased vegetation & habitat providing greater scenic resources	Impacts Unknown	- Moderate Impacts: may decrease recreational opportunities	- Moderate Impacts: possible reduction of available land for grazing permits			+ Impacts: provides added control on public lands				
14) Expand Visitor Information Services	+ Impacts: decreases erosion & compaction on recreation lands	No Impacts	No Impacts	+ Impacts: increases awareness of water quality and pollution control	+ Impacts: increases awareness which protects the resources	+ Impacts: will increase awareness of cultural resources	+ Impacts: increases quality and quantity of recreational opportunities	No Impacts		+ Impacts: increases awareness of safe & healthful recreation habits	+ Impacts: provides added control through education				
a) No Action: present facilities only	No New Impacts: continues potential for erosion & compaction			No Impacts	No Impacts	No Impacts	No Impacts			No Impacts	No Impacts				
15) Allow Limited Special Uses of Bureau Lands	Unknown level of Negative Impacts: depends on use	Unknown Impacts		No Impacts Identified	- Minor Impacts: increases activity & structures on land		Both + & - Impacts: varying degrees of recreational opportunities lost & gained	Unknown Impacts: depends on uses			- Minor Impacts: slight increase in enforcement responsibilities	- Minor Impacts: may displace users to fee areas			+ Impacts: new programs & services may generate additional retail sales
a) No Action: no specific policy	No New Impacts: potential for future impacts depending upon use				No New Impacts: continued potential activity & structures on landscape		No Impacts	Unknown Impacts: no planning or decision criteria			No Impacts				No Impacts
b) Prohibit Any Limited Special Uses	No Impacts			No Impacts	+ Impacts: decrease in activities and structures on land		Both + & - Impacts: varying degrees of temporary opportunities lost & gained	No Impacts							
16) Allow Special Events on Bureau Lands	- Minor Impacts: slight increase in erosion potential and compaction	- Minor Impacts: temporary disruption of wildlife		No Impacts Identified	- Minor Impacts: temporarily increases activity & structures on land		No New Impacts: continues both + & - Impacts when events occur	- Minor Impacts: temporary concentration of visitors may cause disruption	- Minor Impacts: slight increase on a limited basis	- Minor Impacts: temporary increase in problems due to concentration of activities	- Minor Impacts: temporary increase in enforcement responsibilities			+ Impacts: may increase revenues due to increased visitation	+ Impacts: new programs & services may generate additional retail sales
a) No Action: no specific policy	No New Impacts: continues potential for erosion & compaction	No New Impacts: continued temporary disruption of wildlife		No Impacts	No New Impacts: continued potential impacts		No Impacts	Unknown Impacts: no planning or decision criteria	No Impacts	No Impacts	No Impacts	No Impacts		No Impacts	No Impacts
b) Prohibit Special Events	+ Impacts: decreases erosion & compaction on recreation lands	No Impacts			+ Impacts: decrease in activities and structures on land		Both + & - Impacts: varying degrees of recreational opportunities lost & gained	No Impacts		+ Impacts: decrease in problems due to less concentration of activities				- Minor Impacts: loss in revenues due to decreased visitation	- Minor Impacts: may reduce retail sales
WATER SURFACE MANAGEMENT															
17) Establish Specific Zoning & Restriction for Uses & Activities on Water	+ Impacts: decrease bank erosion	No Impacts	+ Impacts: Improve habitat conditions for fish	+ Impacts: may decrease turbidity in specific areas	+ Impacts: may decrease overuse in some areas, allowing lower density, etc.	No Impacts	Both + & - Impacts: mixed gains & losses of recreational opportunities	No Impacts	No Impacts	+ Impacts: increases health & safety for visitors	Both + & - Impacts: increased control & requires additional enforcement	No Impacts	No Impacts	- Minor Impacts: may restrict concession rental activities	- Minor Impacts: may decrease retail sales if specific uses are restricted
a) No Action: continue current minimal restrictions	No New Impacts: continues bank erosion		No New Impacts: continued disturbance of habitat	No New Impacts: continued turbidity in areas of high use	No Impacts		No New Impacts: continues varied impacts both + & -			No New Impacts: continued problems with health & safety	No Impacts			No Impacts	No Impacts
b) Allow Restrictions to be Established by Napa County	+ Impacts: decrease bank erosion		+ Impacts: Improve habitat conditions for fish	+ Impacts: may decrease turbidity in specific areas	+ Impacts: may decrease overuse in some areas, allowing lower density, etc.		Unknown Impacts			+ Impacts: increases health & safety for visitors	Impacts Unknown			- Minor Impacts: may restrict concession rental activities	- Minor Impacts: may decrease retail sales if specific uses are restricted
18) Allow Limited Special Uses of Specific Water Surface Areas	- Minor Impacts: increases bank erosion		No Impacts	No Impacts Identified	- Minor Impacts: increases activity & structures on water surface		Both + & - Impacts: varying degrees of recreational opportunities lost & gained			No Impacts	- Moderate Impacts: increase in enforcement responsibilities			+ Impacts: may increase revenues by utilizing resort water surface area	Both + & - Impacts: increases some uses & sales while limiting others
a) No Action: recalm special use areas without policy change	No New Impacts: continues bank erosion			No Impacts			No New Impacts: continued loss of recreational opportunities overall			No New Impacts: continued problems with concentrated use and conflicts	No New Impacts: continues enforcement difficulties	No New Impacts: continues to limit no fee recreation opportunities		No Impacts	No Impacts
b) Eliminate All Special Use Areas	+ Impacts: decrease bank erosion				+ Impacts: decreases structures & organized use on water surface		Both + & - Impacts: varying degrees of recreational opportunities lost & gained			+ Impacts: decreases concentrated and conflicting uses	No Impacts	+ Impacts: increases no fee recreation opportunities		- Minor Impacts: may decrease revenues from special uses	Both + & - Impacts: increases some uses & sales while limiting others
19) Allow Special Water Use Events	- Minor Impacts: increases compaction, erosion, & bank erosion		+ Impacts: could provide information and management of fish resources	No Impacts Identified	- Minor Impacts: temporarily increases to high density use & activities on water		Both + & - Impacts: varying degrees of temporary opportunities lost & gained	- Minor Impacts: temporary concentration of visitors may cause disruption	- Minor Impacts: slight increase on a limited basis	- Minor Impacts: temporary increase in concentrated use and activities	- Minor Impacts: temporary increase in enforcement responsibilities	No Impacts		+ Impacts: may increase revenues due to increased visitation	Both + & - Impacts: may generate additional retail sales but require some services
a) No Action: no specific policy	No New Impacts: continues compaction, erosion, & bank erosion		No Impacts					Unknown Impacts: no planning or decision criteria	No Impacts	No New Impacts: continued irregular concentrated use & activities	No Impacts			No Impacts	No Impacts
b) Prohibit Special Events	+ Impacts: decrease compaction, erosion, & bank erosion		- Minor Impacts. would prevent agencies from gathering information	No Impacts	+ Impacts: eliminates temporary increases in high density use & activities			No Impacts		+ Impacts: decreases concentrated use and activities in specific areas				- Minor Impacts: may decrease revenues due to decreased visitation	- Minor Impacts: may reduce retail sales

PREFERRED ACTIONS AND ALTERNATIVES	IMPACTS ON NATURAL RESOURCES					IMPACTS ON CULTURAL RESOURCES	GENERAL IMPACTS					IMPACTS ON ECONOMIC ENVIRONMENT			
	SOILS AND TOPOGRAPHY	VEGETATION AND WILDLIFE	FISH RESOURCES	WATER QUALITY	SCENIC RESOURCES	CULTURAL RESOURCES	RECREATION	LAND USE	TRAFFIC	VISITOR HEALTH AND SAFETY	LAW ENFORCEMENT	RECREATION VISITORS	RESORT TENANTS	CONCESSIONAIRES	ECONOMY
WATER SURFACE MANAGEMENT (CONT.)															
20) Set Carrying Capacity at 7000 as per Public Use Plan (1979)	+ Impacts: decreases potential for compaction, erosion, & bank erosion	No Impacts	+ Impacts: provides for increased protection of fish resources	+ Impacts: limits potential for bacterial & nutrient contamination	+ Impacts: sets controls for use & activities on water surface	No Impacts	Both + & - Impacts: loss in quantity but increase in quality of recreation	No Impacts	+ Impacts: may lessen traffic especially on peak use days	+ Impacts: increases health & safety for visitors by limiting watercraft on lake	- Minor Impacts: increase in enforcement responsibilities	No New Impacts	No New Impacts	No New Impacts	No New Impacts
a) No Action: do not limit launching/storage of watercraft	Unknown Negative Impact: level of increased compaction & erosion unknown		- Minor Impacts: increases disturbance of fish resources	- Unquantified Impact: increases potential bacterial & nutrient contamination	- Major Impacts: allows unlimited use & activities of water surface		Both + & - Impacts: increase in quantity but loss in quality of recreation		- Minor Impacts: slight increase continued	No New Impacts: continued uncontrolled use of lake	No Impacts			No Impacts	No Impacts
COMPLIANCE MANAGEMENT															
21) Obtain Additional Law Enforcement Support	+ Impacts: decreases potential for compaction, erosion, & bank erosion	+ Impacts: increase in benefit due to increased protection	+ Impacts: increase in benefit due to increased protection	+ Impacts: increases potential to regulate activities associated with water pollution	+ Impacts: allows protection of scenic resources	+ Impacts: will increase enforcement of Archeological Resources Protection Act	+ Impacts: increase in quality of recreational opportunities & ability to use uses	+ Impacts: increased control over recreationists disrupting adjacent lands	No Impacts	+ Impacts: increases health & safety for visitors	+ Impacts: provides increase control on public lands	No Impacts	+ Impacts: reduced vandalism, costs, fees	+ Impacts: reduced vandalism, need for costly patrols	No Impacts
a) No Action: no change in current situation	No New Impacts: continued increase in compaction, erosion, & bank erosion	No New Impacts: continues problems with habitat management	No New Impacts: continued decrease due to inability to protect resource	No New Impacts: continued inability to enforce water quality controls	No New Impacts: continued impacts on resources	No Impacts	No New Impacts: continued loss of experiences due to lack of management control	No New Impacts: continued inability to control users trespassing on adjacent lands		No New Impacts: continues inability to administer health & safety standards	No New Impacts: continues enforcement difficulties	No New Impacts	No New Impacts	No New Impacts	No New Impacts
CONCESSIONS MANAGEMENT: PRIOR TO RESORT REORGANIZATION															
22) Floodproof/anchor or Remove Structures & Facilities in the Base Floodplain	- Minor Impacts: may increase erosion if retaining walls are not maintained	No Impacts	+ Impacts: minimizes littoral zone impacts	+ Impacts: decreases potential of water pollution from flooding	No New Impacts: continued presence of built structures on shoreline unless removed	No Impacts	- No Impacts	No Impacts	No Impacts	+ Impacts: increases health & safety for visitors	No Impacts	No Impacts	- Major Impacts: increased expenditures required	- Major Impacts: increased expenditures required	No Impacts
a) No Action: no floodproofing/anchoring requirements	No Impacts		No New Impacts: continued impacts on littoral zone	No New Impacts: continued potential of water pollution from flooding						No New Impacts: continues health & safety problems associated with flooding			No Impacts	No Impacts	
b) Remove All Structures from the Base Floodplain	- Minor Impacts: may increase erosion if retaining walls are not maintained		+ Impacts: minimizes littoral zone impacts	+ Impacts: decreases potential of water pollution from flooding	+ Impacts: decrease built environment on shoreline		Both + & - Impacts: varying degrees of recreational opportunities lost & gained			+ Impacts: increases health & safety for visitors			- Major Impacts: loss of improvements and added relocation costs	- Major Impacts: loss of improvements and added relocation costs	- Minor Impacts: may reduce volume of retail sales due to relocation out of area
23) Prohibit Construction & Placement of Facilities in Reservoir Floodplain	+ Impacts: decreases potential for compaction & erosion	+ Impacts: provides protection of vegetation and habitat	+ Impacts: would provide protection of habitat		+ Impacts: prevents additional built environment on shoreline	+ Impacts: will reduce potential for destruction of resources	No Impacts						- Minor Impacts: loss of opportunity for improvements	- Minor Impacts: loss in opportunity to develop in given areas	- Minor Impacts: limits future growth & development which decreases sales growth
a) No Action: no policy or direction	No New Impacts: continued potential for compaction & erosion	No Impacts	No New Impacts: continued potential disturbance of habitat for fish resources	No New Impacts: continued potential of water pollution from flooding	No New Impacts: continues to allow construction in shoreline area	No Impacts				No New Impacts: continues health & safety problems associated with flooding			No Impacts	No Impacts	No Impacts
24) Prohibit Increase in Total Number of Long-term Sites, Allow Relocation	+ Impacts: decreases potential for compaction & erosion	- Minor Impacts: decrease in vegetation & habitat in relocation areas	No Impacts	+ Impacts: decreases potential impacts of additional sewage systems on water quality	+ Impacts: controls or plans built environment	Impacts Unknown			+ Impacts: may lessen traffic pressure	No Impacts				Both + & - Impacts: restricts increased development but allows for relocation	- Minor Impacts: limits future development which decreases retail sales growth
a) No Action: no additional long-term sites with no relocation opportunities		+ Impacts: increase in vegetation & habitat through protection		+ Impacts: decreases potential impacts of existing uses on water quality	+ Impacts: prohibits additional built environment	No Impacts	Both + & - Impacts: varying degrees of recreational opportunities lost & gained							No New Impacts	No New Impacts
b) Allow Expansion of Long-term Uses	- Major Impacts: increases potential for compaction & erosion	- Moderate Impacts: loss of vegetation & habitat and disturbance of wildlife		- Unqualified Impacts: increases potential impacts of uses on water quality	- Major Impacts: increases built environment on and around shoreline areas	Impacts Unknown			- Moderate Impacts: increase in traffic				+ Impacts: increases opportunity for long-term site occupancy	+ Impacts: increases revenue potential	+ Impacts: new development may generate additional retail sales
25) Remove Structures & Facilities for Environmental Causes	+ Impacts: decreases potential for compaction & erosion	+ Impacts: allows for habitat restoration	+ Impacts: minimizes littoral zone impacts	+ Impacts: decreases potential impacts of existing uses on water quality	+ Impacts: decreases built environment on landscape	No Impacts			No Impacts	+ Impacts: increases health & safety for visitors			- Minor Impacts: loss incurred due to removal unless relocation available	- Moderate Impacts: loss in revenues if site is eliminated	- Minor Impacts: may reduce retail sales
a) No Action: no policy or direction	No New Impact: continues potential for compaction & erosion	No Impacts	No New Impacts: continued impacts on littoral zone	No New Impacts: continues potential impacts of existing uses on water quality	No New Impacts: continues existing impact on landscape		No Impacts			No New Impacts: continues health & safety problems			No Impacts	No Impacts	No Impacts
a) No Removals for Environmental Causes													No New Impacts: continued high maintenance costs	No New Impacts: continued high maintenance costs	
26) Prohibit Storage in Shoreline Areas	+ Impacts: decreases potential for compaction & erosion		+ Impacts: minimizes littoral zone impacts	+ Impacts: decreases potential for solid waste contamination	+ Impacts: decrease presence of built materials on shoreline		+ Impacts: increases recreational opportunities for shoreline use			+ Impacts: increases health & safety for visitors		- Minor Impacts: limits storage available which may affect supply & pricing	- Minor Impacts: limits storage available which may affect supply & pricing	- Minor Impacts: loss in revenues from storage	+ Impacts: increases revenues from off-government land storage
a) No Action: allow storage to occur with minimal restrictions	No New Impact: continues potential for compaction & erosion		No New Impacts: continued impacts on littoral zone	- Minor Impacts: increases potential for waste contamination	- Moderate Impacts: increases presence of built materials on shoreline		No New Impacts: continued loss of recreational opportunities			No New Impacts: continues health & safety problems		No New Impacts: continues storage availability which may reduce price increases	No New Impacts: continues storage availability which may reduce price increases	No New Impacts	No New Impacts

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PREFERRED ACTIONS AND ALTERNATIVES	IMPACTS ON NATURAL RESOURCES					IMPACTS ON CULTURAL RESOURCES	GENERAL IMPACTS					IMPACTS ON ECONOMIC ENVIRONMENT			
	SOILS AND TOPOGRAPHY	VEGETATION AND WILDLIFE	FISH RESOURCES	WATER QUALITY	SCENIC RESOURCES	CULTURAL RESOURCES	RECREATION	LAND USE	TRAFFIC	VISITOR HEALTH AND SAFETY	LAW ENFORCEMENT	RECREATION VISITORS	RESORT TENANTS	CONCESSIONAIRES	ECONOMY
CONCESSIONS MANAGEMENT: PRIOR TO RESORT REORGANIZATION (CONT.)															
27) Resort Master Plans	+ Impacts: decreases potential for compaction & erosion	+ Impacts: increase in protection of vegetation & habitat	+ Impacts: minimizes littoral zone impacts	+ Impacts: increases potential for waste treatment and management	+ Impacts: increases planning for scenic resources	+ Impacts: allows planning for cultural resources protection	+ Impacts: increased recreational opportunities due to efficient planning	No Impacts	+ Impacts: improves circulation in resorts	+ Impacts: increases health & safety for visitors	No Impacts	Unknown Impacts	Unknown Impacts	Both + & - Impacts: increases planning and services but cost to prepare	+ Impacts: consistent planning may stimulate retail sales
a) No Action: no master plans required	No New Impact: continues potential for compaction & erosion	No New Impacts: continued decrease in vegetation and habitat	No New Impacts: continued impacts on littoral zone	No New Impacts: continues potential impact of sewage & solid wastes on water	- Major Impacts: no organized planning for scenic resources	Impacts Unknown	No New Impacts: continued loss & gain of recreational opportunities		No Impacts	No New Impacts: continues health & safety problems		No Impacts	No Impacts	No Impacts	No Impacts
28) Establish & Implement Land Planning & Dev. Criteria for New Projects	+ Impacts: decreases potential for compaction & erosion	+ Impacts: increases protection of vegetation	+ Impacts: minimizes littoral zone impacts	+ Impacts: increases potential for waste treatment and management	+ Impacts: increases planning for scenic resources	+ Impacts: allows planning for cultural resources protection	+ Impacts: increased recreational opportunities due to efficient planning		+ Impacts: improves circulation in resorts	+ Impacts: increases health & safety for visitors				Both + & - Impacts: increases planning but may have restrictions on development	+ Impacts: consistent planning may stimulate retail sales
a) No Action: do not establish specific criteria	No New Impact: continues potential for compaction & erosion	No Impacts	No New Impacts: continued impacts on littoral zone	No New Impacts: continues potential impact of sewage & solid wastes on water	No New Impacts: continues general scenic resources degradation	Impacts Unknown	No New Impacts: continued loss & gain of recreational opportunities		No Impacts	No New Impacts: continues health & safety problems				No Impacts	No Impacts
29) Establish & Implement Facility Development & Design Standards	+ Impacts: decreases potential for compaction & erosion		No Impacts	No Impacts	+ Impacts: increases planning for scenic resources	+ Impacts: increases protection of cultural resources	Both + & - Impacts: varying degrees of recreational opportunities lost & gained			+ Impacts: increases health & safety for visitors			- Minor Impacts: any increase improvement costs to meet standards	Both + & - Impacts: increased revenues from improved facilities but may cost more	+ Impacts: consistent planning may stimulate retail sales
a) No Action: minimal standards with Title 24	No New Impact: continues potential for compaction & erosion				No New Impacts: continues general scenic resources degradation	No Impacts	No New Impacts: continued loss & gain of recreational opportunities			No New Impacts: continues health & safety problems			No Impacts	No Impacts	No Impacts
30) Allow 75 Commercial Houseboats/OOMs	No Impacts			- Minor Impacts: increases potential for bacterial & nutrient contamination	- Minor Impacts: increases visibility of built structures in landscape		+ Impacts: increases recreational opportunities			- Unknown Quantifiable Impacts: increase in wastes, debris & fire danger	- Minor Impacts: slight increase in enforcement responsibilities			+ Impacts: increases revenue capability	+ Impacts: increased opportunities will increase retail sales
a) No Action: allow maximum of 65 Commercial houseboats															
b) Allow 150 Commercial houseboats per 1987 Policy					- Moderate Impacts: increases visibility of built structures in landscape		Both + & - Impacts: varying degrees of recreational opportunities lost & gained		- Minor Impacts: slight increase in traffic						
c) Prohibit All Commercial Houseboats				+ Impacts: decreases potential for bacterial & nutrient contamination of water	+ Impacts: decreases presence of built structures in landscape		- Moderate Impacts: decreases recreational houseboating opportunities		+ Impacts: any decrease traffic in area	+ Impacts: decreases build up of debris & fire danger	No Impacts			- Moderate Impacts: decreases revenue potential	- Minor Impacts: decreased use will reduce retail sales
31) Require Sewage and Greywater Holding Facilities			+ Impacts: protects fish resources		+ Impacts: increases control of visible water quality		No Impacts		No Impacts	+ Impacts: increases health & safety for visitors	- Minor Impacts: slight increase in enforcement responsibilities	- Minor Impacts: increases expenditure on equipment & servicing		- Minor Impacts: requires expenditures on facilities	No Impacts
a) No Action: continues existing policy			No New Impacts: continued potential loss of fish resources	No New Impacts: continued potential for bacterial & nutrient contamination	No Impacts					No New Impacts: continues health & safety problems	No Impacts			No Impacts	No New Impacts
32) Allow Private Houseboats/OOMs			No Impacts	- Minor Impact: increase potential for bacterial & nutrient contamination	- Minor Impacts: increases visibility of built structures in landscape		+ Impacts: increases houseboat recreational opportunities		- Minor Impacts: slight increase in traffic			No Impacts		+ Impacts: increases revenue potential	+ Impacts: increased opportunities will increase retail sales
a) No Action: continues existing policy				No Impacts	No Impacts		No Impacts		No Impacts	- Unknown Quantifiable Impacts: increase in wastes, debris & fire danger	- Moderate Impacts: increase in enforcement responsibilities				
33) Allow Only Minor Modifications of the Shoreline Below 440 ft.	- Minor Impacts: slight increase in erosion potential and compaction		- Minor Impacts: disturbance of fish habitat	+ Impacts: decreases potential of accelerated nutrient flow into the lake	+ Impacts: allows control and planning for scenic resources		+ Impacts: may increase day use recreational opportunities			+ Impacts: increases health & safety for visitors	No Impacts			- Minor Impacts: prevents some developments below normal full pool	- Minor Impacts: restricts resort expansion which reduces potential sales
a) Prohibit Shoreline Modifications Below 440 ft.	No New Impact: continues potential for compaction & erosion		+ Impacts: increased protection of fish resources		+ Impacts: allows control and planning for scenic resources		- Minor Impacts: may prevent specific developed recreational opportunities			- Minor Impacts: does not allow for solutions to health & safety problems				- Moderate Impacts: prevents all development below normal full pool	
b) Allow Shoreline Modifications without Restrictions below 440 ft.	- Minor Impacts: slight increase in erosion potential and compaction		- Minor Impacts: disturbance of fish resources	- Unquantified Impacts: increases nutrient flow into the lake	- Moderate to Major Impact: increases built environment visibility on shoreline		Both + & - Impacts: varying degrees of recreational opportunities lost & gained			Unknown Impacts				+ Impacts: allows for new development potential below full pool	+ Impacts: allows resorts to expand, stimulating retail sales

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PREFERRED ACTIONS AND ALTERNATIVES	IMPACTS ON NATURAL RESOURCES					IMPACTS ON CULTURAL RESOURCES	GENERAL IMPACTS					IMPACTS ON ECONOMIC ENVIRONMENT			
	SOILS AND TOPOGRAPHY	VEGETATION AND WILDLIFE	FISH RESOURCES	WATER QUALITY	SCENIC RESOURCES	CULTURAL RESOURCES	RECREATION	LAND USE	TRAFFIC	VISITOR HEALTH AND SAFETY	LAW ENFORCEMENT	RECREATION VISITORS	RESORT TENANTS	CONCESSIONAIRES	ECONOMY
CONCESSIONS MANAGEMENT: ASSOCIATED WITH RESORT REORGANIZATION															
34) Remove All Long-term Uses From Base Floodplain Areas	- Minor Impacts: may increase erosion if retaining walls are not maintained	+ Impacts: increase in vegetation & habitat	+ Impacts: minimizes littoral zone impacts	+ Impacts: decreases potential impacts of existing uses on water quality	+ Impacts: decrease in built environment visibility on shoreline	No Impacts	Both + & - Impacts: varying degrees of recreational opportunities lost & gained	No Impacts	+ Impacts: may decrease traffic	+ Impacts: increases health & safety for visitors	No Impacts	No Impacts	- Major Impacts: loss of opportunity for site occupancy & reuse of improvements	- Moderate Impacts: loss in investment on facilities	- Moderate Impacts: may dislocate users & decrease retail sales
a) No Action: allow long-term uses in Res. Floodplain until public needs develop	No New Impact: continues potential for compaction & erosion	No Impacts	No New Impacts: continued littoral zone impacts	No New Impacts: continues potential impacts of existing uses on water quality	No New Impacts: continued negative impact on landscape		No New Impacts: continued exclusive use and disruption of public access		No Impacts	No New Impacts: continues health & safety problems associated with flooding			No New Impacts Until Public Need Develops	No New Impacts	No Impacts
b) Allow Long-term Uses If Floodproofed & Secured				+ Impacts: decreases potential impacts of existing uses on water quality						+ Impacts: increases health & safety for visitors			- Minor Impacts: increased expenditures required	+ Impacts: flood loss minimized with minimal loss in revenues	
c) Remove All Long-term Uses From Reservoir Floodplain	- Minor Impacts: may increase erosion if retaining walls are not maintained	+ Impacts: increase in vegetation & habitat	+ Impacts: minimizes littoral zone impacts		+ Impacts: decrease in built environment visibility on shoreline		Both + & - Impacts: varying degrees of recreational opportunities lost & gained		+ Impacts: may decrease traffic				- Major Impacts: loss of opportunity for site occupancy & reuse of improvements	- Major Impacts: loss in investment on facilities	- Moderate Impacts: may dislocate users, reducing retail sales
35) Flood-proof/Anchor or Remove All Permanent Structures in Reservoir Floodplain			+ Impacts: protects fish resources		No New Impacts: continued negative impact on landscape unless structures are removed		No Impacts		No Impacts				No Impacts	- Moderate Impacts: increased expenditures required	No Impacts
a) No Action: no flood-proofing/anchoring or removal required	No New Impact: continues potential for compaction & erosion	No Impacts	No New Impacts: continued impacts on littoral zone which affects fish resources	No New Impacts: continues potential impacts of existing uses on water quality	No New Impacts: continued negative impact on landscape		—			No New Impacts: continues health & safety problems associated with flooding				No Impacts	
b) Remove All Facilities & Structures From the Reservoir Floodplain	- Minor Impacts: may increase erosion if retaining walls are not maintained	+ Impacts: increase in vegetation & habitat	+ Impacts: minimizes littoral zone impacts fish resources	+ Impacts: decreases potential impacts of existing uses on water quality	+ Impacts: decrease in built environment visibility on shoreline					+ Impacts: increases health & safety for visitors				- Moderate Impacts: loss in investment on facilities	- Moderate Impacts: may dislocate users & decrease retail sales
36) Create Short-term Sites From Existing Long-term Sites in Shoreline Areas	- Minor Impacts: slight increase in erosion potential and compaction	No Impacts	No Impacts	No New Impacts: continues potential impacts of existing uses on water quality	+ Impacts: decrease in built environment & density		+ Impacts: increases public opportunities however eliminating long-term uses		- Minor Impacts: slight increase in traffic	No Impacts			- Moderate Impacts: loss of shoreline occupancy, relocation possible	Impacts Unknown: may increase or decrease revenues depending on replacement facilities	Both + & - Impacts: may increase retail sales but also increase services demand
a) No Action: no conversion of long-term to short-term	No New Impact: continues potential for compaction & erosion				No New Impacts: continued negative impact on landscape		No New Impacts: continued exclusive use and disruption of public access		No Impacts				No Impacts	No Impacts	No Impacts
b) Convert Long-term in Water Influence Zone & Reservoir Floodplain to Short-term	- Minor Impacts: slight increase in erosion potential and compaction				+ Impacts: decrease in built environment & density		+ Impacts: increases public opportunities however eliminating long-term uses		- Minor Impacts: slight increase in traffic	+ Impacts: increases health & safety for visitors			- Major Impacts: loss of opportunity for site occupancy & reuse of improvements	Impacts Unknown: may increase or decrease revenues depending on replacement facilities	Both + & - Impacts: may increase retail sales but also increase services demand
c) Convert All Long-term Uses to Short-term									Impacts Unknown	No Impacts					
37) Relocate Long-term Sites Which Have Been Converted or Removed	- Moderate Impacts: increases compaction & erosion potential	- Moderate Impacts: loss of vegetation & habitat			- Moderate Impacts: increase of built environment on the landscape	Impacts Unknown	+ Impacts: continues specific exclusive uses without preventing public access		No Impacts				+ Impacts: lessens the impacts of site removal with costs incurred during relocation		No Impacts
a) No Action: no policy on relocation	No New Impact: continues potential for compaction & erosion	Unknown Impacts			No New Impacts: continued negative impact on landscape	Impacts Unknown	No Impacts						No New Impacts: continues + & - Impacts associated with mitigation & relocation	No New Impacts	No New Impacts
b) No Relocation for Long-term Sites Eliminated	+ Impacts: decreases potential for compaction & erosion	No Impacts			+ Impacts: decrease in built environment & density on landscape	No Impacts	- Major Impacts: decrease in specific exclusive uses and recreational opportunities						- Major Impacts: loss of opportunity for site occupancy & reuse of improvements	- Major Impacts: loss in revenues due to site elimination	- Moderate Impacts: may dislocate users & decrease retail sales
38) Establish & Implement Facility Development & Design Standards	+ Impacts: decreases potential for compaction & erosion			No Impacts	+ Impacts: increases planning for scenic resources	+ Impacts: increases protection of cultural resources	No Impacts			+ Impacts: increases health & safety for visitors			- Minor Impacts: may incur compliance costs associated with new standards	Both + & - Impacts: increased revenues from improved facilities but may cost more	+ Impacts: consistent planning may stimulate retail sales
a) No Action: continue compliance with Title 25	No New Impact: continues potential for compaction & erosion				No New Impacts: continues lack of coordinated planning and design	No Impacts				No New Impacts: continues health & safety problems			No Impacts	No Impacts	No Impacts
39) Delete Specific Land From Concession Areas	Unknown Impacts: depends on future use of land	+ Impacts: protects wildlife & habitats from high density development		+ Impacts: increases ability to control nutrient flow into the lake	+ Impacts: allows for control and planning of scenic resources by the Bureau	+ Impacts: increased protection of cultural resources	Both + & - Impacts: varying degrees of recreational opportunities lost & gained			No Impacts		+ Impacts: may create additional no fee areas		- Minor Impacts: decrease in potential revenue from currently unused lands	No Impacts
a) No Action: no deletions	Unknown Impacts: continues potential for compaction & erosion	Unknown Impacts: potential decrease in vegetation and habitat		No Impacts	No New Impacts: potential for continued negative impact on landscape by development	No Impacts						No Impacts		No Impacts	

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PREFERRED ACTIONS AND ALTERNATIVES	IMPACTS ON NATURAL RESOURCES					IMPACTS ON CULTURAL RESOURCES	GENERAL IMPACTS					IMPACTS ON ECONOMIC ENVIRONMENT			
	SOILS AND TOPOGRAPHY	VEGETATION AND WILDLIFE	FISH RESOURCES	WATER QUALITY	SCENIC RESOURCES	CULTURAL RESOURCES	RECREATION	LAND USE	TRAFFIC	VISITOR HEALTH AND SAFETY	LAW ENFORCEMENT	RECREATION VISITORS	RESORT TENANTS	CONCESSIONAIRES	ECONOMY
CONCESSIONS MANAGEMENT: ACTIONS ASSOCIATED WITH RESORT REORGANIZATION (CONT.)															
40) Establish & Implement Variable Franchise Fees	No Impacts	No Impacts	No Impacts	No Impacts	+ Impacts: allows control and planning for scenic resources by the Bureau	No Impacts	+ Impacts: may increase the variety & quality of recreational opportunities	No Impacts	No Impacts	+ Impacts: may provide incentive to rectify health & safety problems	No Impacts	Both + & - Impacts: depends upon resort management	Both + & - Impacts: may improve services and/or increase site rental cost	Both + & - Impacts: improves services & may increase revenues, but may cost more	+ Impacts: resort improvements may generate additional local retail sales
a) No Action: maintain franchise fee at 1%					No New Impacts: continued negative impact on landscape		No Impacts			No New Impacts: continues inability to administer health & safety standards		No Impacts	No Impacts	No Impacts	No Impacts
b) Set Franchise Fee to Maximize Fair Market Value Return to Bureau					- Minor Impacts: does not provide concessionaire with planning incentive		- Minor Impacts: may decrease the variety & quality of recreational opportunities					- Moderate Impacts: potential for significant increase in fees	- Moderate Impacts: may cause concessionaire to pass higher fees on to tenants	-Minor Impacts: some costs may be absorbed by concessionaires	- Minor Impacts: may reduce retail sales due to increase in fees & reduced visitation
41) Review Long-term Use Fees If Reimbursed By Concessionaire					No New Impacts continued negative impact on landscape							No Impacts	- Moderate Impacts: may increase fees without control	+ Impacts: provides for potential fee increases without regulation	No Impacts
a) No Action, continue current concession fee review & approval							No Impacts					No New Impacts: continues incremental fee increases	No New Impact: continues fee review and increases	No New Impacts	
b) Discontinue All Concession Fee Review & Approvals					- Minor Impacts: encourages exploitive development of lakeside land		- Minor Impacts: may decrease the variety & quality of recreational opportunities					- Moderate Impacts: potential for significant increase in fees	- Moderate Impacts: may increase fees without control	+ Impacts: provides for potential fee increases without regulation	