# Mokelumne Watershed Master Plan

## East Bay Municipal Utility District

January 2010

# Recreation Management Plan

EBMUD

# MOKELUMNE WATERSHED RECREATION PLAN
# RECREATION MANAGEMENT PLAN

## Contents

# MOKELUMNE WATERSHED RECREATION PLAN

**SUMMARY**. The Mokelumne Watershed Master Plan (MWMP) identified specific goals for Recreation Management in the Mokelumne Watershed; (1) provide recreation to meet regulatory requirements, (2) minimize subsidy of recreation activities while providing a quality recreational experience and protecting water quality and the environment, and (3) promote the well-being of the community and maintain District values by providing recreational activities that are environmentally and financially sustainable and enhance understanding of and respect for the watershed ecosystem. The Mokelumne Watershed Recreation Plan identifies the following measures to meet those goals.

1. Implement specific monitoring and management actions to protect water quality in Pardee and Camanche reservoirs from potential impacts of recreation activities.
2. Accommodate anticipated recreation demand and changing recreation demographics.
    - Maintain recreation use of the reservoirs and watershed lands near current levels.
    - Add additional facilities if/when weekend/holiday demand exceeds 80% capacity more than 90% of the time during the recreation season and Net Present Value of capital investment is positive.
    - Confine upgraded or new facilities to the Recreation Management Area boundaries identified in the MWMP.
    - Focus on recreational alternatives that reflect changing demographics and feedback as indicated by Visitor experience and facility surveys.
3. Implement specific Best Management Practices to limit potential recreation impacts to ecological health.
4. Continue hazard and maintenance inspection and abatement practices to ensure public safety.
5. Continue law enforcement support at a level necessary to meet specific boating and recreation area safety/security targets.
6. Implement financial performance monitoring as identified in the Mokelumne Watershed Financial Management Plan.

7. Complete the Mokelumne Coast to Crest trail on District lands in the Mokelumne Watershed.
8. Implement specific recreation trail construction, maintenance, and repair standards necessary to meet management targets.
9. Continue monitoring invasive species presence/absence in Pardee and Camanche reservoirs in coordination with the District's Invasive Aquatic Species Control and Prevention Program.
10. Install and operate floating restrooms at Camanche Reservoir and continue operation of floating restrooms at Pardee Reservoir contingent on funding.
11. Continue the recycle/reuse/conservation program within the Mokelumne Watershed.
12. Comply with Americans with Disabilities Act standards for new or rehabilitated structures within the Recreation Management Areas.
13. Evaluate transitioning from the Camanche Regional Park Advisory Board to a forum that includes recreation stakeholders and encompasses all watershed recreation facilities and uses.
14. Implement an Adaptive Management Program to meet management targets for specific recreation management indicators.

The Mokelumne Watershed Recreation Management Plan is designed to provide guidance and direction, and the tools necessary to effectively meet the goals of the Mokelumne Watershed Master Plan. It is also designed to be reviewed and revised periodically to meet changing conditions over time.

## 1.0 INTRODUCTION

East Bay Municipal Utility District (EBMUD) developed the MWMP in 2008 to guide management of EBMUD facilities and property in the Mokelumne Watershed. One of the strategies of the MWMP included development and implementation of a Mokelumne Watershed Recreation Plan to "improve District watershed management practices through application of adaptive management principles and the ongoing collection and evaluation of water quality, natural resource, and financial data for District-owned lands." This Plan describes recreation management goals and objectives for plan implementation (Section 2.0); defines recreation management units (Section 3.0); describes the issues and management associated with plan objectives (Section 4.0); and, identifies an adaptive management approach to improving recreation management practices in the watershed (Section 5.0).

Recreation is an identified beneficial use of Pardee and Camanche Reservoirs, and the lower Mokelumne River below Camanche Dam (CRWQCB 2007). Public access to Pardee and Camanche began in 1958 and 1967, respectively, in compliance with State Law that required multiple uses of reservoirs. Additionally, EBMUD is required to provide public access for recreation through agreements with the US Army Corp of Engineers and the Federal Energy Regulatory Commission (FERC), who oversee the EBMUD's flood control and power generation activities in the watershed, respectively. The type of public access and recreation activities is not dictated by regulation. At Pardee Reservoir, recreational uses initially were established based on public input.

In 1964, as Camanche Dam and Reservoir were being constructed, EBMUD entered into a Park and Recreation Lease with the Camanche Regional Park Board (CRPB), an entity created a year earlier by a Joint Exercise of Powers Agreement between Amador, Calaveras, and San Joaquin counties. The intent

was that CRPB would develop the infrastructure, retain concessionaires, and oversee operation and maintenance of the Camanche North Shore and South Shore Recreation Areas. Subsequent amendments to the lease in 1967 and 1972 gave CRPB authority to allow mobile homes for recreational use at the recreation areas. Both the Pardee and Camanche projects came under FERC jurisdiction in 1981 as a requirement for constructing and operating the Camanche Power Plant and third generating unit at Pardee. In 1986, FERC conducted an environmental and recreation inspection, which led to dissolution of the CRPB and transfer of the Camanche North and South Shore Recreation Areas to EBMUD. EBMUD became responsible for the Camanche recreation areas, and made new agreements with concessionaires. A new Camanche Regional Park Advisory Board (CRPAB) consisting of representatives from Amador, Calaveras, and San Joaquin Counties was established to continue to advise the District on recreation activities at Camanche Reservoir.

In 1990, EBMUD developed a formal recreation plan for Camanche Reservoir, in response to a request from FERC. That recreation plan outlined recreational uses and prescribed certain maintenance and improvement activities by EBMUD. Prior to approving the recreation plan, FERC noticed the plan in the Federal Register per the National Environmental Quality Act (NEPA), and public comments were requested.

Current activities in the developed recreation areas reflect EBMUD commitments in the FERC approved recreation plan, which conducts site inspections of the recreation areas every five years. Changes to that plan are possible but would require notification of and approval by FERC. In 1992, EBMUD also entered into an agreement with the Mokelumne Coast to Crest Trail Committee, a non-profit group whose goal is the establishment of a trail along the Mokelumne River. EBMUD committed to support the concept of the trail and alignment of the trail with the trails of EBMUD, and to ensure that the use of the trails are consistent

with EBMUD rules and regulations. To date a portion of the trail has been constructed, primarily by EBMUD staff and volunteers.

Recreation Management Areas are shown in Figure 3-1 and current recreation activities in the Mokelumne Watershed are shown in the following Table 1-1.

**Table 1-1. Recreation Activities and Facilities Provided at the Recreation Management Areas in EBMUD's Mokelumne Watershed.**

| | Pardee Reservoir | Camanche Reservoir | Pardee Recreation Area | Camanche North Shore | Camanche South Shore | Camanche Hills Hunting Preserve | Mokelumne Watershed Trails | Mokelumne River Day Use Area |
|---|---|---|---|---|---|---|---|---|
| Bicycle Trail (Limited Use) | | | • | • | • | | | |
| Boat Rentals | • | • | • | • | • | | | |
| Cabins | | | | • | • | | | |
| Camping | | | • | • | • | | | |
| Children's Play Apparatus | | | | • | • | | | |
| Fishing | • | • | • | • | • | | | • |
| Food Concession | | | • | • | • | • | | |
| Hiking Trails | | | • | • | • | | • | • |
| Horseback Trails | | | | • | • | | • | |
| Jogging | | | • | • | • | | • | |
| Nature Study | • | • | • | • | • | | • | • |
| Marina | | | • | • | • | | | |
| Picnicking | | | • | • | • | | | • |
| RV Park | | | • | | • | | | |
| Sailing | • | • | • | • | • | | | |
| Swimming Pool | | | • | | | | | |
| Water Skiing & Swimming | | • | | • | • | | | |
| Windsurfing | | • | | • | • | | | |
| General Store | | | • | • | • | | | |
| Hunting & Sporting Clays | | | | | | • | | |

## 2.0 GOALS AND OBJECTIVES

EBMUD's Board of Directors' policy direction for development of the MWMP was to balance the needs of natural systems and community use. The MWMP goals for Recreation Management include:

- Provide recreation to meet regulatory requirements;
- Minimize subsidy of recreation activities while providing a quality recreational experience and protecting water quality and the environment;
- Promote the well-being of the community and maintain District values by providing recreational activities that are environmentally and financially sustainable and enhance understanding of and respect for the watershed ecosystem.

The MWMP identifies the following objectives to be incorporated in the Mokelumne Watershed Recreation Plan:

- Consider recreational access to District lands that does not conflict with maintaining water quality and ecological integrity in the watershed and reservoirs;
- Provide a combination of day and short-term recreational activity based on projected future demand and feedback from recreational users;
- Identify BMPs that may be applied to limit impacts of recreational activity on water quality and ecological health;
- Focus on recreational alternatives requiring lower capital investment and operating costs and minimal infrastructure investment, and that meet, to the extent possible, the demand for recreational access to the watershed;
- Include hazard inspections and mitigation as part of public safety and security measures;
- Plan for the completion of the Mokelumne Coast to Crest Trail;
- Identify trail construction, maintenance, and repair standards for existing and future trail systems and reference asset management plans as appropriate;
- Identify and evaluate alternatives to protect water quality against chemical contaminants and invasive species transported on vehicles, equipment, boats and trailers;
- Provide for human sanitation containment, removal, and disposal for both Pardee and Camanche reservoirs;
- Continue to promote and prioritize reuse, recycling, and conservation efforts at the recreation areas; and

- Identify construction, maintenance, and repair standards for recreation facilities that provide ADA accommodations where feasible and practical and include facilities in the infrastructure master plan.

The Plan is designed to identify specific measures to meet the objectives described above with the use of adaptive management principles that incorporate metrics and indicators to assess progress in meeting the objectives. The Plan is an interactive approach to decision-making that incorporates feedback mechanisms to evaluate actions and incorporate new information as it becomes available. Evaluations will be assessed based on the criteria identified in Section 5.0 and ongoing adaptive management of recreation resources will be coordinated with the local communities through a public forum.

## 3.0 RECREATION MANAGEMENT UNITS

To facilitate plan development and implementation, eight recreation Management Units are identified:

**Camanche Reservoir** – Although Camanche Reservoir fluctuates seasonally and annually based on precipitation and water demand, the water surface area is usually about 5,000 surface acres. Body contact recreation (swimming, waterskiing, jet skiing, etc.) is allowed in the reservoir and it is currently open year-round.

**Pardee Reservoir** – Pardee Reservoir fluctuates seasonally and annually based on precipitation and water demand, but less so than Camanche Reservoir. This results in minor variation in surface water, with the typical area about 1,900 surface acres. No body contact is allowed on Pardee Reservoir but daily boating is allowed. It is currently open to the public from February through October.

**Camanche North Shore Recreation** - The Camanche North Shore Recreation management unit includes the following facilities:

- Rabbit Creek Campground (30 sites with a capacity of 240 campers)
- Peninsula Campground (20 sites with a capacity of 160 campers)
- Blue Oak Campground (148 sites with a capacity of 1,360 campers)
- Blue Oaks Group Camp (one site with a capacity of 72 campers)

- Eastridge Group Camp (one site with a capacity of 72 campers)
- Tiers 1 Group Camp (one site with a capacity of 12 campers)
- Tiers 2 Group Camp (one site with a capacity of 24 campers)
- Primitive Campground (20 sites with a capacity of 160 campers)
- Day Use Point
- Blue Oaks Day Use

The park also includes an entrance kiosk, coffee shop/general store, service station, park offices, utility buildings, 2 shower facilities, 2 laundry locations, and 4 restroom buildings. There are 18 picnic sites, a trail staging area, tennis courts, basketball court, horseshoe pit, playground, fish cleaning facility, RV dump station, shop buildings, storage buildings, and fenced yards. There is a marina with 34 open berths, 50 covered berths, 16 rental boats, two courtesy docks, an on-water service station, and main and low-water boat launch ramps.

**Camanche South Shore Recreation** - The Camanche South Shore Recreation management unit includes the following facilities:

- River view Campground (45 sites with a capacity of 360 campers)
- Oaks Campground (30 sites with a capacity of 224 campers)
- Sugar loaf Campground (35 sites with a capacity of 216 campers)
- Sugar loaf Group Camp – (one site with a capacity of 64 campers)
- Camanche and Arrowhead Campground (31 sites with a capacity of 248 campers)
- Lakeside Campground (8 sites with a capacity of 60 campers)
- Moccasin Campground (37 sites with a capacity of 304 campers)
- Cottonwood Campground (30 sites with a capacity of 232 campers)
- Gold Run Campground (25 sites with a capacity of 184 campers)
- Coyote Flat Campground (33 sites with a capacity of 264 campers)
- Turkey Hill Equestrian/Group Campground (16 sites with a capacity of 128 campers)
- Trout Pond Day Use Area
- Tule Day Use Area
- Cottonwood Day Use Area
- Eucalyptus Day Use Area
- Lakeside Day Use Area

The Camanche South Shore Recreation area also includes 99 short-term RV campsites, 198 seasonal and short-term RV campsites, seven rental cottages, 6 shower facilities, recreation hall, laundry facilities, fish cleaning station, fuel dock, trail staging area, an equestrian group campground, horseshoe and volleyball courts, convenience store, playground, amphitheater, sheriffs office, tennis and basketball courts. There is a marina with one open berth, 34 covered berths, 12 rental boats, 3 courtesy docks, a service station, and main and low-water boat launch ramps.

**Pardee Recreation** - The Pardee Recreation management unit includes the following facilities:

- Oaks Campground (38 sites with a capacity of 320 campers)
  - Oaks Campground Group sites (2 sites with a capacity of 32 campers)
- Short-term RV [C-Unit] (12 sites with a capacity of 96 campers)
- Lake View Campground (41 sites with a capacity of 328 campers)
  - Oak Knoll Campground (4 sites with a capacity of 32 campers)
  - Buckeye Campground (4 sites with a capacity of 32 campers)
- Lupine Camp Site (2 sites with a capacity of 16 campers)
- Porcupine Point Day Use Area (capacity of 68 cars)
- Woodpile Gulch Day Use Area (capacity of 29 cars)
- Rainbow Point Day Use Area (capacity of 24 cars)
- Blue Heron Point Day Use Area (capacity of 22 cars)
- Mistletoe Day Use Area (capacity of 10 cars)
- Shoreline Day Use Area (capacity of 8 cars)
- Blue Heron Trail – 1,260 feet
- Rainbow Trail – 2,515 feet
- Woodpile Trail – 5,592 feet
- Porcupine Trail – 1,023 feet
- Stony Creek Trail – 8,795 feet
- Lupine Trail – 2,524 feet

In addition, there are 83 seasonal RV spots, 4 monthly RV spaces, entry kiosk, park headquarters, swimming pool, coffee shop, store, RV & boat storage, marina with rental boats and low water and high water boat launch ramps, three restrooms, shower facilities, fishing dock, portable toilets, bocce ball court, horseshoe pit, maintenance building, laundry facility, RV dump station,

fish cleaning station, capacity for 284 vehicles in the parking lots, and a fuel station.

**Camanche Hills Hunting Preserve** - The Camanche Hills Hunting Preserve management unit encompasses 1,600 acres of EBMUD property near the Camanche North Shore Recreation area. It is separate from the recreation area, with its main entrance on Curran Road. Vegetation grown on about 400 acres of the preserve provides cover for birds. The preserve is divided into hunting zones. The Rabbit Creek arm of Camanche Reservoir, separated by a levee/road occurs at the south end of the property. Near the Clubhouse are a 30-station sporting clay target course, a lighted 5-stand clay target courses, and a trap and skeet range. A pro shop with a coffee shop and bar, a bird picking room, office building, gun maker's shop, and maintenance buildings are also located on the property.

**Mokelumne River Day Use Area** - The Mokelumne River Day Use Area (MRDUA) is a 65-acre park located adjacent to the lower Mokelumne River immediately downstream of Camanche Dam. Use is primarily by fishermen, individuals launching watercraft (small boats, canoes, kayaks, rafts, and inner tubes) to float down the river, and people seeking a shaded picnic area. The MRDUA has one entrance kiosk, one Americans with Disabilities Act (ADA) accessible fishing dock, 15 picnic tables, 14 barbeques, four benches, three recycling stations, 36 garbage cans, three vault toilets and five chemical toilets. In addition, there are 0.65 acres of surfaced access roads; 1.86 acres of unsurfaced vehicle routes; 4,000 $ft^2$ of surfaced trails; 0.41 acres of unsurfaced trails; and three parking lots (1.5 acres total). The Mokelumne River Day Use Area is adjacent to the Mokelumne River Fish Hatchery.

**Watershed Trails** - There are currently five staging areas and 48 miles of trails within the Mokelumne watershed, of which 23 miles are part of the Mokelumne Coast to Crest Trail and 8 miles comprise the China Gulch Trail.

- Campo Seco Staging Area (Pardee Watershed) – East trail is 13.6 miles and west is 14.7.0 miles [staging area parking capacity is 20 trucks with horse trailers or 40 cars]
- Camanche South Shore Staging Area – East trail is 12.4 miles and west is 2.3 miles [staging area parking capacity is 8 trucks with horse trailers or 16 cars]
- China Gulch Staging Area (Camanche North Shore) – Trail is 5.1 miles with optional 3 mile loop [ staging area parking capacity is 10 trucks with horse trailers or 20 cars]
- Middle Bar Takeout/Trail Staging Area [capacity or 25 cars]
- Rich Gulch Trail Access Point [capacity of 8 cars]

## 4.0 RECREATION MANAGEMENT PLAN OBJECTIVES

Each objective identified in the Mokelumne Watershed Master Plan is incorporated in the Recreation Management Plan as described below.

### 4.1 Consider recreational access to District lands that does not conflict with maintaining water quality and ecological integrity in the watershed and reservoirs

#### 4.1.1 Issues

The Mokelumne River watershed is generally a pristine watershed, with minimal urban development and few downstream water quality issues associated with upstream conditions. The primary source of water to both watersheds is the inflow from the Mokelumne River above the Highway 49 Bridge. The watershed surrounding the two reservoirs contributes only a small percent of the total inflow to the reservoir, 1.5 percent for Pardee Reservoir and 2.1 percent for Camanche Reservoir. Issues of concern in the Mokelumne River watershed include the protection of public drinking water supplies and aquatic species from impacts caused by land uses and activities such as livestock grazing, hydropower production, mobilehome parks, wildfires, and recreation.

Recreation activities have the potential to impact water quality and ecological resources if the activities are not properly managed or actions are not undertaken to mitigate or moderate potential effects. Potential recreation effects on

ecological integrity are addressed in the Mokelumne Watershed Ecological Integrity Program. Potential water quality impacts from recreation activities include:

**Trails.** Construction, maintenance, and trail clearing can lead to sedimentation from erosion. Heavy rains in winter can cause erosion problems due to loosely packed exposed soils of unpaved or unsurfaced portions of trails. Trails across steep slopes with inadequate erosion and water management controls can have serious effects on sediment transport. Bacterial contamination may be also a concern on the trail system. Horse and cattle manure can be washed down by rain on trails that cross streams or run along fairly steep slopes. Trails may also provide access to ecologically or culturally sensitive areas. The actual use of the trails can contribute to all of the above impacts described above depending on the use level and if trail rules are followed or not.

**Boat Access.** The primary contamination concern for boat launches is petroleum byproducts possibly introduced to project waters during launching from spills, leaky fuel tanks, or bilge discharge. During launching, partial immersion of the automobile undercarriage could introduce gasoline, diesel, grease, and oil. Sediment from erosion and road runoff is also a potential water quality concern at boat access points. Both paved and unpaved access points could have sediment problems. The paved access points can have road base washout from long-term soaking or wave and wake action erosion. Unpaved access points release sediments directly during use by boaters (dragging, launching, and landing). Additionally, power boats could contribute to bacteria and organic materials from sewage, leaky containment tanks, open valves, deliberate dumping, and possibly from associated swimming activities. Power boats can also contribute to shoreline erosion and turbidity from wake-driven waves.

**Day Use.** Bacteria contamination from highly populated swimming areas and portable restrooms at the campgrounds are a potential concern.

Additionally, fish cleaning and organic garbage from campers could lead to nutrient enrichment. Sedimentation from high boat use and swimming could lead to higher than normal turbidity in some areas. Nutrient enrichment from discarded garbage would be the primary contamination concern at picnic areas. Human activities that disturb land can lead to high sediment levels entering water bodies during rain storms, due to storm water runoff, and create turbid conditions. Developed campgrounds can contribute large amounts of turbidity to nearby waters, through stormwater discharge from paved, unpaved and disturbed surfaces such as picnic areas, roads and parking lots.

**Campgrounds and Picnic Areas.** Disturbed and exposed soils around campsites, trails and other impact areas in and around campgrounds could contribute eroded sediment to nearby reservoirs. Due to the relatively high density of the roads in and around the campgrounds, petroleum byproducts could be a concern from road runoff. Discarded garbage could contribute to nutrient enrichment. Leakage from RVs or pumping activities of their holding tanks could introduce contaminants to campsite surfaces or the paved area of the dump stations, which may then be transported with surface runoff to the reservoirs. The primary contamination concerns for this effluent are bacteria and nutrients from human waste and petroleum byproducts from the RVs. Bacteria from horse manure and nutrient enrichment from horse feed and manure at the equestrian campground are the primary contamination concerns. Sedimentation from erosion may be a secondary concern. The major potential contamination concern for the fish cleaning stations would be nutrient enrichment from discarded fish parts and carcasses. However, since waste products are typically disposed in trash cans or down the drains into sewer systems and not discarded into the adjacent water bodies, nutrient enrichment is not a major concern.

**Marinas and Docks.** The marinas are serviced by paved roads and large paved car/boat parking areas above the boat ramp. The parking areas could

contribute to turbidity and petroleum byproducts from road runoff, since the road and parking drainage system of the marinas empty directly into the reservoirs. The refueling pumps could contribute petroleum byproducts through spills, leaky gas tanks or lines, or leaky fuel storage tanks. Marina sites can have high levels of arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc. Metals and metal-containing compounds have many functions in boat operation, maintenance, and repair. Lead is used as ballast and may be released through boat bilge discharges. Arsenic is used in paint pigments, pesticides, and wood preservatives. Zinc anodes are used to deter corrosion of metal hulls and engine parts. Copper and tin are used as biocides in antifouling paints. The boat docks can contribute to bacteria and organic materials from sewage due to leaky containment tanks, open valves, or deliberate dumping. Additionally, powerboats can contribute to petroleum byproducts from spills, leaky gas tanks, and bilge discharge.

### 4.1.2 Management

The objective of the Plan is to manage the potential effects of recreational facilities, operations, and activities on the water quality and ecological integrity of Camanche and Pardee reservoirs. Potential effects on ecological integrity and associated management actions are addressed in the Ecological Integrity Plan. Additional information on watershed water quality monitoring is presented in the Water Quality Monitoring Program.

Management of potential water quality impacts is based on monitoring the water quality parameters that reflect the localized effects of recreation and taking action to mitigate negative effects.

The major categories of water quality parameters that are potentially impacted by recreation activities include:

- Microorganisms
- Particulates
- Nutrients
- Metals, Cations and Anions
- SOCs, VOCs, and Pesticides

The Upper Mokelumne River Watershed Authority completed an assessment of the upper Mokelumne River watershed to document baseline water quality watershed conditions, establish a program to evaluate long-term water quality, and develop an assessment tool to identify watershed trends and assist in making decisions in the watershed (UMRWA 2007). That assessment identified benchmarks to serve as numeric values against which the watershed baseline water quality can be compared. These benchmarks establish a basis for evaluating the condition of the watershed with respect to the effect of recreation on each parameter.

Specific parameters to be evaluated to identify recreation impacts were selected based on baseline water quality data in Pardee and Camanche reservoirs from January 2000 to date. If the monthly average or maximum concentration of a parameter exceeded, or was within 10% of the benchmark(s) identified for that parameter, then the parameter was deemed a parameter of interest. Parameters of interest and baseline data are shown in Table 4.1-1.

**Table 4.1-1. Water Quality Parameters of Interest and Baseline Data**

| PARAMETER | BENCHMARK[1] | | OBSERVED DATA | | |
|---|---|---|---|---|---|
| | HUMAN HEALTH | AQUATIC HEALTH | MOKELUMNE RIVER[1] | PARDEE RESERVOIR[2] | CAMANCHE RESERVOIR[2] |
| **General Parameters** | | | | | |
| Hardness | ≤ 60 mg/L as $CaCO_3$ | None identified | 16 mg/L | 15.5 mg/L (70 mg/L) | 18 mg/L (32 mg/L) |
| pH | Between 6.5 and 8.5 | Between 6.5 and 9.0 four day average | 7.2 | 7.4 (6.3-8.6) | 7.2 (6.0-8.9) |
| **Particulates** | | | | | |
| Turbidity | Monthly average < 6 NTU | None identified | 1.9 NTU | 3.67 NTU (43 NTU) | 1.99 NTU (16.6 NTU) |
| **Microbes** | | | | | |
| Fecal Coliform | Monthly geometric mean < 200/100 mL | None identified | 54 MPN/100 mL | 3.1 MPN/100 mL (17 MPN/100 mL) | 13.5 MPN/100 mL (9000 MPN/100 mL |
| *E. coli* | Monthly geometric mean < 126/100 mL. Single sample < 235/100 mL | None identified | 8 MPN/100 mL | 3.34 MPN/100 mL (17 MPN/100 mL) | 12.57 MPN/100 mL (9000 MPN/100 mL) |
| **Nutrients** | | | | | |
| Nitrate | Monthly average < 0.04 mg/L as N | None identified | 0.013 mg/L | 0.011 mg/L (0.15 mg/L) | 0.033 mg/L (0.12 mg/L) |
| Total Phosphate | Monthly average < 0.1 mg/L | None identified | 0.024 mg/L | 0.022 mg/L (0.17 mg/L) | 0.022 mg/L (0.078 mg/L) |
| **Metals, Anions and Cations** | | | | | |
| Aluminum | Monthly average < 200µg/L | Four-day average < 87µg/L | 73µg/L | 149.87 µg/L (2350 µg/L) | 48.37 µg/L (964 µg/L) |

**Table 4.1-1. Water Quality Parameters of Interest and Baseline Data**

| PARAMETER | BENCHMARK[1] | | OBSERVED DATA | | |
|---|---|---|---|---|---|
| | HUMAN HEALTH | AQUATIC HEALTH | MOKELUMNE RIVER[1] | PARDEE RESERVOIR[2] | CAMANCHE RESERVOIR[2] |
| **Metals, Anions and Cations** | | | | | |
| Arsenic | Monthly average < 5 µg/L | Four-day average < 150µg/L | 0.20 µg/L | 0.326 µg/L (1.9 µg/L) | 0.35 µg/L (16.6 µg/L) |
| Cadmium | Monthly average < 4 µg/L | Four-day average < 1.5µg/L | 0.013 µg/L | 0.006 µg/L (0.14 µg/L) | 0.010 µg/L (1.10 µg/L) |
| Copper | Monthly average < 1000 µg/L | Four-day average < 5.8µg/L | 1.1 µg/L | 17.309 µg/L (632 µg/L) | 0.850 µg/L (34.8 µg/L) |
| Lead | Monthly average < 15 µg/L | Four-day average < 1.4µg/L | 0.2 µg/L | 0.220 µg/L (2.06 µg/L) | 0.214 µg/L (13.7 µg/L) |
| Mercury | Monthly average < 2 µg/L | Four-day average < 0.77µg/L | 0.007 µg/L | 0.064 µg/L (0.41 µg/L) | 0.056 µg/L (0.70 µg/L) |
| Nickel | Monthly average < 100µg/L | Four-day average < 34µg/L | Not Detected | 0.693 µg/L (5.8 µg/L) | 0.450 µg/L (90.7 µg/L) |
| Zinc | Monthly average < 5000µg/L | Four-day average < 77µg/L | 2.9 µg/L | 9.034 µg/L (35 µg/L) | 7.503 µg/L (90.7 µg/L) |
| **SOCs and VOCs** | | | | | |
| Methyl Tert-Butyl Ether | Monthly average < 0.013 µg/L | None Identified | 0.047 µg/L | 0.201 µg/L (2.6 µg/L) | 0.591 µg/L (7.2 µg/L) |

[1] Benchmarks and data from UMRWA (2007). Data as measured in the main stem Mokelumne River at Highway 49.
[2] Data from EBMUD samples 2000-2009 reported as mean of all detections and (maximum).

This Plan uses a water quality index (WQI) to provide a measure of the performance of management practices designed to ensure the maintenance of water quality in the reservoirs. The WQI focuses on the parameters of interest that will provide a quantitative index of the effects of recreation activities.

The goal of the Plan is to maintain a WQI of at least 80 in Pardee Reservoir (no body contact) and at least 65 in Camanche Reservoir (body contact allowed) to ensure that water quality is protected (CCME 2001).

$$WQI = 100 - \left( \frac{\sqrt{F_1^2 + F_2^2 + F_3^2}}{1.732} \right)$$

Where: $F_1$ = (# of failed parameters/Total # of parameters) x 100
$F_2$ = (# of failed tests/Total # of tests) x 100
$F_3$ = ($nse$/0.01 * $nse$ + 0.01)

$$\text{Where: } nse = \frac{\sum_{i=1}^{n} excursion_i}{\#oftests}$$

Where: $excusion_i$ = (Failed test value$_i$/Benchmark$_j$) – 1 when the test value must not exceed the Benchmark
$excursion_i$ = (Failed test value$_i$/Benchmark$_j$) – 1 when the test value must not fall below the Benchmark

Water quality sample locations will be established adjacent to each Recreation Management Unit in the watershed (Camanche North Shore, Camanche South Shore, Camanche Hills Hunt Preserve, and Pardee Recreation Area) and at reference locations in Camanche and Pardee reservoirs (Table 4.1-2). All water quality monitoring locations, frequency, and constituents will be coordinated (and combined if appropriate) with existing water quality monitoring programs.

**Table 4.1-2. Water Quality Monitoring Locations and Schedule**

| LOCATION | SITES | DURATION | FREQUENCY |
|---|---|---|---|
| Camanche North Shore Recreation | 2 | May -Sep | Monthly |
| Camanche South Shore Recreation | 2 | May -Sep | Monthly |
| Camanche Hills Hunt Club (Rabbit Creek) | 2 | Oct -Mar | Monthly |
| Pardee Recreation Area | 2 | May -Sep | Monthly |
| Camanche Reservoir | 2 | May -Sep | Monthly |
| Pardee Reservoir | 2 | May -Sep | Monthly |

Water quality parameters will be monitored annually to determine the annual Water Quality Index (WQI). Should the WQI fall below the target of 80 (Pardee Reservoir) or 65 (Camanche Reservoir) during two consecutive years, specific management actions will be implemented to improve the Water Quality Index.

Potential management actions to achieve water quality targets may include the following:

- Informing boaters about the recycling programs on site for used oil, antifreeze, batteries and lamps.
- Informing boaters what hazardous wastes are and how they are handled at the marina.
- Prohibiting topping-off.
- Requiring clean and dry boat bilges prior to launching.
- Never applying wood preservatives or paint to decks or docks while they are in or over the water.
- Using naturally resistant wood (cedar, tamarack, redwood), metal, or plastic instead of treated wood.
- Educating boaters on damages caused by excessive wake and informing them of no-wake zones in the area.
- Prohibiting over watering of lawns to limit surface runoff.
- Prohibiting excessive fertilizer use.
- Requiring collection and proper disposal of pet waste.
- Eliminating sales of lead-based fishing tackle.
- Encouraging the use of non-lead fishing tackle.
- Sweeping parking lots regularly.
- Requiring boaters and employees to stay with a boat that is being fueled.
- Posting safe fueling instructions for boaters.
- Prohibiting discharge of untreated bilge water in the marina basin.
- Monitoring fuel tanks excessive losses that would indicate a leak.
- Posting signs about safe oil and fuel spill response and removal.
- Posting signs advising users not to drain their bilges until the boat is off the ramp. Consider providing an alternate inclined surface where bilge oil can be contained or channeled to an acceptable receiving location.
- Offering oil-absorbent bilge socks for sale to boaters.
- Giving boaters oil-absorbent pads with the fuel nozzle so they can capture drips, vent-line overflow and backwash.
- Providing pamphlets to boaters about the effects of fuel spills and safe fueling of boats.
- Providing boaters with trash bags so that they can bring back their trash.
- Having a spill response plan in place and practice it regularly with all employees.
- Training employees to contain a spill.
- Keeping storm drains properly maintained and cleaned.
- Making sure infants wear swim diapers and rubber pants.
- Establishing and enforcing additional no-wake zones in areas subject to shoreline and substrate erosion.

- Providing for the convenient disposal of hazardous wastes.
- Recycling solvents, used batteries, and used antifreeze and keep them stored with caps closed and on an impervious sheltered surface.
- Relocating docks to allow free flow of water beneath them to prevent erosion and sedimentation along the shore.
- Composting organic waste.
- Installing and operating additional floating restrooms on Camanche reservoir.
- Providing an impervious area for filling fuel cans so any overflow can be easily captured.
- Dispensing nozzles used at marine service stations should be of the automatic-closing type without a latch-open device.
- Installing fuel spill equipment in a waterproof, easily identifiable locker or storage area near boat ramps and fueling stations. The storage area should include enough spill response equipment to contain the greatest potential spill, including a boom large enough to encircle the largest vessel at your facility based on three times the length of the vessel.
- Eliminating paths to the waterfront that cut directly up and down slopes or over bluffs because they decrease stability of the shoreline and increase erosion; replace with stairways when necessary.
- Increasing population control of Canada geese in recreation areas.
- Planting native vegetation along the edges of parking lots.
- Installing wave attenuators at marinas to minimize erosion and allow for flushing of the marina basin.
- Minimizing impervious surfaces.
- Installing bioengineered shoreline erosion control structures in areas of significant shoreline erosion.
- Installing infiltration trenches or basins to infiltrate and percolate runoff from impervious surfaces (since runoff from parking lots and other paved surfaces may contain pollutants, site specific conditions such as soil characteristics and depth to ground water must be considered to prevent shallow ground water contamination).

## 4.2 Provide a combination of day and short-term recreational activity based on projected future demand and feedback from recreational users

### 4.2.1 Issues

The Recreation Management Plan is designed to address future recreation facility demand in the Mokelumne Watershed over the term of the planning horizon based on projected recreation demand, population demographic changes, existing facility capacities, specific recreation management objectives, and feedback from users. Thirty years (to 2040) was selected as the planning horizon to allow for evaluation of future facility development and incorporate reasonable assumptions associated with future recreation demand and use This approach is anticipated to be flexible over time based on adaptive monitoring measures described in Section 5.0.

Meeting the projected future demand for day and short-term recreation use in the Mokelumne watershed is based on anticipated recreation demand, existing facility capacities, and recreation management objectives.

**Projected Recreation Demand**

Recreation demand is based on population growth, demographic profile, and participation trends. Population growth and participation trends guide the need for future facilities; the demographic profile guides the types of facilities needed. While attendance at parks within the California State Parks and National Parks is significant and has increased over recent decades, per capita attendance appears to have decreased (CSP 2008). Pergams and Zaradic (2008) concluded that there is an ongoing and fundamental shift away from nature-based recreation. Use projections used in this plan are based on the qualitative and quantitative information developed by the California Department of Water Resources for projected recreation use at Lake Oroville (DWR 2004). The recreation facilities at Lake Oroville support a variety of

recreational opportunities similar to those at Camanche and Pardee reservoirs, including several types of boating and fishing, camping, picnicking, swimming, horseback riding, hiking, and hunting. Like Lake Oroville, although regional and California populations have increased significantly over the last 30 years, historical data show that visitation at Camanche and Pardee reservoirs has not increased commensurately. Table 4.2-1 shows the anticipated increase in recreation demand resulting from population growth and participation trends for each Recreation Management Unit.

**Table 4.2-1. Projected Decadal Increase (%) in Recreation Demand (from DWR 2004).**

| Recreation Management Unit | 2020 | 2030 | 2040 |
|---|---|---|---|
| Camanche Reservoir | 15.1 | 15.4 | 15.7 |
| Pardee Reservoir | 15.1 | 15.4 | 15.7 |
| Camanche North Shore Recreation Area | | | |
| Day Use | 15.1 | 15.4 | 15.7 |
| Camping | 11.6 | 11.5 | 11.6 |
| Camanche South Shore Recreation Area | | | |
| Day Use | 15.1 | 15.4 | 15.7 |
| Camping | 11.6 | 11.5 | 11.6 |
| Recreational Vehicles | 11.6 | 11.5 | 11.6 |
| Pardee Recreation Area | | | |
| Day Use[3] | 15.1 | 15.4 | 15.7 |
| Camping | 11.6 | 11.5 | 11.6 |
| Recreational Vehicles[5] | 11.6 | 11.5 | 11.6 |
| Camanche Hills Hunting Preserve | 8.6 | 8.7 | 8.8 |
| Mokelumne River Day Use Area | 15.3 | 15.4 | 15.6 |
| Trails | 13.2 | 13.4 | 13.5 |

### Demographic Profile

Two major demographic changes are anticipated to occur in the Region (Alameda, Alpine, Amador, Calaveras, Contra Costa, El Dorado, Marin, Napa, Sacramento, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz,

Solano, Sonoma, Stanislaus, Tuolumne, and Yolo counties) over the next 30 years; the population of those less than 20 years old and older than 60 will increase substantially (Table 4.2-2), and the ethnic composition will change significantly (Table 4.2-3). These changes will alter the recreation demand in the Mokelumne Watershed in terms of uses and facilities.

**Table 4.2-2. Projected Age Structure of the Region Population (2010-2040).**

| AGE CLASS | 2010 | 2020 | 2030 | 2040 |
|---|---|---|---|---|
| <10 | 13.5% | 13.3% | 13.3% | 13.3% |
| 10-19 | 11.6% | 13.1% | 12.9% | 13.0% |
| 20-29 | 13.3% | 13.2% | 13.0% | 13.0% |
| 30-49 | 28.5% | 25.2% | 24.9% | 25.0% |
| 50-59 | 13.6% | 13.2% | 10.8% | 10.6% |
| 60-69 | 9.4% | 11.4% | 11.1% | 9.3% |
| 70+ | 8.3% | 10.6% | 13.8% | 15.8% |

Source: State of California, Department of Finance, Population Projections for California and Its Counties 2000-2050, by Age, Gender and Race/Ethnicity, Sacramento, California, July 2007.

**Table 4.2-3. Projected Racial Composition of the Region Population (2010-2040).**

| RACE | 2010 | 2020 | 2030 | 2040 |
|---|---|---|---|---|
| White | 47.5% | 42.5% | 37.6% | 33.1% |
| Hispanic | 24.7% | 28.8% | 33.0% | 37.0% |
| Asian | 17.5% | 18.4% | 19.0% | 19.5% |
| Pacific Islander | 0.7% | 0.8% | 1.0% | 1.1% |
| Black | 6.3% | 5.9% | 5.6% | 5.3% |
| American Indian | 0.6% | 0.7% | 0.7% | 0.7% |
| Multirace | 2.8% | 2.9% | 3.1% | 3.3% |

Source: State of California, Department of Finance, Population Projections for California and Its Counties 2000-2050, by Age, Gender and Race/Ethnicity, Sacramento, California, July 2007.

Pertinent recommendations by Dunn (1999a, 1999b) and California State Parks (2005), Chavez (2002, 2006), Gramman et al. (1992), Gramann (1996), RoperASW (2004), Sasidharan (2004), Shaull (1993), Tierney et al. (1998) and Winter et al. (2004) to accommodate recreation preferences of future demographic changes in California include:

- Add more playground equipment for children, particularly near picnic areas;
- Add ball fields in day-use areas which could be used by multiple family groups;
- Provide more picnic tables and trash cans to accommodate heavy visitation by large families;
- Construct large group shelters for extended family picnics and reunions;
- Construct open-air pavilions and gazebos where social and community events could be held;
- Provide group shelters to provide shade, protection from rain;
- Provide larger tables or groups of tables to accommodate large family groups;
- Provide larger and easier to maintain grills for large group picnics;
- Accommodate the preference to recreate in larger groups and at forested sites with water features and amenities to support a day-long, extended family social outing with extensive on-site meal preparation;
- Provide facilities and programs that involve families, programs for children and youth, and family oriented entertainment events and festivals;
- Focus on facilities that support stress relief and a good family experience;
- Provide and environment that supports safety, quality and accessibility of park facilities to accommodate older visitors;
- Provide signage that overcomes language barriers; and
- Provide adequate access and facilities for RVs.

This information provides guidance for anticipating recreation demand in the future. This would suggest that there will be a significant demand for recreation facilities that provide increased capacity for larger groups for longer duration, particularly on weekends; and increased demand to provide more opportunities for hiking, camping and picnicking, particularly along the reservoirs, and increased capacity for Recreational Vehicle camping.

### Existing Facility Capacity

The primary indicator of facility capacity is percent occupancy. In general, percent occupancy is defined as the average percentage of occupied facilities (e.g., parking spaces, campsites, boating use, etc.) at a developed recreation site. Percent capacity at the Recreation Management Units in the watershed was determined as a component of the MWMP Recreation Plan. Basing developed recreation site utilization on the theoretical maximum occupancy of site (i.e., 100 percent occupancy), while important for considering the maximum possible use the site could potentially accommodate during the recreation season, is less useful as a day-to-day management indicator. In order to plan potential expansion or take other non-construction management actions to avoid impacts related to crowding and facility overuse, actions are typically necessary long before recreation site percent occupancy reaches 100 percent. For purposes of the MWRMP and future monitoring, two distinct percent-occupancy thresholds (i.e., indicators) were considered in terms of categorizing existing and future use of developed recreation sites in the study area. For day use, trails, and camping, a 60 percent occupancy level was used as an indicator that a developed site was at its recreation season weekday capacity and an 80 percent level was used as an indicator that a developed site was at its recreation season weekend and holiday occupancy capacity (DWR 2004, Table 4.2-4). For boating use, boating density, as measured in surface acres per watercraft was used as an indicator that the area was at its occupancy capacity (Ashton 1971, Kusler 1972, URDC 1977, Jaakson et al 1989, 1990, Warren and Rea 1989, Wagner 1991, Warbach et al 1994, Aukerman 2004, Table 4.2-5). Using these percent occupancy levels as indicators, existing percent occupancy at each developed recreation site in the study area was categorized according to the capacity levels described below. Use rate on weekends (Friday, Saturday and Sunday) and weekdays (Monday through Thursday) is based on daily use statistics

from April through September 2004 through 2007. More than seventy-five percent of recreation use occurs from April through September at Camanche Reservoir, from March through August at Pardee Reservoir, from March through October at the Mokelumne River Day Use Area, and from October through March at the Camanche Hills Hunting Preserve.

**Table 4.2-4. Facility Carrying Capacity for Day Use, Trail Use, and Camping at the Recreation Management Units.**

| Physical Capacity Level | Recreation Season Weekday Percent Occupancy | Recreation Season Weekend and Holiday Percent Occupancy |
|---|---|---|
| Exceeding Capacity | >60% | >80% |
| At Capacity | 50-59% | 70-79% |
| Approaching Capacity | 40-49% | 60-69% |
| Below Capacity | <40% | <60% |

**Table 4.2-5. Facility Boating Carrying Capacity at the Camanche and Pardee Reservoir Recreation Management Units.**

| Physical Capacity Level | Density Range (acres/boat) | |
|---|---|---|
| | Camanche Reservoir | Pardee Reservoir |
| Exceeding Capacity | < 10 | < 5 |
| At Capacity | 10-20 | 5-10 |
| Approaching Capacity | 21-40 | 11-25 |
| Below Capacity | >40 | >25 |

The assumptions for developing the projected use estimates (Table 4.2-6) for recreation facilities include:

- Participation trends contribute to a projected increase in recreation use in the watershed (Table 4.2-1).
- The existing recreation opportunities available in the Mokelumne Watershed will continue to be available in the future and will be constrained only by the designated Recreation Management Area as defined in the MWMP.
- The estimates of existing use in the Mokelumne Watershed Recreation Management Units from 1998 through 2007 are used as the basis for the projected demand.
- Reservoir surface elevations used for projections are similar to those of 1998-2007

**Table 4.2-6. Projected Proportion of Time Recreation Use Exceeds Physical Capacity during the Recreation Season.**

| Recreation Management Unit | % of TIME EXCEEDING CAPACITY | | |
|---|---|---|---|
| | 2020 | 2030 | 2040 |
| Camanche Reservoir | 0 | 0 | 0 |
| Pardee Reservoir | 0 | 0 | 0 |
| Camanche North Shore Recreation Area | | | |
| Day Use | 13 | 27 | 40 |
| Camping | 2 | 8 | 20 |
| Camanche South Shore Recreation Area | | | |
| Day Use | 0 | 2 | 2 |
| Camping | 0 | 5 | 13 |
| Pardee Recreation Area | | | |
| Day Use | 0 | 0 | 0 |
| Camping | 8 | 10 | 13 |
| Camanche Hills Hunting Preserve | 0 | 0 | 0 |
| Mokelumne River Day Use Area | 5 | 5 | 8 |
| Trails | ND | ND | ND |

### Recreation Management Objectives

Key guiding principles for recreation management as identified in the MWMP include:

- Anticipate regional growth and recreational demand and develop guidelines to proactively respond to that growth and the associated potential impacts to water quality and ecological health;
- Prioritize the use of District watershed property to meet core business requirements for water supply, water quality and regulatory; compliance, and complementary related uses including open space, recreation and public education;
- Manage watershed activities in such a manner so as to provide the greatest value to ratepayers; and
- Consider the impact to ratepayers in determining the appropriateness of watershed activities that are not primarily related to the protection of water quality.

The management objectives for upgrading or constructing new recreation facilities include:

- Maintaining recreational use of the reservoirs and watershed lands near current levels:
    - Limit maximum day use at Camanche North Shore Recreation Area to 400 vehicles as recommended by the Amador County Sheriffs Department;
    - Limit maximum day use at Camanche South Shore Recreation Area to 450 vehicles as recommended by the Calaveras County Sheriffs Department;
    - Limit maximum day use at Pardee Recreation Area to 445 vehicles;
- Adding additional camping facilities when weekend/holiday demand exceeds 80% of the physical capacity more than 90% of the weekends/holidays during the recreation season (see Table 4.2-6);
- Confining upgraded and/or new facilities to the Recreation Management Areas identified in the MWMP; and
- Focusing on recreational alternatives requiring lower capital investment and operating costs and minimal infrastructure investment.

Day use capacities are limited to a specific number of vehicles to manage user conflicts. Enhancement (campsites) of recreation management units is warranted when 80% of the physical capacity is exceeded during more than 90% of the weekends and holidays during the recreation season in two consecutive years, provided that enhancements do not exceed the physical limitations of the recreation management areas defined in the MWMP. This is projected at the Camanche North Shore, Camanche South Shore, and Pardee Recreation Recreation Management Units in the future (Table 4.2-6).

Based on the information in section 4.2.1, recreation activities should reflect changing demographics (more Hispanics and Asians, fewer Whites, with a focus on family activities, and older recreationists); participation trends (overall slower growth in outdoor recreation with a focus on walking, picnicking, swimming and developed camping); and the existing physical capacity of the recreation management units.

### 4.2.2 Management

The provision of recreation facilities and activities necessary to accommodate recreation demand and meet recreation management objectives is based on indicators and targets for Visitor Experience Perception, Visitor Facility Perception, and Facility Use Levels relative to facility capacities (reservoir boating, day use, camping, and trailheads).

A visitor card survey was developed to determine user preferences for facility and area development; perceptions of facility management, and levels of satisfaction (Appendix A). The two-sided card will be available to recreation visitors every three years with an incentive to accurately complete the survey and return the card. Survey cards can be mailed to trail permit holders. The results will reveal those facilities and management issues of most concern to certain users, and thus provide guidance for potential future actions to address them.

The Visitor Experience Perception survey measures recreation user perceptions of facility management, reservoir conditions, and user interactions and has a target of 80% or more of the respondents reporting that their experience with the indicators was less than a "moderate" problem.

The Visitor Facility Perception survey measures recreation user perceptions of the adequacy of recreation facilities associated with the Recreation Management Unit and has a target of 80% or more of the respondents reporting that facility adequacy was "about right."

The Facility Use Levels measure recreation use relative to capacity at each facility (Appendix B) and has a target of 80% occupancy or less of physical capacity on 90% of the weekends and holidays throughout the recreation season.

In addition to the self-evident management actions associated with visitor perceptions, potential management actions to achieve recreation targets may include the following:

- Camanche North Shore Recreation -
  - Construct up to 14 additional campsites (adjacent to Peninsula Campground);
  - Expand Blue Oaks and Eastridge group camps to accommodate up to 48 additional vehicles;
  - Add two group sites at Blue Oaks campground; and
  - Make an area available for ball games (soccer, soft ball, etc).

- Camanche South Shore Recreation -
  - Construct up to 10 additional campsites (7 at Coyote Flat, group site NE of Camanche South Shore Mobilehome Park) ;
  - Make an area available for ball games (soccer, soft ball, etc.) NE of Tule Day Use Area; and
  - Create Group camp at Coyote Flat.

- Pardee Recreation -
  - Convert up to 30 sites at Lakeview Campground to short-term RV sites;
  - Create group campground at Mistletoe;
  - Construct up to 10 additional campsites (4-6 at Oaks, 4 boat-in at Mistletoe or Stony Creek Landing);
  - Install fishing dock at Porcupine Point;
  - Develop vehicle access to Stony Creek day use area and shoreline trail;
  - Eliminate all but two employee mobilehome sites.

- Mokelumne River Day Use Area -
  - Use the Mokelumne River Day Use Area Recreation and Resource Management Plan (EBMUD 2006) as guidance to direct management actions.

- Trails -
  - Construct loop trails on existing trail systems;
  - Evaluate bicycle use on selected fireroad portions of trails;
  - Evaluate dogs use on trails (on leash with animal waste disposal provisions), that does not conflict with livestock grazing and equestrian use;
  - Provide more connector trails and loop trails; and
  - Provide spur trail from the Mokelumne Coast to Crest Trail to Watertown Pond for interpretive trail.

In addition to using Visitor Experience Perception, Visitor Facility Perception, and Facility Use Levels to accommodate recreation demand and desires, it is recommended that EBMUD evaluate transition from the Camanche Regional Park Advisory Board (CRPAB) to a more effective means to partner with the recreation community to help meet regional demand for recreation.

The CRPAB, consisting of representatives from Amador, Calaveras, and San Joaquin Counties, was established by contract in December 1986 to continue to advise EBMUD on recreation at the "Camanche Regional Park." CRPAB responsibilities are limited to advisement and recommendation to EBMUD and the three counties on ordinances, policies, and procedures for the operation and maintenance of the park, park development proposals, rules and regulations for public conduct, appropriate fees and charges, fish enhancement programs, and the names of facilities and trails in the park (Camanche only). It is recommended that with implementation of this plan, the continuation of the CRPAB be examined to ensure that recreation management on EBMUD Mokelumne Watershed lands is coordinated with recreation use in Amador, Calaveras and San Joaquin counties in the most effective and efficient manner.

## 4.3 Identify BMPs that may be applied to limit impacts of recreational activity on water quality and ecological health

Incorporate the Best Management Practices (BMPs) for limiting impacts of recreational activities on water quality identified in Section 4.1.2. and the following BMPs for limiting impacts of recreational activity to ecological health in the management of recreation areas.

- Prohibiting shore boat access in specific areas to avoid disturbing wildlife and wetlands.
- Using buoyant foams in docks and marinas that have been coated or encapsulated in plastic or wood to prevent buoyant debris, which may be mistaken for food by birds or fish.
- Limiting access to important amphibian and reptile habitats (e.g., shoreline areas, denning and basking sites).
- Design new recreation area trail systems to encourage people to stay on designated trails via board walks, fencing and plantings, and offering viewing positions from a distance, such as viewing platforms. In addition, buffers can be placed around critical habitats, to deter human access.
- Entry into areas can be limited at certain times of the year via trail closures during the breeding season and juvenile dispersal.
- Limiting access of free-roaming pets into parks and reserves.
- Imposing strict garbage control so that feral animals and opportunistic predators are not inadvertently fed or attracted to natural/critical areas.
- Prohibiting fishing and fish stocking in amphibian habitats consistent with the Safe Harbor Agreement.

Additional monitoring and BMP implementation are defined in the Ecological Integrity Plan for the Mokelumne Watershed. Conduct a 5-year assessment of the success of BMP implementation on recreation management.

## 4.4 Focus on recreational alternatives requiring lower capital investment and operating costs and minimal infrastructure investment, and that meet, to the extent possible, the demand for recreational access to the watershed

### 4.4.1 Issues

Fundamental to the management of the recreation facilities is the complex nature of EBMUD's oversight of recreation enterprises including the regulatory requirement to provide recreation opportunities; the policy to manage watershed land in a manner which assures source water quality and water supply, and supports biological diversity; and the necessity of providing the greatest value to the ratepayer. Achieving the greatest value to the ratepayer requires implementation of sound business practices in the operation and management of recreation facilities and concessions, and exercising appropriate oversight of EBMUD Departments and concessionaires to ensure the full implementation of these principles.

### 4.4.2 Management

In order to provide recreation services in an economically and environmentally sustainable manner, EBMUD must (1) implement an improved financial/performance tracking process that enables effective and efficient response to revenue/cost ratios, (2) move toward financially sustainable and locally-focused operating revenues and operating/capital investments, and (3) focus future recreation management on low-cost (operating and capital) alternatives based on recreation demand and cost recovery strategies and/or those with a positive cost-benefit ratio. The Financial Management Plan provides an accounting framework to track revenues and expenditures and identifies key recreation management financial targets to guide financial decisions.

The use of benchmarks and financial targets can move EBMUD recreation management towards financial stability. Reports by Walls (2009) and Gordon et al. (2007) suggest that a reasonable benchmark for financial stability is 30% -

42% of recreation facility operating expense is recovered by user fees. A review of past operating expenses and revenues, evaluation of readily available data on the recovery of operating and capital costs from recreation fees from comparable agencies, and recreation services business models (Greenplay 2003) suggest the following financial targets:

- Camanche Hills Hunting Preserve – 100% of operating expenses recovered by user fees.
- Camanche North Shore Recreation Area - 45% of operating expenses recovered by user fees.
- Camanche South Shore Recreation Area - 45% of operating expenses recovered by user fees.
- Pardee Recreation Area - 40% of operating expenses recovered by user fees.

The best long-term approach to providing recreation services in an economically sustainable manner is to reduce the gap between revenues and operating costs by focusing on cost recovery and lower operating costs. Tools to facilitate this include the monthly financial reports described in the Mokelumne Watershed Financial Management Plan, the financial targets listed above, and the Capital Project Decision procedure described below. Potential management actions to achieve the financial management targets include, but are not limited to the following:

- Modernization of facilities -
  Invest in capital projects (see Capital Projects below) that result in reduced operation costs over time while providing the same or improved level of service.
- Facility consolidation -
  Consolidate recreation facilities to meet Recreation Management Objectives (Section 4.2) that result in reduced operation costs over time.
- Improved fishing -
  Improve the fishing opportunities in Camanche and Pardee reservoirs to increase revenues:
  - Restructure fees to accommodate warm water anglers;
  - Support stocking program for Florida strain largemouth bass;
  - Consider night boat fishing access;

    - Adjust seasonal access at Pardee Reservoir to allow fishing November through February; and
    - Implement fish habitat enhancement measures.
- Adjustments to fees -
  Adjust fees (increase or decrease) based on recreation demand and increased revenue.
- Adjustments to seasons -
  Based on recreation use data from 1991 through 2007, 87% of the day use, 98% of the campground use, and 91% of the boating use occurs between March 1st and October 31st. Adjust season of operation to reduce operation expense and maximize revenue.
- Adjustments to service levels -
  Adjust service levels (facility management, availability of goods and services) based on visitor feedback (Section 4.2) to maximize revenues and/or reduce operating expense.
- Adjustments to staffing -
  Adjust staffing levels (EBMUD and concessionaires) to optimize facility services and operating costs.
- Partial or complete park closures -
  Consider closing specific facilities that are underutilized on an annual, seasonal, or day-of-week basis to reduce operation costs.
- Enhanced/expanded partnerships -
  Explore partnerships (County and local governments, special interest groups, recreation vendors and suppliers) to increase revenue and/or reduce costs.
- Enhanced/expanded volunteer efforts -
  Increase volunteer efforts to reduce operation expenses.
- Grants -
  Apply for grants to support capital improvement projects designed to meet cost effective recreation management objectives.
- Special Events -
  Evaluate special events (see Capital Projects below) to increase revenue.
- Redevelop/reconfigure existing facilities -
  Focus on redeveloping or reconfiguring existing facilities to meet recreation management objectives (e.g., converting existing underutilized day use and campgrounds to group sites).

Capital investment decisions that involve the purchase or construction of items such as boat docks, machinery, buildings, or equipment are important decisions undertaken by the Program manager to meet recreation demand, improve efficiency and/or safety, and improve revenues. These decisions typically involve

the commitment of large sums of money, and they will affect the financial sustainability over a number of years. Furthermore, except for bond funding, the funds to purchase a capital item must be paid out immediately, whereas the income or benefits accrue over time. Economic profitability analysis will show if an alternative is economically profitable (see Financial Management Plan).

## 4.5 Include hazard inspections and mitigation as part of public safety and security measures

### 4.5.1 Issues

Recreation safety and security is important to all visitors, recreation providers, and managers in the watershed. The public safety and security program includes wildland fire prevention and suppression, search and rescue, identification and mitigation of reservoir swimming and boating hazards, tree hazards, campground and day use hazards, emergency evacuation procedures, first response, and law enforcement support. This program ensures that recreational users are afforded a safe and secure environment in the watershed. Fire prevention and suppression activities are described in detail in the Mokelumne Watershed Fire Management Plan. Search and rescue measures are described in the Mokelumne Watershed and Recreation Division Standard Operating Procedures (Land Search & Rescue Incidents, Water Search & Rescue Incidents, Responding to Medical Incidents/Emergencies).

#### Swimming and Boating Hazards

EBMUD performs routine hazard inspections of Camanche Reservoir (boating and swimming) and Pardee Reservoir (boating only). Hazards can include submerged islands, rock outcroppings, archeological features, and other debris. In the event such hazards are observed, immediate action may be necessary to prevent the boating and swimming public from encountering these hazards. Obstacles that are not submerged are not typically marked unless they are difficult to see. The purpose of the inspections is to provide a

basic level of public safety. It is not intended or feasible that all hazards at all lake elevations be located and marked. Upon entry, the boating public is reminded of the presence of submerged obstacles and their responsibility to boat carefully and that they do so at their own risk.

A Systematic inspection is performed (at least three times a year, just prior to Memorial Day, Independence Day, and Labor Day weekends) by dividing the reservoir into zones and performing a grid search at 100' intervals for hazards within the zones. This method provides the highest degree of certainty that a majority of the hazards will be located at any given lake elevation.

A cursory inspection is performed (during the peak boating season, June through August, with every ten foot elevation change of the reservoir surface with reference to the Memorial Day weekend elevation) by navigating around the perimeter and portions of the interior of the reservoir where the submerged contours are known to potentially present themselves. This method provides a reasonable degree of certainty that a majority of hazards will be located at any given lake elevation.

Hazards are marked using fabricated "pencil" buoys that are 4" in diameter, 4' tall, with a marine hazard decal installed, and counter-balanced to stand upright. They are anchored in place using adequate concrete block or comparable anchor and tethered with a 1/8" stainless steel wire rope 6' long. Standard practice has the markers set off to the side of the peak of the submerged obstacle to ensure the marker is floating upright prior to surfacing.

### Tree Hazards

The goal of the tree hazard evaluation program is to reasonably protect visitors from unnecessary risks resulting from hazardous trees. Systematic inspections and abatement processes are described in the Mokelumne Watershed and Recreation Division Tree Hazard Program.

### Recreation Area Maintenance

The goal of the Recreation Area maintenance program is to reasonably protect visitors from unnecessary risks resulting from hazardous situations and facilities. Systematic inspections as described in the Mokelumne Watershed and Recreation Division Maintenance Inspection Program are conducted regularly to ensure safety and performance.

### Emergency Evacuation Procedures

As part of the Mokelumne Watershed Fire Management Plan, Emergency Evacuation and Safety Plans for each of the Recreation Management Units should be developed. Emergency safety and evacuation plans shall be reviewed and updated annually or as needed because of changes to staff, occupancy or physical arrangement of the sites.

### First Response

The primary responsibility for first aid response is held by Amador, Calaveras, and San Joaquin counties. EBMUD supplements first aid response in the Mokelumne watershed through a voluntary program with the Mokelumne Watershed & Recreation Division ranger staff. Staff's primary role is to facilitate emergency response from the county emergency services (EMS) and provide reasonable assistance. Staff may voluntarily respond as "Good Samaritans" and use a limited amount of equipment to perform initial assessment and provide immediate life support and care while awaiting arrival of emergency medical services. EBMUD will continue to provide

training to interested staff that includes emergency response, CPR/AED, basic first aid, and preventing disease transmission.

**Law Enforcement Support**

It is the responsibility of Amador, Calaveras and San Joaquin counties to provide for general law enforcement, surveillance, and water safety within the Mokelumne watershed. EBMUD currently contracts with the Amador and Calaveras county sheriff's departments and a private security contractor in San Joaquin County. The purpose of these contracts is to provide special patrol and law enforcement on EBMUD properties in the Mokelumne Watershed to ensure public safety and security.

### 4.5.2 Management

Continuing the existing programs for hazard inspection and mitigation is important to reasonably protect visitors from unnecessary risks. Monitoring public safety/security indicators will guide patrol and law enforcement support. The monitoring indicators for public safety and security include boating accidents at Camanche and Pardee reservoirs with a target boating accident rate of 0.01% or less of recreational boaters on an annual basis; and, an incident rate (arrests, evictions and/or citations for violation of watershed rules and regulations) of 2% or less of total visitors on an annual basis in each Recreation Management Unit (Haas et al. 2004).

If indicator targets can not be met in two consecutive years, management actions such as those described below should be implemented to reduce incidents:

- Review concession contract for adequacy of public safety information program.
- Review adequacy of staff patrol.
- Review law enforcement contract performance.
- Review concessionaire safety procedures.
- Adjust contracts, rules or regulations to address incidents.
- Increase the frequency of ranger patrols.

- Develop and implement additional educational programs regarding safety and compliance.
- Reduce recreation activities and/or capacity based on evictions and violations.
- Provide additional law enforcement.
- Increase ranger staff.

## 4.6 Plan for the completion of the Mokelumne Coast to Crest Trail

The Mokelumne Coast to Crest Trail is a conceptual scenic corridor extending from the Pacific Ocean near San Francisco Bay to the Pacific Crest Trail in the Sierra Nevada Range. The Trail is approximately 300 miles long with 53 miles completed. The trail is proposed to begin in the west at Martinez Regional Shoreline and will traverse the urban greenbelt along San Francisco Bay, the rural landscape along the San Joaquin River Delta, the Mother Lode Country, the forested slopes along the Mokelumne River Canyon and ending in the east at Ebbits Pass in the high Sierra. The lead organization is the Mokelumne Coast to Crest Trail Council (MCCTC). Responsible Jurisdictions include East Bay Regional Park District (EBRPD), East Bay Municipal Utility District (EBMUD), California State Parks (CSP), U.S. Forest Service (USFS), San Joaquin County, Pacific Gas & Electric, Georgia- Pacific Corporation, & Bureau of Land Management (BLM). The planning area for the trail embraces a wide cross-section of Northern California from San Francisco Bay to the Sierra Nevada just south of Lake Tahoe. The cities of Martinez, Concord, Pittsburg, Antioch, & Stockton fall within the planning area. Alpine, Amador, Calaveras, Contra Costa, San Joaquin, & Eldorado counties stand to directly benefit from the trail. The Mokelumne Coast to Crest Trail has been divided into five separate planning segments based on geographic and political boundaries. Individual segments will be planned, constructed and opened to the public at different times. Progress on any given trail segment depends upon many factors including the availability and commitment of a managing agency to the trail, presence of trail advocates,

number and productivity of volunteers, and the amount of support from local officials, community groups, and the general public.

The total length of the MCCT on EBMUD lands in the Mokelumne Watershed is 30.9 miles, of which 28.1 miles have been completed. One segment of the Mokelumne Coast to Crest Trail (Middle Bar to Highway 49 in the vicinity of Pardee Reservoir) remains to complete the trail from Camanche Creek West to Big Bar on EBMUD lands. The following table shows the anticipated costs and completion dates for trail construction. EBMUD will evaluate additional trail segments on its property based on the ultimate routing of the section of the MCCT west of Camanche Reservoir, input from the MCCTC and other objectives and constraints.

| Trail Segment | Distance (miles) | | Anticipated Cost | Proposed Completion Date |
|---|---|---|---|---|
| | Existing Fire Road | New Trail | | |
| Middle Bar to Highway 49 | 1.4 | 2.8 | $210,000 | June 2012 |

## 4.7 Identify trail construction, maintenance, and repair standards for existing and future trail systems and reference asset management plans as appropriate

Trail maintenance on EBMUD lands is important to protect water quality, insure visitor safety and maintain ecological integrity. The routine maintenance program includes annual management of invasive or noxious weeds, mowing/trimming for fire and public safety, structural assessment, and erosion control. Trail construction, maintenance and repair standards are described in the EBMUD Trails Manual. Trail condition is assessed at frequencies based on use and category as defined in the Trails Manual. Trail segment maintenance targets are used to drive specific trail maintenance while a holistic evaluation is determined by the overall rating of all trails. The trigger in that assessment is 90% of the trails and fire roads used as trails are in condition class III or better.

This trigger is employed in the adaptive management process identified in Section 5.0 to effectively manage the trail system.

**Trail and fireroad condition assessment classes (adapted from Marion et al. 2006)**

| Condition Class | Description |
|---|---|
| I | Trail barely distinguishable; no or minimal disturbance of vegetation and/or organic litter |
| II | Minimally impacted trail. Trail width is ≤ 5 ft.; no more than three treads apparent; low to moderate potential for trail expansion; some muddy spots may be present; incision is ≤ 0.5 ft; some exposed and loose soil may be present on trail surface. Overall, a trail under this classification is stable and does not require any maintenance. |
| III | Lightly impacted trail. Trail segments show minor deteriorating conditions. Either a single impact feature with moderate damage, or a combination of more than two impacted features are present: trail is wider than 5 ft; incision between 0.5 and 1.0 ft (incision of 1.5 ft. in the absence of any other features will satisfy the condition itself); more than three treads are present; seasonal muddiness on trail; trail is displaced; and soil is unconsolidated. Overall, a trail under this classification is stable but may require minor maintenance. |
| IV | Moderately impacted trail. Both the magnitude and the extent of damage are moderate. Basic impact features include trail width, multiple treads and incision. Usually these are present in combined forms, for example, trail braiding leading to excessive width. In certain cases, trail width is less but several treads are present, some of which are deeply incised (≥ 1.5 ft). Frequently exposed bedrock and roots are present in addition to other impact features. Overall, a trail under this classification is stable but requires maintenance. |
| V | Significantly damaged trail or "hotspot." Either a single criterion or a combination of several impact features qualifies this category. The basic parameters are trail width, multiple treads, and trail incision, which are significantly damaged in extent and magnitude compared to Class III. A trail under this classification exhibits excessive width (≥ 10 ft), multiple treads (≥ 5), and incision ≥ 1.5 ft. It may also exhibit signs of downhill sliding. Soil on the trail surface is unconsolidated, and no organic layer is present; exposed bedrock is frequent; trailside is highly eroded; root exposure is excessive; and seasonally the trail is very muddy. Overall, a trail under this classification requires urgent repair. |

## 4.8 Identify and evaluate alternatives to protect water quality against chemical contaminants and invasive species transported on vehicles, equipment, boats and trailers

Chemical contaminants that may affect water quality in Camanche and Pardee reservoirs as a result of recreation activities are addressed in Section 4.1. Terrestrial invasive species are addressed in the Mokelumne Watershed Ecological Integrity Plan. The East Bay Municipal Utility District (EBMUD) Invasive Aquatic Species Control Program (EBMUD 2009) aims to prevent non-native invasive aquatic species from becoming established in EBMUD reservoirs and water system infrastructure. The primary focus of the program is Dreissena mussels, including quagga and zebra mussels, but is meant provide a barrier to any other potentially invasive organisms. This program is consistent with the Bay Area Regional Consortium Zebra and Quagga Mussel Coordinated Prevention Plan.

Based on risk assessment, EBMUD implemented a vessel screening and inspection program in 2008 at all of EBMUD-owned reservoirs that permit public recreational boating (San Pablo, Lafayette, Pardee, and Camanche Reservoirs). The EBMUD vessel screening and inspection program is consistent with inspection measures and guidelines outlined within the draft Consortium Plan. In addition, EBMUD prohibits the use of live bait in its reservoirs, performs periodic monitoring and sampling, and conducts a public outreach program.

EBMUD will continue to support the objectives, strategies, and actions to minimize the harmful ecological, economic and human health impacts of aquatic invasive species in California.

## 4.9 Provide for human sanitation containment, removal, and disposal for both Pardee and Camanche reservoirs

### 4.9.1 Issues

Untreated human waste dumped into waterways degrades water quality and is harmful to human health and aquatic life. This waste decreases the amount of oxygen available for aquatic life and introduces excessive nutrients to the water which then increases algal growth. Excessive algae in the water limit the amount of sunlight that can penetrate the surface water and reach underwater vegetation. When algae die it is decomposed by bacteria, which further reduces the amount of oxygen. Raw human waste can also introduce bacteria and viruses that can cause disease. People who swim in contaminated waters or eat contaminated shellfish can suffer from typhoid, hepatitis, cholera, and gastroenteritis.

There are currently 13 floating restrooms operated seasonally at Pardee Reservoir and none at Camanche Reservoir. Recreational boaters on Camanche Reservoir do not have ready access to sanitation facilities when away from the recreation areas at Camanche north and shore shore recreation areas. A review of floating restrooms installed and operated in major recreation reservoirs in California (DWR 2001) suggests that where floating restrooms are operated the average is one restroom per 3,700 surface acres of reservoir (Table 4.9-1).

**Table 4.9-1. Floating Restrooms in California Reservoirs.**

| Reservoir | Number of Floating Restrooms | Reservoir Surface Area (acres) | Surface Area per Floating Restroom |
|---|---|---|---|
| Berryessa | 3 | 20700 | 6900 |
| Don Pedro | 6 | 12960 | 2160 |
| Folsom | 2 | 11400 | 5700 |
| McClure | 4 | 7400 | 1850 |
| Millerton | 1 | 4900 | 4900 |
| Nacimiento & San Antonio | 4 | 11120 | 2780 |
| New Melones | 2 | 12500 | 6250 |
| Oroville | 7 | 21000 | 3000 |
| Pine Flat | 4 | 5970 | 1493 |
| Shasta | 6 | 29500 | 4917 |
| Trinity | 4 | 17280 | 4320 |
| Pardee | 13 | 2259 | 174 |
| Camanche | 2* | 7621 | 3810 |

*Recommended

The 1992 Federal Clean Vessel Act identifies vessel sewage discharges as "a substantial contributor to localized degradation of water quality in the United States." Under the California Harbors and Navigation Code (§ 72.7) and the Clean Vessel Act, the California Department of Boating and Waterways (Cal Boating) will help fund the construction, renovation, operation, and maintenance of pump out and dump stations to service pleasure craft. According to the Code;

> (a) The department [Cal Boating] may grant funds to any public agency for the construction or procurement of floating restrooms and ancillary items.
> (b) The department may prepare plans and arrange for the procurement of floating restrooms and ancillary items for later transfer to other public agencies. All procurements shall be conducted under the supervision of the Department of General Services, in accordance with the requirements for state procurement of materials, supplies, and equipment established in Chapter 2 (commencing with Section 10290) of Part 2 of Division 2 of the Public Contract Code.
> (c) The department shall establish general policies for determining appropriate bodies of water and locations thereon for placing floating

> restrooms. The department may adopt such rules and regulations as may be necessary to carry out the provisions of this section.
> (d) It is the intent of the Legislature that the purpose of this section is to furnish restroom facilities on bodies of water where conventional restrooms cannot meet the needs of boaters and where the presence of floating restrooms may lessen environmental degradation of those bodies of water.

The Grant Program will reimburse recipients for up to 75% of the installed cost of pumpout and dump stations. This includes the cost of new equipment, or the renovation of existing equipment, as well as necessary pumps, piping, lift stations, on-site holding tanks, pier or dock modifications, signs, permits and other miscellaneous equipment needed for a complete and efficient station.

### 4.9.2 Management

Floating restrooms are designed to reduce potential impacts of untreated human waste that enters Pardee and Camanche reservoirs on water quality resulting from recreation use on the reservoirs. Management actions include soliciting a grant reimbursement from the California Department of Boating and Waterways and installing and operating at least two floating restrooms on Camanche Reservoir. Restrooms will be installed on Camanche Reservoir by 2011 if grant funding is available from the California Department of Boating and Waterways or identified in the capital budget in FY2012.

## 4.10 Continue to promote and prioritize reuse, recycling, and conservation efforts at the recreation areas

Recycling involves collecting and processing used materials into new products in order to reduce litter, prevent waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage, reduce air and water pollution. Recycling is a key component of modern waste management and is the third component of the "Reduce, Reuse, Recycle" waste hierarchy.

Recyclable materials include many kinds of glass, paper, metal, plastic, textiles, and electronics. Materials to be recycled are either brought to a collection center or picked up from the curbside, then sorted, cleaned, and reprocessed into new materials bound for manufacturing.

EBMUD promotes recycling at the recreation areas in the Mokelumne Watershed by providing convenient collection stations at various sites.

In addition to recycling consumer waste, an effort to keep high-density nylon fishing line out of Pardee and Camanche reservoirs should be implemented. Since monofilament is invisible in the water and extremely strong, improperly discarded fishing line is a hazard to wildlife and humans, and stays in the environment for a long time before it breaks down. Birds, mammals, reptiles and fish can easily become entangled in improperly discarded fishing line. This leads to injury, disfigurement, drowning, strangulation, or starvation. Swimmers can become tangled in fishing line or caught by hooks that may be hidden in the discarded line. Fishing line is frequently caught in boat propellers, and can enter a boat's bilge pump, and water intake valves. Recycling collection stations should be installed at Pardee Recreation Area, Camanche North and South Shore Recreation Areas, and the Mokelumne River Day Use Area.

Additional no- or low-cost conservation practices that could be implemented on the watershed are listed in Appendix C.

## 4.11 Identify construction, maintenance, and repair standards for recreation facilities that provide ADA accommodations where feasible and practical and include facilities in the infrastructure master plan

All newly constructed or rehabilitated structures should be universally accessible in accordance with the Americans with Disabilities Act (ADA). Guidelines to accommodate persons with disabilities are presented in:

Architectural and Transportation Barriers Compliance Board

36 CFR Parts 1190 and 1191 (Federal Register / Vol. 67, No. 170 / Tuesday, September 3, 2002 / Rules and Regulations)

- Americans With Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Final Rule
- Americans With Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; Recreation Facilities; Supplemental Notice of Proposed Rulemaking

Architectural and Transportation Barriers Compliance Board
36 CFR Part 1195 (Federal Register / Vol. 72, No. 118 / Wednesday, June 20, 2007 / Proposed Rules 34074)

- Architectural Barriers Act (ABA) Accessibility Guidelines for Outdoor Developed Areas; Proposed Rule

# 5.0 RECREATION MANAGEMENT PLAN ADAPTIVE MANAGEMENT

Adaptive management is a structured, iterative process of decision-making in the face of uncertainty, with an aim of reducing uncertainty over time by monitoring. No long-term plan can reasonably predict exactly what is needed or foresee all events, particularly for a long-term planning horizon. As a result, actions taken will have to be adaptive within certain predictable limits. The Recreation Monitoring Program uses an interactive approach to decision making that incorporates feedback mechanisms to evaluate actions and incorporate new information as it becomes available (Figure 5-1).

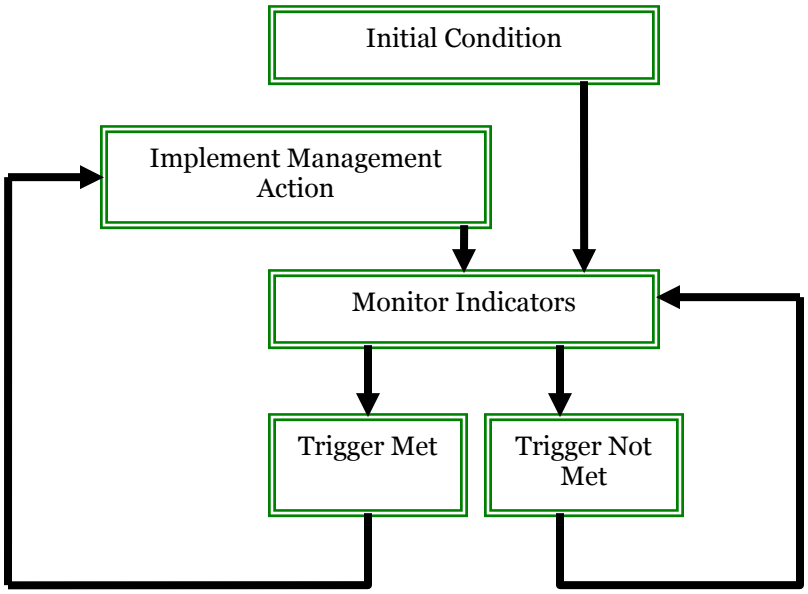


**Figure 5-1. Adaptive Management Feedback Loop**

In general, the Recreation Monitoring Program has two main attributes: (1) it is a response to uncertainty about the resource being managed over time; and (2) future actions are dependent upon information acquired through monitoring. To meet the goals and objectives of the MWMP, several different monitoring

indicators (environmental, spatial, social and economic) will be used in different recreational settings.

Quantitative and qualitative data were used to identify environmental, spatial, social, and economic indicators and define quantitative targets for each indicator. Indicator variables and targets are used to specifically define when and what types of management actions are required to meet program goals and objectives; indicator variables are monitored to determine whether targets are being met.

Key considerations related to monitoring indicators and targets include:

- Reflect important key issues that should be monitored (i.e., objectives identified in the MWMP).
- Indicate specific variables that realistically describe watershed conditions.
- Allow definition of desired conditions and assess effectiveness of management practices.
- Should be measurable and responsive to possible management actions.
- Should be easily and economically measurable.

**Environmental Indicators –** Considers the impacts of recreation on the ecosystem, specifically the impact on water quality.

| Indicator | Target |
|---|---|
| Water Quality Index | Index value of 80 or above at Pardee Reservoir, 65 or above at Camanche Reservoir |
| Trail Condition | 90% of trails and fire roads in the watershed in condition class III or better |

**Spatial Indicators** –Considers the facility impacts such as number of people, groups, or vehicles per parking lot or campground, percent occupancy for various facilities and reservoirs and visitor perception of facility capacities.

| Indicator | Target |
|---|---|
| Visitor Facility Perception | 70% or more of the respondents report average of all facilities as "about right" |
| | 70% or more of the respondents report each facility as "about right" |
| Facility Use Levels | 90% of weekend & holiday visitor use during the recreation season is less than 80% of capacity |
| Boating Safety | Boating accident rate during the recreation season is less than 0.01% of total boating use (launches) |

**Social Indicators** – Considers visitors' perceptions of recreational experiences, such as crowding, encounters with individuals or groups, and user conflicts.

| Indicator | Target |
|---|---|
| Visitor Experience Perception | 30% or less of the respondents report average of all experiences as more than a "moderate problem" |
| | 30% or less of the respondents report each experience as more than a "moderate problem" |
| Visitor Safety/Security | Incident rate (arrests, evictions, citations for Rules & Regulations violations/number of visitors) less than 2% during the recreation season |

**Economic Indicators** – Considers the economics of recreational facility operation (costs and revenues) based on revenues and/or revenue (cost) per visitor.

| Indicator | Target |
|---|---|
| Financial Performance | Revenue recovers at least 40% of total operation and capital costs at Pardee Recreation Area<br><br>Revenue recovers at least 45% of total operation and capital costs at Camanche North and South Shore Recreation areas<br><br>Revenue recovers at least 100% of total operation and capital costs at CHHP, and seasonal RV sites |

Management action triggers or thresholds (i.e., standards of quality) are realistic goals that can be achieved over time and alert recreation managers that actions may be necessary to sustain the area's resources, visitor experiences, and management effectiveness. Potential management actions are initiated if/when triggers are exceeded.

Table 5-1 lists the monitoring indicators, targets, and triggers for recreation management units in the Mokelumne Watershed. Additionally, Table 5-1 describes the monitoring frequency for each indicator, and lists potential management actions for each indicator, to be considered when "triggers" are met. The management actions represent a continuum of management actions, ranging from minor, less management-intensive actions to major, more management-intensive actions. Decisions regarding future management actions would be made at the time that standards for each indicator are approached and then exceeded, based on field conditions. In all cases, the entire suite of indicators should be reviewed and examined before management actions are taken. During the first three years of implementation, the Recreation Monitoring Program will be refined and tested. Adjustments may be made as necessary to improve the efficiency, performance, or end results of the program.

**Table 5-1. Recreation Monitoring Program**

| RECREATION MANAGEMENT UNIT | INDICATOR | TARGET | MANAGEMENT ACTION TRIGGER | MONITORING FREQUENCY | POTENTIAL MANAGEMENT ACTIONS |
|---|---|---|---|---|---|
| Pardee Reservoir | Visitor Experience Perception | ≤ 30% of respondents > 3.0 | ≥ 35% of respondents >3.0 | Once every three years | • Address specific experience concerns |
| | | ≤ 30% of respondents to single issue > 3.0 | ≥ 35% of respondents to single issue > 3.0 | | |
| | Visitor Facility Perception | ≥ 70% of respondents between 1.5 and 2.5 | ≤ 65% of respondents between 1.5 and 2.5 | Once every three years | • Address specific facility concerns |
| | | ≥ 70% of respondents to single issue between 1.5 and 2.5 | ≤ 65% of respondents to single issue between 1.5 and 2.5 | | |
| | Boating Safety | Boating accident rate ≤ 0.01% | Exceed target in 2 consecutive years | Annual | • See Section 4.5.2 |
| | Facility Use Levels | ≤ 80% physical capacity level on 90% of weekends/holidays | Exceed target in 2 consecutive years | Annual | • Institute speed limits<br>• Reservoir closure at target levels |

**Table 5-1. Recreation Monitoring Program (cont.)**

| RECREATION MANAGEMENT UNIT | INDICATOR | TARGET | MANAGEMENT ACTION TRIGGER | MONITORING FREQUENCY | POTENTIAL MANAGEMENT ACTIONS |
|---|---|---|---|---|---|
| Camanche Reservoir | Visitor Experience Perception | ≤ 30% of respondents > 3.0 | ≥ 35% of respondents >3.0 | Once every three years | • Address specific experience concerns |
| | | ≤ 30% of respondents to single issue > 3.0 | ≥ 35% of respondents to single issue > 3.0 | | |
| | Visitor Facility Perception | ≥ 70% of respondents between 1.5 and 2.5 | ≤ 65% of respondents between 1.5 and 2.5 | Once every three years | • Address specific facility concerns |
| | | ≥ 70% of respondents to single issue between 1.5 and 2.5 | ≤ 65% of respondents to single issue between 1.5 and 2.5 | | |
| | Boating Safety | Boating accident rate ≤ 0.01% | Exceed target in 2 consecutive years | Annual | • See Section 4.5.2 |
| | Facility Use Levels | ≤ 80% physical capacity level on 90% of weekends/holidays | Exceed target in 2 consecutive years | Annual | • Limit waterskiing and PWC<br>• Institute speed limits<br>• Reservoir closure at target levels |

**Table 5-1. Recreation Monitoring Program (cont.)**

| RECREATION MANAGEMENT UNIT | INDICATOR | TARGET | MANAGEMENT ACTION TRIGGER | MONITORING FREQUENCY | POTENTIAL MANAGEMENT ACTIONS |
|---|---|---|---|---|---|
| Camanche North Shore Recreation | Visitor Experience Perception | ≤ 30% of respondents > 3.0 | ≥ 35% of respondents >3.0 | Once every three years | • Address specific experience concerns |
| | | ≤ 30% of respondents to single issue > 3.0 | ≥ 35% of respondents to single issue > 3.0 | | |
| | Visitor Facility Perception | ≥ 70% of respondents between 1.5 and 2.5 | ≤ 65% of respondents between 1.5 and 2.5 | Once every three years | • Address specific facility concerns |
| | | ≥ 70% of respondents to single issue between 1.5 and 2.5 | ≤ 65% of respondents to single issue between 1.5 and 2.5 | | |
| | Day Use and Campground Visitor Safety/Security | Incident rate < 2% | Exceed target in 2 consecutive years | Annual | • See Section 4.5.2 |
| | Day Use and Campground Facility Capacity Levels | ≤ 80% physical capacity level on 90% of weekends/holidays | Exceed target in 2 consecutive years | Annual | • Offer incentives to redistribute use (other sites, days, seasons)<br>• Direct visitors to other available sites in region<br>• Institute closures at target levels<br>• Expand existing facilities (see Section 4.2.2) |

**Table 5-1. Recreation Monitoring Program (cont.)**

| RECREATION MANAGEMENT UNIT | INDICATOR | TARGET | MANAGEMENT ACTION TRIGGER | MONITORING FREQUENCY | POTENTIAL MANAGEMENT ACTIONS |
|---|---|---|---|---|---|
| Camanche North Shore Recreation | Water Quality | Annual Water Quality Index ≥ 65 | Exceed target in two consecutive recreation seasons | Monthly (Seasonal) | • See Objective 4.1.2 |
| | Financial Performance | Program revenues provide ≥ 50% of operating and capital expenses | Exceed target in two consecutive recreation seasons | Annual | • See Section 4.4.2 |
| Camanche South Shore Recreation | Visitor Experience Perception | ≤ 30% of respondents > 3.0 | ≥ 35% of respondents >3.0 | Once every three years | • Address specific experience concerns |
| | | ≤ 30% of respondents to single issue > 3.0 | ≥ 35% of respondents to single issue > 3.0 | | |
| | Visitor Facility Perception | ≥ 70% of respondents between 1.5 and 2.5 | ≤ 65% of respondents between 1.5 and 2.5 | Once every three years | • Address specific facility concerns |
| | | ≥ 70% of respondents to single issue between 1.5 and 2.5 | ≤ 65% of respondents to single issue between 1.5 and 2.5 | | |
| | Day Use and Campground Visitor Safety/Security | Incident rate < 2% | Exceed target in 2 consecutive years | Annual | • See Section 4.5.2 |

**Table 5-1. Recreation Monitoring Program (cont.)**

| RECREATION MANAGEMENT UNIT | INDICATOR | TARGET | MANAGEMENT ACTION TRIGGER | MONITORING FREQUENCY | POTENTIAL MANAGEMENT ACTIONS |
|---|---|---|---|---|---|
| Camanche South Shore Recreation | Day Use and Campground Facility Capacity Levels | ≤ 80% physical capacity level on 90% of weekends/holidays | Exceed target in 2 consecutive years | Annual | • Offer incentives to redistribute use (other sites, days, seasons)<br>• Direct visitors to other available sites in region<br>• Institute closures at target levels<br>• Expand existing facilities (see Section 4.2.2) |
| | Water Quality | Annual Water Quality Index ≥ 65 | Exceed target in two consecutive recreation seasons | Monthly (Seasonal) | • See Objective 4.1.2 |
| | Financial Performance | Program revenues provide ≥ 50% of operating and capital expenses | Exceed target in two consecutive recreation seasons | Annual | • See Section 4.4.2 |
| Pardee Recreation Area | Visitor Experience Perception | ≤ 30% of respondents > 3.0 | ≥ 35% of respondents >3.0 | Once every three years | • Address specific experience concerns |
| | | ≤ 30% of respondents to single issue > 3.0 | ≥ 35% of respondents to single issue > 3.0 | | |
| | Visitor Facility Perception | ≥ 70% of respondents between 1.5 and 2.5 | ≤ 65% of respondents between 1.5 and 2.5 | Once every three years | • Address specific facility concerns |
| | | ≥ 70% of respondents to single issue between 1.5 and 2.5 | ≤ 65% of respondents to single issue between 1.5 and 2.5 | | |

**Table 5-1. Recreation Monitoring Program (cont.)**

| RECREATION MANAGEMENT UNIT | INDICATOR | TARGET | MANAGEMENT ACTION TRIGGER | MONITORING FREQUENCY | POTENTIAL MANAGEMENT ACTIONS |
|---|---|---|---|---|---|
| Pardee Recreation Area | Day Use and Campground Visitor Safety/Security | Incident rate ≤ 2% | Exceed target in 2 consecutive years | Annual | • See Section 4.5.2 |
| | Day Use and Campground Facility Capacity Levels | ≤ 80% physical capacity level on < 90% of weekends/holidays | Exceed target in 2 consecutive years | Annual | • Offer incentives to redistribute use (other sites, days, seasons)<br>• Direct visitors to other available sites in region<br>• Increase fees<br>• Institute closures at target levels<br>• Expand existing facilities (see Section 4.2.2) |
| | Water Quality | Annual Water Quality Index ≥ 80 | Exceed target in two consecutive recreation seasons | Monthly (Seasonal) | • See Objective 4.1.2 |
| | Financial Performance | Program revenues provide ≥ 50% of operating and capital expenses | Exceed target in two consecutive recreation seasons | Annual | • See Section 4.4.2 |

**Table 5-1. Recreation Monitoring Program (cont.)**

| RECREATION MANAGEMENT UNIT | INDICATOR | TARGET | MANAGEMENT ACTION TRIGGER | MONITORING FREQUENCY | POTENTIAL MANAGEMENT ACTIONS |
|---|---|---|---|---|---|
| Camanche Hills Hunting Preserve | Visitor Experience Perception | ≤ 30% of respondents > 3.0 | ≥ 35% of respondents >3.0 | Once every three years | • Address specific experience concerns |
| | | ≤ 30% of respondents to single issue > 3.0 | ≥ 35% of respondents to single issue > 3.0 | | |
| | Visitor Facility Perception | ≥ 70% of respondents between 1.5 and 2.5 | ≤ 65% of respondents between 1.5 and 2.5 | Once every three years | • Address specific facility concerns |
| | | ≥ 70% of respondents to single issue between 1.5 and 2.5 | ≤ 65% of respondents to single issue between 1.5 and 2.5 | | |
| | Financial Performance | Program revenues provide 100% of operating and capital costs | Exceed target in two consecutive recreation seasons | Annual | • See Section 4.4.2 |

**Table 5-1. Recreation Monitoring Program (cont.)**

| RECREATION MANAGEMENT UNIT | INDICATOR | TARGET | MANAGEMENT ACTION TRIGGER | MONITORING FREQUENCY | POTENTIAL MANAGEMENT ACTIONS |
|---|---|---|---|---|---|
| Mokelumne River Day Use Area | Visitor Experience Perception | ≤ 30% of respondents > 3.0 | ≥ 35% of respondents >3.0 | Once every three years | • Address specific experience concerns |
| | | ≤ 30% of respondents to single issue > 3.0 | ≥ 35% of respondents to single issue > 3.0 | | |
| | Visitor Facility Perception | ≥ 70% of respondents between 1.5 and 2.5 | ≤ 65% of respondents between 1.5 and 2.5 | Once every three years | • Address specific facility concerns |
| | | ≥ 70% of respondents to single issue between 1.5 and 2.5 | ≤ 65% of respondents to single issue between 1.5 and 2.5 | | |
| | Day Use Visitor Safety/Security | Incident rate ≤ 2% | Exceed target in 2 consecutive years | Annual | • See Section 4.5.2 |
| | Day Use Facility Capacity Levels | ≤ 80% physical capacity level on 90% of weekends/holidays | Exceed target in 2 consecutive years | Annual | • Offer incentives to redistribute use (other sites, days, seasons)<br>• Direct visitors to other available sites in region<br>• Implement user fees<br>• Institute closures at target levels<br>• Expand existing facilities (see Section 4.2.2) |

**Table 5-1. Recreation Monitoring Program (cont.)**

| RECREATION MANAGEMENT UNIT | INDICATOR | TARGET | MANAGEMENT ACTION TRIGGER | MONITORING FREQUENCY | POTENTIAL MANAGEMENT ACTIONS |
|---|---|---|---|---|---|
| Trails | Visitor Experience Perception | ≤ 30% of respondents > 3.0 | ≥ 35% of respondents >3.0 | Once every three years | • Address specific experience concerns |
| | | ≤ 30% of respondents to single issue > 3.0 | ≥ 35% of respondents to single issue > 3.0 | | |
| | Visitor Facility Perception | ≥ 70% of respondents between 1.5 and 2.5 | ≤ 65% of respondents between 1.5 and 2.5 | Once every three years | • Address specific facility concerns |
| | | ≥ 70% of respondents to single issue between 1.5 and 2.5 | ≤ 65% of respondents to single issue between 1.5 and 2.5 | | |
| | Trailhead Capacity Levels | ≤80% physical capacity level on 90% of weekends/holidays | Exceed target in 2 consecutive years | Annual | • Offer incentives to redistribute use (other sites, days, seasons)<br>• Direct visitors to other available sites in region<br>• Increase fees<br>• Institute closures at target levels<br>• Expand existing facilities |
| | Trail Condition | >90% of trails in condition class III or less. | ≤ 80% of trails in condition class III or less. | Every three years | • Provide increased visitor education<br>• Close trails<br>• Expand trail network<br>• Increase resource protection measures |

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# Appendix A. Recreational Visitor Perception Surveys

**Visitor Satisfaction Survey Card.** The objectives of this survey are to determine user preferences for facility and area development; perceptions of facility management, and levels of satisfaction. The results reveal those facilities and management issues of most concern to certain users, and thus provide guidance for potential future actions to address them. The two-sided card will be available to recreation visitors every three years with an incentive to accurately complete the survey and return the card.

## Camanche Reservoir

### *Visitor Experience Perception*

The following question lists things you might or might not have experienced on your recent trip to East Bay Municipal Utility District's Recreation Area. For each item below, indicate how much of a problem you think the issue was at the recreation area you visited: (**Circle the appropriate number for each item**.). If you are uncertain about an item or the item does not apply, do not circle a number.

| Experience | A big problem | A moderate problem | A slight problem | Not a problem |
|---|---|---|---|---|
| ***Management*** | | | | |
| Litter along the shoreline | 4 | 3 | 2 | 1 |
| Sanitation along the shoreline | 4 | 3 | 2 | 1 |
| Facility maintenance | 4 | 3 | 2 | 1 |
| Grounds maintenance | 4 | 3 | 2 | 1 |
| Cost to use facilities | 4 | 3 | 2 | 1 |
| Overall cleanliness | 4 | 3 | 2 | 1 |
| Overall safety and security | 4 | 3 | 2 | 1 |
| Availability of service/staffing | 4 | 3 | 2 | 1 |
| Overall crowding | 4 | 3 | 2 | 1 |
| Adequate information/warnings provided | 4 | 3 | 2 | 1 |
| Boat launch maintenance | 4 | 3 | 2 | 1 |
| Access to the shoreline | 4 | 3 | 2 | 1 |
| Law enforcement presence | 4 | 3 | 2 | 1 |
| ***Water Conditions*** | | | | |
| Shallow areas during lower water levels | 4 | 3 | 2 | 1 |
| Floating debris in the water | 4 | 3 | 2 | 1 |
| Quality of water | 4 | 3 | 2 | 1 |
| Water level fluctuations | 4 | 3 | 2 | 1 |
| ***User Interactions*** | | | | |
| Numbers of watercraft | 4 | 3 | 2 | 1 |
| Noise from boats and personal watercraft | 4 | 3 | 2 | 1 |
| Boat speed or wake effects | 4 | 3 | 2 | 1 |
| Encounters between water skiers and others | 4 | 3 | 2 | 1 |
| Encounters between pleasure boaters & boat anglers | 4 | 3 | 2 | 1 |
| Encounters between jet skis and other users | 4 | 3 | 2 | 1 |
| Unsafe behavior by other users | 4 | 3 | 2 | 1 |
| Use of alcohol by other users | 4 | 3 | 2 | 1 |

### *Visitor Facility Perception*

How do you evaluate the following facilities at the recreation area where you were surveyed on your recent trip? Remember, each item listed pertains only to the recreation area visited. (**Circle the appropriate number for each item**). If you are uncertain about an issue, or it does not apply, do not circle a number.

| Facility | Too Few | About Right | Too Many |
|---|---|---|---|
| Number of recycling stations | 3 | 2 | 1 |
| Number of RV dump stations | 3 | 2 | 1 |
| Number of boat ramps | 3 | 2 | 1 |
| Number of docks or temporary moorage | 3 | 2 | 1 |
| Number of floating restrooms | 3 | 2 | 1 |
| Number of boat-in campsites | 3 | 2 | 1 |
| Number of marinas | 3 | 2 | 1 |
| Number of boat-in gas stations | 3 | 2 | 1 |
| Number of parking sites | 3 | 2 | 1 |
| Number of rental boats | 3 | 2 | 1 |
| Number of fish cleaning stations | 3 | 2 | 1 |
| Number of fishing access sites | 3 | 2 | 1 |
| Number of picnic sites | 3 | 2 | 1 |
| Number of group picnic sites | 3 | 2 | 1 |
| Amount of swim areas | 3 | 2 | 1 |
| Number of developed day use or picnic areas along the shore | 3 | 2 | 1 |
| Hours of operation | 3 | 2 | 1 |
| Number of interpretive programs/educational opportunities | 3 | 2 | 1 |
| Number of restrooms | 3 | 2 | 1 |
| Number of food service sales sites | 3 | 2 | 1 |
| Number of merchandise sale sites | 3 | 2 | 1 |

## Pardee Reservoir

### *Visitor Experience Perception*

The following question lists things you might or might not have experienced on your recent trip to East Bay Municipal Utility District's Recreation Area. For each item below, indicate how much of a problem you think the issue was at the recreation area you visited: (**Circle the appropriate number for each item**.). If you are uncertain about an item or the item does not apply, do not circle a number.

| Experience | A big problem | A moderate problem | A slight problem | Not a problem |
|---|---|---|---|---|
| ***Management*** | | | | |
| Litter along the shoreline | 4 | 3 | 2 | 1 |
| Sanitation along the shoreline | 4 | 3 | 2 | 1 |
| Cost to use facilities | 4 | 3 | 2 | 1 |
| Facilities maintenance | 4 | 3 | 2 | 1 |
| Grounds maintenance | 4 | 3 | 2 | 1 |
| Overall cleanliness | 4 | 3 | 2 | 1 |
| Overall safety and security | 4 | 3 | 2 | 1 |
| Availability of service/staffing | 4 | 3 | 2 | 1 |
| Overall crowding | 4 | 3 | 2 | 1 |
| Adequate information/warnings provided | 4 | 3 | 2 | 1 |
| Boat launch maintenance | 4 | 3 | 2 | 1 |
| Access to the shoreline | 4 | 3 | 2 | 1 |
| Law enforcement presence | 4 | 3 | 2 | 1 |
| ***Water Conditions*** | | | | |
| Shallow areas during lower water levels | 4 | 3 | 2 | 1 |
| Floating debris in the water | 4 | 3 | 2 | 1 |
| Quality of water | 4 | 3 | 2 | 1 |
| Water level fluctuations | 4 | 3 | 2 | 1 |
| ***User Interactions*** | | | | |
| Numbers of watercraft | 4 | 3 | 2 | 1 |
| Noise from boats | 4 | 3 | 2 | 1 |
| Boat speed or wake effects | 4 | 3 | 2 | 1 |
| Encounters between pleasure boaters & boat anglers | 4 | 3 | 2 | 1 |
| Encounters between pleasure boaters & shoreline anglers | 4 | 3 | 2 | 1 |
| Encounters with float tubers | 4 | 3 | 2 | 1 |
| Unsafe behavior by other users | 4 | 3 | 2 | 1 |
| Use of alcohol by other users | 4 | 3 | 2 | 1 |

### *Visitor Facility Perception*

How do you evaluate the following facilities at the recreation area where you were surveyed on your recent trip? Remember, each item listed pertains only to the recreation area visited. (**Circle the appropriate number for each item**). If you are uncertain about an issue, or it does not apply, do not circle a number.

| Facility | Too Few | About Right | Too Many |
|---|---|---|---|
| Number of recycling stations | 3 | 2 | 1 |
| Number of RV dump stations | 3 | 2 | 1 |
| Number of boat ramps | 3 | 2 | 1 |
| Number of docks or temporary moorage | 3 | 2 | 1 |
| Number of floating restrooms | 3 | 2 | 1 |
| Number of boat-in campsites | 3 | 2 | 1 |
| Number of marinas | 3 | 2 | 1 |
| Number of boat-in gas stations | 3 | 2 | 1 |
| Number of parking sites | 3 | 2 | 1 |
| Number of rental boats | 3 | 2 | 1 |
| Number of fish cleaning stations | 3 | 2 | 1 |
| Number of fishing access sites | 3 | 2 | 1 |
| Number of picnic sites | 3 | 2 | 1 |
| Number of group picnic sites | 3 | 2 | 1 |
| Hours of operation | 3 | 2 | 1 |
| Number of developed day use or picnic areas along the shore | 3 | 2 | 1 |
| Number of interpretive programs/educational opportunities | 3 | 2 | 1 |
| Number of restrooms | 3 | 2 | 1 |
| Number of food service sales sites | 3 | 2 | 1 |
| Number of merchandise sale sites | 3 | 2 | 1 |

## Camanche North Shore Recreation Area

### *Visitor Experience Perception*

The following question lists things you might or might not have experienced on your recent trip to East Bay Municipal Utility District's Recreation Area. For each item below, indicate how much of a problem you think the issue was at the recreation area you visited: (**Circle the appropriate number for each item**.). If you are uncertain about an item or the item does not apply, do not circle a number.

| Experience | A big problem | A moderate problem | A slight problem | Not a problem |
|---|---|---|---|---|
| ***Management*** | | | | |
| Litter along the shoreline | 4 | 3 | 2 | 1 |
| Sanitation along the shoreline | 4 | 3 | 2 | 1 |
| Cost to use facilities | 4 | 3 | 2 | 1 |
| Facilities maintenance | 4 | 3 | 2 | 1 |
| Grounds maintenance | 4 | 3 | 2 | 1 |
| Overall cleanliness | 4 | 3 | 2 | 1 |
| Overall safety and security | 4 | 3 | 2 | 1 |
| Availability of service/staffing | 4 | 3 | 2 | 1 |
| Overall crowding | 4 | 3 | 2 | 1 |
| Adequate information/warnings provided | 4 | 3 | 2 | 1 |
| Adequacy of landscaping of facilities | 4 | 3 | 2 | 1 |
| Campground maintenance | 4 | 3 | 2 | 1 |
| Litter in campgrounds | 4 | 3 | 2 | 1 |
| Access to the shoreline | 4 | 3 | 2 | 1 |
| Litter in day use areas | 4 | 3 | 2 | 1 |
| Law enforcement presence | 4 | 3 | 2 | 1 |
| ***Water Conditions*** | | | | |
| Shallow areas during lower water levels | 4 | 3 | 2 | 1 |
| Floating debris in the water | 4 | 3 | 2 | 1 |
| Quality of water | 4 | 3 | 2 | 1 |
| Water level fluctuations | 4 | 3 | 2 | 1 |
| ***User Interactions*** | | | | |
| Numbers of watercraft | 4 | 3 | 2 | 1 |
| Noise from boats and personal watercraft | 4 | 3 | 2 | 1 |
| Boat speed or wake effects | 4 | 3 | 2 | 1 |
| Encounters between water skiers and others | 4 | 3 | 2 | 1 |
| Encounters between pleasure boaters & boat anglers | 4 | 3 | 2 | 1 |
| Encounters between jet skis and other users | 4 | 3 | 2 | 1 |
| Unsafe behavior by other users | 4 | 3 | 2 | 1 |
| Numbers of people at developed facilities | 4 | 3 | 2 | 1 |
| Use of alcohol by other users | 4 | 3 | 2 | 1 |
| Campground noise | 4 | 3 | 2 | 1 |
| Picnic area noise | 4 | 3 | 2 | 1 |
| Vandalism | 4 | 3 | 2 | 1 |
| Inappropriate dog use | 4 | 3 | 2 | 1 |
| Limited dog use | 4 | 3 | 2 | 1 |

### *Visitor Facility Perception*

How do you evaluate the following facilities at the recreation area where you were surveyed on your recent trip? Remember, each item listed pertains only to the recreation area visited. (**Circle the appropriate number for each item**). If you are uncertain about an issue, or it does not apply, do not circle a number.

| Type of Facility | Too Few | About Right | Too Many |
|---|---|---|---|
| ***Camping Related*** | | | |
| Presence of campground hosts | 3 | 2 | 1 |
| Number of campgrounds | 3 | 2 | 1 |
| Number of campsites with RV hookups | 3 | 2 | 1 |
| Number of cottages | 3 | 2 | 1 |
| Number of group campsites | 3 | 2 | 1 |
| Screening between campsites | 3 | 2 | 1 |
| Number of shower facilities at campgrounds | 3 | 2 | 1 |
| Number of recycling stations | 3 | 2 | 1 |
| Number of RV dump stations | 3 | 2 | 1 |
| ***Boat Related*** | | | |
| Number of boat ramps | 3 | 2 | 1 |
| Number of docks or temporary moorage | 3 | 2 | 1 |
| Number of floating restrooms | 3 | 2 | 1 |
| Number of boat-in campsites | 3 | 2 | 1 |
| Number of marinas | 3 | 2 | 1 |
| Number of boat-in gas stations | 3 | 2 | 1 |
| Number of parking sites | 3 | 2 | 1 |
| Number of rental boats | 3 | 2 | 1 |
| ***Fishing/Hunting Related*** | | | |
| Number of fish cleaning stations | 3 | 2 | 1 |
| Number of fishing access sites | 3 | 2 | 1 |
| ***Other Activity Related*** | | | |
| Number of picnic sites | 3 | 2 | 1 |
| Number of group picnic sites | 3 | 2 | 1 |
| Amount of swim areas | 3 | 2 | 1 |
| Number of equestrian facilities | 3 | 2 | 1 |
| Number of developed day use or picnic areas along the shore | 3 | 2 | 1 |
| Number of interpretive programs/educational opportunities | 3 | 2 | 1 |
| Number of restrooms | 3 | 2 | 1 |
| Number of food service sales sites | 3 | 2 | 1 |
| Number of merchandise sale sites | 3 | 2 | 1 |
| Number of laundry facilities | 3 | 2 | 1 |
| Number of playgrounds | 3 | 2 | 1 |
| Number of sports facilities | 3 | 2 | 1 |

## Camanche South Shore Recreation Area

### *Visitor Experience Perception*

The following question lists things you might or might not have experienced on your recent trip to East Bay Municipal Utility District's Recreation Area. For each item below, indicate how much of a problem you think the issue was at the recreation area you visited: (**Circle the appropriate number for each item**.). If you are uncertain about an item or the item does not apply, do not circle a number.

| Experience | A big problem | A moderate problem | A slight problem | Not a problem |
|---|---|---|---|---|
| ***Management*** | | | | |
| Litter along the shoreline | 4 | 3 | 2 | 1 |
| Sanitation along the shoreline | 4 | 3 | 2 | 1 |
| Cost to use facilities | 4 | 3 | 2 | 1 |
| Overall safety and security | 4 | 3 | 2 | 1 |
| Availability of service/staffing | 4 | 3 | 2 | 1 |
| Overall crowding | 4 | 3 | 2 | 1 |
| Adequate information/warnings provided | 4 | 3 | 2 | 1 |
| Adequacy of landscaping of facilities | 4 | 3 | 2 | 1 |
| Campground maintenance | 4 | 3 | 2 | 1 |
| Litter in campgrounds | 4 | 3 | 2 | 1 |
| Access to the shoreline | 4 | 3 | 2 | 1 |
| Litter in day use areas | 4 | 3 | 2 | 1 |
| Law enforcement presence | 4 | 3 | 2 | 1 |
| ***Water Conditions*** | | | | |
| Shallow areas during lower water levels | 4 | 3 | 2 | 1 |
| Floating debris in the water | 4 | 3 | 2 | 1 |
| Quality of water | 4 | 3 | 2 | 1 |
| Water level fluctuations | 4 | 3 | 2 | 1 |
| ***User Interactions*** | | | | |
| Numbers of watercraft | 4 | 3 | 2 | 1 |
| Noise from boats and personal watercraft | 4 | 3 | 2 | 1 |
| Boat speed or wake effects | 4 | 3 | 2 | 1 |
| Encounters between water skiers and others | 4 | 3 | 2 | 1 |
| Encounters between pleasure boaters & boat anglers | 4 | 3 | 2 | 1 |
| Encounters between jet skis and other users | 4 | 3 | 2 | 1 |
| Unsafe behavior by other users | 4 | 3 | 2 | 1 |
| Numbers of people at developed facilities | 4 | 3 | 2 | 1 |
| Use of alcohol by other users | 4 | 3 | 2 | 1 |
| Campground noise | 4 | 3 | 2 | 1 |
| Picnic area noise | 4 | 3 | 2 | 1 |
| Vandalism | 4 | 3 | 2 | 1 |
| Inappropriate dog use | 4 | 3 | 2 | 1 |
| Limited dog use | 4 | 3 | 2 | 1 |

### *Visitor Facility Perception*

How do you evaluate the following facilities at the recreation area where you were surveyed on your recent trip? Remember, each item listed pertains only to the recreation area visited. (**Circle the appropriate number for each item**). If you are uncertain about an issue, or it does not apply, do not circle a number.

| Facility | Too Few | About Right | Too Many |
|---|---|---|---|
| ***Camping Related*** | | | |
| Presence of campground hosts | 3 | 2 | 1 |
| Number of campgrounds | 3 | 2 | 1 |
| Number of campsites with RV hookups | 3 | 2 | 1 |
| Number of cottages | 3 | 2 | 1 |
| Number of group campsites | 3 | 2 | 1 |
| Screening between campsites | 3 | 2 | 1 |
| Number of shower facilities at campgrounds | 3 | 2 | 1 |
| Number of recycling stations | 3 | 2 | 1 |
| Number of RV dump stations | 3 | 2 | 1 |
| ***Boat Related*** | | | |
| Number of boat ramps | 3 | 2 | 1 |
| Number of docks or temporary moorage | 3 | 2 | 1 |
| Number of floating restrooms | 3 | 2 | 1 |
| Number of boat-in campsites | 3 | 2 | 1 |
| Number of marinas | 3 | 2 | 1 |
| Number of boat-in gas stations | 3 | 2 | 1 |
| Number of parking sites | 3 | 2 | 1 |
| Number of rental boats | 3 | 2 | 1 |
| ***Fishing/Hunting Related*** | | | |
| Number of fish cleaning stations | 3 | 2 | 1 |
| Number of fishing access sites | 3 | 2 | 1 |
| ***Other Activity Related*** | | | |
| Number of picnic sites | 3 | 2 | 1 |
| Number of group picnic sites | 3 | 2 | 1 |
| Amount of swim areas | 3 | 2 | 1 |
| Number of equestrian facilities | 3 | 2 | 1 |
| Number of developed day use or picnic areas along the shore | 3 | 2 | 1 |
| Number of interpretive programs/educational opportunities | 3 | 2 | 1 |
| Number of restrooms | 3 | 2 | 1 |
| Number of food service sales sites | 3 | 2 | 1 |
| Number of merchandise sale sites | 3 | 2 | 1 |
| Number of laundry facilities | 3 | 2 | 1 |
| Number of playgrounds | 3 | 2 | 1 |
| Number of sports facilities | 3 | 2 | 1 |

## Pardee Recreation Area

### *Visitor Experience Perception*

The following question lists things you might or might not have experienced on your recent trip to East Bay Municipal Utility District's Recreation Area. For each item below, indicate how much of a problem you think the issue was at the recreation area you visited: (**Circle the appropriate number for each item**.). If you are uncertain about an item or the item does not apply, do not circle a number.

| Experience | A big problem | A moderate problem | A slight problem | Not a problem |
|---|---|---|---|---|
| ***Management*** | | | | |
| Litter along the shoreline | 4 | 3 | 2 | 1 |
| Sanitation along the shoreline | 4 | 3 | 2 | 1 |
| Cost to use facilities | 4 | 3 | 2 | 1 |
| Overall safety and security | 4 | 3 | 2 | 1 |
| Availability of service/staffing | 4 | 3 | 2 | 1 |
| Overall crowding | 4 | 3 | 2 | 1 |
| Adequate information/warnings provided | 4 | 3 | 2 | 1 |
| Adequacy of landscaping of facilities | 4 | 3 | 2 | 1 |
| Campground maintenance | 4 | 3 | 2 | 1 |
| Litter in campgrounds | 4 | 3 | 2 | 1 |
| Access to the shoreline | 4 | 3 | 2 | 1 |
| Litter in day use areas | 4 | 3 | 2 | 1 |
| Law enforcement presence | 4 | 3 | 2 | 1 |
| ***Water Conditions*** | | | | |
| Shallow areas during lower water levels | 4 | 3 | 2 | 1 |
| Floating debris in the water | 4 | 3 | 2 | 1 |
| Quality of water | 4 | 3 | 2 | 1 |
| Water level fluctuations | 4 | 3 | 2 | 1 |
| ***User Interactions*** | | | | |
| Numbers of watercraft | 4 | 3 | 2 | 1 |
| Number of people at developed sites | 4 | 3 | 2 | 1 |
| Noise from boats | 4 | 3 | 2 | 1 |
| Boat speed or wake effects | 4 | 3 | 2 | 1 |
| Encounters between pleasure boaters & boat anglers | 4 | 3 | 2 | 1 |
| Encounters between float tubers, canoes, kayaks | 4 | 3 | 2 | 1 |
| Unsafe behavior by other users | 4 | 3 | 2 | 1 |
| Numbers of people at developed facilities | 4 | 3 | 2 | 1 |
| Use of alcohol by other users | 4 | 3 | 2 | 1 |
| Campground noise | 4 | 3 | 2 | 1 |
| Picnic area noise | 4 | 3 | 2 | 1 |
| Vandalism | 4 | 3 | 2 | 1 |
| Inappropriate dog use | 4 | 3 | 2 | 1 |
| Limited dog use | 4 | 3 | 2 | 1 |

### *Visitor Facility Perception*

How do you evaluate the following facilities at the recreation area where you were surveyed on your recent trip? Remember, each item listed pertains only to the recreation area visited. (**Circle the appropriate number for each item**). If you are uncertain about an issue, or it does not apply, do not circle a number.

| Facility | Too Few | About Right | Too Many |
|---|---|---|---|
| ***Camping Related*** | | | |
| Presence of campground hosts | 3 | 2 | 1 |
| Number of campgrounds | 3 | 2 | 1 |
| Number of campsites with RV hookups | 3 | 2 | 1 |
| Number of group campsites | 3 | 2 | 1 |
| Screening between campsites | 3 | 2 | 1 |
| Number of shower facilities at campgrounds | 3 | 2 | 1 |
| Number of recycling stations | 3 | 2 | 1 |
| Number of RV dump stations | 3 | 2 | 1 |
| ***Boat Related*** | | | |
| Number of boat ramps | 3 | 2 | 1 |
| Number of docks or temporary moorage | 3 | 2 | 1 |
| Number of floating restrooms | 3 | 2 | 1 |
| Number of boat-in campsites | 3 | 2 | 1 |
| Number of marinas | 3 | 2 | 1 |
| Number of boat-in gas stations | 3 | 2 | 1 |
| Number of parking sites | 3 | 2 | 1 |
| Number of rental boats | 3 | 2 | 1 |
| ***Fishing/Hunting Related*** | | | |
| Number of fish cleaning stations | 3 | 2 | 1 |
| Number of fishing access sites | 3 | 2 | 1 |
| ***Other Activity Related*** | | | |
| Number of picnic sites | 3 | 2 | 1 |
| Number of group picnic sites | 3 | 2 | 1 |
| Number of developed day use or picnic areas along the shore | 3 | 2 | 1 |
| Number of interpretive programs/educational opportunities | 3 | 2 | 1 |
| Number of restrooms | 3 | 2 | 1 |
| Number of food service sales sites | 3 | 2 | 1 |
| Number of merchandise sale sites | 3 | 2 | 1 |
| Number of laundry facilities | 3 | 2 | 1 |
| Number of playgrounds | 3 | 2 | 1 |
| Number of sports facilities | 3 | 2 | 1 |
| Number of garbage cans | 3 | 2 | 1 |

## Camanche Hills Hunt Preserve

### *Visitor Experience Perception*

The following question lists things you might or might not have experienced on your recent trip to East Bay Municipal Utility District's Recreation Area. For each item below, indicate how much of a problem you think the issue was at the recreation area you visited: (**Circle the appropriate number for each item**.). If you are uncertain about an item or the item does not apply, do not circle a number.

| Experience | A big problem | A moderate problem | A slight problem | Not a problem |
|---|---|---|---|---|
| ***Management*** | | | | |
| Cost to use facilities | 4 | 3 | 2 | 1 |
| Overall safety and security | 4 | 3 | 2 | 1 |
| Facilities maintenance | 4 | 3 | 2 | 1 |
| Grounds maintenance | 4 | 3 | 2 | 1 |
| Overall cleanliness | 4 | 3 | 2 | 1 |
| Availability of service/staffing | 4 | 3 | 2 | 1 |
| Overall crowding | 4 | 3 | 2 | 1 |
| Adequate information/warnings provided | 4 | 3 | 2 | 1 |
| Adequacy of landscaping of facilities | 4 | 3 | 2 | 1 |
| Litter | 4 | 3 | 2 | 1 |
| Law enforcement presence | 4 | 3 | 2 | 1 |
| Unsafe behavior by other users | 4 | 3 | 2 | 1 |
| Too many hunters | 4 | 3 | 2 | 1 |
| Hunters/shooters following rules | 4 | 3 | 2 | 1 |
| Use of alcohol by other users | 4 | 3 | 2 | 1 |
| Vandalism | 4 | 3 | 2 | 1 |

### *Visitor Facility Perception*

How do you evaluate the following facilities at the recreation area where you were surveyed on your recent trip? Remember, each item listed pertains only to the recreation area visited. (**Circle the appropriate number for each item**). If you are uncertain about an issue, or it does not apply, do not circle a number.

| Facility | Too Few | About Right | Too Many |
|---|---|---|---|
| Number of garbage cans | 3 | 2 | 1 |
| Number of recycling stations | 3 | 2 | 1 |
| Number of parking sites | 3 | 2 | 1 |
| Number of hunting sites | 3 | 2 | 1 |
| Number of shooting sites | 3 | 2 | 1 |
| Number of picnic sites | 3 | 2 | 1 |
| Number of group picnic sites | 3 | 2 | 1 |
| Number of restrooms | 3 | 2 | 1 |
| Number of food service sales sites | 3 | 2 | 1 |
| Number of merchandise sale sites | 3 | 2 | 1 |
| Hours of operation | 3 | 2 | 1 |
| Drinking water sources | 3 | 2 | 1 |

## Mokelumne River Day Use Area

### *Visitor Experience Perception*

The following question lists things you might or might not have experienced on your recent trip to East Bay Municipal Utility District's Recreation Area. For each item below, indicate how much of a problem you think the issue was at the recreation area you visited: (**Circle the appropriate number for each item**.). If you are uncertain about an item or the item does not apply, do not circle a number.

| Experience | A big problem | A moderate problem | A slight problem | Not a problem |
|---|---|---|---|---|
| ***Management*** | | | | |
| Litter along the shoreline | 4 | 3 | 2 | 1 |
| Sanitation along the shoreline | 4 | 3 | 2 | 1 |
| Overall safety and security | 4 | 3 | 2 | 1 |
| Overall crowding | 4 | 3 | 2 | 1 |
| Adequate information/warnings provided | 4 | 3 | 2 | 1 |
| Trail maintenance | 4 | 3 | 2 | 1 |
| Adequacy of landscaping of facilities | 4 | 3 | 2 | 1 |
| Boat launch maintenance | 4 | 3 | 2 | 1 |
| Trail condition | 4 | 3 | 2 | 1 |
| Access to the shoreline | 4 | 3 | 2 | 1 |
| Litter on trails | 4 | 3 | 2 | 1 |
| Litter in day use areas | 4 | 3 | 2 | 1 |
| Law enforcement presence | 4 | 3 | 2 | 1 |
| Encounters between trail users and other users | 4 | 3 | 2 | 1 |
| Numbers of watercraft | 4 | 3 | 2 | 1 |
| Unsafe behavior by other users | 4 | 3 | 2 | 1 |
| Use of alcohol by other users | 4 | 3 | 2 | 1 |
| Picnic area noise | 4 | 3 | 2 | 1 |
| Vandalism | 4 | 3 | 2 | 1 |
| Inappropriate dog use | 4 | 3 | 2 | 1 |
| Limited dog use | 4 | 3 | 2 | 1 |

### *Visitor Facility Perception*

How do you evaluate the following facilities at the recreation area where you were surveyed on your recent trip? Remember, each item listed pertains only to the recreation area visited. (**Circle the appropriate number for each item**). If you are uncertain about an issue, or it does not apply, do not circle a number.

| **Facility** | **Too Few** | **About Right** | **Too Many** |
|---|---|---|---|
| Number of garbage cans | 3 | 2 | 1 |
| Number of recycling stations | 3 | 2 | 1 |
| Number of parking sites | 3 | 2 | 1 |
| Number of fishing access sites | 3 | 2 | 1 |
| Number of boat launch sites | 3 | 2 | 1 |
| Number of picnic sites | 3 | 2 | 1 |
| Number of group picnic sites | 3 | 2 | 1 |
| Number of interpretive programs/educational opportunities | 3 | 2 | 1 |
| Number of restrooms | 3 | 2 | 1 |
| Number of hiking trails | 3 | 2 | 1 |
| Number of signs indicating trail locations | 3 | 2 | 1 |
| Number of loop trails | 3 | 2 | 1 |
| Drinking water sources | 3 | 2 | 1 |
| Hours of operation | 3 | 2 | 1 |

## Trails

### *Visitor Experience Perception*

The following question lists things you might or might not have experienced on your recent trip to East Bay Municipal Utility District's Recreation Area. For each item below, indicate how much of a problem you think the issue was at the recreation area you visited: (**Circle the appropriate number for each item**.). If you are uncertain about an item or the item does not apply, do not circle a number.

| Experience | A big problem | A moderate problem | A slight problem | Not a problem |
|---|---|---|---|---|
| Cost to use facilities | 4 | 3 | 2 | 1 |
| Overall safety and security | 4 | 3 | 2 | 1 |
| Overall crowding | 4 | 3 | 2 | 1 |
| Adequate information/warnings provided | 4 | 3 | 2 | 1 |
| Trail maintenance | 4 | 3 | 2 | 1 |
| Trail condition | 4 | 3 | 2 | 1 |
| Litter on trails | 4 | 3 | 2 | 1 |
| Law enforcement presence | 4 | 3 | 2 | 1 |
| Encounters between trail users and other users | 4 | 3 | 2 | 1 |
| Unsafe behavior by other users | 4 | 3 | 2 | 1 |
| Use of alcohol by other users | 4 | 3 | 2 | 1 |
| Trail conflicts | 4 | 3 | 2 | 1 |
| Vandalism | 4 | 3 | 2 | 1 |
| Inappropriate dog use | 4 | 3 | 2 | 1 |
| Limited dog access | 4 | 3 | 2 | 1 |

### *Visitor Facility Perception*

How do you evaluate the following facilities at the recreation area where you were surveyed on your recent trip? Remember, each item listed pertains only to the recreation area visited. (**Circle the appropriate number for each item**). If you are uncertain about an issue, or it does not apply, do not circle a number.

| Facility | Too Few | About Right | Too Many |
|---|---|---|---|
| Number of hiking trails | 3 | 2 | 1 |
| Number of signs indicating trail locations | 3 | 2 | 1 |
| Number of equestrian trails | 3 | 2 | 1 |
| Number of trail heads | 3 | 2 | 1 |
| Number of loop trails | 3 | 2 | 1 |
| Number of garbage cans | 3 | 2 | 1 |
| Number of restrooms | 3 | 2 | 1 |
| Drinking water sources | 3 | 2 | 1 |
| Number of horse troughs | 3 | 2 | 1 |
| Number of trail signs | 3 | 2 | 1 |
| Parking for vehicles | 3 | 2 | 1 |

# Appendix B. Recreation Facility Capacities

The following tables list the boat capacity targets for Camanche and Pardee reservoirs and the facility capacities at the Recreation Management Units in the Mokelumne Watershed.

**Table B-1. Daily boat capacity targets at Camanche and Pardee Reservoirs**

| CAMANCHE RESERVOIR | | PARDEE RESERVOIR | |
|---|---|---|---|
| RESERVOIR ELEVATION | DAILY BOAT CAPACITY | RESERVOIR ELEVATION | DAILY BOAT CAPACITY |
| 120 | 50 | 450 | 126 |
| 125 | 66 | 455 | 135 |
| 130 | 84 | 460 | 144 |
| 135 | 100 | 465 | 155 |
| 140 | 116 | 470 | 166 |
| 145 | 133 | 475 | 177 |
| 150 | 154 | 480 | 190 |
| 155 | 175 | 485 | 209 |
| 160 | 196 | 490 | 227 |
| 165 | 225 | 495 | 240 |
| 170 | 262 | 500 | 252 |
| 175 | 302 | 505 | 264 |
| 180 | 343 | 510 | 277 |
| 185 | 385 | 515 | 290 |
| 190 | 423 | 520 | 304 |
| 195 | 461 | 525 | 317 |
| 200 | 500 | 530 | 331 |
| 205 | 537 | 535 | 344 |
| 210 | 575 | 540 | 359 |
| 215 | 612 | 545 | 374 |
| 220 | 646 | 550 | 390 |
| 225 | 678 | 555 | 405 |
| 230 | 710 | 560 | 421 |
| 235 | 744 | 565 | 436 |
| 240 | 775 | 570 | 451 |

**Table B-2. Day Use capacities at the Recreation Management Units**

| Recreation Management Unit | Daily Capacity |
|---|---|
| Camanche North Shore Recreation Area | 400 vehicles |
| Camanche South Shore Recreation Area | 450 vehicles |
| Pardee Recreation Area | 445 vehicles |
| Middle Bar Takeout | 25 vehicles |
| Mokelumne River Day Use Area | 120 vehicles |
| Trails | |
| Campo Seco Staging Area | 20 trucks w/trailers<br>40 cars |
| Camanche South Shore Staging Area | 8 trucks w/trailers<br>16 cars |
| China Gulch Staging Area | 10 trucks w/trailers<br>20 cars |
| Middle Bar Takeout/Staging Area | 25 vehicles |
| Rich GulchTrail Access Point | 8 vehicles |

**Table B-3. Campground capacities at the Recreation Management Units**

| Recreation Management Unit | Daily Campers | Campsites |
|---|---|---|
| Camanche North Shore Recreation Area | 2,100 | 244 |
| Camanche South Shore Recreation Area | 2,324 | 250 |
| Turkey Hill Equestrian/Group Campground | 128 | 8 |
| Pardee Recreation Area | 776 | 91 |

# Appendix C. Measures to Recycle, Reuse, and Conserve

**WATER CONSERVATION**

- Water lawn and garden in the morning or evening when temperatures are cooler to minimize evaporation.
- Replace the showerhead with a water-efficient model.
- Split landscape watering time into shorter periods to allow for better absorption.
- Shorten your shower by a minute or two and you'll save up to 150 gallons per month.
- Collect water from roof to water landscaping.
- Designate one glass for your drinking water each day or refill a water bottle.
- Water plants deeply but less frequently to encourage deep root growth and drought tolerance.
- Use a commercial car wash that recycles water.
- Make sure there are water-saving aerators on all of your faucets.
- Install an instant water heater near the kitchen sink so you don't have to run the water while it heats up.
- Insulate hot water pipes for more immediate hot water at the faucet and for energy savings.
- Use reclaimed wastewater for irrigation and industrial uses.
- If your toilet was installed before 1992, reduce the amount of water used for each flush by inserting a displacement device in the tank.
- Use discarded ice to water landscaping.
- Install flow reduction devices and automatic controls that meet standards of less than 1.5 gallons per minute (gpm) on faucets and less than 2.5 gpm on showerheads.
- Install high-efficiency toilets that use less than 1.5 gallons per flush (gpf) such as those with dual-flush mechanisms or pressure-assist models.
- Choose toilets that rate high in testing programs for waste removal thresholds.
- Install high efficiency urinals that are with less than 0.5 gpf or water free.
- Limit impervious surfaces. Install permeable substitutes for walkways, gathering spaces and common areas because of their ability to help control stormwater drainage and retain less heat.
- Utilize drip irrigation systems with low flow emitters where practical.
- Use coin operated showers.
- Install a recirculation pump to circulate hot water quickly and efficiently through buildings/facilities.
- Install self closing faucets.
- Repair/replace leaky faucet and valves.
- Use garden hoses coupled with shut off spray nozzle.

**ENERGY USE**

- Use compact fluorescent (CFL) or T8 or T5 linear fixtures instead of incandescent fixtures. Select longer-life linear fluorescent lamps with a minimum of 12,000 hours rated life.
- Ensure the ballasts are electronic (as opposed to magnetic) for higher efficiency and better light quality.
- Install LED (light emitting diode) and ENERGY STAR exit signs—they consume around 2 watts per fixture, as opposed to 10 or 40 watts for typical incandescent and fluorescent products.
- Use replacement lamps with low mercury content. Specify low-mercury lamps.
- Some manufacturers offer fluorescent lamps that contain only a fraction of the mercury used in standard fluorescent lamps.
- Clean fixtures and lamps to get more light. Use a soft, moist (to prevent static) cotton cloth, soft-bristled brushes with anti-static material or a low-powered hand vacuum to clean fixtures and lamps. Avoid using disposable cleaning materials such as paper towels.
- Because of the mercury contained in most lighting products, and the toxicity of mercury, it is important that lamps are disposed of or recycled properly as a hazardous waste.
- Unplug seldom-used appliances, like an extra refrigerator in the basement or garage that contains just a few items. You may save around $10 every month on your utility bill.
- Unplug your chargers when you're not charging. Every house is full of little plastic power supplies to charge cell phones, PDA's, digital cameras, cordless tools and other personal gadgets. Keep them unplugged until you need them.
- Use power strips to switch off televisions, home theater equipment, and stereos when you're not using them. Even when you think these products are off, together, their "standby" consumption can be equivalent to that of a 75 or 100 watt light bulb running continuously.
- Enable the "sleep mode" feature on your computer, allowing it to use less power during periods of inactivity. In Windows, the power management settings are found on your control panel.
- Configure your computer to "hibernate" automatically after 30 minutes or so of inactivity. The "hibernate mode" turns the computer off in a way that doesn't require you to reload everything when you switch it back on. Allowing your computer to hibernate saves energy and is more time-efficient than shutting down and restarting your computer from scratch. When you're done for the day, shut down.
- Set your thermostat in winter to 68 degrees or less during the daytime, and 55 degrees before going to sleep (or when you're away for the day). During the summer, set thermostats to 78 degrees or more.
- Use sunlight wisely. During the heating season, leave shades and blinds open on sunny days, but close them at night to reduce the amount of heat lost through windows. Close shades and blinds during the summer or when the air conditioner is in use or will be in use later in the day.

- Set the thermostat on your water heater between 120 and 130 degrees. Lower temperatures can save more energy.
- Set your refrigerator temperature at 38 to 42 degrees Fahrenheit; your freezer should be set between 0 and 5 degrees Fahrenheit. Use the power-save switch if your fridge has one, and make sure the door seals tightly. You can check this by making sure that a dollar bill closed in between the door gaskets is difficult to pull out. If it slides easily between the gaskets, replace them.
- Don't forget to flick the switch when you leave a room.
- Remember this at the office, too. Turn out or dim the lights in unused conference rooms, and when you step out for lunch. Work by daylight when possible. A typical commercial building uses more energy for lighting than anything else.
- Wrap your water heater in an insulating jacket.
- Install shades, awnings or sunscreens on windows facing south and/or west to block summer light. In winter, open shades on sunny days to help warm rooms.
- Convert facilities to solar power or solar assist when feasible.
- Install lighting with motion sensors to minimize waste or lighting that has a sensor to come on at night and go off during the day.
- Install foam gaskets on the backside of electrical outlets to minimize heat loss and infiltration of cold air.
- Use wind turbines to evacuate heat.
- Use a programmable thermostat.
- Use ceiling fans, whole house fans, swamp coolers in lieu of air conditioning.
- Use electric hand dryers instead of paper towels.
- Use reflective films on windows to reduce heat buildup within buildings/facilities.
- Use Natural gas or propane appliances vs. electric appliances.
- Periodically remove dust build up from compressor coils so appliances operate more efficiently and use less energy.
- Install a heat pump instead of using space heaters.

**BUILDING/FACILITY MAINTENANCE**

- Select light and moderate paint tints. Some manufacturers only offer low-VOC paints in the light and moderate tints. VOC ratings are generally reported for the base paint before the product is tinted. Most tints are synthetic and add some VOCs, although a few brands have true zero-VOC tints.
- Purchase interior paints with the following VOC limits before colorants are added to bases:
  - Non-flat: 150 grams/liter (g/l)
  - Flat: 50 g/l.
- Purchase water-based (latex) paint over oil-based when appropriate.
- Select recycled content latex paint for exteriors. Recycled paint is mixed with virgin materials to meet quality standards for consistency and color. The U.S. EPA recommends 20 percent postconsumer recycled content for white and light colors of latex paint and 50-99 percent for dark colors of latex paint. Recycled content paints are not recommended for interior use since the VOC content levels are typically higher than recommended VOC limits.

- Avoid aerosol paint.
- Replace appliances with those with the ENERGY STAR label.
- Set up a regular cleaning and inspection schedule for filters, ducts, and intake and exhaust fans. Maintaining a uniform airflow and low filter face velocity can increase the efficiency of the filtering system. Choose a reusable filter medium such as bag or wet filters where possible to minimize waste.
- Avoid the use of cleaning chemicals outdoors. Instead, use non-toxic alternatives for pressure washing, painting, moss removal, cleaning up minor oil leaks and equipment washing.
- Use construction products made with postconsumer recycled content materials according to the U.S. Environmental Protection Agency's Comprehensive Procurement Guidelines (CPG).
- Use recreation products made with postconsumer recycled content materials according to the U.S. Environmental Protection Agency's Comprehensive Procurement Guidelines (CPG).

**OFFICE SUPPLIES and OPERATIONS**

- Use paper and non-paper office products made with postconsumer recycled content materials according to the U.S. Environmental Protection Agency's Comprehensive Procurement Guidelines (CPG).
- Specify cleaning products and supplies that meet the standards of Green Seal (GS-37, GS-40 or GS-41).
- Consider adopting applicable procedures and practices in the Green Seal Environmental Standard for Cleaning Services (GS-42).
- Specify recyclable, recycled content and/or reusable packaging.
- Consider reducing the total number of stocked cleaning products by using multiuse cleaners in concentrated formulas.
- Consider not using trash can liners, to the greatest extent practicable.
- Make double-sided copies. Require contractors to submit double-sided bid documents.
- Where practical, work with your suppliers, vendors and business partners to reduce disposable packaging.
- Replace disposable products. Use coffee mugs, cutlery and crockery in place of paper and plastic items. Wherever you can, substitute reusable products for single-use products such as paper towels.
- Use rechargeable batteries.
- Use rechargeable toner cartridges in your printers.
- Consider replacing your fax machine with a plain paper model. A traditional thermal fax paper is not readily recyclable.
- Reuse single-sided paper. Have it made into note pads or use it for copy drafts.
- Reuse file folders, envelopes and boxes.
- Reuse packaging containers, polystyrene packaging "peanuts" and bags.
- Donate obsolete equipment and furniture to charitable organizations instead of throwing them away.

- Salvage building materials for re-use.
- Get off unwanted mailing lists.

**LANDSCAPING**

- When replanting, select California native species or Mediterranean plants appropriate to the site and adapted to the region's annual rainfall.
- Mulch regularly. Mulch conserves water, enhances the growth of plants and improves the appearance of the landscape.
- Compost plant debris. Separate plant debris for on-site composting, or delivery to a composting or processing facility.
- Purchase compost that is produced from feedstock that includes at least 50%, by volume, regionally generated plant debris and/or food scraps. Also specify that compost has less than 0.5% physical contaminants (by volume). The compost should be processed in accordance with California Code of Regulations, Title 14, Chapter 3, Article 7, Sections 17868.2-3 to promote pathogen reduction and weed seed kill and minimize heavy metal concentrations.
- Avoid synthetic quick-release fertilizers. Slow release fertilizers make nutrients available to the plants when they are needed, so their efficiency increases and they are therefore often a better value.
- Minimize the use of chemical pesticides. Minimizing pesticides reduces water pollution and help support soil life, promoting resistance to plant disease.
- Use landscaping products made with postconsumer recycled content materials according to the U.S. Environmental Protection Agency's Comprehensive Procurement Guidelines (CPG).

**CONCESSIONAIRES**

- Require measures above.
- Require the use of recyclable plastic labeled 1 (PETE), 2 (HDPE) and 4 (LDPE) when feasible and avoid plastics labeled 3 (PVC), 5 (PP), 6 (PS), and 7 (OTHER) which are not readily recyclable.
- Prohibit the use of all polystyrene (Styrofoam) containers.
- Require concessionaires to submit double-sided documents.
- Prohibit the sale of lead fishing sinkers.
- Continue District recycling efforts within our Recreation Areas (glass, plastic, aluminum).
- Recycle cardboard.
- Continued disposal of hazardous wastes for recycling purposes (batteries, paint, solvents, etc).
- Recycling of rubber tires of various sizes.
- Chipping of plant materials to the extent possible (tree branches, limbs, shrubs, etc).
- Encouraging the recycling of discarded metal products.
- Encourage the use of organic herbicide.
- Installation of recycling containers for monofilament fishing line.
- Specify recyclable, recycled content bait containers (worms, grubs, etc).