

Section 3: Nitrate Compliance

Chapter 4 IMPLEMENTATION in the Basin Plan includes a section (GUIDELINES FOR NEW COMMUNITY AND INDIVIDUAL SEWAGE FACILITIES) addressing individual septic systems. Septic and leach field systems serving five (5) or less family units and commercial or industrial projects with flows 100 gallons per day or less will be deferred to the appropriate county health officer. Community systems with flows greater than 1200 gallons per day and serving more than five family units may be deferred to the appropriate county health officer if certain conditions are met.

The District flows were estimated to average 2540 gallons per day (gpd) annually with peak day flows up to 8,000 gpd based on records for 2001. Order No. R9-2004-0015 prohibits maximum daily flows greater than 8,000 gpd. The holding tank, septic tank and leach field was approved for a maximum day flow rate of 8,000 gallons per day.

Over the last two and one half years, the District has implemented a conservation plan that has reduced wastewater flows to 1600 gallons per day (average daily rate). Wastewater flow reduction has occurred by installing water conservation devices in rest rooms and recreation vehicle holding wastes are no longer accepted (as required in Order No. R9-2004-0015). Peak flows are much lower than the previous maximum day rates of 8,000 gpd.

The district proposes to reduce the average flow rates to 1200 gallons per day (average annual rate). This will be accomplished by implementing additional water conservation plans to the maximum extent possible and hauling wastewater flows to appropriate sewer systems to meet the annual flow limitation. A daily peak flow rate of 4,000 gpd to accommodate peak holiday periods is requested.

3.1 Meeting Basin Plan Requirements

To ensure compliance with the Basin Plan objective for nitrate (5 mg/l as NO₃), the approach included in Section 4 is proposed. This approach requires sufficient land area for septic-leach field systems to provide sufficient mixing with recharge water provided by precipitation to meet the objective. This section identifies a set aside for the District septic system discharge.

Figure 4-1 REQUIRED RECHARGE RATES TO MAINTAIN 10 MG/L N NITRATE STANDARD Section 4, Basin Plan was developed from information provided in the report entitled *Technical Report Review of Subsurface Wastewater Disposal Policy San Diego Regional Water Quality Control Board* (David Huntley, 30 September 1987). The Huntley report documents impacts on groundwater from septic systems and was used by the Regional Board to establish guidelines for new community and individual systems.

The Huntley report references a County of San Diego Groundwater policy in effect when the report was prepared. Table 1 (page 13) in the Huntley report identifies minimum lot sizes based on precipitation rates and corresponding recharge rates. The report also concludes the concentration of nitrate in leachate reaching the groundwater to be in the 30 to 40 mg/l range (page 11). The data provided in Figure 1 (Basin Plan) identifies a range of 30 to 50 mg/l nitrate in septic tank effluent as it reaches groundwater.

The Report of Waste Discharge for Lake Cuyamaca Recreation and Park District Wastewater Infiltration Disposal System (Kenney/Jenks Consultants, 2002) reported an average annual rainfall of 35 inches per year based on data obtained from Helix Water District (Helix). Updated information has been obtained from Helix and the 30 year average rainfall for the Lake Cuyamaca area is 35.14 inches per year. The recharge rate included in Table 1 for precipitation greater than 24 inches (Huntley 1987) is 0.5 acre feet per acre pre year (ac-ft/yr).

The higher value of leachate effluent nitrate level (50 mg/l) has been used in this analysis.

The District has developed a memorandum of understanding with California State Parks, Colorado Desert District that identifies an area set aside as a Septic System Limitation Zone. The total area included in the limitation zone is 263 acres as shown on Figure 3.1. The area includes that portion of the District site located in the Lake Cuyamaca drainage (32 acres) and 231 acres.

Table 5 identifies presents a calculation of nitrate concentration as recharge water mixed with septic system effluent reaches the groundwater.

Table 5: Nitrate Mixing Calculations

DATA COMPONENTS	VALUES
Limitation Zone Area (acres)	263
Annual Rainfall (inches)	35.14
Recharge Rate (ac-ft/ac)	0.50
Recharge Volume (acre ft)	130.6
Average Annual Effluent Rate (gpd)	1200
Effluent Nitrate Concentration (mg/l)	50
Groundwater Nitrate Concentration (mg/l as N)	0.51 mg/l

As shown in Table 5, the calculated concentration of nitrate in groundwater mixed with recharge water is 0.51 mg/l as N (2.3 mg/l as NO₃), well below the Basin Plan objective of 5.0 mg/l as NO₃.

A summary of recorded run off into Lake Cuyamaca is provided in Table 6. The data is taken from information provided by Helix and provides a comparison of the 0.5 ac-ft/yr recharge rate referenced in the Huntley report with the average runoff and average total precipitation in the Lake Cuyamaca area.

Table 6: Lake Cuyamaca Runoff Data summary

DATA COMPONENTS	VALUES
Annual Average Rainfall (ft)	2.93
Drainage Area (acres)	8,320
Total Annual Precipitation (ac-ft)	24,364
Annual Lake Evaporation (ac-ft)	300
Annual Diversion to El Capitan Reservoir (ac-ft)	2,600
Evaporation and Runoff (ac-ft)	2,900
Evaporation and Diversion (% of Total precipitation)	11.9
Evaporation and Diversion (ft)	0.35

The data in Table 6 presents the annual average portion of precipitation that is collected in Lake Cuyamaca and either released to the stream below the dam or lost to evaporation. This is provided to compare the recharge rate used in the mixing calculations (0.5 ac-ft) with average precipitation. The total average rainfall (2.93 ac-ft/yr) results in recharge, runoff and water lost to evapotranspiration. The evapotranspiration component is calculated to be 2.08 feet (2.93 feet less 0.85 feet).

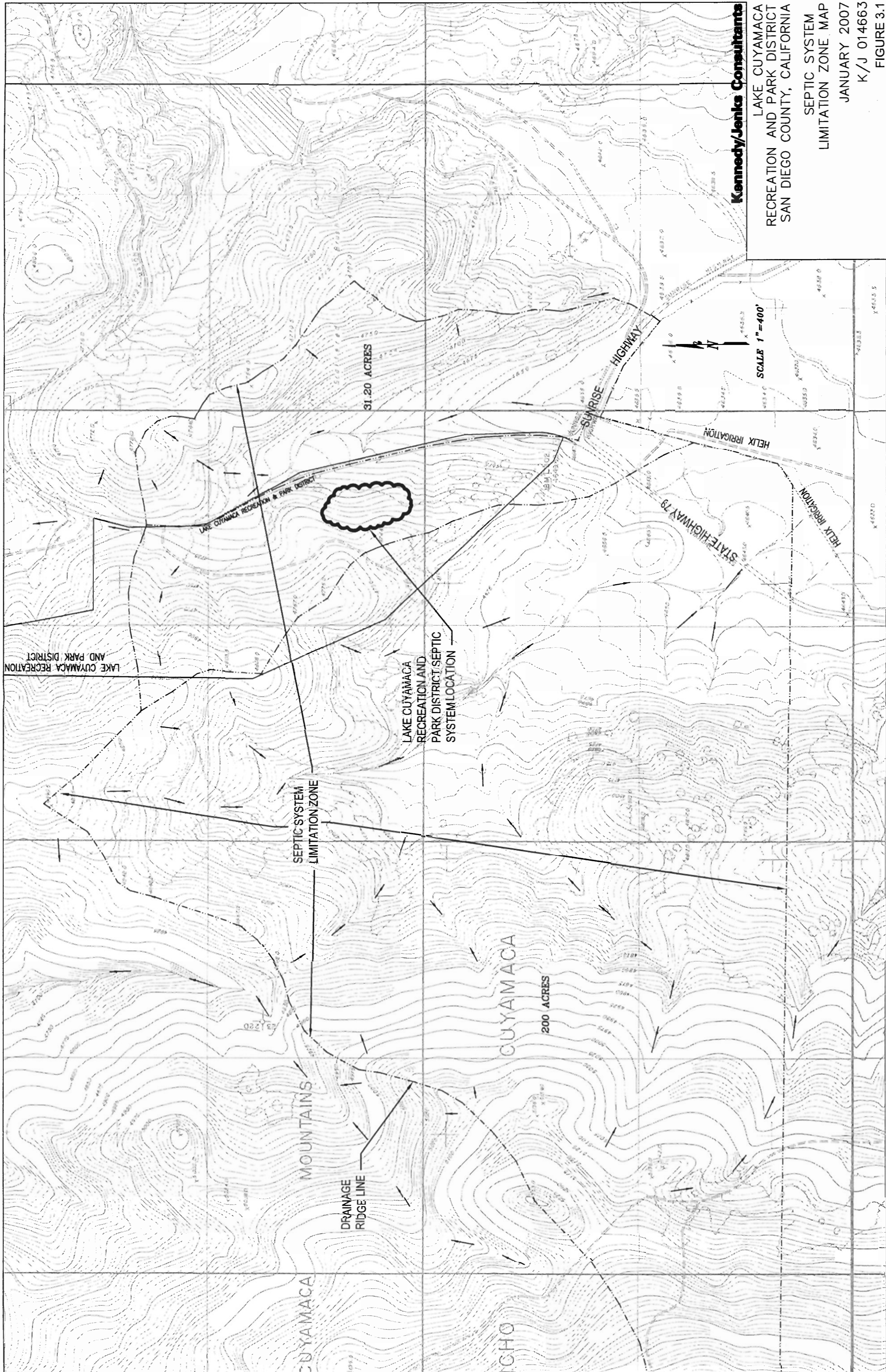
The 263 acres included in the septic system limitation zone provides a safety factor of slightly of 2 for mixing of recharge water and septic system effluent with respect to nitrate concentrations.

3.2 Septic Limitation Zone and State Parks Agreement

The District and California State Parks, Colorado Desert District have entered into a memorandum of understanding (MOU) (see Appendix C). By entering into this both agencies have agreed the 263 acres surrounding the District septic system is required to provide adequate mixing of effluent and recharge to ensure compliance with Nitrate objectives in the Basin Plan for local groundwater. No additional septic systems will be constructed within this zone.

The MOU also requires the District to discontinue discharge on the existing surface spreading site owned by California State Parks.

The MOU specifies a total of 263 acres as shown on Figure 3.1. The District parcel includes 32 acres and 231 acres are land owned by California State Parks , Colorado Desert District.



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LAKE CUYAMACA
RECREATION AND PARK DISTRICT
SAN DIEGO COUNTY, CALIFORNIA

SEPTIC SYSTEM
LIMITATION ZONE MAP

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FIGURE 3.1