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California Regional Water Quality Control Board
Central Valley Region

Water Quality Control Plan for the Tulare Lake Basin
Second Edition - 1995

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Water Quality Control Plan for the Tulare Lake Basin

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FOREWORD TO THE SECOND EDITION

Water quality control plans, or basin plans, contain California's administrative policies and procedures for protecting state waters. Basin plans are required by the state Porter-Cologne Water Quality Control Act (California Water Code Section 13240). In addition, Section 303 of the federal Clean Water Act requires states to adopt water quality standards that "consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses."

Each of California's nine regional water quality control boards must formulate and adopt a basin plan for all areas within its region. The basin plans must conform with statewide policy set forth by the legislature and by the State Water Resources Control Board. Basin plans consist of designated beneficial uses to be protected, water quality objectives to protect those uses, and a program of implementation needed for achieving the objectives {California Water Code, Section 13050(j)}.

Beneficial uses, together with their corresponding water quality objectives, meet federal regulatory criteria for water quality standards. Hence, California's basin plans serve as regulatory references for meeting both State and federal requirements for water quality control {40 CFR Parts 130 and 131}. One significant difference between the state and federal programs is that California's basin plans establish standards for ground waters in addition to surface waters.

Basin plans are adopted and amended by regional water boards under a structured process involving full public participation and state environmental review. Basin plans and amendments do not become effective until approved by the State Water Board. Regulatory provisions must be approved by the Office of Administrative Law. Adoption or revision of surface water standards are subject to the approval of the U. S. Environmental Protection Agency before they become accepted standards for the federal program.

Basin plans complement water quality control plans adopted by the State Water Board. It is the intent of the state and regional water boards to maintain basin plans in an updated and readily available edition that reflects all current water quality control programs.

The first edition of this *Water Quality Control Plan for the Tulare Lake Basin* (Basin Plan) was adopted by the California Regional Water Quality Control Board, Central Valley Region, on 25 July 1975, and became effective following approval by the State Water Board on 21 August 1975 and the U. S. Environmental Protection Agency (EPA) in June 1976. Although several revisions have been adopted and approved since 1975, this revision is the first complete rewrite of the text of the Basin Plan.

Regional Water Board resolutions adopted prior to 17 August 1995, that revise or supplement the first edition of the plan which are not expressly incorporated by reference into the second edition of the plan are superceded.

In this Basin Plan, "Regional Water Board" refers to the Central Valley Regional Water Quality Control Board and "State Water Board" refers to the State Water Resources Control Board.

I. INTRODUCTION

BASIN DESCRIPTION

The Central Valley Region includes about 40% of the land in California and stretches from the Oregon border to the Kern County/Los Angeles County line. It is bound by the Sierra Nevada Mountains on the east and the Coast Range on the west. The Region is divided into three basins: the Sacramento River Basin, the San Joaquin River Basin, and the Tulare Lake Basin. This basin plan covers only the Tulare Lake Basin. The Sacramento River Basin and the San Joaquin River Basin are covered in a separate basin plan.

The Tulare Lake Basin comprises the drainage area of the San Joaquin Valley south of the San Joaquin River (See Figure I-1).

> Note: In 1976, the U. S. Geologic Survey, the Department of Water Resources, and the State Water Resources Control Board agreed upon the hydrologic boundaries for basins within California. The agreed boundaries did not match the planning boundaries in certain cases such as between the San Joaquin River Basin and the Tulare Lake Basin. The planning boundary between the San Joaquin River Basin and the Tulare Lake Basin follows the northern boundary of Little Panoche Creek basin, continues eastward along the channel of the San Joaquin River to Millerton Lake in the Sierra Nevada foothills, and then follows along the southern boundary of the San Joaquin River drainage basin.

Surface water from the Tulare Lake Basin only drains north into the San Joaquin River in years of extreme rainfall. This essentially closed basin is situated in the topographic horseshoe formed by the Diablo and Temblor Ranges on the west, by the San Emigdio and Tehachapi Mountains on the south, and by the Sierra Nevada Mountains on the east and southeast.

The Basin encompasses approximately 10.5 million acres, of which approximately 3.25 million acres are in federal ownership. Kings Canyon and Sequoia National Parks and substantial portions of Sierra, Sequoia, Inyo, and Los Padres National Forests are included in the Basin. Valley floor lands (i.e., those having a land slope of less than 200 feet per mile) make up slightly less than one-half of the total basin land area. The maximum length and width of the Basin are about 170 miles and 140 miles, respectively. The valley floor is approximately 40 miles in width near its southern end, widening to a maximum of 90 miles near the Kaweah River.

Urban development is generally confined to the foothill and eastern valley floor areas. Major concentrations of population occur in or near the metropolitan areas of Bakersfield, Fresno, Porterville, Hanford, Tulare, and Visalia.

The Basin is one of the most important agricultural centers of the world. Industries related to agriculture, such as food processing and packaging (including canning, drying, and wine making), are prominent throughout the area. Producing and refining petroleum lead non-agricultural industries in economic importance.

Surface water supplies tributary to or imported for use within the Basin are inadequate to support the present level of agricultural and other development. Therefore, ground water resources within the valley are being mined to provide additional water to supply demands. Water produced in extraction of crude oil is used extensively to supplement agricultural irrigation supply in the Kern River sub-basin.

The Kings, Kaweah, Tule, and Kern Rivers, which drain the west face of the Sierra Nevada Mountains, are of excellent quality and provide the bulk of the surface water supply native to the Basin. Imported surface supplies, which are also of good quality, enter the Basin through the San Luis Canal/California Aqueduct System, Friant-Kern Canal, and the Delta-Mendota Canal. Adequate control to protect the quality of these resources is essential, as imported surface water supplies contribute nearly half the increase of salts occurring within the Basin.

Buena Vista Lake and Tulare Lake, natural depressions on the valley floor, receive flood water from the major rivers during times of heavy runoff. During extremely heavy runoff, flood flows in the Kings River reach the San Joaquin River as surface outflow through the Fresno Slough. These flood flows represent the only significant outflows from the Basin.

Besides the main rivers, the basin also contains numerous mountain streams. These streams have been administratively divided into eastside streams and westside streams using Highway 58 from Bakersfield to Tehachapi. Streams from the Tehachapi and San Emigdio Mountains are grouped with westside streams. In contrast to eastside streams, which are fed by Sierra snowmelt and springs from granitic bedrock, westside streams derive from marine sediments and

are highly mineralized, and intermittent, with sustained flows only after extended wet periods.

Surface water hydrologic units within the Tulare Lake Basin have been defined and numbered by the Department of Water Resources, as shown on Figure II-1. Eastside streams are surface waters in hydrologic units 552, 553, 554, and 555. Westside streams are surface waters in hydrologic units 556 and 559 and portions of 541 and 542. Valley floor waters are surface waters in hydrologic units 551, 557, and 558. All natural surface waters within the Basin have designated beneficial uses (See Table II-1).

Normally all native surface water supplies, imported water supplies, and direct precipitation percolate into valley ground water if not lost through consumptive use, evapotranspiration, or evaporation.

Ground water is defined as subsurface water that occurs beneath the ground surface in fully saturated zones within soils and other geologic formations. Where ground water occurs in a saturated geologic unit that contains sufficient permeability and thickness to yield sufficient water to sustain a well or spring, it can be defined as an aquifer {USGS, Water Supply Paper 1988, 1972}. A ground water basin is define as a hydrogeologic unit containing one large aquifer or several connected and interrelated aquifers {Todd, Groundwater Hydrology, 1980}.

Major ground water basins underlie the valley floor, and there are scattered smaller basins in the foothill areas and mountain valleys. In many parts of the Basin, usable ground waters occur outside of these identified basins. There are water-bearing geologic units within ground water basins in the Basin that do not meet the definition of an aquifer. Therefore, for basin planning and regulatory purposes, the term "ground water" includes all subsurface waters that occur in fully saturated zones and fractures within soils and other geologic formations, whether or not these waters meet the definition of an aquifer or occur within identified ground water basins.

Generally, the quality and the beneficial uses of the deep ground waters remain the same as before man entered the valley. A few areas within the Basin have ground waters that are naturally unusable or of marginal quality for certain beneficial uses.

Because of the closed nature of the Tulare Lake Basin, there is little subsurface outflow. Thus, salts accumulate within the Basin due to importation and evaporative use of the water. The paramount water quality problem in the Basin is the accumulation of salts. This problem is compounded by the overdraft of ground water for municipal, agricultural, and industrial purposes, and the use of water from deeper formations and outside the basin which further concentrates salts within remaining ground water.

WASTE DISCHARGE TYPES

Discharges can be classified as point source or nonpoint source discharges. A point source discharge usually refers to waste emanating from a single, identifiable point. A nonpoint source discharge usually refers to waste emanating from diffused locations. Agricultural runoff may discharge to waters of the state from a pipe, but is treated as a nonpoint source.

Both sources may cause health hazards, contamination, and nuisance problems and both must be managed to reduce salt contributions. Point sources may be high in heavy metals and other toxic materials. Nonpoint source wastes traditionally contribute more dissolved minerals and sediments, but have also contaminated waters with pesticides. Nonpoint source discharges contribute the largest portion of the waste load to surface and ground water resources within the Tulare Lake Basin.

Effective water quality management requires more than control of point source discharges. It must respond to many factors such as water use, land use, social and economic needs, and various other activities within the Basin. Although only a few management actions involve facility construction of some kind, all involve some cost to society. The Regional Water Board has authority to control both categories of discharge, but the approach is less direct for nonpoint sources.

Not fitting either category are spills, leaks, above and under ground storage tanks, and other sites that discharge illegally and impact waters of the state. The Regional Water Board has authority to require investigation and cleanup of these sites.

Point Sources

Problems from point source wastes are highly identifiable and for several decades have been subject to regulation. However, they must still be actively managed to protect the state's waters. Regulated point sources include municipal wastewater, oil field wastewater, winery discharges, solid waste sites and other industrial discharges. These dischargers must apply for and obtain waste discharge requirements or a waiver.

Nonpoint Sources

Nonpoint sources include drainage and percolation from a variety of activities, such as agriculture, forestry, recreation, and storm runoff. Specific sources of nonpoint source pollution may be difficult to identify, treat, or regulate. The goal is to reduce the adverse impact of nonpoint source discharges on the Basin's water resources through better management of these activities.

Much of the nonpoint source pollutants originate from agriculture. The Basin's economy is dependent upon agriculture, which is dependent upon water. Water supplies are finite. Some ground water areas are being overdrafted and additional water is needed to sustain the present intensity of farming. When new lands are put under irrigation, or when cropping patterns are changed, the potential for eliminating overdraft may be lost. Efficient use and development of supplies within the Basin can provide some water to meet growth demands, but to alleviate the projected overdraft, imported water supplies will still be required. The imported water quality should be the highest quality possible to prolong and protect good quality ground water.

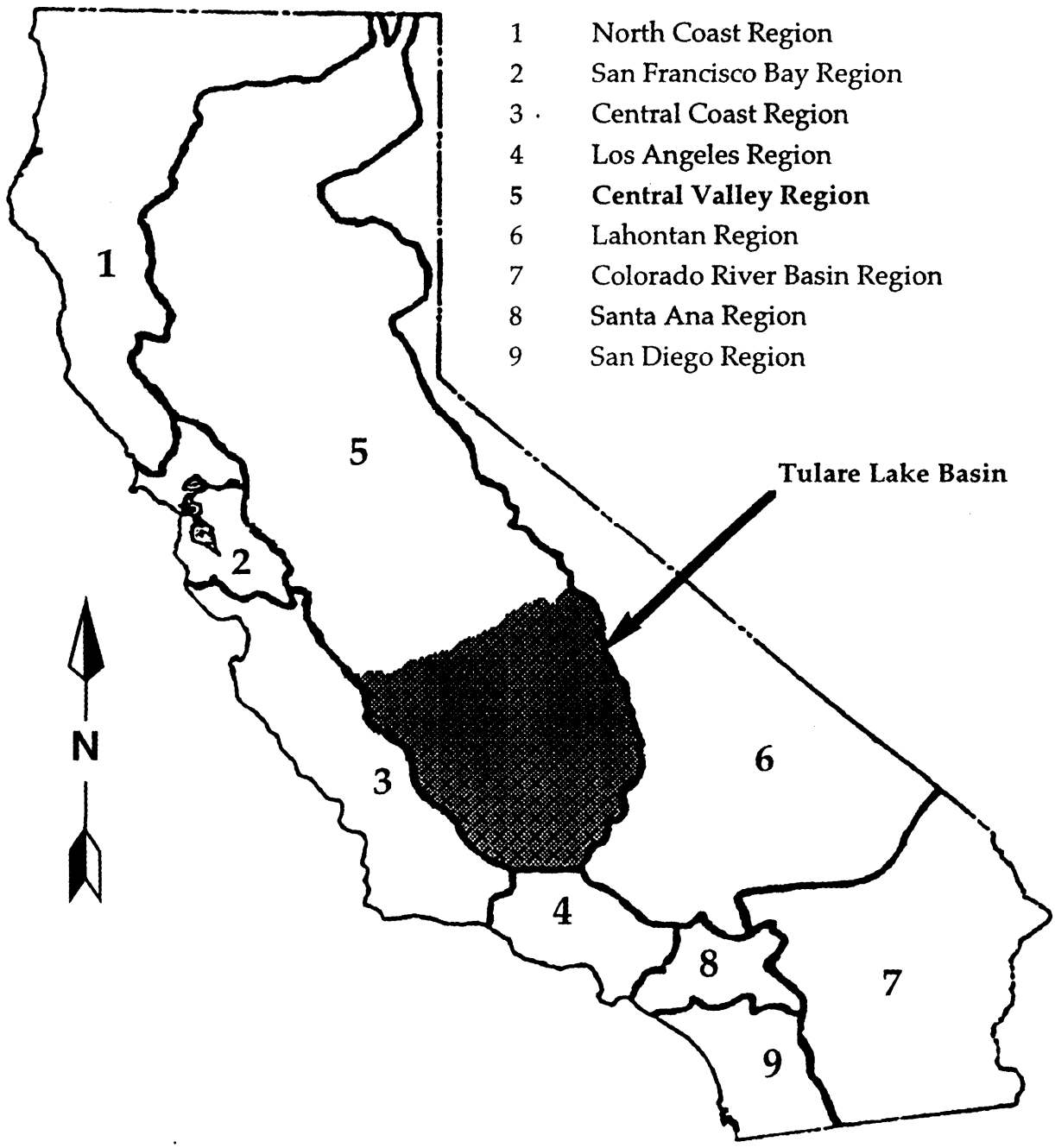
Adequate disposal of collected agricultural drainage water from subsurface drains is essential to sustain agriculture in some areas and provide water quality protection. The preferred and long deferred permanent solution of exporting drainage water to San Francisco Bay may not be feasible. In the interim, evaporation ponds are being used for disposal of these saline waters. However, the ponds have created an impact on wildlife that must be mitigated for this interim disposal option to remain viable.

Salinity increases in ground water can ultimately eliminate the beneficial use of the resource. This loss will not be immediate, but control of the increase is a major part of this plan. Salt loads reaching the ground water body must be reduced. Storage of salt in the soil through increased irrigation efficiency is being done, but is only a temporary solution. Current fertilization and soil amendment practices should be reviewed. Methods to control the leachate from newly developed lands should be studied.

Watersheds must be managed to protect water quality. This can be accomplished within the concept of multiple uses of resources. Esthetic, recreational, wildlife, and other uses should receive consideration. Two historical problems within the Tulare Lake Basin are poor sanitation associated with recreational use and erosion from construction, logging, grazing, and irrigated agriculture. Management of these activities has improved the situation and must continue to assure no significant adverse effect on pristine streams. Erodible material must be stabilized so that turbidity in streams will be of limited intensity and duration. Activities in stream protection zones must be regulated. Provisions should be made to protect fishery flow releases in designated reaches of streams.

Waste disposal from land developments and from animals in confinement must conform with guidelines. Most existing unsewered communities need not be sewered if individual waste systems are properly sited, operated and maintained. New developments must consider collection systems and should connect if within the sphere of influence of an established collection and treatment system. Septic tank pumpings must be treated and disposed of in a way that prevents impact to waters of the state.

FIGURE I-1
REGIONAL WATER QUALITY CONTROL BOARDS
TULARE LAKE BASIN LOCATION MAP



II. EXISTING AND POTENTIAL BENEFICIAL USES

Protection and enhancement of beneficial uses of water against quality degradation is a basic requirement of water quality planning under the Porter-Cologne Water Quality Control Act. In setting water quality objectives, the Regional Water Board must consider past, present, and probable future beneficial uses of water.

Significant points concerning beneficial uses are:

1. All water related problems can be stated in terms of whether there is water of sufficient quantity and quality to protect or enhance beneficial uses.

2. Fish, plants, and other wildlife, as well as humans, depend on and use water beneficially both directly or indirectly.

3. Defined beneficial uses do not include all possible uses of water. For example, use of waters for disposal of wastewaters is not included as a beneficial use. Similarly, the use of water for the dilution of salts in other waters is not a beneficial use. These may, in some cases, be reasonable and desirable uses of water, but they are not protected uses and are subject to regulation as activities that may harm protected uses.

4. The protection and enhancement of beneficial uses requires that certain quality and quantity objectives be met for surface and ground waters.

5. Quality of water in upstream reaches and upper aquifers may impact the quality and beneficial uses of downstream reaches and lower aquifers.

Beneficial use designations (and water quality objectives, see Chapter III) must be reviewed at least once during each three-year period for potential modification as appropriate {40 CFR Part 131.20}.

The beneficial uses and abbreviations as defined and listed below are the standard designations used in all basin plans in California with the exception of the definition for Fish Spawning (SPWN) and Warm Freshwater Habitat (WARM). The standard statewide definition for SPWN includes spawning of both warm and cold water fish. In the Tulare Lake Basin, warm water spawning is considered to occur wherever a warm freshwater habitat exists while only select cold water habitats are suitable for spawning by cold water species. For example, certain cold water species require gravel beds in order to spawn. For this reason, for the Tulare Lake Basin, SPWN has been modified to limit the designation to suitable reaches of cold water streams and WARM has been modified to clarify that it includes sensitive fish propagation stages.

Municipal and Domestic Supply (MUN) - Uses of water for community, military, or individual water supply systems, including, but not limited to, drinking water supply.

Agricultural Supply (AGR) - Uses of water for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.

Industrial Service Supply (IND) - Uses of water for industrial activities that do not depend primarily on water quality, including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well repressurization.

Industrial Process Supply (PRO) -Uses of water for industrial activities that depend primarily on water quality.

Hydropower Generation (POW) - Uses of water for hydropower generation.

Water Contact Recreation (REC-1) - Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.

Non-Contact Water Recreation (REC-2) - Uses of water for recreational activities involving proximity to water, but where there is generally no body contact with water, nor any likelihood of ingestion of water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

Warm Freshwater Habitat (WARM) - Uses of water that support warm water ecosystems, including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

WARM includes support for reproduction and early development of warm water fish.

Cold Freshwater Habitat (COLD) - Uses of water that support cold water ecosystems, including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Wildlife Habitat (WILD) - Uses of water that support terrestrial or wetland ecosystems, including, but not limited to, preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

Rare, Threatened, or Endangered Species (RARE) - Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened or endangered.

Spawning, Reproduction, and/or Early Development (SPWN) - Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

SPWN shall be limited to cold water fisheries.

Migration of Aquatic Organisms (MIGR) - Uses of water that support habitats necessary for migration or other temporary activities by aquatic organisms, such as anadromous fish.

Ground Water Recharge (GWR) - Uses of water for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.

Freshwater Replenishment (FRSH) - Uses of water for natural or artificial maintenance of surface water quantity or quality.

Aquaculture (AQUA) - Uses of water for aquaculture or mariculture operations including, but not limited to, propagation, cultivation, maintenance, or harvesting of aquatic plants and animals for human consumption or bait purposes.

Preservation of Biological Habitats of Special Significance (BIOL) - Uses of water that support designated areas or habitats, such as established refuges, parks, sanctuaries, ecological reserves, or Areas of Special Biological Significance (ASBS), where the preservation or enhancement of natural resources requires special protection.

Navigation (NAV) - Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.

The existing and probable future beneficial uses which currently apply to surface waters are presented in Figure II-1 and Table II-1. The beneficial uses of any specifically identified water body generally apply to its tributary streams. In some cases a beneficial use may not be applicable to the entire body of water. In these cases the Regional Water Board's judgement will be applied. It should be noted that it is impractical to list every surface water body in the Region. For unidentified water bodies, the beneficial uses will be evaluated on a case-by-case basis.

Upstream from the foothill reservoirs, the quality of surface waters remains good to excellent. The quality of the major streams is suitable for all beneficial uses. Beneficial uses below the dams, however, may be significantly impacted because of the reduced flows in the channels.

For ground water, the following beneficial uses have been identified and occur throughout the Basin: Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Industrial Service Supply (IND), Industrial Process Supply (PRO), Water Contact Recreation (REC-I), and Wildlife Habitat (WILD).

Figure II-2 and Table II-2 present the AGR, IND, PRO, REC-1, REC-2, and WILD beneficial uses of ground water that existed as of 1993. Due to the "Sources of Drinking Water Policy," all ground waters are designated MUN (the use may be existing or potential) unless specifically exempted by the Regional Water Board and approved for exemption by the State Water Board. Ground water areas exempted from MUN are footnoted in Table II-2. In addition, unless otherwise designated by the Regional Water Board, all ground waters in the Region are considered suitable or potentially suitable, at a minimum, for agricultural supply (AGR), industrial supply (IND), and industrial process supply (PRO).

Existing beneficial uses generally apply within the listed Detailed Analysis Unit (DAU). Due to the size of the DAUs, however, the listed uses may not exist throughout the DAU. For the purpose of assigning beneficial uses, the term ground water is defined in Chapter I.

In considering any exceptions to the beneficial use designation of MUN, the Regional Water Board employs the following criteria:

1. The TDS must exceed 3,000 mg/l (5,000 µmhos/cm EC) and the aquifer cannot be reasonably expected to supply a public water system, or

2. There is contamination, either by natural processes or by human activity (unrelated to a specific pollution incident), that cannot reasonably be treated for domestic use using either Best Management Practices or best economically achievable treatment practices, or

3. The water source cannot provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day, or

4. The aquifer is regulated as a geothermal energy producing source or has been exempted administratively pursuant to 40 CFR, Section 146.4 for the purpose of underground injection of fluids associated with the production of hydrocarbon or geothermal energy, provided that these fluids do not constitute a hazardous waste under 40 CFR, Section 261.3.

To be consistent with State Water Board Resolution No. 88-63 in making exceptions to beneficial use designations other than municipal and domestic supply (MUN), the Regional Water Board will consider criteria for exceptions, parallel to Resolution No. 88-63 exception criteria, which would indicate limitations on those other beneficial uses as follows:

In making any exceptions to the beneficial use designation of agricultural supply (AGR), the Regional Water Board will consider the following criteria:

1. There is pollution, either by natural processes or by human activity (unrelated to a specific pollution incident), that cannot reasonably be treated for agricultural use using either Best Management Practices or best economically achievable treatment practices, or

2. The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day, or

3. The aquifer is regulated as a geothermal energy producing source or has been exempted administratively pursuant to 40 CFR, Section 146.4 for the purpose of underground injection of fluids associated with the production of hydrocarbon or geothermal energy, provided that these fluids do not constitute a hazardous waste under 40 CFR Section 261.3.

In making any exceptions to the beneficial use designation of industrial supply (IND or PRO), the Regional Water Board will consider the following criteria:

1. There is pollution, either by natural processes or by human activity (unrelated to a specific pollution incident), that cannot reasonably be treated for industrial use using either Best Management Practices or best economically achievable treatment practices, or

2. The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day.

TABLE II-1
TULARE LAKE BASIN
SURFACE WATER BENEFICIAL USES

Stream	MUN	AGR	IND	PRO	POW	REC-1	REC-2	WARM	COLD	WILD	RARE	SPWN	GWR	FRSH
552, 551 Kings River														
North Fork, Upper					•	•	•	•	•	•	•	•		•
Main Fork, Above Kirch Flat	•					•	•	•	•	•	•	•		•
Kirch Flat to Pine Flat Dam (Pine Flat Reservoir)					•	•	•	•	•	•				•
Pine Flat Dam to Friant-Kern	•	•			•	•	•	•	•	•		•	•	•
Friant Kern to Peoples Weir	•	•		•		•	•	•		•			•	
Peoples Weir to Stinson Weir on North Fork and to Empire Weir No. 2 on South Fork		•				•	•	•		•			•	
553, 558 Kaweah River														
Above Lake Kaweah	•				•	•	•	•	•	•	•	•		•
Lake Kaweah					•	•	•	•		•				•
Below Lake Kaweah	•	•	•	•		•	•	•		•			•	
555, 558 Tule River														
Above Lake Success	•	•			•	•	•	•	•	•	•	•		•
Lake Success		•			•	•	•	•		•				•
Below Lake Success	•	•	•	•		•	•	•		•			•	
554, 557 Kern River														
Above Lake Isabella	•				•	•	•	•	•	•	•	•		•
Lake Isabella					•	•	•	•	•	•				•
Lake Isabella to KR-1‡					•	•	•	•	•	•	•			
Below KR-1‡	•	•	•	•	•	•	•	•		•	•		•	
555, 558 Poso Creek		•				•	•	•	•	•			•	•
552 Mill Creek, Source to Kings River	•					•	•	•		•			•	•
552, 553, 554, 555 Other East Side Streams	•	•				•	•	•	•	•			•	
556, 559 West Side Streams		•	•	•		•	•	•		•	•		•	
551, 557, 558 Valley Floor Waters		•	•	•		•	•	•		•	•		•	

‡ KR-1: Southern California Edison Kern River Powerhouse No. 1.

TABLE II-2
TULARE LAKE BASIN
GROUND WATER BENEFICIAL USES*

HYDROLOGIC UNIT	DAU	MUN	AGR	IND	PRO	REC-1	REC-2	WILD
Delta-Mendota Basin								
	216	•	•	•				
	235	•	•	•	•		•	•
	237	•	•	•				
Kings Basin								
	233	•	•	•	•	•	•	
	234	•	•	•				
	235	•	•	•	•			
	236	•	•	•	•			
	237	•	•	•				
	239	•	•	•	•			
	240	•	•					
Kaweah Basin	242	•	•	•	•	•	•	
Tulare Lake Basin								
	238	•	•	•	•			
	241	•	•	•				
	246	•	•	•				
Tule Basin								
	243	•	•	•	•			•
	257	•	•					
Pleasant Valley Basin	245	•	•	•				
Westside Basin	244	•	•	•				

* Table II-2 presents the AGR, IND, PRO, REC-1, REC-2, and WILD beneficial uses of ground water that existed as of 1993.

TABLE II-2
TULARE LAKE BASIN
GROUND WATER BENEFICIAL USES* (continued)

HYDROLOGIC UNIT	DAU	MUN	AGR	IND	PRO	REC-1	REC-2	WILD
Kern County Basin								
	245	•	•	•				
	254[a]	•	•	•	•	•	•	•
	255	•	•	•				•
	256	•	•	•	•			
	257	•	•	•		•		
	258	•	•	•	•			
	259[b]	•	•	•				
	260	•		•				
	261	•	•	•				
Satellite Basins								
Panoche Valley		•						
Squaw Valley		•	•	•				
Kern River Valley		•	•	•				
Walker Basin Creek Valley		•	•	•				
Cummings Valley		•	•	•		•	•	
Tehachapi Valley West		•	•	•		•	•	•
Castac Lake Valley		•	•	•				
Vallecitos Creek Valley		•						
Cedar Grove Area		•						
Three Rivers Area		•						
Springville Area		•		•				
Templeton Mountain Area		•						
Monache Meadows Area		•	•				•	
Secator Canyon Valley		•						
Rockhouse Meadow Valley		•				•		
Linns Valley		•		•				
Brite Valley		•	•	•		•	•	•
Bear Valley		•	•	•		•	•	•
Cuddy Canyon Valley		•		•			•	
Cuddy Ranch Area		•	•					
Cuddy Valley		•	•	•				
Mill Potrero Area		•		•			•	
All Other Ground Waters[c]		•						

TABLE II-2
TULARE LAKE BASIN
GROUND WATER BENEFICIAL USES (continued)
Beneficial Use Exceptions

[a] Ground water contained in the lower Transition Zone and Santa Margarita formation within 3,000 feet of the Kern Oil and Refining Company proposed injection wells in Section 25, T30S, R28E, MDB&M, is not suitable, or potentially suitable, for municipal or domestic supply (MUN).

Ground water contained in the basal Etchegoin formation, Chanac formation, and Santa Margarita formation within, and extending to one-quarter mile outside the administrative boundary of the Fruitvale Oil Field, as defined by the State of California, Department of Conservation, Division of Oil and Gas in *Application for Primacy in the Regulation of Class II Injection Wells Under Section 1425 of the Safe Drinking Water Act*, dated April 1981, is not suitable, or potentially suitable, for municipal or domestic supply (MUN). However, the upper ground water zone (ground water to a depth of 3,000 feet) retains the MUN beneficial use.

[b] Ground water and spring water within 1/2 mile radius of the McKittrick Waste Treatment (formerly Liquid Waste Management) site in Section 29, T30S, R22E, MDB&M, have no beneficial uses.

[c] Ground water in the San Joaquin, Etchegoin, and Jacalitos Formations within one-half mile of existing surface impoundments P-1, P-2, P-3, P-4, P-4 1/2, P-5, P-6, P-7, P-8, P-9, P-10, P-11, P-12/12A, P-13, P-14, P-15, P-16, P-17, P-18, P-19, and P-20, and proposed surface impoundments P-21, P-24, P-25, P-27, P-28, and P-29 at the Kettleman Hills Facility (Sections 33 and 34, T22S, R18E, and Section 3, T23S, R18E, MDB&M) of Chemical Waste Management is not a municipal or domestic supply (MUN).

Figures II-1 and II-2 will be included at 1:500,000 scale in map pockets in back of final plan.

III. WATER QUALITY OBJECTIVES

The Porter-Cologne Water Quality Control Act defines water quality objectives as "...the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area" {Water Code Section 13050(h)}. It also requires the Regional Water Board to establish water quality objectives, while acknowledging that it is possible for water quality to be changed to some degree without unreasonably affecting beneficial uses. In establishing water quality objectives, the Regional Water Board must consider, among other things, the following factors:

- Past, present, and probable future beneficial uses;
- Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto;
- Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area;
- Economic considerations;
- The need for developing housing within the region;
- The need to develop and use recycled water. {Water Code Section 13241}

The federal Clean Water Act requires a state to submit for approval of the Administrator of the U. S. Environmental Protection Agency (USEPA) all new or revised water quality standards which are established for surface and ocean water. The ground water objectives contained in this plan are not required by the federal Clean Water Act. In California, water quality standards are either water body specific or are based on beneficial uses designated for a water body and the water quality objectives that protect those uses.

There are six important points about water quality objectives. The first point is that water quality objectives can be revised through the basin plan amendment process. Objectives may apply region-wide or specifically to individual water bodies or parts of water bodies. Site-specific objectives may be developed if the Regional Water Board believes they are appropriate. Federal regulations require the review of water quality standards at least every three years. These "Triennial Reviews" provide one opportunity to evaluate the effectiveness of existing water quality objectives because the reviews begin with an identification of potential and actual water quality problems. The results of the Triennial Review are used to identify and prioritize Regional Water Board actions to achieve objectives and protect beneficial uses. Actions include assessment, remediation, monitoring, or whatever else may be appropriate, to address water quality problems. For example, a beneficial use may be impacted because the existing water quality objective is inadequate. This water quality objective should be re-evaluated and a proper objective should be amended into the Basin Plan, along with a plan and schedule for attainment. In other cases, the existing water quality objective may be adequate and it may be necessary to develop new implementation strategies to address the problem.

Changes to a water quality objective can also occur because of new scientific information on the effects of a pollutant on beneficial uses. A major source of information is USEPA data on the effects of chemical and other constituent concentrations on particular aquatic species and human health. Other common information sources for data on protection of beneficial uses include the National Academy of Science, which has published data on bioaccumulation, and the federal Food and Drug Administration, which has issued criteria for unacceptable levels of chemicals in fish and shellfish used for human consumption. The Regional Water Board may also make use of other state or federal agency information sources when assessing new or revised water quality objectives.

The second point is that achievement of water quality objectives depends on applying them to regulate controllable water quality factors, although regulating controllable water quality factors may not necessarily cause water quality objectives to be achieved. Controllable water quality factors are those actions, conditions, or circumstances resulting from human activities that may influence the quality of the waters of the State, that are subject to the authority of the State Water Board or the Regional Water Board, and that may be reasonably controlled. These factors are subject to the authority of the State Water Board or the Regional Water Board. Controllable factors are not allowed to degrade water quality unless it is demonstrated that degradation is consistent with maximum benefit to the people of the State. In no cases may controllable water quality factors unreasonably affect present and anticipated beneficial uses of water nor result in water quality less than that prescribed in water quality control plans and policies. In instances where uncontrollable factors have already resulted in

water quality objectives being exceeded, controllable factors are not allowed to cause further degradation of water quality. The Regional Water Board recognizes that manmade changes that alter flow regimes can affect water quality and impact beneficial uses.

The third point is that water quality objectives are achieved primarily through the adoption of waste discharge requirements (including federal NPDES permits) and enforcement orders. When adopting requirements and ordering actions, the Regional Water Board considers the beneficial uses within the area of influence of the discharge, the existing quality of receiving waters, and water quality objectives that apply to the reach or uses of the receiving water. Effluent limits may be established to reflect what is necessary to achieve water quality objectives, or, if more stringent, will reflect the technology-based standard for the type of discharge being regulated. The objectives in this plan do not require improvement over naturally occurring background concentrations. Water quality objectives contained in this plan, and any State or Federally promulgated objectives applicable to the Tulare Lake Basin, apply to the main water mass. They may apply at or in the immediate vicinity of effluent discharges, or may apply at the edge of an approved mixing zone. A mixing zone is an area of dilution or criteria for diffusion or dispersion defined in the waste discharge requirements. The Regional Water Board recognizes that immediate compliance with water quality objectives adopted by the Regional Water Board or the State Water Board, or with water quality criteria adopted by the federal Environmental Protection Agency, may not be feasible in all circumstances. Where the Regional Water Board determines it is infeasible for a discharger to comply immediately with such objectives or criteria, compliance shall be achieved in the shortest practicable period of time, not to exceed ten years after the adoption of applicable objectives or criteria. This policy shall apply to water quality objectives and water quality criteria adopted after the effective date of this Basin Plan update.

The fourth point is that, in cases where water quality objectives are formulated to preserve historic conditions, there may be insufficient data to determine completely the temporal and hydrologic variability representative of historic water quality. When violations of such water quality objectives occur, the Regional Water Board evaluates the reasonableness of achieving those objectives through regulation of the controllable factors in the areas of concern.

The fifth point is that the State Water Board adopts policies and plans for water quality control that can specify water quality objectives or affect their implementation. Chief among the State Water Board's policies for water quality control is State Water Board Resolution No. 68-16, *Statement of Policy with Respect to Maintaining High Quality of Waters in California* (Anti-degradation Policy). It requires that, wherever the existing quality of surface or ground waters is better than the objectives established for those waters, the existing quality will be maintained unless as otherwise provided by Resolution No. 68-16 or any revisions thereto. This policy and others establish general objectives.

The sixth point is that water quality objectives may be in numerical or narrative form. The enumerated milligram-per-liter (mg/l) limit for dissolved oxygen is an example of a numerical objective; the objective for color is an example of a narrative objective.

WATER QUALITY OBJECTIVES FOR INLAND SURFACE WATERS

Surface water quality in the Basin is generally good, with excellent quality exhibited by most eastside streams. The Regional Water Board intends to maintain this quality. The water quality objectives below are presented by categories which, like the beneficial uses of Chapter II, were standardized for uniformity among the regional water boards.□ Designated beneficial uses of the waters of the Tulare Lake Basin for which provisions should be made are identified in Chapter II; this chapter gives the water quality objectives to protect those beneficial uses. As new information becomes available, the Regional Water Board will review the appropriateness of these objectives, and may modify them accordingly.

Ammonia

Waters shall not contain un-ionized ammonia in amounts which adversely affect beneficial uses. In no case shall the discharge of wastes cause concentrations of un-ionized ammonia (NH_3) to exceed 0.025 mg/l (as N) in receiving waters.

Bacteria

In waters designated REC-1, the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100 ml, nor shall more than ten percent of the total number of samples taken during any 30-day period exceed 400/100 ml.

Biostimulatory Substances

Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the

extent that such growths cause nuisance or adversely affect beneficial uses.

Chemical Constituents

Waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. The Regional Water Board will consider all material and relevant information submitted by the discharger and other interested parties and numerical criteria and guidelines for detrimental levels of chemical constituents developed by the State Water Board, the California Office of Environmental Health Hazard Assessment, the California Department of Health Services, the U.□ S. Food and Drug Administration, the National Academy of Sciences, the U. S. Environmental Protection Agency, and other appropriate organizations to evaluate compliance with this objective.

At a minimum, water designated MUN shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs) specified in the following provisions of Title 22 of the California Code of Regulations, which are incorporated by reference into this plan: Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of Section 64431, Table 64444-A (Organic Chemicals) of Section 64444, and Table 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) and 64449-B (Secondary Maximum Contaminant Levels-Ranges) of Section 64449. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. At a minimum, water designated MUN shall not contain lead in excess of 0.015 mg/l. The Regional Water Board acknowledges that specific treatment requirements are imposed by state and federal drinking water regulations on the consumption of surface waters under specific circumstances. To ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses, the Regional Water Board may apply limits more stringent than MCLs

Color

Waters shall be free of discoloration that causes nuisance or adversely affects beneficial uses.

Dissolved Oxygen

Waste discharges shall not cause the monthly median dissolved oxygen concentrations (DO) in the main water mass (at centroid of flow) of streams and above the thermocline in lakes to fall below 85 percent of saturation concentration, and the 95 percentile concentration to fall below 75 percent of saturation concentration.

The DO in surface waters shall always meet or exceed the concentrations in Table□ III–1 for the listed specific water bodies and the following minimum levels for all aquatic life:

Waters designated WARM 5.0 mg/l
Waters designated COLD or SPWN 7.0 mg/l

Where ambient DO is less than these objectives, discharges shall not cause a further decrease in DO concentrations.

Floating Material

Waters shall not contain floating material, including but not limited to solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.

Oil and Grease

Waters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.

pH

The pH of water shall not be depressed below 6.5, raised above 8.3, or changed at any time more than 0.3 units from normal ambient pH.

In determining compliance with the above limits, the Regional Water Board may prescribe appropriate averaging periods provided that beneficial uses will be fully protected.

Pesticides

Waters shall not contain pesticides in concentrations that adversely affect beneficial uses. There shall be no increase in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses. (For the purposes of this objective, the term pesticide is defined as any substance or mixture of substances used to control objectionable insects, weeds, rodents, fungi, or other forms of plant or animal life.) The Regional Water Board will consider all material and relevant information submitted by the discharger and other interested parties and numerical criteria and guidelines for detrimental levels of chemical constituents developed by the State Water

TABLE III-1
TULARE LAKE BASIN
SPECIFIC DISSOLVED OXYGEN WATER QUALITY OBJECTIVES

Stream	Location	Min DO (mg/l)
Kings River		
Reach I	Above Kirch Flat	9
Reach II	Kirch Flat to Pine Flat Dam	9
Reach III	Pine Flat Dam to Friant-Kern	9
Reach IV	Friant-Kern to Peoples Weir	7
Reach V	Peoples Weir to Island Weir	7
Kaweah River	Lake Kaweah	7
Tule River	Lake Success	7
Kern River		
Reach I	Above Lake Isabella	8
Reach III	Lake Isabella to Southern California Edison Powerhouse (KR-1)	8

Board, the California Office of Environmental Health Hazard Assessment, the California Department of Health Services, the U.S. Food and Drug Administration, the National Academy of Sciences, the U. S. Environmental Protection Agency, and other appropriate organizations to evaluate compliance with this objective.

At a minimum, waters designated MUN shall not contain concentrations of pesticide constituents in excess of the maximum contaminant levels (MCLs) specified in Table 64444-A (Organic Chemicals) of Section 64444 of Title 22 of the California Code of Regulations, which is incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. The Regional Water Board acknowledges that specific treatment requirements are imposed by state and federal drinking water regulations on the consumption of surface waters under specific circumstances. To ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses, the Regional Water Board may apply limits more stringent than MCLs.

In waters designated COLD, total identifiable chlorinated hydrocarbon pesticides shall not be present at concentrations detectable within the accuracy of analytical methods prescribed in *Standard Methods for the Examination of Water and Wastewater, 18th Edition*, or other equivalent methods approved by the Executive Officer.

Radioactivity

Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life nor which result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.

At a minimum, waters designated MUN shall not contain concentrations of radionuclides in excess of the maximum contaminant levels (MCLs) specified in Table 4 (MCL Radioactivity) of Section 64443 of Title 22, California Code of Regulations, which are incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect.

Salinity

Waters shall be maintained as close to natural concentrations of dissolved matter as is reasonable considering careful use of the water resources.

"The only reliable way to determine the true or absolute salinity of a natural water is to make a complete chemical analysis. However, this method is time-consuming and cannot yield the precision necessary for accurate work" {*Standard Methods for the Examination of Water and Wastewater*, 18th Edition}. Conductivity is one of the recommended methods to determine salinity.

The objectives for electrical conductivity in Table III-2 apply to the water bodies specified. Table III-3 specifies objectives for electrical conductivity at selected streamflow stations.

Sediment

The suspended sediment load and suspended sediment discharge rate of waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

Settleable Material

Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.

TABLE III-2
TULARE LAKE BASIN
MAXIMUM ELECTRICAL CONDUCTIVITY LEVELS

Stream	Location	Max. Electrical Conductivity (µmho/cm)
Kings River		
Reach I	Above Kirch Flat	100
Reach II	Kirch Flat to Pine Flat Dam	100[a]
Reach III	Pine Flat Dam to Friant-Kern	100
Reach IV	Friant-Kern to Peoples Weir	200
Reach V	Peoples Weir to Island Weir	300[b]
Reach VI	Island Weir to Stinson Weir on North Fork and Empire Weir No. 2 on South Fork	300[b]
Kaweah River		
Reach I	Above Lake Kaweah	175
Reach II	Lake Kaweah	175[c]
Reach III	Below Lake Kaweah	[d]
Tule River		
Reach I	Above Lake Success	450
Reach II	Lake Success	450[e]
Reach III	Below Lake Success	[d]
Kern River		
Reach I	Above Lake Isabella	200
Reach II	Lake Isabella	300
Reach III	Lake Isabella to Southern California Edison Powerhouse (KR-1)	300
Reach IV	KR-1 to Bakersfield	300[f]
Reach V	Below Bakersfield	[d]

[a] Maximum 10-year average - 50 µmhos

[b] During the period of irrigation deliveries. Providing, further, that for 10 percent of the time (period of low flow) the following shall apply to the following reaches of the Kings River:

Reach V	400 µmhos
Reach VI	600 µmhos

[c] Maximum 10-year average - 100 µmhos

[d] During the irrigation season releases should meet the levels shown in the preceding reach. At other times the channel will be dry or controlled by storm flows.

[e] Maximum 10-year average - 250 µmhos

[f] Maximum 10-year average - 175 µmhos

TABLE III-3
TULARE LAKE BASIN
ELECTRICAL CONDUCTIVITY OBJECTIVES AT SELECTED STREAMFLOW STATIONS

Streamflow Station Number		Location	Electrical Conductivity (µmhos/cm)		
USGS	DWR		90-Percentile	Median	Mean
--	C01140.00	Kings River below Peoples Weir	198	81	102
11-2185	C11460.00	Kings River below North Fork	68	48	47
11-2215	C11140.00	Kings River below Pine Flat Dam	54	36	42
11-2105	C21250.00	Kaweah River near Three Rivers	154	95	94
11-2032	C31150.00	Tule River near Springville	429	278	367
11-2049	C03195.00	Tule River below Success Dam	368	244	235
11-1870	C51500.00	Kern River at Kernville	177	116	118
11-1910	C5135.00	Kern River below Isabella Dam	278	141	165
11-1940	C05150.00	Kern River near Bakersfield	233	158	167

Suspended Material

Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.

Tastes and Odors

Waters shall not contain taste- or odor-producing substances in concentrations that cause nuisance, adversely affect beneficial uses, or impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin or to domestic or municipal water supplies.

Temperature

Natural temperatures of waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Water Board that such alteration in temperature does not adversely affect beneficial uses.

Temperature objectives for COLD interstate waters, WARM interstate waters, and Enclosed Bays and Estuaries are as specified in the *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays of California*, including any revisions. (See Appendix 10.)

Elevated temperature wastes shall not cause the temperature of waters designated COLD or WARM to increase by more than 5°F above natural receiving water temperature.

In determining compliance with the above limits, the Regional Water Board may prescribe appropriate averaging periods provided that beneficial uses will be fully protected.

Toxicity

All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life. This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances. Compliance with this objective will be determined by analyses of indicator organisms, species diversity, population density, growth anomalies, biotoxicity tests of appropriate duration, or other methods as specified by the Regional Water Board. The Regional Water Board will also consider all material and relevant information submitted by the discharger and other interested parties and numerical criteria and guidelines for toxic substances developed by the State Water Board, the California Office of Environmental Health Hazard Assessment, the California Department of Health Services, the U.S. Food and Drug Administration, the National Academy of Sciences, the U. S. Environmental Protection Agency, and other appropriate organizations to evaluate compliance with this objective.

The survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors shall not be less than that for the same water body in areas unaffected by the waste discharge, or, when necessary, for other control water that is

consistent with the requirements for "dilution water" as described in *Standard Methods for the Examination of Water and Wastewater, 18th Edition.* As a minimum, compliance shall be evaluated with a 96-hour bioassay.

In addition, effluent limits based upon acute biotoxicity tests of effluents will be prescribed where appropriate; additional numerical receiving water quality objectives for specific toxicants will be established as sufficient data become available; and source control of toxic substances will be encouraged.

Turbidity

Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits:

- Where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases shall not exceed 1 NTU.
- Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent.
- Where natural turbidity is equal to or between 50 and 100 NTUs, increases shall not exceed 10 NTUs.
- Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

In determining compliance with the above limits, the Regional Water Board may prescribe appropriate averaging periods provided that beneficial uses will be fully protected.

WATER QUALITY OBJECTIVES FOR GROUND WATERS

The following objectives apply to all ground waters in the Tulare Lake Basin.

Bacteria

In ground waters designated MUN, the concentration of total coliform organisms over any 7-day period shall be less than 2.2/100 ml.

Chemical Constituents

Ground waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. The Regional Water Board will consider all material and relevant information submitted by the discharger and other interested parties and numerical criteria and guidelines for detrimental levels of chemical constituents developed by the State Water Board, the California Office of Environmental Health Hazard Assessment, the California Department of Health Services, the U.□ S. Food and Drug Administration, the National Academy of Sciences, the U. S. Environmental Protection Agency, and other appropriate organizations to evaluate compliance with this objective.

At a minimum, waters designated MUN shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs) specified in the following provisions of Title 22 of the California Code of Regulations, which are incorporated by reference into this plan: Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of Section 64431, Table 64444-A (Organic Chemicals) of Section 64444, and Table 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) and 64449-B (Secondary Maximum Contaminant Levels-Ranges) of Section 64449. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. At a minimum, water designated MUN shall not contain lead in excess of 0.015 mg/l. To ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses, the Regional Water Board may apply limits more stringent than MCLs.

Pesticides

No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses.

At a minimum, waters designated MUN shall not contain concentrations of pesticide constituents in excess of the maximum contaminant levels (MCLs) specified in Table 64444-A (Organic Chemicals) of Section 64444 of Title 22 of the California Code of Regulations, which is incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. The Regional Water Board acknowledges that specific treatment requirements are imposed by state and federal drinking water regulations on the consumption of surface waters under specific circumstances. More stringent objectives may apply if necessary to protect other beneficial uses.

Radioactivity

Radionuclides shall not be present in ground waters in concentrations that are deleterious to human, plant,

animal, or aquatic life, or that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal or aquatic life.

At a minimum, ground waters designated MUN shall not contain concentrations of radionuclides in excess of the maximum contaminant levels (MCLs) specified in Table 4 (MCL Radioactivity) of Section 64443 of Title 22, California Code of Regulations, which are incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect.

Salinity

All ground waters shall be maintained as close to natural concentrations of dissolved matter as is reasonable considering careful use and management of water resources.

No proven means exist at present that will allow ongoing human activity in the Basin and maintain ground water salinity at current levels throughout the Basin. Accordingly, the water quality objectives for ground water salinity control the rate of increase.

The maximum average annual increase in salinity measured as electrical conductivity shall not exceed the values specified in Table III-4 for each hydrographic unit shown on Figure III-1.

The average annual increase in electrical conductivity will be determined from monitoring data by calculation of a cumulative average annual increase over a 5-year period.

Tastes and Odors

Ground waters shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses.

Toxicity

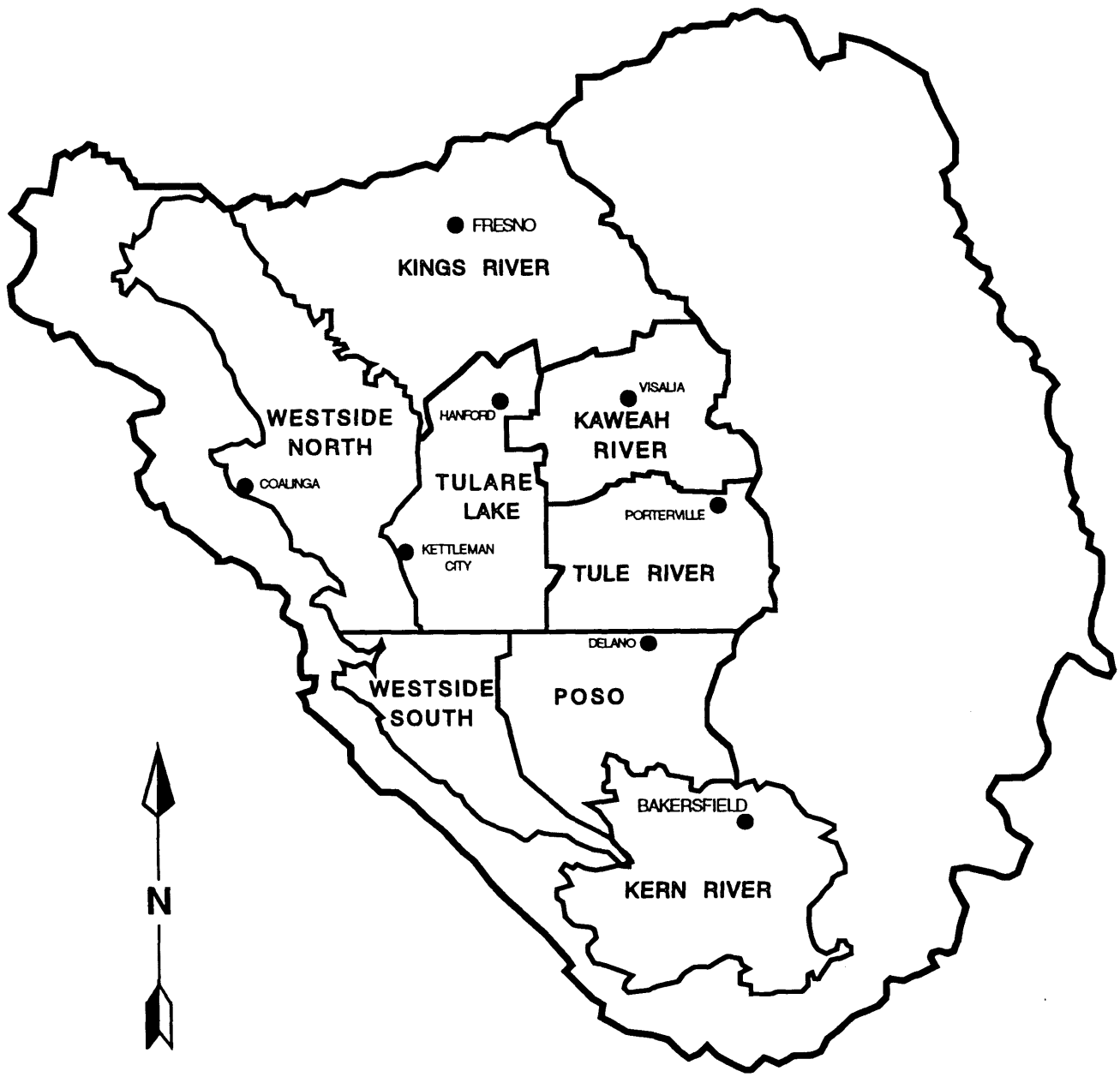
Ground waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated with designated beneficial use(s). The Regional Water Board will also consider all material and relevant information submitted by the discharger and other interested parties and numerical criteria and guidelines for toxic substances developed by the State Water Board, the California Office of Environmental Health Hazard Assessment, the California Department of Health Services, the U.□ S. Food and Drug Administration, the National Academy of Sciences, the U. S. Environmental Protection Agency, and other appropriate organizations to evaluate compliance with this objective. This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances.

TABLE III-4
TULARE LAKE BASIN
GROUND WATER QUALITY OBJECTIVES FOR SALINITY

Hydrographic Unit	Maximum Average Annual Increase in Electrical Conductivity (µmhos/cm)
Westside (North and South)	1
Kings River	4
Tulare Lake and Kaweah River	3
Tule River and Poso	6
Kern River	5

FIGURE III-1

TULARE LAKE BASIN
GROUND WATER HYDROGRAPHIC UNITS



IV. IMPLEMENTATION PLAN

The Porter-Cologne Water Quality Control Act requires that every basin plan consist of beneficial uses, water quality objectives, and a program of implementation for achieving water quality objectives {California Water Code Section 13050(j)}. This Basin Plan covers the first two components in earlier chapters. According to the Act, the implementation program must at least include:

1. A description of the nature of actions which are necessary to achieve the objectives, including recommendations for appropriate action by any entity, public or private;

2. A time schedule for the actions to be taken; and,

3. A description of surveillance to be undertaken to determine compliance with the objectives. {California Water Code Section 13242}

In addition, state law requires that every new water quality control program for agriculture estimate the total cost and identify potential sources of funding as part of its implementation {California Water Code Section 13141}. This chapter of the Basin Plan contains all but the surveillance component of the implementation program. That is described in Chapter VI.

The first section of this chapter describes water quality concerns and how the Regional Water Board addresses them. This section is organized by discharge type (agriculture, silviculture, mines, etc.). The second section lists Regional Water Board programs, and plans and policies which will result in the achievement of most of the water quality objectives in this plan. This section includes a list of Regional Water Board prohibition areas. The third section contains recommendations for appropriate action by entities other than the Regional Water Board to protect water quality. The fourth section describes how the Regional Water Board integrates water quality control activities into a continuous planning process.

WATER QUALITY CONCERNS

Impairment of beneficial uses or degradation of water quality generally reflect the intensity of activities of key discharge sources. The impact a discharge may have is relative to the volume, quality, and uses of the receiving waters.

Our knowledge of the number and types of problems associated with discharge activities changes over time. Early federal and state control efforts focussed on the most understood and visible problems, such as discharge of raw sewage to rivers and streams. As these problems were controlled, focus shifted to prevention of nuisance and protection of ground water. As data became available on toxics in the environment and their harmful effects at low concentrations, and as toxic pollutant detection and measurement methods improved, regulatory emphasis shifted further. Control of toxic discharges now receives major emphasis. Small amounts of pesticides in drinking water wells within the Tulare Lake Basin have caused the closure of some wells.

The greatest long-term problem facing the entire Tulare Lake Basin is the increase of salinity in ground water. Even though an increase in the salinity of ground water in a closed basin is a natural phenomenon, salinity increases in the Basin have been accelerated by man's activity, with the major impact coming from intensive use of soil and water resources by irrigated agriculture. Salinity increases in ground water could ultimately eliminate the beneficial uses of this resource. Controlled ground water degradation by salinity is the most feasible and practical short-term management alternative for the Tulare Lake Basin.

The following briefly describes the water quality impacts associated with specific discharge activities and the policies and programs developed to protect beneficial uses and achieve water quality objectives.

Agriculture

In 1987, agriculturally induced employment in the Basin ranged from 20 percent to more than 50 percent ["A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley", September 1990]. Most of the agricultural activity occurs on the valley floor. However, the natural precipitation on the Valley portion of the Basin averages less than 10 inches per year. Most precipitation occurs in the Sierras and the Coast Ranges. In order to supply the water needs of agriculture, water from the mountain areas is held in reservoirs and released during irrigation periods. The released water is transported to crops through a complex distribution system crisscrossing the Valley. Irrigated agriculture, agricultural support activities, and animal confinement operations create their own unique problems.

Irrigated Agriculture

Irrigated agriculture accounts for most water used in the Tulare Lake Basin. Local surface water, mainly stored in foothill reservoirs, is controlled for agricultural use. Historically, ground water made up the rest of agricultural needs. However, heavy ground water extractions after the 1930s, when improvements in pump technology led to the development of large turbine pumps, caused severe overdraft and accompanying land subsidence. This led to development of water projects (i.e., the California Aqueduct, the Delta-Mendota Canal, the Friant-Kern Canal, and the Cross City Canal) in the 1950's, 1960's and 1970's to import additional water into the Basin to relieve the demands on ground water. Even with the imported water, municipal, agricultural, and industrial water users continue to pump ground water to meet demands. Ground water pumping continues to contribute to overdraft of ground water aquifers.

Another problem from irrigated agriculture is drainage, excess water not used by crops which runs off or percolates. Agricultural drainage, depending on management and location, carries varying amounts of salts, nutrients, pesticides, trace elements, sediments, and other by-products to surface and ground waters.

The crucial problem in the Tulare Lake Basin is the salts brought in with irrigation water and leached out of soils. Evaporation and crop transpiration remove water from soils, which can result in an accumulation of salts in the root zone of the soils at levels that retard or inhibit plant growth. Additional amounts of water often are applied to leach the salts below the root zone. The leached salts eventually enter ground or surface water.

The amount of salts which are leached depends on the amounts in the soil profile and the applied waters. In 1970, the Department of Water Resources estimated that 481 million tons of salt were stored in the top 20 feet of soil (or the root zone) in the San Joaquin Valley {Department of Water Resources, "Land and Water Use Aspects of San Joaquin Valley Drainage Investigations", June 1970}. In 1971, the Department of Water Resources estimated that the four major rivers of the Tulare Lake Basin bring in 145,000 tons of salt per year. Another 63,000 tons are brought in by the Friant-Kern Canal, annually. The Delta-Mendota Canal brings in 336,000 tons per year {Department of Water Resources, "A General Survey of Electrical Conductivity in Ground Water, San Joaquin Valley", March through June 1971}.

The movement of the salts to surface waters can occur as shallow subsurface ground water flows or it can result from the surface water discharge of agricultural subsurface collection systems (or tile drains) which are employed in areas where farm lands have naturally poor drainage. Tile drains consist of pipe systems below the root zone of crops that drain water from soils that would otherwise stay saturated. TDS concentrations in tile drained water is many times greater than in the irrigation water that was applied to the crops. Tile drain water can also contain trace elements and nutrients. Removal and export, through a valleywide drain, of perched waters will offset, in part, the Basin's adverse salt accumulation.

Subsurface drainage will be a constant threat to surface water and usable ground water quality unless the disposal method is adequate. Disposal must be in a manner that isolates the salts in the drainage from the usable ground water body. In some areas of the Basin, evaporation basins are used to concentrate drainage water and contain salts. However, evaporation basins cannot be considered permanent solutions due to wildlife impacts, and the cost of ultimate salt disposal and basin closure. The California Department of Water Resources and other federal, state and local agencies continue to study alternative approaches for reuse and disposal of agricultural drainage waters.

The Central Valley provides critically important wetland habitat for wintering waterfowl of the Pacific Flyway. The Pacific Flyway covers the western portion of the North American Continent. Most Pacific Flyway waterfowl are from the prairies and parklands of western Canada and the river valleys and deltas of Alaska. The Central Valley supports approximately 60% of the Pacific Flyway wintering waterfowl population. Hundreds of thousands of shorebirds and other water or marsh birds annually winter or pass through the Central Valley {San Joaquin Valley Drainage Program, "Fish and Wildlife Resources and Agricultural Drainage in the San Joaquin Valley, California", Volume I, October 1990}.

Evaporation ponds constitute attractive oases for many species of wildlife. Aquatic migratory birds of the Pacific Flyway are drawn to the ponds, in part, because almost all of the native aquatic and wetland habitats in the San Joaquin Valley (especially in the Tulare Lake Basin) have been lost and because the ponds hold surface water in a vast, relatively sterile, agricultural landscape. The ponds also produce abundant aquatic invertebrates which feed large numbers of waterbirds {San Joaquin Valley Drainage

Program, "Fish and Wildlife Resources and Agricultural Drainage in the San Joaquin Valley, California", Volume I, October 1990).

Evaporation basins have varying potentials to impact wildlife, specifically shorebirds. Various studies have been conducted on this impact. Technical reports addressing site-specific and cumulative impacts from the majority of operating basins were completed in 1993. These reports were certified as environmental impact reports (EIRs).

The EIRs focussed on impacts to wildlife and found all basins pose a risk to birds due to salinity and avian disease. To prevent and mitigate these impacts, waste discharge requirements for evaporation basins, adopted in 1993, include the following:

- Removal of attractive habitat, such as vegetation.
- A program for avian and waterfowl disease prevention, surveillance and control.
- Closure and financial assurance plans.
- Drainage operation plan to reduce drainage.

Basins with concentrations of selenium greater than 2.7 µg/l in the drainage water have potential for reduced hatchability and teratogenic impacts on waterfowl. To prevent and mitigate these impacts, waste discharge requirements for these basins, adopted in 1993, include those listed above and the following:

- Intensive hazing prior to the breeding season.
- Egg monitoring.
- Basin reconfiguration, if necessary, to minimize attractiveness to waterbirds.
- Wildlife enhancement program, alternative habitat and/or compensatory habitat.

Regional Water Board policy on agricultural subsurface drainage:

- A valleywide drain to carry salts out of the valley remains the best technical solution to the water quality problems of the Tulare Lake Basin.
- Evaporation basins are an acceptable interim disposal method for agricultural subsurface drainage and may be an acceptable permanent disposal method in the absence of a valley drain provided that water quality is protected and potential impacts to wildlife are adequately mitigated. For existing basins requiring substantial physical improvements and other mitigations, some of which are dependent upon empirically derived techniques, operators shall implement mitigations as early as feasible.
- Persons proposing new evaporation basins and expansion of evaporation basins shall submit technical reports that assure compliance with, or support exemption from, Title 23, California Code of Regulations, Section 2510, et seq., and that discuss alternatives to the basins and assess potential impacts of and identify appropriate mitigations for the proposed basins.
- Agricultural drainage may be discharged to surface waters provided it does not exceed 1,000 µmhos/cm EC, 175 mg/l chloride, nor 1 mg/l boron. Other requirements also apply.

LOWER KINGS RIVER

The Lower Kings River from Peoples Weir to Stinson Weir on the North Fork and Empire Weir #2 on the South Fork is a Water Quality Limited Segment (see discussion regarding water quality limited segments later in this chapter) because of high salinity. Studies indicate that the source of the salinity is either surface or subsurface agricultural drainage. Levels of boron, molybdenum, sulfates, and chlorides in the Lower Kings River are high enough to impact agricultural uses and aquatic resources. Additional information is necessary to further characterize discharges to this section of the Kings River. A monitoring program is described in Chapter VI. In the meantime, drainage should be reduced by the use of at least the following management practices:

- Maximize distribution uniformity of irrigation systems.
- Minimize or eliminate pre-irrigation.
- Control the amount of water applied to each crop so it does not exceed the evapotranspiration needs of the crop and a reasonable leaching factor.
- Minimize seepage losses from ditches and canals to the extent feasible by lining them or replacing them with pipe.

- During periods of extreme dry conditions when dilution flows in the River are very low, farmers in the area should temporarily remove poorly drained land from production.

AGRICULTURAL CHEMICALS

Pesticides and nutrients in agricultural drainage have found their way to ground waters in many areas of the basin. Nitrate and pesticide levels exceeding the State drinking water standards occur in some ground waters in the basin, and have caused closure of domestic supply wells in several locations. One of the biggest problems facing municipal water providers is the presence of the chemical dibromochloropropane (DBCP) in their wells. The fumigant was widely used in the 1960's to control nematodes in vineyards and can now be found in wells down gradient of the use areas. Providers sued the manufacturers to recover damages and, as of 1995, most providers within the Valley have settled. State and local agencies are searching for methods to mitigate this problem.

The Department of Pesticide Regulation investigates reported cases of pesticide residues in ground water. Where contamination is confirmed to be through legal use of a pesticide, the Department designates a pest management zone after holding a public hearing. Use of the pesticide of concern is modified within the management zone created for it. Responsibility for water quality, however, remains with the State and Regional Water Boards. There is a Memorandum of Understanding between the State Water Board and the Department of Pesticide Regulation describing the role of each agency with regard to pesticide regulation.

Agricultural chemical applicators have been a source of pollution from spills, and improper containment and disposal of waters used to clean equipment or work areas. The application facilities fall under Regional Water Board regulatory programs. When appropriate management practices are implemented, waste discharge requirements may be waived (see Appendices 27 and 28, which are incorporated by reference into this plan). Regional Water Board staff also inspect high risk sites to evaluate compliance.□ Enforcement strategies are implemented as warranted.

Confined Animal Activities

The Tulare Lake Basin is a fast-growing animal and milk production area. With urban pressures increasing in other parts of the State, dairymen and poultry operators are moving into the Basin. In 1994, Tulare County had the largest number of cows in the United States. Tulare County was also the top milk producing county in the United States.

Where not controlled, surface runoff from such operations can impair both surface and ground water beneficial uses. Uncontrolled runoff can also cause nuisance conditions. Disposal of washwater and manure must occur in a manner that protects both surface and ground waters.

Animal wastes may produce significant bacteria, organic, nitrate, and TDS contamination. The greatest potential for water quality problems has historically stemmed from the overloading of the facilities' waste containment and treatment ponds during the rainy season and inappropriate application of waste water and manure. Overloading sometimes results in discharge of manure waste to canals and drainageways. Most animal confinement facilities have some crop land available for wastewater and spreading manure; the lands assimilative capacity will depend upon area, crop, crop yield, soil, and season of the year. When land and capacity is exceeded, the excessive salts and nutrients are leached to the underlying ground water. Where land is not available, agreements between the operator and other landowners can increase area available for disposal.

Title 23, California Code of Regulations, Section 2510-2601 (Chapter 15) contains minimum standards to protect both surface and ground waters from discharges of animal waste at confined animal facilities.

In addition to the standards in Chapter 15, the following is required:

- Lands that receive dry manure shall be managed to minimize erosion and runoff, and applied manure shall be incorporated into surface soils soon after manure application.

- Animal confinement areas, manure storage areas, lagoons, disposal fields, and crop lands that receive manure shall not create a nuisance.

- Salt in animal rations should be limited to the amount required to maintain animal health and optimum production.

- Animal confinement facilities, including retention ponds, shall be protected from overflow from stream channels during 20-year peak stream flows for facilities that existed as of 25 July 1975 and protected from 100-year peak stream flows for facilities constructed after 25 July 1975. Facilities

constructed after 8 December 1984 must comply with the specifications in Chapter 15.

- Facilities shall be designed and constructed to retain all facility wastewater generated, together with all precipitation on, and drainage through, manured areas during a 25-year, 24-hour storm. Facilities with operation capacities equal to or greater than the capacities described in 40 CFR 412 (Feedlots Point Source Category) must obtain an National Pollutant Discharge Elimination System (NPDES) permit prior to discharge for events greater than a 25 year, 24 hour storm. (See "Storm Water" section for additional information regarding stormwater regulation.)

- New manure retention ponds shall be sited, designed, constructed, and operated to ensure that the invert of the pond will be at least 5 feet above the highest anticipated elevation of underlying ground water.

Waste discharge requirements for the land application of wastewater may be conditionally waived for animal confinement facilities that can demonstrate compliance with the above. This waiver does not waive responsibility of the facility owner or operator to apply for and comply with a storm water permit. Facilities for which waste discharge requirements are waived shall provide an annual report to the Regional Water Board describing land and waste management practices for the past year. The annual report should summarize the following:

1. Inventory of total head of milking cows, dry cows, heifers, calves, and comparable number of animal units at the dairy during the year.

2. Crops and acreage used for wastewater disposal (irrigation application).

3. Estimates of the quantity of dry manure (tons) spread on site and exported off site, including the location of the fields where the manure is applied, and the names of buyers, and/or locations of application (disposal) areas, if applicable.

Unconfined Animals

Grazing animals can contribute bacteria and pathogens to surface waters, just as wildlife do. The greatest potential problem, though, is erosion resulting from overgrazing. Grazing impacts are generally considered nonpoint source pollution. Due to the diffuse nature of this type of pollution, the State Water Board's Nonpoint Source Management Plan recommends that land use entities in an affected area develop a coordinated resource management plan with Regional Water Board assistance. Good grazing management will prevent pollution and impairment of water quality.

Overdraft

The elimination of overdraft is an important step in managing the rate of salinity increase in the ground water. Continued overdraft will deplete good quality water supplies and introduce salts from poorer quality aquifers.

Continued overdraft has other effects, such as increased costs to overlying landowners from greater pumping lifts, depletion of local ground water, and possible deep subsidence in certain soils with permanent loss of ground water storage capacity.

Various measures can reduce overdraft. Measures include improving efficiency of water use by domestic, industrial, and agricultural users; expanded ground water recharge; watershed management; and development of new sources of supply. The solution to the overdraft problem requires a combination of management programs.

The Regional Water Board goal is to alleviate overdraft and the water quality problems associated with overdraft, and extend the beneficial uses of the ground water resource for the longest period economically feasible. Water used to recharge ground water and imported water supplies must be of the highest quality possible. Banking of water in the ground is encouraged. Construction of storage facilities to store surplus wet-weather basin outflows is also recommended where such facilities do not adversely impact other waters of the state.

Salinity

Degradation of ground water in the Tulare Lake Basin by salts is unavoidable without a plan for removing salts from the Basin. A valleywide drain to carry salts out of the valley remains the best technical solution to the water quality problems of the Tulare Lake Basin. The drain would carry wastewater generated by municipal, industrial, and agricultural activities, high in salt and unfit for reuse. The only other solution is to manage the rate of degradation by minimizing the salt loads to the ground water body.

Some of the salt load to the ground water resource is primarily the result of natural processes within the

Basin. This includes salt loads leached from the soils by precipitation, valley floor runoff, and native surface waters.

Salts that are not indigenous to the Basin water resources result from man's activity. Salts come from imported water, soil leached by irrigation, animal wastes, fertilizers and other soil amendments, municipal use, industrial wastewaters, and oil field wastewaters. These salt sources, all contributors to salinity increases, should be managed to the extent practicable to reduce the rate of ground water degradation.

The Regional Water Board supports construction of a valleywide drain to remove salt-laden wastewater from the Basin under the following conditions:

- All toxicants would be reduced to a level which would not harm beneficial uses of receiving water.
- The discharge would be governed by specific discharge and receiving water limits in an NPDES permit.
- Long-term continuous biological monitoring would be required.

The Regional Water Board also encourages proactive management of waste streams to control and manage salts that remain in the Basin. Application or disposal of consolidated treated effluents should be to the west, toward the drainage trough of the valley. If feasible, salts in waste streams should be processed for reuse to reduce the need to import salt. Salt import should be reduced by assuring that imported water is of the highest quality possible. Water conveyance systems used to import water into the Basin should not be used to transport inferior quality water.

Silviculture

Forest management activities, principally timber harvesting and application of herbicides, have the potential to impact beneficial uses.

Timber harvest activities occur annually on tens of thousands of acres of private and federal land in the Basin and they may affect water quality throughout the area being harvested. Logging debris may be deposited in streams. Landslides and other mass soil movements can also occur as a result of timber operations. The amount of sediment washed from a logged area is directly proportional to the density of roads and skid trails in the area. Thus, the area used for roads, skid trails, and landings should be minimized. Proper drainage should be provided. Crossings of streams and other natural channels must be kept to a minimum. Activities (particularly, use of mechanical equipment) in wet meadow areas should be minimized. Disturbed areas should be reseeded or should receive erosion control treatment. The U. S. Forest Service and the California Department of Forestry and Fire Protection designates zones in each harvest area where the activities are closely controlled to protect the quality of water in streams and lakes. These water protection zones reflect the degree of erosion hazard in the tributary areas and apply in all areas where man's activities threaten to degrade the quality of waters in the streams.

Herbicides are sometimes used in silviculture to reduce commercial timber competition from weeds, grasses, and other plants or to prepare a site for planting of commercial species by eliminating existing vegetation.□ dblems associated with use of herbicides in forests in the Tulare Lake Basin are not well documented, although there is concern that there may be transport from target sites to streams by wind and water runoff. The U. S. Forest Service and the California Department of Forestry and Fire Protection should keep records of all pesticides, herbicides, or fertilizers used for forest and range management, for insect and disease protection, or for fire control, listing time, place, reason for use, and amounts used. To the extent feasible, such materials shall be precluded from entering streams.

The State and Regional Water Boards entered into agreements with both the U. S. Forest Service and the California Department of Forestry and Fire Protection. These agreements require these agencies to control nonpoint source discharges by implementing control actions certified by the State Water Board as best management practices. The Regional Water Board enforces compliance with best management practices and may impose control actions above and beyond what is specified in the agreements, such as adoption of waste discharge requirements, if the practices are not applied correctly or do not adequately protect water quality.

Mineral Exploration and Extraction

Drainage and runoff from mines and various operations associated with mining can result in serious impacts to ground and surface water beneficial uses, if not properly managed. Efforts to control drainage have gradually expanded over the years. A staff assessment of mine water quality problems, done in 1979, identified an approach to the problems (see

Appendix 29, which is incorporated by reference into this plan). Sedimentation caused by mining can be addressed by discharge requirements for existing mines, but the Regional Water Board does not have a specific program for controlling erosion from abandoned mines.

Chapter 15 contains standards to protect both surface and ground waters from discharge of mining wastes. Surface and subsurface drainage systems should be installed to prevent or minimize contact between water and any minerals that will impair the quality of water draining from the mine. Mine tailing piles must be prevented from eroding.

Additional environmental protection regulations are found in Title 14, California Code of Regulations, Division 2, Chapter 8, Subchapter 1.

Discharges of dredge spoils and process discharges from sand and gravel operations to surface waters shall be regulated by a National Pollutant Discharge Elimination System (NPDES) permit. In addition, these operations are also subject to storm water regulations. Operators must submit a Notice of Intent to comply with the General Industrial Activities Storm Water Permit or obtain an individual NPDES permit.

Requirements for small, short-term discharges confined to land from sand and gravel operations may be waived.

Erosion

Erosion is one of the greatest problems in the watershed area. Erosion is a natural occurrence, but most activities of man accelerate the process. Erosion causes discoloration of streams, and the suspended matter settles to form a smothering blanket on the stream bed. Erosion is accelerated by poor drainage and soil stabilization associated with the following activities: road building, clearing land, leveling land, construction, logging, brush clearing, off-road vehicle use, agriculture, overgrazing, and fires.

Disturbance of soil, vegetation, organic debris, and other materials that control runoff should be minimized. The Regional Water Board's policies on soil disturbance activities are as follows:

- Operations and activities should be planned and conducted in a manner that will not disturb extensive areas of soil or that will disrupt local drainage.
- Areas where soil is disturbed should be promptly reseeded or stabilized to prevent erosion.
- Strict regulation of activities in water protection zones, as described above in the "Silviculture" section, should be established.
- The stream flow regimen should be stabilized and maintained, and soil control measures should be applied in a timely manner.
- Neither organic nor earthen material should be discharged into any streams nor should such materials be placed at locations where they can pass into streams in quantities that could impair any beneficial use of the water.
- Operations and activities that cause increased turbidity levels in local streams must be regulated so that streams are not affected for extended periods or for more than ten percent of the time and operations and activities shall not violate water quality objectives.

Erosion control guidelines are included in the erosion/sedimentation action plan which is Appendix 30 and is incorporated by reference into this plan.

Recreation

Recreational activity can cause water quality problems. Boating can cause waves which increase lake bank erosion. Other potential water quality impacts may result from boat exhausts and oils entering the water, human secretions and excretions, various waste disposal activities, or cleaning fish and other activities. In certain intensive use areas without sufficient toilet facilities, a reach of stream bank or section of trail may be marked with closely interspersed fecal deposits, a direct threat both from contact and from ready transport into surface stream channels. Another problem is the disposal of material from vault privies or chemical toilets. Most installations are far removed from conventional waste treatment plants; thus, the use of such facilities for disposal is impractical. Climate, geology, and other factors become critical when considering local disposal as a part of routine maintenance. Some installations are considering use of flush toilets and a package, biological treatment system. Such systems must meet the requirements of a domestic wastewater treatment facility (See the "Discharges to Land" subsection of the "Municipal and Domestic Wastewater" section).

Attractive, convenient, and adequate toilet facilities, fish cleaning sinks, and disposal containers should be provided to prevent disposal in or near surface waters. Measures should be implemented to reduce lake bank erosion, such as reducing boat speeds near banks. Programs and procedures, developed from studies where necessary, must be adopted for processing and disposal of solid wastes and vault toilet pumpings from recreational areas. Educational programs on proper handling and disposal of wastes must be made available to classes and groups who would apply the techniques.

Well Standards

Improper well construction, maintenance, abandonment, or destruction can lead to contamination of ground water. California Water Code, Section 13801, requires all counties to adopt water well standards in accordance with Department of Water Resources Bulletin No. 74-81: "Water Well Standards: State of California," and Bulletin No. 74-90: "California Well Standards". Counties in the Tulare Lake Basin have established well standards equal to or more stringent than those in the bulletin.

Controlled Burning

Controlled burning is a method to regulate growth of some chaparral species and encourage the growth of preferable trees and grasses. Controlled burning helps prevent wildfire and uncontrolled burns. Burning changes the character of eroded matter from organic to mineral and may increase the contribution of material to streams. Burned areas, whether from controlled or uncontrolled burns, should be managed to minimize erosion of materials into streams.

Municipal and Domestic Wastewater

Increasing population and a higher standard of living require continuing expansion of wastewater treatment facilities. Advances in technology, normal equipment deterioration, and higher performance expectations require continuing replacement of these facilities. Expansion and replacement of municipal wastewater treatment facilities are integral components of the wastewater management program. Wastewater facilities should be evaluated periodically to determine if they adequately meet long-term needs, i.e., 20 years in the future. Financial programs must include a capital replacement fund to provide for these future needs. New land developments should include collection and treatment facilities as part of the initial plans.

The Regional Water Board regulates all municipal wastewater discharges to protect the quality and beneficial uses of ground water and surface water resources, to maximize reclamation and reuse, and to eliminate waste associated health hazards.

Municipal and industrial point source discharges to surface waters are generally controlled through National Pollutant Discharge Elimination System (NPDES) permits. Although the NPDES program is established by the federal Clean Water Act, the permits are prepared and enforced by the regional water boards through program delegation to California and implementing authority in the California Water Code.

The Regional Water Board will issue NPDES permits and waste discharge requirements for municipal waste discharges to protect water quality. Dischargers will be required to reclaim and reuse wastewater whenever reclamation is feasible.

To prevent nuisance, dischargers are required to manage vegetation on their respective facilities. However, birds may utilize this same vegetation during nesting season, creating a potential conflict between the Health and Water Codes and the Fish and Game Code. In accordance with a Memorandum of Understanding between the Department of Fish and Game and Mosquito Abatement Districts in the Tulare Lake Basin (copy is Appendix 25), vegetation management operations should be conducted so that weed removal operations are not necessary when nesting takes place, which is between April 1 and June 30.

Individual Waste Systems

Control of individual waste treatment and disposal systems can best be accomplished by local county environmental health departments if these departments are strictly enforcing an ordinance that is designed to provide complete protection to ground and surface waters as well as public health. The Regional Water Board's policies and guidelines for waste disposal from land developments is in Appendix 32, which is included by reference into this plan.

The Regional Water Board will consider adoption of a ban on new septic tank systems and elimination of existing systems in areas where the systems contaminate underlying ground water or where a substantial percentage of existing systems fail annually. In making this determination, the Regional Water Board must consider the factors listed in Section 13281 of the

California Water Code. (See the "Prohibitions" section of this chapter for a listing of communities with septic tank system moratoria.) The Regional Water Board will also review alternatives to protect water quality standards and beneficial uses; and prevent nuisance, pollution and contamination. Alternatives may include any combination of individual disposal systems, community collection and disposal systems with subsurface disposal, and conventional treatment systems.

A problem may develop in some agricultural areas of the Basin owing to saturation of the soil when irrigation water along the valley trough is restricted from percolating through the soil profile. As the areal extent of this condition expands, individual waste disposal systems in areas where community sewers are not an option may create surfacing waste and a public health problem.

Septage

Every three years, septage should be pumped from the average septic tank. Commercial liquid waste haulers provide this service. Small sewage treatment plants that may be in a rural area of septic tank users are reluctant to accept pumpings from individual waste disposal systems and vault toilets because of the extremely variable nature of the waste and its potential adverse affect on the plant's operation. Where regional wastewater plants have been funded with federal or state grants, one condition of the award typically requires provision for septage. Where this variability can be accommodated, haulers may find the hauling distance too great and fees too large. As a result, illegal dumps of this waste sometimes occur and cause aesthetic and public health problems.

County authorities presently license septic tank pumpers through their environmental health departments. Thus, county and municipal agencies provide effective control, treatment, and disposal of septic tank pumpings. Upon approval of the County Health Officer, septic tank pumpings may be disposed to qualified waste disposal sites, as defined in Chapter 15, or to disposal facilities specifically approved to receive these wastes.

The Regional Water Board recommends construction of facilities for septic tank pumpings at municipal sewage treatment plants where the waste will not interfere with treatment or cause nuisances.

Effluent Limits

Discharges must meet effluent and receiving water limits set forth in adopted waste discharge requirements. Point source discharges to navigable waters must comply with Section 301 of the Clean Water Act. Point source discharges to land must comply with waste discharge requirements developed according to California Water Code Section 13377 and Section 13263, respectively. NPDES permits must be renewed every 5 years. Other waste discharge requirements must be reviewed every 5, 10, or 15 years depending upon the threat to water quality of the discharge.

The effluent limits presented in the following sections of this chapter are the minimum treatment level which must be provided.

Discharges to Navigable Waters

40 CFR 125 requires publicly owned treatment works to provide secondary treatment and best practicable waste treatment technology, or provide adequate treatment to meet the water quality standards, whichever is more stringent. (40 CFR 133 defines secondary treatment as removal of 85 percent or reduction to 30 mg/l, whichever is more stringent, of both 5-day BOD and suspended solids.) Effluent limitations for other point sources are also described in 40 CFR 125. Special limitations for certain types of industrial discharges are defined in the 40 CFR 400 series. These sources must provide best practicable control technology currently available.

The following policy shall govern waste discharges to navigable waters in the Tulare Lake Basin:

- Discharges to surface waters will not be considered a permanent solution when the potential exists for wastewater reclamation.
- Discharge to ephemeral streams or to streams that have limited dilution capacity will not be considered a permanent solution unless it is accomplished in such a manner as to safeguard the public health and prevent nuisances, and the wastewater is of such a quality that it benefits streamflow augmentation.
- Dischargers in mountain areas must evaluate land disposal as an alternative. Where studies show that year-round land disposal is not practicable, dischargers must evaluate dry season land disposal as an alternative.

As a minimum, dischargers to surface waters, including stream channels, shall comply with the following effluent limits:

- All domestic discharges shall be adequately treated and disinfected to reliably meet wastewater reclamation criteria (Title 22, California Code of Regulations, Division 4, Section 60301, et. seq.).

- The maximum electrical conductivity (EC) of a discharge shall not exceed the quality of the source water plus 500 micromhos per centimeter or 1,000 micromhos per centimeter, whichever is more stringent. When the water is from more than one source, the EC shall be a weighted average of all sources.

- Discharges shall not exceed an EC of 1,000 micromhos per centimeter, a chloride content of 175 mg/l, or a boron content of 1.0 mg/l.

In addition to the above, discharges to waters having an EC or water quality objective of less than 150 micromhos shall comply with the following:

- Complete removal of settleable and floatable solids

- Nutrient removal as necessary to control biostimulation

- Removal of dissolved solids to levels consistent with those of the receiving waters

- Ammonia removed as necessary to protect aquatic life.

- Substantially complete removal of any substance known to be toxic to plant and/or animal life.

Discharges to Land

Wastewater treatment facilities that discharge to land in a manner that waste may infiltrate below the ground surface and degrade ground water must also comply with effluent limits. The excellent quality of ground waters along the easterly edge of the Basin should be protected by encouraging the application or disposal of consolidated treated effluents to the west, toward the drainage trough of the valley.

The levels of treatment required of all domestic wastewater facilities with land disposal are as follows:

1. Primary: Primary treatment is acceptable only under exceptional circumstances, typically a relatively minor discharge in an isolated location where there is little risk of nuisance or water quality degradation. Treatment and disposal in some instances could be provided by septic tanks and a leach field. Increased amounts of wastewater or nuisance conditions would require an upgrade in level of treatment.

2. Advanced Primary: This treatment may be satisfactory for smaller facilities in outlying or remote areas where the potential for odors and other nuisances is low. Advanced primary shall provide removal of 60 to 70 percent or reduction to 70 mg/l, whichever is more restrictive, of both 5-day BOD and suspended solids.

3. Secondary Treatment: Secondary treatment should remove 85 percent or reduce to 30 mg/l, whichever is more restrictive, of both 5-day BOD and suspended solids. Secondary treatment may be required where public access to wastewater is not precluded.

   Most wastewater discharges will be adequately precluded from public access and secondary treatment will not be necessary. Facilities which discharge or are designed to discharge in excess of 1 million gallons per day must provide removal of 80 percent or reduction to 40 mg/l, whichever is more restrictive, of both 5-day BOD and suspended solids. Smaller facilities (less than 1 million gallons per day) in close proximity to an urbanized area or using particular methods of effluent disposal (e.g., irrigation of certain types of crops) will also be required to provide 80 percent removal or reduction to 40 mg/l, whichever is more restrictive, of both 5 day BOD and suspended solids.

4. Advanced Wastewater Treatment: Reclaimed water used for the spray irrigation of food crops must also be coagulated and filtered. Coagulated wastewater means oxidized wastewater in which colloidal and finely divided suspended matter have been destabilized and agglomerated by the addition of suitable floc-forming chemicals or by an equally effective method. Filtered wastewater means an oxidized, coagulated, clarified wastewater which has been passed through natural undisturbed soils or filter media, such as sand or diatomaceous earth, so that the turbidity does not exceed an average operating turbidity of 2 NTUs and does not exceed 5 NTUs more than 5 percent of the time during any 24-hour period {Title 22, California Code of Regulations, Section 60301, et seq.}.

Additional effluent limits follow:

- The incremental increase in salts from use and treatment must be controlled to the extent possible. The maximum EC shall not exceed the EC of the source water plus 500 micromhos/cm. When the source water is from more than one source, the EC shall be a weighted average of all sources.

- Concentration of total coliform organisms in reclaimed wastewater must be in accordance with limits established in the following provisions of Title 22, California Code of Regulations: Sections 60303 (Spray Irrigation of Food Crops), 60305 (Surface Irrigation of Food Crops), 60311 (Pasture for Milking Animals), 60313 (Landscape Irrigation), 60315 (Nonrestricted Recreational Impoundment), 60317 (Restricted Recreational Impoundment), and 60319 (Landscape Impoundment).

- In the Poso Creek Subarea, discharges shall not exceed 1,000 micromhos/cm EC, 200 mg/l chlorides, and 1.0 mg/l boron. The Poso Creek subarea consists of about 35,000 acres of land between State Highways 99 and 65 about six miles north of Bakersfield, and is defined more specifically in Regional Water Board Resolution No. 71-122, which is incorporated by reference into this plan.

- In the White Wolf Subarea, for areas overlying Class I irrigation water, discharges shall not exceed 1,000 µmhos/cm EC, 175 mg/l chlorides; 60 percent sodium, and 1.0 mg/l boron. For areas overlying Class II or poorer irrigation water, discharges shall not exceed 2,000 µmhos/cm EC, 350 mg/l chlorides, 75 percent sodium, and 2 mg/l boron. In areas where ground water would be Class I except for the concentration of a specific constituent, only that constituent will be allowed to exceed the specified limits for Class I water. In no case shall any constituent be greater than those limits specified for areas overlying Class II irrigation water. The White Wolf subarea consists of 64,000 acres within the valley floor, at the southern tip of the Tulare Lake Basin, about 20 miles south of Bakersfield. The subarea is bounded on the west by the San Emigdio Mountains, on the south and east by the Tehachapi Mountains, and on the north by the White Wolf Fault.

  Criteria for mineral quality of irrigation water is described below:

Constituent	Class I	Class II	Class III
TDS (mg/l)	<700	700 - 2,000	>2,000
EC (µmhos/cm)	<1,000	1,000 - 3,000	>3,000
Chlorides (mg/l)	<175	175 - 350	>350
Sodium (percent base constituents)	<60	60 - 75	>75
Boron (mg/l)	<0.5	0.5 - 2	>2

- Discharges to areas that may recharge to good quality ground waters shall not exceed an EC of 1,000 micromhos per centimeter, a chloride content of 175 mg/l, or a boron content of 1.0 mg/l.

Wastewater Reclamation

Reclaimed water provides a substitute source of water and provides nutrients that nourish crops. When properly managed, reclamation consumes nitrates and effluent that would normally percolate to local ground waters underlying a community and can free up potable water for growth or other uses. Extensive reclamation is a practical necessity simply to maintain present levels of development and activity in the Basin.

Wastewater reclamation shall be maximized by controlling or limiting salt pickup and evaporation during use, treatment, or disposal. Integration of final disposal into existing surface distribution systems appears to be advantageous. Wherever feasible, eventual wastewater reclamation will be requested.

Title 22, California Code of Regulations, establishes reclamation criteria for direct use of reclaimed water but has no criteria for wastewater distributed with irrigation supplies. Therefore, municipal treatment facilities producing effluent for introduction to irrigation canals for unrestricted irrigation will be required, as a minimum, to disinfect to 23 MPN coliform per 100 ml. The Department of Health Services will be consulted for all cases.

To facilitate the use of treated wastewater with short notice, wastewater reclamation requirements may be waived for up to one year provided that the following conditions are met:

1. The reclaimed water will comply with any applicable criteria provided by Title 22, Division 4, California Code of Regulations;

2. The proposed uses receive prior approval from the state and local health departments and the Executive Officer; and

3. The reclamation project is consistent with the "Guidelines for Use of Reclaimed Water" developed by the Department of Health Services. The "Guidelines for Use of Reclaimed Water" is incorporated by reference into this plan. (See Appendix 34.)

Reclamation projects more than one year in duration may be allowed to proceed prior to final approval of reclamation requirements provided that the use complies with reclamation criteria.

Waste discharge requirements will be revised and wastewater reclamation requirements adopted as soon as possible to allow reuse. No enforcement actions will be taken against a community allowing wastewater reuse prior to revision of waste discharge requirements provided that the use complies with reclamation criteria.

Reclamation policies are as follows:

- Discharges to surface water and evaporation of reclaimable wastewater will not be acceptable permanent disposal methods where opportunity exists to replace an existing use or proposed use of fresh water with reclaimed water; a timetable for reclamation or reuse may be set by the Regional Water Board.

- The quality of waste discharges shall be regulated to promote reclamation and reuse wherever feasible.

- Rates of wastewater application that exceed reasonable agronomic rates will not be considered as reclamation or reuse.

- Project reports for new or expanded wastewater facilities shall include plans for wastewater reclamation or the reasons why this is not possible.

- Where studies show that year-round or continuous reuse of all of the wastewater is not practicable, consideration shall be given to partial reuse of the flow and seasonal reuse.

The irrigation season in the Tulare Lake Basin area typically extends 9 to 10 months, but monthly water usage varies widely. To maximize reuse, users should provide water storage and regulating reservoirs, or percolation ponds that could be used for ground water recharge of surplus waters when there is no irrigation demand.

State Water Board policy, described in Resolution No. 77-1, Appendix 4, encourages and provides funds for reclamation projects that protect beneficial uses of existing water supplies, encourage water conservation, and encourage other agencies to assist in implementation.

Consolidations

Proliferation of small treatment plants in developed areas is undesirable. Most small communities do not have adequate resources to properly manage, treat and dispose of wastewater in an urban environment. Typical problems involve nuisance and ground water pollution. Small communities and development close to other small communities may be able to construct and operate a joint wastewater treatment facility with greater treatment ability, opportunity for reclamation, and for lower cost. Policies on consolidation are as follows:

- Adjoining small communities should combine resources to construct and operate a joint or regional wastewater treatment plant.

- Consolidation, whether one or more regional facilities operated by a single sewering authority, should be cost-effective, and consider benefits to the ecology, treatment efficiencies, and effective reuse of the waters.

- Unsewered areas and new developments adjacent to or within existing wastewater collection system service areas should be connected to the system. Developments not within a service area but within the projected sphere of influence of a regional system should be developed in a manner that provides for future connection to the system when the regional sewer system becomes available. One condition of approval of individual sewage disposal systems in certain areas and of certain densities may be that developments be dry sewered in a manner that provides cost-effective sewerage infrastructure to be placed during initial construction.

- Each municipal facility should act as a regional facility and provide sewerage services within its sphere of influence. The municipality must be equitably compensated for these services.

- Areas recommended for consolidation of wastewater systems are the Parlier area, the Bakersfield area, and the City of Delano. The Selma-Kingsburg-Fowler (Tri-Cities) and Fresno-Clovis regions have been consolidated. Consolidations of other wastewater treatment plants may be justified at some future time.

The intent of this policy is to make consolidation the rule rather than the exception. Consolidation should be compared to other approaches. If such a comparison yields clear technical, environmental, or economic advantages for consolidating, then consolidation should be implemented.

Pretreatment

Many municipal facilities in the Basin treat significant volumes of industrial wastewater. Most of this wastewater is from agriculture-related industries that fluctuate seasonally. Requirements for industrial users that discharge directly to surface water or to land are in the "Industrial Wastewater" Section of this chapter. Indirect industrial users discharge to a municipal wastewater treatment system and are regulated by the municipal discharger. Policies on pretreatment are as follows:

- All publicly owned treatment works (POTWs) with a design flow greater than 5.0 million gallons per day must comply with 40 CFR 403, the federal pretreatment program requirements.
- Smaller POTWs with industrial flows which may cause pass-through or interference may also be required to develop pretreatment programs.
- All industrial users that discharge to POTWs must comply with the National Pretreatment Standards regardless of whether the POTW has an approved pretreatment program.

Industrial Wastewater

The number of known cases of ground water pollution or public nuisance attributable to industrial sources has increased steadily over the last decade. Much of the increase is due to sources such as underground tanks that were never intended to discharge but which leaked undetected for years. The Region's inventory of underground storage tanks indicates a high number of leaking tanks. Ground water contamination from other industrial sources generally occurs from the illegal discharge of fluids or other materials used in production processes. Waste compounds have been discharged directly to unlined sumps, pits, or depressions and spread on soils. In some cases, these disposal practices went on for many years before they were discovered or discontinued.

There are two types of industrial dischargers: direct and indirect. Indirect dischargers are those who discharge into community wastewater systems. The federal regulations require that all indirect users abide by general National Pretreatment Standards and that certain categories of indirect users comply with specific discharge standards. (See Pretreatment Section, above.)

Direct dischargers discharge to either surface water or land. Surface water dischargers are subject to federal and state regulations. Federal regulations require dischargers to comply with best conventional pollutant control technology (BCT), best practicable control technology currently available (BPT), or best available technology economically achievable (BAT). Effluent limitations for specific industrial waste discharges to surface waters, together with standards of performance and pretreatment standards for new sources, are found in 40 CFR 400. Waste source categories of particular interest in the Tulare Lake Basin include dairy product processing, meat product and rendering processing, canned and preserved fruit and vegetable processing, beet sugar processing, and petroleum production and refining. When treatment technology is not defined, regulations specify use of best practicable judgement (BPJ).

Generally, the effluent limits established for municipal waste discharges will apply to industrial wastes. Industrial dischargers shall be required to:

1. Comply with water quality objectives established in Chapter III.
2. Comply with Chapter 15 for discharges of designated or hazardous waste unless the discharger demonstrates that site conditions and/or treatment and disposal methods enable the discharge to comply with this Basin Plan and otherwise qualify for exemption from Chapter 15.
3. Comply with effluent limitations set forth in 40 CFR 400 when discharge is to surface water.
4. Comply with, or justify a departure from, effluent limitations set forth in 40 CFR 400 if discharge is to land.
5. Limit the increase in EC of a point source discharge to surface water or land to to a maximum of 500 µmhos/cm. A lower limit may be required to assure compliance with water quality objectives.

   An exception to this EC limit may be permitted for industrial sources when the discharger technically demonstrates that allowing a greater net incre-

mental increase in EC will result in lower mass emissions of salt and in conservation of water, provided that beneficial uses are protected.

An exception may also be permitted for food processing industries that discharge to land and exhibit a disproportionate increase in EC of the discharge over the EC of the source water due to unavoidable concentrations of organic dissolved solids from the raw food product, provided that beneficial uses are protected. Exceptions shall be based on demonstration of best available technology and best management practices that control inorganic dissolved solids to the maximum extent feasible.

Cull fruits and wastes from food processing generally are voluminous and may have a high water content like winery wastes. Provision should be made for thin spreading of such materials on the fields, followed promptly by disking into the soil.

6. The Regional Water Board encourages the reclamation and reuse of wastewater, including treated ground water resulting from a cleanup action, where practicable and requires as part of a Report of Waste Discharge an evaluation of reuse and land disposal options as alternative disposal methods. Reuse options should include consideration of the following, where appropriate, based on the quality of the wastewater and the required quality for the specific reuses: industrial and municipal supply, crop irrigation, landscape irrigation, ground water recharge, and wetland restoration. Where studies show that year-round or continuous reuse of land disposal of all the wastewater is not practicable, the Regional Water Board will require dischargers to evaluate how reuse or land disposal can be optimized, such as consideration of reuse/disposal for part of the flow and seasonal reuse/disposal options (e. g., dry season land disposal).

7. Unless an exception is technically justified, segregate domestic waste from industrial waste, and treat and dispose of domestic waste according to the policy for municipal and domestic wastewater.

Additional specific requirements have been adopted for wastewater from oil fields and wineries.

Oil Field Wastewater

Hydrocarbon production in the San Joaquin Valley's 74 oil fields generates significant volumes of wastewater. Oil field producers continue to use hundreds of sumps as oil/wastewater separators and as wastewater disposal sumps. Some oil field wastewaters contain salts, oil and grease, metals, and organics which can present a threat to the beneficial uses of underlying good quality ground water. However, in some areas, wastewater may be of a quality which allows its reuse for reclamation or discharge to surface waters. In these instances, waste discharge requirements or NPDES permits, as appropriate, are issued. In addition, some ground water in the Basin is naturally of such poor quality that oil field wastewater will not impact its beneficial uses. Due to historical practices, degradation of ground water from oil field wastewater disposal occurred in some areas. The petroleum industry has been eliminating oilfield wastewater disposal sumps.

With the gradual elimination of the use of sumps for disposal, increased amounts of produced wastewater are being discharged to Class II injection wells. Title 14, California Code of Regulations, Section 1724.6, et seq., defines environmental protection regulations relating to oil and gas operations administered by the California Department of Conservation, Division of Oil, Gas & Geothermal Resources in cooperation with other state regulatory agencies. The Department of Conservation administers the federal underground well injection program for Class II injection wells within the state. The Regional Water Board reviews and may comment on the permit application regarding water quality concerns. The review process is in accordance with a Memorandum of Agreement between the State Water Board and the Department of Conservation. The purpose of the agreement is to ensure that the construction or operation of Class II injection disposal wells and the land disposal of wastewaters from oil, gas, and geothermal production facilities does not cause degradation of waters of the state. The Memorandum of Agreement provides a coordinated approach that results in a single permit satisfying the statutory obligations of both agencies.

The Memorandum of Agreement also requires the Department of Conservation to notify the Board of all pollution problems, including spills associated with operators and/or new proposed oil field discharges. The agencies must work together, within certain timelines, to review and prepare permits and coordinate enforcement actions.

Policies regarding the disposal of oil field wastewater are:

- Maximum salinity limits for wastewaters in unlined sumps overlying ground water with existing and future probable beneficial uses are 1,000 µmhos/cm EC, 200 mg/l chlorides, and 1 mg/l boron, except in the White Wolf subarea where more or less restrictive limits apply. The limits for the White Wolf subarea are discussed in the "Discharges to Land" subsection of the "Municipal and Domestic Wastewater" section.

- Discharges of oil field wastewater that exceed the above maximum salinity limits may be permitted to unlined sumps, stream channels, or surface waters if the discharger successfully demonstrates to the Regional Water Board in a public hearing that the proposed discharge will not substantially affect water quality nor cause a violation of water quality objectives.

- Disposal sumps shall either be free of oil or effectively covered or screened to preclude entry of birds or animals. Compliance monitoring for wildlife problems shall continue to be deferred to the Department of Conservation and the Department of Fish and Game. The Regional Water Board will respond to complaints, spot check for compliance, and enforce conditions as necessary.

- Sumps adjacent to natural drainage courses shall be protected from inundation or washout, or properly closed.

- Regulation of oil field dischargers shall be coordinated with all other state and federal agencies having jurisdiction and interest in the oil field.

- The discharge of produced wastewater to land, where the concentration of constituents may cause ground water to exceed water quality objectives, shall be subject to the requirements contained in the California Code of Regulations, Title 23, Section 2510, et seq. (Chapter 15).

Wineries

A substantial number of wineries operate throughout the Central Valley. Many of these wineries produce substantial quantities of stillage waste which is high in concentrations of BOD, EC, TDS, and nitrogen. As stillage is normally discharged directly to land without any prior treatment, there is significant potential for the waste to affect water quality and to create nuisance conditions if not managed properly.

A study conducted in 1980 developed recommendations for minimizing water quality effects and nuisance conditions resulting from land application of stillage waste {Metcalf and Eddy, "Land Application of Stillage Waste: Odor Control and Environmental Effects"}. Based on the study, the Regional Water Board adopted guidelines for the land disposal of stillage waste from wineries. These guidelines may not be sufficient where local soil, ground water, weather, or other conditions are not compatible with the stillage to be disposed. These guidelines prescribe the minimum requirements for disposal of stillage waste from wineries and do not preclude the establishment of more stringent requirements as necessary to comply with water quality objectives. The policy for land disposal of stillage waste is presented below.

Storm Water

Runoff from residential and industrial areas can contribute to water quality degradation. Urban storm water runoff contains organics, pesticides, oil, grease, and heavy metals. Because these pollutants accumulate during the dry summer months, the first major storm after summer can flush a highly concentrated load to receiving waters and catch basins. Combined storm and sanitary systems may result in some runoff to wastewater treatment plants. In other cases, storm water collection wells can produce direct discharges to ground water. Impacts of storm water contaminants on surface and ground waters are an important concern.

EPA has promulgated regulations for municipal and industrial stormwater permits in 40 CFR 122. The State Water Board implemented these regulations by adopting a General Industrial Activities Storm Water Permit (excluding construction activity) and a General Construction Activity Storm Water Permit. Storm water dischargers indicate intention to follow the specifications in the appropriate permit by filing a Notice of Intent with the State Water Board.

The Regional Water Board will take all measures necessary to protect the quality of surface and ground waters from treatment or disposal of urban runoff.

- The Regional Water Board will issue waste discharge requirements on the discharge of urban runoff when a threat to water quality exists.

- The Regional Water Board will regulate large and medium municipal stormwater dischargers and, at its discretion, specific industrial dischargers through the issuance of individual NPDES permits. Industrial dischargers may also be

Land Disposal of Stillage Waste from Wineries

Rapid Infiltration Method for Disposal of Stillage:

A. Disposal Site Requirements

1. Land for disposal should be as remote from habitation as possible.

2. Soils should be capable of infiltrating 3 to 4 inches of stillage in 24 hours or less.

3. Soil permeability should be greater than 2 inches per hour for the entire profile.

4. There should be no unripped hardpan within the top 10 feet of the soil profile.

5. Soil depth should be 10 feet or greater.

6. Depth to ground water should be 10 feet or greater.

B. Operational Procedures

1. Cooling water and any other wastewater with low COD concentrations should be separated from the stillage before land application.

2. Stillage waste should be spread on land between long, narrow, level checks. The surface should be leveled uniformly within 0.1 foot per 100 feet, without potholes.

3. At the inlet of the checks, the flow should be distributed using splash plates or other devices to prevent deep holes from forming.

4. The depth of each stillage application should not exceed the following:

Period of Year	Depth of Stillage Application (inches)
Aug 1 to Oct 1	3.7
Oct 1 to Dec 1	3
Dec 1 to May 1	2.5

5. Standing stillage should not be present 24 hours after application has ceased.

6. After stillage waste has been applied to an area, the area should be allowed to dry for at least the following period before re-application of waste:

Period of Year	Drying Time (days)
Aug 1 to Oct 1	6
Oct 1 to Dec 1	9
Dec 1 to May 1	13

7. After stillage has been applied to an area, if leathers have not been removed, the area should be raked, rototilled, or an equivalent method should be used before re-application of stillage.

8. Loading rates and drying times for stillage waste from raisins or pomace should follow the criteria for December 1 to May 1 operations.

9. Land area used for disposal should equal or exceed the following:

Period of Year	Land Area † (acres per 100,000 gpd of stillage waste)
Aug 1 to Oct 1	7
Oct 1 to Dec 1	12.3
Dec 1 to May 1	20.6

† These land areas are directly related to the drying time stated in No. 6 above. Complete infiltration recovery to the original values may not be obtained by these relatively short resting cycles. At some application sites, the infiltration rate constantly decreases as the application season progresses. A decrease in infiltration of about 75% can be expected with only three applications. Therefore, the number of stillage applications at a specific site should be kept to a minimum. Repeated applications of stillage allowing only minimum drying times may require larger land areas.

10. During periods when it is not used for stillage disposal, the disposal area should be planted with crops to assist in the removal of residual nitrogen concentrations from the soil if necessary.

Slow Rate Irrigation Method:

Most existing stillage disposal sites are located on relatively permeable soils. Where the available land for application of stillage is such that the limiting permeability is slow to moderately slow, the use of slow rate irrigation may be used as an alternative to rapid infiltration. The application depends on the expected evaporation and infiltration and can range from less than 0.5 to 1.5 inches (13,600 to 40,000 gal/acre). Resting periods should range from 18 to 20 days or more. The resultant average loading rates and land areas are shown in Table IV-1. All other disposal site requirements and operational procedures for the rapid infiltration method also apply to the slow rate irrigation method.

Table IV-1
Slow Rate Irrigation Area Requirements

	Soil Permeability Rate	
	Slow	Moderately Slow
Limiting soil permeability, in/hr	0.06-0.2 (clay loam)	0.2-0.6 (clay loam or silt loam)
Infiltration capacity, in/day	0.5	1.0
Resting period, days	20	13
Average loading rate, gal/acre/day	670	1,940
Area required per 100,000 gal/day of stillage, acres	150	52

regulated with individual, site-specific NPDES permits. The Regional Water Board will issue waste discharge requirements on the discharge of urban runoff to land when a threat to water quality exists.

- Combined sewer systems will not be allowed without satisfactory justification.

- The Regional Water Board will require source control programs by local agencies when water quality benefits will be realized.

- Governing agencies should provide facilities for the treatment (if necessary), storage and percolation of runoff.

Hazardous and Non-Hazardous Waste Disposal

Discharges of solid, semi-solid, and liquid wastes to landfills, waste piles, surface impoundments, pits, trenches, tailings ponds, natural depressions, and land treatment facilities (collectively called "waste management units") have the potential to become sources of pollution affecting the quality of waters of the state. Unlike surface waters which often have the capacity to assimilate discharged waste constituents, ground waters have little or no assimilative capacity due to their slow migration rate, lack of aeration, lower biological activity, and laminar flow patterns. If concentrations of pollutants in land-discharged waste are sufficiently high to prevent the waste from being classified as "inert waste" under Title 23, California Code of Regulations, Section 2524, discharges of such wastes to waste management units require long-term containment or active treatment following the discharge in order to prevent waste or waste constituents from migrating to and impairing the beneficial uses of waters of the state. Pollutants from such discharges may continue to affect water quality long after the discharge of new waste to the unit has ceased, either because of continued leachate or gas discharges from the unit, or because pollutants have accumulated in underlying soils from which they are gradually released to ground water.

Landfills for disposal of municipal or industrial solid waste (solid waste disposal sites) are the major categories of waste management units in the region, but there are also surface impoundments used for storage or evaporative treatment of liquid wastes, waste piles for the storage of solid wastes, and land treatment units for the biological treatment of semi-solid sludges from wastewater treatment facilities and liquid wastes from cannery and other industrial operations. Sumps, trenches, and soil depressions have been used in the past for liquid waste disposal. Mining waste management units (tailings ponds, surface impoundments, and waste piles) also represent a significant portion of the waste management units in the Region. The Regional Water Board issues waste discharge requirements to ensure that these discharges are properly contained to protect the Region's water resources from degradation, and to ensure that dischargers undertake effective monitoring to verify continued compliance with requirements.

These discharges, and the waste management units at which the wastes are discharged, are subject to concurrent regulation by other state and local agencies responsible for land use planning, solid waste management, and hazardous waste management. "Local Enforcement Agencies" (mainly cities and counties) implement the state's solid waste management laws and local ordinances governing the siting, design, and operation of solid waste disposal facilities (usually landfills) with the concurrence of the California Integrated Waste Management Board (Waste Management Board). The Waste Management Board also has direct responsibility for review and approval of plans for closure and post-closure maintenance of solid waste landfills. The Department of Toxic Substance Control issues permits for all hazardous waste treatment, storage, and disposal facilities (which include hazardous waste incinerators, tanks, and warehouses where hazardous wastes are stored in drums as well as landfills, waste piles, surface impoundments, and land treatment units). The State Water Board, regional water boards, Waste Management Board, and Department of Toxic Substances Control have entered into Memoranda of Understanding to coordinate their respective roles in the concurrent regulation of these discharges.

The statutes and regulations governing the discharges of both hazardous and non-hazardous wastes have been revised and strengthened in the last few years. The discharge of municipal solid wastes to land are closely regulated and monitored; however, some water quality problems have been detected and are being addressed. Solid waste water quality assessment tests and recent monitoring efforts under the State and regional water boards' Chapter 15 have revealed that discharges of municipal solid wastes to unlined landfills have resulted in ground water degradation and pollution by volatile organic constituents and other waste constituents. Volatile organic constituents are components of many household hazardous wastes and certain industrial wastes that are present within municipal solid waste streams. Volatile organic constituents can easily migrate from

landfills either in leachate or by vapor-phase transport. Clay liners and natural clay formations between discharged wastes and ground waters are largely ineffective in preventing water quality impacts from municipal solid waste constituents. In a recently adopted policy for water quality control, the State Water Board found the "[r]esearch on liner systems for landfills indicates that (a) single clay liners will only delay, rather than preclude, the onset of leachate leakage, and (b) the use of composite liners represents the most effective approach for reliably containing leachate and landfill gas." {State Water Board Resolution No. 93-62, Policy for Regulation of discharges of Municipal Solid Waste}

As a result of similar information on a national scale, the U. S. Environmental Protection Agency (USEPA) adopted regulations under Subtitle D of the Resource Conservation and Recovery Act (RCRA) which require the containment of municipal solid wastes by composite liners and leachate collection systems. Composite liners consist of a flexible synthetic membrane component placed above and in intimate contact with a compacted low-permeability soil component. This liner system enhances the effectiveness of the leachate collection and removal system and provides a barrier to vapor-phase transport of volatile organic constituents from the unit. Regional water boards and the Waste Management Board are implementing these new regulations in California under a policy for water quality control from the State Water Board (Resolution No. 93-62) and regulations from the Waste Management Board. The State Water Board is in the process of developing revised regulations under Title 23, California Code of Regulations, Division 3, Chapter 15, Discharges of Waste to Land, to fully implement water quality-related portions of the RCRA, Subtitle D federal regulations.

Inert waste does not contain hazardous waste or soluble pollutants at concentrations in excess of applicable water quality objectives and does not contain significant quantities of decomposable waste. Some examples of inert wastes include: concrete rubble and excess clean earth fill. Inert wastes do not necessarily need to be disposed of at classified waste management units, but waste discharge requirements may be issued for their discharge at the discretion of the Regional Water Board.

Other Discharge Activities

Some remaining discharges of concern include small hydroelectric facility development, dredging and dredging spoils runoff.

The energy crisis of the 1970s resulted in a surge of small hydroelectric facility development in the mountains and foothills. Impairments to beneficial uses may occur from this type of stream development because of erosion from construction and changes in water temperature. The Regional Water Board has published guidelines for small hydroelectric facilities (see Appendix 31, which is included by reference into this plan) to help address some of the problems associated with small hydroelectric plants.

Dredging can result in turbidity and the reintroduction and resuspension of harmful metal or organic materials. This latter effect occurs directly as a result of the displacement of sediment at the dredging site and indirectly as a result of erosion of dredge spoil to surface waters at the deposition site. The Regional Water Board currently regulates dredging operations on a case-by-case basis. Operational criteria may result from permits or the water quality certification requirements stemming from Section 401(a) of the Clean Water Act. The opportunity may exist to regulate certain of the dredging operations under a general permit.

The Regional Water Board receives notice of spills, leaks, and overflows as they occur. These incidents are evaluated for water quality impacts and remedial actions are implemented when necessary.

THE NATURE OF CONTROL ACTIONS IMPLEMENTED BY THE REGIONAL WATER BOARD

The nature of actions to achieve water quality objectives are the following:

1. identifying potential water quality problems;
2. confirming and characterizing water quality problems through assessments of source, frequency, duration, extent, fate, and severity;
3. remedying water quality problems through imposing or enforcing appropriate measures;
4. monitoring problem areas to assess effectiveness of the remedial measures.

Generally, the actions associated with the first step consist of surveys or reviews of survey information and other data sources to isolate possible impairments of beneficial uses or water quality.

The characterization step usually involves studies that attempt to answer questions about a water quality problem's source, extent, duration, frequency, and severity. Information on these parameters is essential to confirm a problem and prepare for remedy. The Regional Water Board may gain this information through its own work or through data submittals requested of actual or potential dischargers under Section 13267 of the California Water Code.

Problem remedy calls for the Regional Water Board to prevent or cleanup problems. A common means of prevention, as well as protection, of water quality is through the issuance of NPDES permits, waste discharge requirements, discharge prohibitions, or other discharge restrictions. The NPDES is a requirement of the Federal Clean Water Act (Section 402) and California has implementing responsibility. The national permit system only applies to certain surface water discharges. Waste discharge requirements, which encompass permits, are described in the Water Code Section 13260, et seq. The waste discharge requirements system is not as restricted as the federal NPDES.

Waste discharge requirements may be used to control any type of discharge to land, ground waters or surface waters that may affect water quality. The Regional Water Board considers existing quality of receiving waters; historical, present, and future beneficial uses and the rates of use; nature and character of the discharge and possible affect on beneficial uses and receiving water quality; particular impact on beneficial uses within the immediate area of the discharge; and water quality objectives. The Regional Water Board will make a finding as to all beneficial uses within the area of influence of the discharge, and will set waste discharge requirements to protect these uses while not allowing the discharge to violate receiving water quality objectives.

Cleanup is implemented through enforcement measures such as cease and desist and cleanup and abatement orders. Cease and desist orders and cleanup and abatement orders are two of the enforcement tools available to the Regional Water Board to correct actual or potential violations of waste discharge requirements, NPDES permits, prohibitions, and nuisance or pollution.

The details of the monitoring step are explained in Chapter VI. In general, the Regional Water Board has wide latitude to require actual and potential dischargers to submit monitoring and surveillance information, in addition to collecting its own or using State Water Board data.

Whatever actions that the Regional Water Board implements must be consistent with the Basin Plan's beneficial uses and water quality objectives, as well as certain State and Regional Water Boards' policies, plans, agreements, prohibitions, guidance, and other restrictions or requirements. These considerations are described in Chapter V and included in the Appendix when noted.

Antidegradation

The antidegradation directives of State Water Board Resolution No. 68-16 (Appendix 2) require that high quality waters of the State be maintained "consistent with the maximum benefit to the people of the State." The Regional Water Board applies these directives when issuing a permit, or in an equivalent process, regarding any discharge of waste which may affect the quality of surface or ground waters in the region.

No proven means exist at present that will allow ongoing human activity in the Basin and maintain ground water salinity at current levels throughout the Basin. Consistent with the above, the Regional Water Board has determined that controlled ground water degradation by salinity is the most feasible and practical short-term management alternative for the Tulare Lake Basin. The water quality objectives for ground water salinity control the rate of increase and maintain beneficial uses as long as possible. A valleywide drain to carry salts out of the valley remains the best technical solution to the water quality problems of the Tulare Lake Basin.

Implementation of this policy to prevent or minimize surface and ground water degradation is a high priority for the Board. In nearly all cases, preventing pollution before it happens is much more cost-effective than cleaning up pollution after it has occurred. Once degraded, surface water is often difficult to clean up when it has passed downstream. Likewise, cleanup of ground water is costly and lengthy due, in part, to its relatively low assimilative capacity and inaccessibility. The prevention of degradation is, therefore, an important strategy to meet the policy's objectives.

The Regional Water Board will apply the directives of Resolution No. 68-16 in considering whether to allow a certain degree of degradation to occur or remain. In conducting this type of analysis, the Regional Water Board will evaluate the nature of any proposed, existing, or materially changed discharge, that could affect the quality of waters within the region. Any discharge of waste to high quality waters must apply best practicable treatment or control not only to

prevent a condition of pollution or nuisance from occurring, but also to maintain the highest water quality possible consistent with the maximum benefit to the people of the State.

Pursuant to this policy, a Report of Waste Discharge, or any other similar technical report required by the Board pursuant to Water Code Section 13267, must include information regarding the nature and extent of the discharge and the potential for the discharge to affect surface or ground water quality in the region. This information must be presented as an analysis of the impacts and potential impacts of the discharge on water quality, as measured by background concentrations and applicable water quality objectives. The extent of information necessary will depend on the specific conditions of the discharge. For example, use of best professional judgement and limited available information may be sufficient to determine that ground or surface water will not be degraded. In addition, the discharger must identify treatment or control measures to be taken to minimize or prevent water quality degradation.

Application of Water Quality Objectives

Water quality objectives are defined in the Water Code as "the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area." (See Chapter III) Water quality objectives may be stated in either numerical or narrative form. Water quality objectives apply to all waters within a surface water or ground water resource for which beneficial uses have been designated, rather than at an intake, wellhead or other point of consumption.

In conjunction with the issuance of NPDES and storm water permits, the Regional Water Board may designate mixing zones within which water quality objectives will not apply provided the discharger has demonstrated to the satisfaction of the Regional Water Board that the mixing zone will not adversely impact beneficial uses. If allowed, different mixing zones may be designated for different types of objectives, including, but not limited to, acute aquatic life objectives, chronic aquatic life objectives, human health objectives, and acute and chronic whole effluent toxicity objectives, depending in part on the averaging period over which the objectives apply. In determining the site of such mixing zones, the Regional Water Board will consider the applicable procedures and guidelines in EPA's Water Quality Standards Handbook, August 1994, and the Technical Support Document for Water Quality-based Toxics Control, March 1991, both of which are incorporated by reference into this plan. Pursuant to EPA guidelines, mixing zones designated for acute aquatic life objectives will generally be limited to a small zone of initial dilution in the immediate vicinity of the discharge.

State Water Board Resolution No. 68-16 requires the maintenance of the existing high quality of water (i.e., "background") unless a change in water quality "will be consistent with maximum benefit to the people of the State ...". This State Water Board policy explains how the Regional Water Board applies numerical and narrative water quality objectives to ensure the reasonable protection of beneficial uses of water and how the Regional Water Board applies Resolution No. 68-16 to promote the maintenance of existing high quality waters.

The numerical and narrative water quality objectives define the least stringent standards that the Regional Water Board will apply to regional waters in order to protect beneficial uses. Numerical receiving water limitations will be established in Board orders for constituents and parameters which will, at a minimum, meet all applicable water quality objectives. However, the water quality objectives do not require improvement over naturally occurring background concentrations. In cases where the natural background concentration of a particular constituent exceeds an applicable water quality objective, the natural background concentration will be considered to comply with the objective. Consistent with Resolution No. 68-16, the Regional Water Board will impose more stringent numerical limitations (or prohibitions) which will maintain the existing quality of the receiving water, unless, pursuant to Resolution No. 68-16, some adverse change in water quality is allowed. Maintenance of the existing high quality of water means maintenance of "background" water quality conditions, i.e., the water quality found upstream or upgradient of the discharge, unaffected by other discharges. Therefore, the water quality objectives will define the least stringent limits which will be imposed and background defines the most stringent limits which will be imposed on ambient water quality.

This Basin Plan contains numerical water quality objectives for various constituents and parameters in Chapter III. Where numerical water quality objectives are listed, these are the limits necessary for the reasonable protection of beneficial uses of the water. In many instances, the Regional Water Board has not

been able to adopt numerical water quality objectives for constituents or parameters, and instead has adopted narrative water quality objectives (e.g., for bacteria, chemical constituents, taste and odor, and toxicity). Where compliance with these narrative objectives is required (i.e., where the objectives are applicable to protect specified beneficial uses), the Regional Water Board will, on a case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives.

To evaluate compliance with the narrative water quality objectives, the Regional Water Board considers, on a case-by-case basis, direct evidence of beneficial use impacts, all material and relevant information submitted by the discharger and other interested parties, and relevant numerical criteria and guidelines developed and/or published by other agencies and organizations (e.g., State Water Board, California Department of Health Services, California Office of Environmental Health Hazard Assessment, California Department of Toxic Substances Control, University of California Cooperative Extension, California Department of Fish and Game, U. S. EPA, U. S. Food and Drug Administration, National Academy of Sciences, U. S. Fish and Wildlife Service, Food and Agricultural Organization of the United Nations). In considering such criteria, the Board evaluates whether the specific numerical criteria, which are available through these sources and through other information supplied to the Regional Water Board, are relevant and appropriate to the situation at hand and, therefore, should be used in determining compliance with the narrative objective. For example, compliance with the narrative objective for taste and odor may be evaluated by comparing concentrations of pollutants in water with numerical taste and odor thresholds that have been published by other agencies. This technique provides relevant numerical limits for constituents and parameters which lack numerical water quality objectives. To assist dischargers and other interested parties, the Regional Water Board staff has compiled many of these numerical water quality criteria from other appropriate agencies and organizations in the Central Valley Regional Water Board's staff report, A Compilation of Water Quality Goals. This staff report is updated regularly to reflect changes in these numerical criteria.

Where multiple toxic pollutants exist together in water, the potential for toxicologic interactions exists. On a case by case basis, the Regional Water Board will evaluate available receiving water and effluent data to determine whether there is a reasonable potential for interactive toxicity. Pollutants which are carcinogens or which manifest their toxic effects on the same organ systems or through similar mechanisms will generally be considered to have potentially additive toxicity. The following formula will be used to assist the Regional Water Board in making determinations:

$$\sum_{i=1}^{n} \frac{[\text{Concentration of Toxic Substances}]_i}{[\text{Toxicologic Limit for Substance in Water}]_i} < 1.0$$

The concentration of each toxic substance is divided by its toxicologic limit. The resulting ratios are added for substances having similar toxicologic effects and, separately, for carcinogens. If such a sum of ratios is less than one, an additive toxicity problem is assumed not to exist. If the summation is equal to or greater than one, the combination of chemicals is assumed to present an unacceptable level of toxicologic risk. For example, monitoring shows that ground water beneath a site has been degraded by three volatile organic chemicals, A, B, and C, in concentrations of 0.3, 0.4, and 0.04 µg/l, respectively. Toxicologic limits for these chemicals are 0.7, 3, and 0.06 µg/l, respectively. Individually, no chemical exceeds its toxicologic limit. However, an additive toxicity calculation shows:

$$\frac{0.3}{0.7} + \frac{0.4}{3} + \frac{0.04}{0.06} = 1.2$$

The sum of the ratios is greater than unity (> 1.0); therefore, the additive toxicity criterion has been violated. The concentrations of chemicals A, B, and C together present a potentially unacceptable level of toxicity.

Where the Regional Water Board determines it is infeasible to achieve immediate compliance with water quality objectives adopted by the Regional Water Board or the State Water Board, or with water quality criteria adopted by the federal Environmental Protection Agency, or with an effluent limitation based on these objectives or criteria, the Regional Water Board shall establish in NPDES permits a schedule of compliance. The schedule of compliance shall include a time schedule for completing specific actions that demonstrate reasonable progress toward the attainment of the objectives or criteria and shall contain a final compliance date, based on the shortest practicable time required to achieve compliance. In no event shall an NPDES permit include a schedule of compliance that allows more than ten years (from the date of adoption of the objective or criteria) for compliance with water quality objectives, criteria or effluent limitations based on the objectives or criteria.

Schedules of compliance are authorized by this provision only for those water quality objective or criteria adopted after the effective date of this provision. In accordance with Title 23, California Code of Regulations, Section 2231, compliance schedules may be included in waste discharge requirements for discharges other than from point sources to navigable waters.

For permitting purposes, it is important to clearly define how compliance with the narrative toxicity objectives will be measured. Staff is currently working with the State Water Board to develop guidance on this issue.

Ground Water Cleanups

The Regional Water Board's strategy for managing contaminated sites is guided by several important principles, which are based on Water Code Sections 13000 and 13304, the Chapter 15 regulations and State Water Board Resolution No. 92-49:

1. State Water Board Policy and Regulation

   The Regional Water Board will require conformance with the provisions of State Water Board Resolution No. 68-16 in all cases and will require conformance with applicable or relevant provisions of Title 23, California Code of Regulations, Division 3, Chapter 15 to the extent feasible. These provisions direct the Regional Water Board to ensure that dischargers are required to cleanup and abate the effect of discharges in a manner that promotes attainment of background water quality, or the highest water quality which is reasonable and protective of beneficial uses if background levels of water quality cannot be restored.

2. Site Investigation

   An investigation of soil and ground water to determine full horizontal and vertical extent of pollution is necessary to ensure that cleanup plans are protective of water quality. The goal of the investigation shall be to determine where concentrations of constituents of concern exceed beneficial use protective levels (water quality objectives) and, additionally, where constituents of concern exceed background levels (the zero-impact line). Investigations shall extend off-site as necessary to determine the full extent of the impact.

3. Source Removal/Containment

   Immediate removal or containment of the source, to the extent practicable, should be implemented where necessary to prevent further spread of pollution as well as being among the most cost-effective remediation actions. The effectiveness of ground water cleanup techniques often depends largely on the completeness of source removal or containment efforts (e.g., removal of significantly contaminated soil or pockets of dense non-aqueous phase liquids).

4. Cleanup Level Approval

   Ground water and soil cleanup levels are approved by the Regional Water Board through the adoption of enforcement orders or waste discharge requirements. The Executive Officer may approve cleanup levels as appropriately delegated by the Regional Water Board.

5. Site Specificity

   Given the extreme variability of hydrogeologic conditions in the Region, cleanup levels must reflect site specific factors.

6. Discharger Submittals

   The discharger must submit the following information for consideration by the Regional Water Board in establishing cleanup levels which meet the criteria contained in Title 23, California Code of Regulations, Section 2550.4(c) through (g):

   a. water quality assessment to determine impacts and threats to the quality of water resources;

   b. risk assessment to determine impacts and threats to human health and the environment; and

   c. feasibility study of cleanup alternatives which compare effectiveness, cost, and time to achieve cleanup levels. Cleanup levels covered by this study shall include, at a minimum, background levels, levels which meet all applicable water quality objectives and which do not pose significant risks to health or the environment, and an alternate cleanup level which is above background levels and which also meets the requirements as specified in paragraphs 7.e. and f. below.

7. Ground Water Cleanup Levels

Ground water cleanup levels shall be established based on:

a. background concentrations of individual pollutants;

b. applicable water quality objectives to protect designated beneficial uses of the water body, as listed in Chapters II and III;

c. concentrations which do not pose a significant risk to human health or the environment, considering risks from toxic constituents to be additive across all media of exposure and, in the absence of scientifically valid data to the contrary, additive for all constituents having similar toxicologic effects or having carcinogenic effects; and

d. technologic and economic feasibility of attaining background concentrations and of attaining concentrations lower than defined by b and c, above.

e. Pursuant to Title 23, California Code of Regulations, the Regional Water Board establishes cleanup levels that are protective of human health, the environment and beneficial uses of waters of the state, as measured by compliance with b and c, above, and are equal to background concentrations if background levels are technologically or economically feasible to achieve. If background levels are infeasible to achieve, cleanup levels are set between background concentrations and concentrations that meet all criteria in b and c, above. Within this concentration range, cleanup levels must be set at the lowest concentrations that are technologically and economically achievable. In no case are cleanup levels established below natural background concentrations.

f. Technologic feasibility is determined by the availability of technologies which have been shown to be effective in reducing the concentrations of the constituents of concern to the established cleanup levels. Bench-scale and/or pilot-scale studies may be necessary to make this feasibility assessment in the context of constituent, hydrogeologic, and other site-specific factors. Economic feasibility does not refer to the subjective measurement of the ability of the discharger to pay the costs of cleanup, but rather to the objective balancing of the incremental benefit of attaining more stringent levels of constituents of concern as compared with the incremental cost of achieving those levels. Factors to be considered in the establishment of cleanup levels greater than background are listed in Title 23, California Code of Regulations, Section 2550.4(d). The discharger's ability to pay is one factor to be considered in determining whether the cleanup level is reasonable. However, availability of economic resources to the discharger is primarily considered in establishing reasonable schedules for compliance with cleanup levels.

g. Compliance with c, above, shall be determined through risk assessments, performed by the discharger, using procedures consistent with those used by the Department of Toxic Substances Control, the Office of Environmental Health Hazard Assessment, and the USEPA. The Regional Water Board is not the lead agency for specifying risk assessment procedures or for reviewing risk assessments. The Board will assist the discharger, as necessary, in obtaining the appropriate, most current procedures from the above listed agencies. To prevent duplication of effort, the Regional Water Board will rely on the Department of Toxic Substances Control, the Office of Environmental Health Hazard Assessment, or appropriately designated local health agencies to review and evaluate the adequacy of such risk assessments.

8. Compliance with Ground Water Cleanup Levels

To protect potential beneficial uses of the water resource as required by Water Code Sections 13000 and 13241, compliance with ground water cleanup levels must occur throughout the pollutant plume.

9. The Regional Water Board may consider modifying site-specific ground water cleanup levels (that have been determined pursuant to subsection 7, above) that are more stringent than applicable water quality objectives, only when a final remedial action plan has been pursued in good faith, and all of the following conditions are met:

a. Modified cleanup levels meet the conditions listed in 7b and c, above.

b. An approved cleanup program has been fully implemented and operated for a period of

time which is adequate to understand the hydrogeology of the site, pollutant dynamics, and the effectiveness of available cleanup technologies;

c. Adequate source removal and/or isolation is undertaken to eliminate or significantly reduce future migration of constituents of concern to ground water;

d. The discharger has demonstrated that no significant pollutant migration will occur to other underlying or adjacent aquifers;

e. Ground water pollutant concentrations have reached asymptotic levels using appropriate technology;

f. Optimization of the existing technology has occurred and new technologies have been evaluated and applied where economically and technologically feasible; and

g. Alternative technologies for achieving lower constituent levels have been evaluated and are inappropriate or not economically feasible.

10. Soil Cleanup Levels

For soils which threaten the quality of water resources, soil cleanup levels should be equal to background concentrations of the individual leachable/mobile constituents, unless background levels are technologically or economically infeasible to achieve. Where background levels are infeasible to achieve, soil cleanup levels are established to ensure that remaining leachable/mobile constituents of concern will not threaten to cause ground water to exceed applicable ground water cleanup levels, and that remaining constituents do not pose significant risks to health or the environment. The Regional Water Board will consider water quality, health, and environmental risk assessment methods, as long as such methods are based on site-specific field data, are technically sound, and promote attainment of all of the above principles.

11. Verification of Soil Cleanup

Verification of soil cleanup generally requires verification sampling and follow-up ground water monitoring. The degree of required monitoring will reflect the amount of uncertainty associated with the soil cleanup level selection process. Follow-up ground water monitoring may be limited where residual concentrations of leachable/mobile constituents in soils are not expected to impact ground water quality.

12. Remaining Constituents

Where leachable/mobile concentrations of constituents of concern remain onsite in concentrations which threaten water quality, the Regional Water Board will require implementation of applicable provisions of Chapter 15. Relevant provisions of Chapter 15 which may not be directly applicable, but which address situations similar to those addressed at the cleanup site will be implemented to the extent feasible, in conformance with Title 23, California Code of Regulations, Section 2511(d). This may include, but is not limited to, surface or subsurface barriers or other containment systems, pollutant immobilization, toxicity reduction, and financial assurances.

Dilution

Neither surface nor ground waters shall be used to dilute wastes for the primary purpose of meeting waste discharge requirements, where reasonable methods for treating the wastes exist. Blending of wastewater with surface or ground water to promote beneficial reuse of wastewater in water short areas may be allowed where the Regional Water Board determines such reuse is consistent with other regulatory policies set forth or referenced herein.

Prohibitions

The Porter-Cologne Water Quality Control Act allows the Regional Water Board to prohibit certain types of discharges or discharges to certain waters {California Water Code, Section 13243}. Prohibitions may be revised, rescinded, or adopted as necessary. The prohibitions applicable to the Tulare Lake Basin are identified and described below.

Leaching Systems

Discharge of wastes from new and existing leaching and percolation systems in the following areas is prohibited:

Corcoran Fringe Area, Kings County (Order No. 77-224)
East Porterville Area, Tulare County (Order No. 75-069)
Home Garden Community Services District, Kings County (Order No. 77-20)
Kettleman City County Service Area No. 1, Kings County (Order No. 75-071)

In addition, county moratoria prohibit new septic tank disposal systems in the following areas:

Del Rio, Fresno County
Delft Colony, Tulare County
El Rancho, Tulare County
Lindcove, Tulare County
Poplar, Tulare County
Seville, Tulare County
Tonyville, Tulare County
Tooleville, Tulare County
Traver, Tulare County
Wells Tract, Tulare County
Yettem, Tulare County

Petroleum

The discharge of oil or any residuary product of petroleum to the waters of the State, except in accordance with waste discharge requirements or other provisions of Division 7, California Water Code, is prohibited.

Hazardous Waste

Any discharge that may affect water quality of hazardous waste or chemicals known to cause cancer or reproductive toxicity, except in accordance with waste discharge and other federal, state, and local requirements.

Water Quality Limited Segments (WQLSs)

WQLSs are those sections of lakes, streams, rivers or other fresh water bodies where water quality does not meet (or is not expected to meet) water quality standards even after the application of appropriate effluent limitations for point sources {40 CFR 130, et seq.}.

Additional treatment beyond minimum federal requirements will be imposed on dischargers to a WQLS. Point source dischargers will be assigned or allocated a maximum allowable load of critical pollutants. If necessary, nonpoint source discharges will be identified and reduction goals will be developed for these sources.

The list of WQLSs is contained in Appendix Item 33.

Water Quality Assessment

A second list of water bodies comprises the Water Quality Assessment. The Assessment describes the condition of water bodies within the Tulare Lake Basin to the best of the Regional Water Board's knowledge. For water bodies with impairments (actual or suspected), a fact sheet is prepared to describe the Regional Water Board's actions or proposed actions and to estimate the costs to correct the impairments. The Assessment is updated periodically on an as-needed basis.

Waivers

State law allows Regional Water Boards to waive waste discharge requirements for a specific discharge or types of discharges where it is not against the public interest {California Water Code, Section 13269}. However, NPDES permits for discharge to surface waters may not be waived.

On 26 March 1982, the Regional Water Board adopted Resolution No. 82-036 to waive waste discharge requirements for certain discharges. The types of discharges and the limitations on the discharges which must be maintained if the waivers are to apply are shown in Table IV-2. These waivers are conditional and may be terminated at any time.

The Regional Water Board may, after compliance with the California Environmental Quality Act (CEQA), allow short-term variances from Basin Plan provisions, if determined to be necessary to implement control measures for vector and weed control, pest eradication, or fishery management which are being conducted to fulfill statutory requirements under California's Fish and Game, Food and Agriculture, or Health and Safety Codes. In order for the Regional Water Board to determine if a variance is appropriate, agencies proposing such activities must submit to the Regional Water Board project-specific information, including measures to mitigate adverse impacts.

ACTIONS RECOMMENDED FOR IMPLEMENTATION BY OTHER AGENCIES

Consistent with the Porter-Cologne Water Quality Control Act, the Basin Plan may identify control actions recommended for implementation by agencies other than the Regional Water Board {California Water Code, Section 13242(a)}.

Irrigated Agriculture

The water quality concerns from irrigated agriculture are great and the Regional Water Board cannot resolve

TABLE IV-2
WASTE DISCHARGE REQUIREMENT WAIVER AND LIMITATIONS

TYPE OF WASTE DISCHARGE	LIMITATIONS
Air conditioner, cooling and elevated temperature waters	Small volumes which will not change temperature of receiving water more than 1 degree C.
Drilling muds	Discharged to a sump with two feet of freeboard. Sump must be dried by evaporation or pumping. Drilling-mud may remain in sump only if discharger demonstrates that it is nontoxic. Sump area shall be restored to pre-construction state within 60 days of completion or abandonment of well.
Clean oil containing no toxic materials	Used for beneficial purposes such as dust control, weed control and mosquito abatement where it cannot reach state waters.
Minor dredger operations	When soil is nontoxic and discharged to land.
Inert solid wastes (per CCR, Section 2524)	Good disposal practices.
Test pumpings of fresh water wells.	When assurances are provided that pollutants are neither present nor added.
Storm water runoff	Where no water quality problems are contemplated and no federal NPDES permit is required.
Erosion from development	Where BMP plans have been formulated and implemented.
Pesticide rinse waters from applicators	Where discharger complies with Regional Water Board guidance.
Confined animal wastes	Where discharger complies with Regional Water Board guidance.
Minor stream channel alterations and suction dredging	Where regulated by Department of Fish and Game agreements.
Small, short-term sand and gravel	All operations and wash waters confined to land.
Small, metal mining operations	All operations confined to land, no toxic materials utilized in recovery operations.
Swimming pool discharges	Where adequate dilution exists or where beneficial uses are not affected.
Food processing wastes spread on land	Where an operating/maintenance plan has been approved.
Construction	Where BMPs are used.
Agricultural commodity wastes	Small, seasonal and confined to land.
Industrial wastes utilized for soil amendments	Where industry certifies its nontoxic content and BMPs are used for application.
Timber harvesting	Operating under an approved timber harvest plan.

TABLE IV-2
WASTE DISCHARGE REQUIREMENT WAIVER AND LIMITATIONS
(continued)

TYPE OF WASTE DISCHARGE	LIMITATIONS
Minor hydro projects	Operating under water rights permit from State Water Resources Control Board or Department of Fish and Game agreement and no water quality impacts anticipated.
Irrigation return water (tail-water)	Operating to minimize sediment to meet Basin Plan turbidity objectives and to prevent concentrations of materials toxic to fish or wildlife.
Projects where application for Water Quality Certification is required	Where project (normally minor construction) is not expected to have a significant water quality effect and project complies with Dept. of Fish and Game agreements.
Septic tank/leachfield systems	Where project has county permit and county uses Water Board Guidelines.

these alone. The following actions should be taken by other agencies:

1. As a last resort and where the withholding of irrigation water is the only means of achieving significant improvements in water quality, the State Water Board should use its water rights authority to preclude the supplying of water to specific lands.

2. The State Water Board should require all water agencies in the Central Valley, regardless of size, to submit an "informational" report on water conservation.

3. The State Water Board should continue to declare the drainage problem in the Central Valley a priority nonpoint source problem in order to make EPA nonpoint source control funding available to the area.

4. The Legislature should sponsor additional bond issues before the voters to provide low interest loans for agricultural water conservation and water quality projects. The bonds should incorporate provisions that would allow recipients to be private landowners, and that would allow irrigation efficiency improvement projects that reduce drainage discharges to be eligible for both water conservation funds and water quality facilities funds.

5. The US Bureau of Reclamation should give the districts and growers subject to this program first priority in their water conservation loan program.

6. The State Water Board should request legislation that will protect negotiated fish flow releases for instream uses in those critical reaches designated by the Department of Fish and Game from any new exercise of appropriative or riparian rights. These flow releases should recognize and protect existing contractual commitments for beneficial use.

Mining

Agencies with jurisdiction over mineral rights should issue these rights for limited periods of time and distribute them to the Regional Water Board for review.

Transfer of Water

Before granting new permits for water storage or diversion which involves interbasin transfer of water, the State Water Board should require the applicant to evaluate the alternatives listed below. Permits should not be approved unless the alternatives have been thoroughly investigated and ruled out for social, environmental, or economic reasons.

1. Make optimum use of existing water resource facilities.

2. Store what would otherwise be surplus wet-weather basin outflows in off-stream reservoirs.

3. Conjunctively use surface and ground waters.

4. Give careful consideration to the impact on basin water quality of inland siting of power plants.

5. Make maximum use of reclaimed water while protecting public health and avoiding severe economic penalties to a particular user or class of users.

Water Quality Planning

A core planning group should be continued within the staff of the State Water Board, which has the responsibility to integrate the statewide planning of water quality and water resources management.

Sole Source Aquifer

An aquifer may be designated by the U. S. Environmental Protection Agency to be a Sole Source Aquifer if it is the sole or principal drinking water source for an area and which, if contaminated, could create a significant hazard to public health.

The U. S. Environmental Protection Agency has designated a Sole Source Aquifer in Fresno County in accordance with Section 1424(e) of the Safe Drinking Water Act. The Sole Source Aquifer includes all or portions of the communities of Fresno, Clovis, Kerman, Raisin City, Selma, and Sanger. Specifically, it is the area bordered by (1) Fresno Slough Bypass on the west, (2) the San Joaquin River on the north, (3) the Friant-Kern Canal on the east, and (4) the Kings River on the south.

Watershed Management Plans

In many cases, particularly situations involving nonpoint source pollution, standard regulatory techniques are not appropriate or adequate to improve the quality of water. The Regional Water Board supports implementing a watershed based approach to address water quality problems. The benefits to implementing a watershed based program would include gaining participation of stakeholders and focusing efforts on the most important problems and those sources contributing most significantly to those problems.

In many instances, a watershed program is initiated by entities other than the Regional Water Board. A group of affected and concerned entities identifies water quality problems caused or exacerbated by the presence of man. This group then considers the needs and concerns of the watershed to develop a watershed management plan in a coordinated manner. In some of these groups, the Regional Water Board is in an oversight position and the solution is developed from within the group.

CONTINUOUS PLANNING FOR WATER QUALITY CONTROL

Knowledge of water quality problems changes constantly. Because of this, control actions and water quality objectives must be regularly evaluated for their effectiveness in protecting beneficial uses. As warranted, the actions, water quality objectives, or designated beneficial uses may be changed to ensure that the proper beneficial uses are protected and enhanced. The Regional Water Board has a continuous planning process to serve these functions and maintain its water quality regulatory program.

The Regional Water Board is periodically apprised of water quality problems in the Tulare Lake Basin, but the major review of water quality is done every three years as part of the Triennial Review of water quality standards.

During the Triennial Review, the Regional Water Board holds a public hearing to receive comments on actual and potential water quality problems. A workplan is prepared which identifies the control actions that will be implemented over the succeeding three years to address the problems. The actions may include or result in revision of the Basin Plan's water quality standards if that is an appropriate problem remedy. Until such time that a basin plan is revised, the Triennial Review also serves to reaffirm existing standards.

The control actions that are identified through the Triennial Review process are incorporated into the Basin Plan to meet requirements of Water Code Section 13242 (a) and (b). These requirements include describing actions to achieve water quality objectives and developing a time schedule to implement these actions.

This basin plan update serves as the Triennial Review. The following issues are identified for study during this triennial review period:

I. Salinity in the Lower Kings River: This issue was identified during the 1987 Triennial Review. Since that time, two studies were conducted on

the Lower Kings River. The result of these studies was proposed modifications to the implementation and the monitoring and surveillance portions of this plan. However, due to drought conditions, neither investigation was conclusive. Additional study will be necessary to adequately define the salinity problems and develop policy decisions.

II. Beneficial Uses of Surface Water: The Basin Plan designated beneficial uses for all streams in the Tulare Lake Basin but recognized that those uses needed to be modified when additional studies become available. Various agencies have information on uses which were not available in 1975. This information should be used to develop a new table of beneficial uses which accurately describes the individual streams.

III. Ground Water Monitoring Network to detect trends in water quality: The Basin Plan describes a ground water monitoring network for the Tulare Lake Basin. This network was never established. As more and more contaminants are found in the ground water, establishment of an effective monitoring system has become imperative.

IV. Ground Water Contamination: There are several areas within the Tulare Lake Basin where the ground water is adversely impacted by salts and chemicals to the extent that the ground water no longer supports all its beneficial uses. In some cases, the cause of the impact is identified and clean-up operations are proceeding. In most cases, the presence of the salts and chemicals are due to nonpoint source impacts and the source is not clear. Investigations should be done to identify potential sources of these contaminants and practices should be developed to reduce these impacts.

V. Ground Water Quality Objectives for Salinity: The Basin Plan contains water quality objectives for salinity increases in ground water. These objectives have never been studied to determine their adequacy in promoting the Board's goal of minimizing the rate of salinity increase in the Tulare Lake Basin. A study should be conducted to confirm the adequacy of the listed objectives.

VI. Dissolved Oxygen Objectives: The dissolved oxygen objective for Reach III of the Kings River (Pine Flat Dam to Friant-Kern) may not be achievable due to natural conditions. A study should be conducted to investigate this and establish more appropriate objectives, if necessary.

V. PLANS AND POLICIES

In addition to this Basin Plan, statewide plans and policies adopted by the State Water Board direct Regional Water Board actions or clarify the Regional Water Board's intent. Agreements between other agencies and either the State or Regional Water Board also affect Regional Water Board actions. All policies, plans, and agreements may be revised. Any revision will supersede the policies, plans, and agreements described below and found in the appendices.

State Water Board Policies and Plans

Eleven State Water Board water quality control policies and five State Water Board water quality control plans direct regional water board actions. Two of the policies (Policy for the Enclosed Bays and Estuaries of California, and the Pollutant Policy Document) and three of the plans (the Ocean Plan, the Delta Plan, and the Tahoe Plan) do not apply to the Tulare Lake Basin. The applicable policies and plans are described below.

1. The State Policy for Water Quality Control

   Adopted in 1972, this policy declares the State Water Board's intent to protect water quality through the implementation of water resources management programs and serves as the general basis for subsequent water quality control policies. See Appendix 1.

2. State Water Board Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality of Water in California

   This policy, adopted on 28 October 1968, is intended to maintain high quality waters. It establishes criteria the Regional Water Board must satisfy before allowing discharges that may reduce water quality of surface or ground waters even though such a reduction will still protect beneficial uses.

   Changes in water quality may be allowed only if the change is consistent with maximum benefit to the people of the State, does not unreasonably affect present and anticipated beneficial uses, and does not result in water quality less than that prescribed in water quality control plans and policies. U. S. EPA water quality standards regulations require each state to adopt an "antidegradation" policy and specify the minimum requirements for it (40 CFR 131.12). Although Resolution No.□ 68-16 preceded the federal policy, the State Water Board has interpreted Resolution No.□ 68-16 to incorporate the federal antidegradation policy. Therefore, the federal antidegradation policy must be followed where it is applicable. The federal antidegradation policy applies if a discharge or other activity, which began after November 28, 1975, will lower surface water quality. Application of the federal policy may be triggered by water quality impacts or mass loading impacts to receiving waters. Appendix 2 contains Resolution No. 68-16, Appendix 26 contains the federal policy.

3. State Water Board Resolution No. 75-58, Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Powerplant Cooling

   Adopted in June 1975, this policy prohibits discharge of blowdown waters to land unless in compliance with Title 23, California Code of Regulations, Chapter 15. The policy also prohibits the discharge of once through cooling water to surface waters unless existing water quality and aquatic resources can be maintained. Further, it sets forth seven principles that, among other things, establish higher priorities for use of water sources other than fresh inland waters. For the Tulare Lake Basin, the powerplant must investigate the feasibility of using wastewater for powerplant cooling. Regional water boards are directed to adopt requirements that contain mass emission rates that maintain existing water quality. See Appendix 3.

4. State Water Board Resolution No. 77-1, Policy and Action Plan for Water Reclamation in California

   This policy was adopted on 6 January 1977. Because reclamation provides an alternate source of water suitable for irrigation, reuse is encouraged by the State Water Board. The policy also encourages water conservation and calls for other agencies to assist in implementation. See is Appendix 4.

5. State Water Board Resolution No. 87-22, Policy on the Disposal of Shredder Waste

   This policy, adopted 19□ Mar 1987, permits wastes produced by the mechanical destruction of

car bodies, old appliances and similar castoffs to be disposed of into certain landfills at the discretion of and under specific conditions designated and enforced by the Regional Water Board. See Appendix 5.

6. State Water Board Resolution No. 88-23, Policy Regarding Regulation of Underground Storage Tanks

   This policy, adopted on 18 February 1988, implements a pilot program to fund oversight of remedial action at leaking underground storage tank sites, in cooperation with the California Department of Health Services. Oversight may be deferred to the regional water boards. See Appendix 6.

7. State Water Board Resolution No. 88-63, "Sources of Drinking Water" Policy

   This policy, adopted on 19 May 1988, specifies that, except under specifically defined exceptions, all surface and ground waters are suitable or potentially suitable for MUN. The specific exceptions are for waters with existing high total dissolved solids concentrations (greater than 3,000 mg/l), aquifers with low sustainable yield (less than 200 gallons per day for a single well), water with contamination that cannot be treated for domestic use using best management practices or best economically achievable treatment practices, waters within particular municipal, industrial and agricultural wastewater conveyance and holding facilities, and regulated geothermal ground waters. Where the Regional Water Board finds that one of the exceptions applies, it may remove the MUN designation for the particular water body through a formal Basin Plan amendment which includes a public hearing. The exception becomes effective upon approval by the State Water Board and the Office of Administrative Law. See Appendix 7.

8. State Water Board Resolution No. 92-49, Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304

   These policies and procedures, adopted 18 June 1992 and amended on 21 April 1994, describe the manner in which the Regional Water Board will require dischargers to cleanup and abate the effect of discharges. This cleanup and abatement shall be done in a manner that promotes attainment of background water quality, or the highest water quality which is reasonable if background levels of water quality cannot be restored. Any cleanup less stringent than background water quality shall be consistent with State Water Board Resolution No. 68-16. See Appendix 8.

9. State Water Board Resolution No. 93-62, Policy for Regulation of Discharges of Municipal Solid Waste

   Adopted on 17 June 1993, this policy directs the Regional Water Board to amend waste discharge requirements for municipal solid waste landfills to incorporate pertinent provisions of the federal "Subtitle D" regulations under the Resource Conservation and Recovery Act (40 CFR Parts 257 and 258). Landfills which are subject to the Subtitle D regulations and this policy are those which accepted municipal solid waste on or after 9 October 1991. See Appendix 9.

10. The Water Quality Control Plan for the Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan)

    This plan was adopted on 18 May 1972 and amended 18 September 1975. It specifies water quality objectives, effluent quality limits, and discharge prohibitions related to thermal characteristics of interstate waters and waste discharges. See Appendix 10.

11. State Water Board Resolution No. 88-123, Nonpoint Source Management Plan

    This plan was adopted in 1988 and describes three general management approaches that are to be used to address nonpoint source problems. These are 1) voluntary implementation of best management practices, 2) regulatory based encouragement of best management practices, and 3) adopted effluent limits.

    The approaches are listed in order of increasing stringency. In general the least stringent option that successfully protects or restores water quality should be employed, with more stringent measures considered if timely improvements in beneficial use protection are not achieved. The Regional Water Board will determine which approach or combination of approaches is most appropriate for any given nonpoint source problem.

State Water Board Management Agency Agreements (MAAs), Memoranda of Understanding (MOUs), and Memoranda of Agreement (MOAs)

The Regional Water Board acts in accordance with State Water Board agreements with federal agencies and other State agencies which have been formalized with either an MAA, MOU, or an MOA.

1. U. S. Forest Service Agreement

   On 26 February 1981 the State Water Board Executive Director signed an MAA with the U. S. Forest Service (Forest Service) which waives discharge requirements for certain Forest Service nonpoint source discharges provided that the Forest Service implements State Water Board approved best management practices and procedures and the provisions of the MAA. The MAA covers all Forest Service lands in California. Implementation of the best management plans, in conjunction with monitoring and performance review requirements approved by the State and Regional Water Boards, is the primary method of meeting the Basin Plan's water quality objectives for the activities to which the best management plans apply. The MAA does not include Forest Service point source discharges and in no way limits the authority of the Regional Water Board to carry out its legal responsibilities for management or regulation of water quality. See Appendix 11.

2. Department of Health Services

   On 26 January 1986, the State Water Board signed an MOU with the Department of Health Services, now the Department of Toxic Substances Control, regarding the implementation of the hazardous waste program. The agreement covers surveillance and enforcement related to water quality at landfills, surface impoundments, waste piles, and land treatment facilities that treat, store, or dispose of hazardous waste. It also covers the issuance, modification, or denial of permits to facilities, including the revision of the water quality aspects of hazardous waste management facility siting, design, closure, post-closure, and surface and ground water monitoring and protection. See Appendix 12.

3. Department of Health Services

   In 1988, the State Water Board signed an MOA with the Department of Health Services regarding the use of reclaimed water. The MOA outlines the basic activities of the agencies, allocates primary areas of responsibility and authority between these agencies, and provides for methods and mechanisms to assure coordination for activities related to the use of reclaimed water. See Appendix 13.

4. California Department of Forestry Agreement

   In February 1988, the State Water Board signed an MAA with the California Department of Forestry and Fire Protection and the California Board of Forestry, for the purpose of carrying out, pursuant to Section 208 of the Federal Clean Water Act, those portions of the State's Water Quality Management Plan related to controlling water quality impacts caused by silvicultural activities on nonfederal forest lands. As with the Forest Service MAA, the Department of Forestry agreement requires the Department to implement certain best management plans to protect water quality from timber harvest and associated activities. Approval of the MAA as a water quality management plan component by the U. S. EPA results in the Regional Water Boards relinquishing some authority to issue waste discharge requirements for State timber operations. However, Department of Forestry and the Regional and State Water Boards must still ensure that the operations incorporate best management plans and comply with applicable water quality standards. Appendix F of the MAA also calls for the preparation of a MOU for the Regional Water Boards, the State Water Board, and the Department of Forestry to prescribe interagency procedures for implementing best management plans. See Appendix 14.

5. Department of Conservation Agreement

   A March 1988 MOA between the State Water Board and the State Department of Conservation, California Department of Oil and Gas, Gas & Geothermal Resources (Department of Conservation), outlines procedures for reporting proposed oil, gas, and geothermal field discharges and for prescribing permit requirements. The procedures are intended to provide a coordinated approach resulting in a single permit satisfying the statutory obligations of both agencies. The purpose of the new agreement is to ensure that the construction or operation of Class II injection disposal wells and the land disposal of wastewaters from oil, gas, and geothermal production facilities does not cause degradation of waters of the state. The MOA requires the Department of Conservation to notify the Regional Water Board of all pollution

problems, including spills associated with operators and/or new proposed oil field discharges. The agencies work together to review, prepare, and coordinate permits and enforcement. See Appendix 15.

6. Department of Health Services/Department of Toxic Substances Control

   On 30 July 1990, the State Water Board signed a MOU with the Department of Health Services, Toxic Substances Control Program (later reorganized into the Department of Toxic Substances Control) explaining the roles of the agencies (including the Regional Water Board) in the cleanup of hazardous waste sites. The MOU describes the protocol the agencies will follow to determine which agency will act as lead and which will act as support, the responsibilities of the agencies in their respective roles, the procedures the agencies will follow to ensure coordinated action, the technical and procedural requirements which each agency must satisfy, the procedures for enforcement and settlement, and the mechanism for dispute resolution. This MOU does not alter the Regional Water Board's responsibilities with respect to water quality protection. See Appendix 16.

7. Soil Conservation Service, U. S. Department of Agriculture

   On 31 July 1990, the State Water Board signed a MOU with the Soil Conservation Service, now the Natural Resources Conservation Service, to develop appropriate guidelines and procedures to provide technical assistance on the management of nonpoint sources. See Appendix 17.

8. Environmental Affairs Agency, Air Resources Board, and California Integrated Waste Management Board

   On 27 August 1990, the State Water Board signed a MOU with the Environmental Affairs Agency, Air Resources Board, and California Integrated Waste Management Board to enhance program coordination and reduce duplication of effort. This MOU consists of provisions describing the scope of the agreement (including definitions of the parties and issues to which the MOU applies), the principles which will govern the conduct of the parties, and the existing statutory framework. See Appendix 18.

9. California Department of Pesticide Regulation

   On 23 December 1991, the State Water Board signed a MOU with the California Department of Pesticide Regulation to exchange information regarding pesticides in surface waters, develop water quality objectives to protect beneficial uses, and promote the identification and development of best management practices whenever necessary to protect beneficial uses. This agreement was revised on 19 January 1993 to facilitate implementation of the original agreement. See Appendix 19.

10. Implementation of the San Joaquin Valley Drainage Program's Recommended Plan

    In January 1992, the State Water Board signed a MOU with the U. S. Bureau of Reclamation, the U.□ S. Fish and Wildlife Service, the U. S. Soil Conservation Service (now the Natural Resources Conservation Service), the U. S. Geological Survey, the Department of Water Resources, the Department of Fish and Game, and the Department of Food and Agriculture. Subject to the availability of funding and legal authority, these agencies agreed to use the management plan described in the September 1990 final report of the San Joaquin Valley Drainage Program as a guide for remedying subsurface agricultural drainage and related problems. See Appendix 20.

11. California Integrated Waste Management Board

    On 8 January 1993, the State Water Board signed a MOU to address the Regional Water Board's review of Solid Waste Assessment Test (SWAT) reports. See Appendix 21.

12. U. S. Bureau of Land Management

    On 27 January 1993, the State Water Board signed a MOU to work cooperatively with the U. S. Bureau of Land Management to develop and implement best management practices to reduce or prevent nonpoint source pollution. See Appendix 22.

Regional Water Board General Policy

1. Regional Water Board Resolution No. 70-118, Delegation of Duties and Powers to the Regional Water Board's Executive Officer

   In January 1970, the Regional Water Board adopted Resolution No. 70-118, which delegates

certain duties and powers of the Board to its Executive Officer pursuant to Section 13223 of the California Water Code. See Appendix 23.

Regional Water Board Memoranda of Understanding (MOU)

1. U. S. Bureau of Land Management

   In September 1985, the Regional Water Board Executive Officer signed an MOU with the U. S. Bureau of Land Management, Bakersfield District. The MOU aims at improving coordination between the two agencies for the control of water quality problems resulting from mineral extraction activities on BLM administered lands. See Appendix 24.

2. Department of Fish and Game and Mosquito Abatement and Vector Control Districts

   In March 1993, the Regional Water Board Executive Officer signed an MOU with the Department of Fish and Game and Mosquito Abatement Districts in the southern San Joaquin Valley to coordinate weed control efforts in wastewater treatment facilities. See Appendix 25.

VI. SURVEILLANCE AND MONITORING

The effectiveness of a water quality control program cannot be judged without the information supplied by a comprehensive surveillance and monitoring program. This chapter describes the methods and programs that the Regional Water Board uses to acquire water quality information. Accumulation of data is required by both the Clean Water Act and the Porter-Cologne Water Quality Control Act.

Many local water agencies conduct data collection programs, as do some governmental agencies. Cost-effective management shows the benefit of utilizing local efforts for basic elements of the programs. Governmental agencies would perform valuable service by processing data, engaging in cooperative programs, and conducting special studies and intensive surveys.

Although not addressed in detail in this chapter, water quality analysis must comply with the laboratory certification program, and data must be reported to EPA in a form compatible with the STORET; the federal data storage and retrieval program.

The overall objectives of the surveillance and monitoring program are to:

- Measure the achievement of water quality goals and objectives and to aid in setting priorities for improvements;
- Measure specific effects of water quality changes on the beneficial uses;
- Measure background conditions of water quality and long-term trends in water quality;
- Locate and identify sources of water pollution that pose an acute, accumulative, or chronic threat to the environment;
- Provide information needed to relate receiving water quality to mass emissions of point and nonpoint sources of pollutants;
- Provide data for determining waste discharger compliance with NPDES permit conditions and waste discharge requirements;
- Collect data necessary to perform segment classifications and ranking for the water quality assessment;
- Form a basis for setting water quality based requirements;
- Provide data for preparing waste load allocations and total maximum daily load allocations necessary to achieve water quality control in water quality limited segments;
- Provide data needed to carry on the continuing planning process;
- Measure the effects of water rights decisions on water quality and to guide the State Water Board in its responsibility to regulate unappropriated water for the control of quality;
- Provide a clearinghouse for the collection and dissemination of water quality data gathered by other agencies and private parties cooperating in the program;
- Prepare reports on water quality conditions as required by Federal and State regulations and other users requesting water quality data.

Currently, monitoring and surveillance by the Regional Water Board within the Tulare Lake Basin is irregular and detailed information may not be available for certain areas in the Basin. In selecting sampling points, maximum use will be made of stations and data that are now a part of the program of other governmental agencies with whom cooperation has been agreed upon or favorably discussed. In order to ensure that collected data is useful to the present surveillance program, stations will be selected which can reasonably be expected to provide information consistent with the needs of this plan.

The Regional Water Board's surveillance and monitoring efforts include different types of sample collection and analysis. Surface water surveillance may involve analyses of water, sediment, or tissue samples. Ground water surveillance often includes collection and analysis of soil samples. Soil, water, and sediment samples are analyzed via standard, EPA approved, laboratory methods. The Regional Water Board addresses quality assurance through bid specifications and individual sampling actions such as submittal of split, duplicate, or spiked samples and lab inspections.

Although surveillance and monitoring efforts have traditionally relied upon measurement of key chemical or physical parameters (e.g., metals, organic and

inorganic compounds, bacteria, temperature, and dissolved oxygen) as indicators of water quality, there is increasing recognition that close approximation of water quality impacts requires the use of biological indicators. This is particularly true for regulation of toxic compounds in surface waters where standard physical or chemical measurement may be inadequate to indicate the wide range of substances and circumstances able to cause toxicity to aquatic organisms. The use of biological indicators to identify or measure toxic discharges is often referred to as biotoxicity testing. EPA has issued guidelines and technical support materials for biotoxicity testing. A key use of the method is to monitor for compliance with narrative water quality objectives or permit requirements that specify that there is to be no discharge of toxic materials in toxic amounts. The Regional Water Board will continue to use biotoxicity procedures and testing in its surveillance and monitoring program.

The recommended surveillance program is composed of the following elements:

Surface Water

The surface water monitoring network for the Tulare Lake Basin will be composed of a small number of fixed stations to evaluate water quality trends. If additional stations, parameters, or frequencies are required in this network, contractual funds should be budgeted by the State Water Board.

Sampling stations for the major surface waters of the Tulare Lake Basin were selected from those used by the Department of Water Resources in their surface water quality monitoring program. Areas not covered may be supplemented by other federal, state or local data on water column sampling. Table VI-1 lists the surface water sampling stations for the Tulare Lake Basin.

Surface water grab samples are expected to provide sufficient analytical detail to affirm the mineral character of the stream at key points, occurrence of

TABLE VI-1
SURFACE WATER SAMPLING STATIONS

DWR Station No.	Station Name
	Kings River
C1 1490.00	Above North Fork at Rogers Crossing
C1 1460.00	Below North Fork
C1 1140.00	Below Pine Flat Reservoir
C0 1140.00	Below Peoples Weir near Kingsburg
C0 1121.00	South Fork below Empire Weir 2 near Stratford
C0 1128.00	North Fork below Stinson Weir near Wheaton
	Kaweah River
C2 1250.00	At Three Rivers
C0 2185.00	Below Terminus Dam
	Tule River
C3 1150.00	Near Springville
C0 3196.00	Below Success Dam
	Kern River
C5 1500.00	At Kernville
C5 1350.00	Below Isabella Dam
C0 5150.00	Near Bakersfield
	California Aqueduct at Check 13
	California Aqueduct at Tehachapi Afterbay
B7 1910.00	Friant-Kern Canal at Friant
B0 7715.00	San Joaquin River above Mendota Dam
	San Luis Drain near Mendota
C0 0965.00	Buena Vista Slough near Lost Hills
C6 1350.00	Caliente Creek near Bena
	Grapevine Creek at Grapevine

TABLE VI-1
SURFACE WATER SAMPLING STATIONS

DWR Station No.	Station Name
C7 1820.00	Bitterwater Creek near Lost Hills
C0 7120.00	Avenal Creek near Avenal
C0 7050.00	Zapato Chino near Avenal
	Jacalitos Creek near Coalinga
C7 5400.00	Warthan Creek Trib 2 near Coalinga
C7 6150.00	Los Gatos Creek above Nunez Canyon near Coalinga
C7 7050.00	Cantua Creek near Cantua
B8 1100.00	Panoche Creek below Silver Creek near Panoche
C1 5100.00	Dry Creek near Academy
C0 1555.00	Dog Creek below Dry Creek near Academy
	Redbank Creek
	Fancher Creek
C1 1120.00	Mill Creek near Piedra
C0 1185.00	Wahtoke Creek near Navelencia
C0 2520.00	Sand Creek near Monson
C0 2680.00	Cottonwood Creek near Redbank
C0 2780.00	Limekiln Creek near Terminus
C2 8170.00	Yokhohl Creek at Friant Kern Canyon near Exeter
C0 3650.00	Lewis Creek East of Lindsay
C3 5100.00	Deer Creek Foothills near Terra Bella
C4 1100.00	White River Foothills near Ducor

toxic substances, general levels of nutrients and biological responses, and common physical characteristics.

The State Water Board manages its own Toxic Substances Monitoring Program to collect and analyze fish tissue for the presence of bioaccumulative chemicals. The Regional Water Board participates in the selection of sampling sites for its basins and annually is provided with a report of the testing results.

Ground Water

Ground water monitoring will be undertaken in various areas to support activities in the point and nonpoint source investigations. Sampling will be done to show long-term trends and identify problem areas for further study. Basins with the highest priority will be selected on the basis of economic importance and degree of threat to ground water quality. The first priority subtasks are:

- Designation of principal aquifers
- Selection of wells for potential inclusion in the ground water network
- Identification of potential pollution sources.

Wells for this ground water monitoring network shall be selected from a pool of qualified wells. Qualified wells are geologically and structurally described on a well log which includes perforated intervals. Qualified wells are also clearly located and accessible. Field checks of their availability, suitability, and access will be made. Final selection of wells shall be based on how representative the well is of ground water pollution and in areas of high use of ground water. This effort also relies upon information generated as part of state and federal programs' ground water surveillance efforts. A Ground Water Sampling Manual should be prepared by the State Water Board in cooperation with the Department of Water Resources to standardize sampling procedures and give guidance to local agencies when conducting ground water data programs.

Self-Monitoring

Self-monitoring reports are normally submitted by the discharger on a monthly or quarterly basis as required by the permit conditions. Most dischargers will be required to submit self-monitoring reports. These reports will be reviewed by the Regional Water Board and entered into the data bank. This program will be continued at its present level, with additions made to the present list as additional self-monitoring requirements are imposed.

Compliance Monitoring

Compliance monitoring will determine permit compliance, validate self-monitoring reports, and provide data for enforcement actions. Discharger compliance monitoring and enforcement actions are the responsibility of Regional Water Board staff. The key element of the compliance monitoring program will be personal visits to the facility for direct observation and to review procedures that assure quality control.

The scope of the Compliance Monitoring Program for the Basin depends on the number and complexity of Waste Discharge Requirements and NPDES orders issued.

Complaint Investigation

Every effort will be made to prevent conditions that give rise to complaints. When such conditions occur, complaints from citizens and public or governmental agencies stemming from the discharge of pollutants or creation of nuisance conditions will be investigated. The Regional Water Board will document observed conditions and prepare reports and letters, or take other follow-up actions as necessary.

Intensive Surveys

Intensive monitoring surveys are specially designed to investigate problems in water quality class segments or hydrologic units requiring sampling in addition to the routine monitoring programs. Surveys are repeated at appropriate intervals depending on the parameters involved, the variability of conditions, and changes in hydrologic or effluent regimes. They usually consist of localized intermittent sampling at a higher than normal frequency. These surveys will provide detailed water quality data to locate and evaluate violations of water quality objectives and to calculate waste load allocations or total maximum daily load allocations as the case may require. The level of effort devoted to a given monitoring survey will depend upon the severity and complexity of the pollution problem in the survey area.

Aerial Surveillance

Low-altitude flights are conducted primarily to observe variations in field conditions, gather photographic records of discharges, and document variations in water quality.

Subsurface Agricultural Drainage

All local agricultural water supply and drainage agencies should participate in joint, coordinated programs to monitor the volume and quality of drainage water in collection, treatment, and/or disposal systems.

Lower Kings River

The Kings River Conservation District should continue monitoring the Lower Kings River monthly for electrical conductivity, pH and temperature.

The Regional Water Board should continue monitoring the River and specific discharges for constituents of concern on a regular basis. River samples should focus on areas of special concern, i.e. where human activity such as fishing or boating is most frequent and/or where water quality objectives are not met on a regular basis. Specific discharges should be selected based upon the electrical conductivity of the discharge. Monitoring should be conducted quarterly, at a minimum, to assess seasonal variations in flow and water quality.

The Regional Water Board should monitor storm water discharges from NAS Lemoore to check for hydrocarbons during peak flow periods and review existing pollution control procedures at the installation to insure such discharges are minimized.