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GROUNDWATER MANAGEMENT PLAN

KINGS RIVER WATER DISTRICT

SANGER, CA

July 1995

Appr 8/17/95

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KINGS RIVER WATER DISTRICT
GROUND WATER MANAGEMENT PLAN

I. INTRODUCTION

In response to California Water Code Section 10753.7 et seq (AB 3030, 1992), Kings River Water District has authorized the preparation of a ground water management plan to protect ground water supplies, encourage a balanced use of available water supplies and to protect the quality of ground water in the District area.

The authorizing legislation provides that the District, after public notice, shall conduct a public hearing as to whether a ground water management plan should be prepared.

After such hearing, the District may draft a Resolution of Intention to adopt a Ground Water Management Plan and shall publish such resolution following which a draft Ground Water Management Plan is prepared.

A hearing on the draft plan shall take place and unless a majority of landowners representing more than 50 percent of the assessed valuation of the District protest, the Ground Water Management Plan may be adopted.

If fees and assessments are required in the implementation of the Ground Water Management Plan such fees and/or assessments can only be fixed and collected if such authority is approved by a majority of votes cast in a popular election.

II. STUDY AREA

1. DESCRIPTION

The District encompasses approximately 14,500 acres which is located in an area known as Centerville Bottoms east of Sanger, Fresno County,

California. The Kings River and its various channels run generally in a north to south direction through the District with Avocado Lake being at the upper northerly edge of the District and Reedley Narrows west of the City of Reedley being near the south boundary of the District. Plate 1 shows the boundaries of the District and Plate 2 shows its location.

The lands of the District are situated in the river bottom area lying between mesa lands to the west below a bluff of 25 to 35 feet in height and on the eastern edge by either foothills or mesa lands. The many channels of the river cut lands within the District into many parcels, most of which are gravity irrigated although a limited number are irrigated by pumping from the channels.

The City of Sanger is located adjacent to the west central portion of the District.

III. HISTORICAL DATA

Early use of water from the Kings River in the Centerville Bottoms is documented in the 1870's and use continues. After many years of independent operations of the various ditch companies, districts and private entities in the Kings River service area,, there was unrest on the entire Kings River as to water rights. In 1927 a water right settlement was accomplished. An internal schedule of entitlements for the several Centerville Bottoms ditches was concurred in by the individuals responsible for the individual operations. Entitlement was acknowledged informally by other Kings River water right holders in Fresno, Tulare and Kings Counties, although it was not included in the 1927 master agreement by Kings River Water Association.

Stream flow of the Kings River is regulated by Pine Flat Dam and reservoir located about 10 miles upstream from the upper boundary of Kings River Water District. Prior to the construction and operation of Pine Flat Dam, many lands in the Centerville Bottoms were subject to flooding from channels of Kings River.

In contemplation of the completion of construction of Pine Flat Dam and Reservoir, negotiations for the allocation and use of reservoir storage space and the extension to high flows of the water entitlement schedules was undertaken. Although Pine Flat Dam was completed in 1954, it was not until 1963 that the permanent agreement for the storage allocation and water rights schedule was completed and executed. Kings River Water District has contracted for 15,000 acre-feet of storage space in Pine Flat Reservoir. This storage is flood-protected in that this water would be the last water released in the event of a forced flood release.

IV. FORMATION DATA

Kings River Water District was formed in 1948 under provisions of the California Water District Act of the California Water Code formation. The District was established to provide a public entity which could act to participate in water right negotiations on Kings River, negotiate for storage space at Pine Flat and to protect existing surface and ground water rights.

V. CLIMATIC CONDITIONS

Climatic conditions in Kings River Water District are generally typical of those on the eastern side of the San Joaquin Valley, although occasionally the winter temperatures are sometimes 2 to 3 degrees below those of the

surrounding mesa lands. Typically, there are 5 to 10 days with minimum temperatures below freezing. Temperatures can vary in the District although such differences depend on many factors such as soils, ground cover, moisture, and elevations, although there are no discernible geographic patterns of minimum or maximum temperatures either as to duration or frequency. There are two distinct frost situations with each having a separate effect on district crops. In the December - January winter period, if temperatures stay below 27°F for more than one hour, the citrus crop can be seriously damaged. The spring frost period usually occurring in April can cause serious damage to tree fruit, citrus and vineyards if blooming, leafing and budding has taken place or is occurring. Frost reduction methods include the use of irrigation water and/or wind machines.

Maximum summer temperatures occasionally exceed 105°F. The application of irrigation water can lessen the adverse affects of higher summer temperatures both as to plant transpiration and the risk of sunburning fruit. Storms which bring hail and/or high winds can inflict considerable damage to immature fruit, but fortunately such occurrences are rare.

Rainfall usually ranges from 10 to 15 inches annually with extremes as great as 25 inches and as low as 6 inches.

VI. TOPOGRAPHY

District lands slope from north to south with elevations at the narrow northerly end of about 425 feet above sea level and at the narrow southerly end 6.5 miles distant of about 325 feet above sea level or an average slope of about 15 feet per mile near Kings River.

In the central 4.5 mile wide part of the District the land elevations above sea level are approximately as follows: on the west edge about 350 feet;

near Kings River about 325; and on the east edge about 355 feet.

The river channel bottoms are typically four feet to ten feet below adjoining lands.

VII. SOILS

Soils in Kings River Water District are predominantly of the Grangeville series and most of the cultivated land falls in this general category. In the Grangeville series, these soils are generally sandy loams with the variation of classification having to do with substratum as to being sandy or hard or gravelly. Ground water levels are near the ground surface in a few instances, but there are no reports of saline conditions within the District.

These soils are typical of those usually found in areas where river channels have coursed many years, often developing new channels under flood conditions.

The river channels have cobbles and river wash due to the action of the flowing water. There are areas, particularly in the eastern portions of the District where the soils are of the Tujunga series classified as cobbly loamy sand some underlain with a gravelly substratum. In instances where cobbles have existed at or near the surface, most have been eliminated by hand-picking or by mechanical equipment to render the lands highly adaptable for permanent plantings of fruit trees and grapevines.

There are limited swamp areas, the most of which are situated in the southwesterly portion of the District.

VIII. CROPS

Kings River Water District lands, except for channels and small isolated parcels, are generally very adaptable to either permanent plantings of vines and fruit trees or for pasture and row crops. Some citrus plantings exist along the eastern portion of the District, but frost conditions have not been conducive to extensive plantings.

The somewhat poorer soils, especially where ground water tables are close to the surface, are used mainly for native pasture, some of which is surface irrigated and some of which is sub-irrigated.

The Grangeville series adapt well to these cropping patterns. Historically, grapes mostly of the wine varieties, were planted, but the area now supports many acres of peaches and nectarines as well. As to row crops, most are corn, black-eyed peas or limited parcels of vegetables.

IX. WATER DISTRIBUTION FACILITIES

In Kings River Water District, there are 18 diversions from channels of Kings River into open ditches and pipelines which serve their respective service areas. Flows into the ditches and pipelines are controlled by gate structures at or near each of these diversion points. Some of these waterways are improved natural channels and some are artificial. Kings River Water District operates and maintains these headworks and the responsibility for distribution of water in most cases is through voluntary or mutual water company organizations. Several of these ditch entities have turned over their administration, operation and maintenance to Kings River Water District and it is anticipated that more of these entities will do the same.

The District collects water orders and coordinates diversion and storage operations with the Kings River watermaster.

Existence of the ditches is carried out giving regard to the maintenance of habitat for wildlife to the maximum extent consistent with efficiently delivering irrigation water.

X. WATER APPLICATION FACILITIES

On-farm facilities receiving water through turnouts from the various ditches include facilities to apply water through various irrigating systems such as drip system furrows, checks, flooding and high or low volume sprinklers. It is anticipated that continuing improvement of water application methods will take place in the future.

In limited areas of the District, sub-irrigation provides sufficient moisture for crops.

XI. MUNICIPAL AND INDUSTRIAL USES

There are no cities or towns within Kings River Water District although the City of Sanger operates and maintains a wastewater treatment plant in the west central part of the District. Currently, Sanger is planning to improve this facility to enable it to meet needs of its increasing population and provide better reliability in meeting applicable standards.

It is anticipated that a limited number of additional homes will be constructed in the District area since planning and building restrictions will limit such increases to a manageable degree.

Except for existing and future sand, gravel and rock mining operations and fruit processing facilities, it is unlikely that there will be industrial development in Kings River Water District.

XII. WATER SUPPLY DATA

As previously indicated, water rights for Kings River Water District are included in water rights schedules for Kings River as agreed to by all the diverting units on Kings River. This schedule is administered by the Kings River Water Association Watermaster in accordance with the day-to-day requests of the various river diverters.

The District participates in the storage operations of the river entities at Pine Flat Dam and Reservoir. The District has contracted for 15,000 acre-feet of space at Pine Flat and an additional approximately 2,000 acre-feet of storage is available through the operation of upstream storage reservoirs of Pacific Gas & Electric Company.

Total District annual average entitlement from Kings River is shown on Table 1.

XIII. GROUND WATER

Investigation of available ground water records in Kings River Water District indicates that average ground water levels have not changed much over a period of at least 40 years.

Surface water entitlements in the Kings River Water District service area are such that ground water pumping is not a major source of irrigation water. Most of the irrigable lands in the service area receive Kings River water

either by gravity diversion from channels of Kings River or by use of pumps taking water from channels of Kings River.

Ground water pumping is relied upon as a reserve supply in most operations, particularly since the construction and use of Pine Flat Dam and Reservoir located above Piedra.

Depths from the ground surface to ground water vary from approximately 1 foot to 50 feet in different areas served by the District with most of the variation depending on location with respect to Kings River channels and major ditches.

Production from pumps and wells varies depending on the permeability of various strata below the ground surface.

Unknown effects on ground water conditions would result if extensive sand and gravel mining were to take place in the District. If mining excavations go below existing ground water levels adjacent to any such mining operations, extremely adverse affects could result due to the anticipated draining of ground water to open pits. Such draining would adversely affect the areas adjoining such mining operations to the extent that channel seepage and drainage would eliminate any sub-irrigation resulting in a greater need for surface water.

Examination of ground water maps produced by the California Department of Water Resources indicates that water levels have not varied substantially, particularly in the years from 1989 to 1993. Reference to this data and mapping indicates that the ground water slope is generally parallel to the main channel of Kings River and that there is little indication of underground flow into Kings River Water District, although there may be isolated examples where such might be the case.

Unless such mining operations take place, or there is export of ground water from the District service area, it is unlikely that, barring drastic climatic in runoff conditions, ground water conditions would deteriorate beyond those which have been experienced in the past.

XIV. WATER QUALITY

Available water quality tests indicate that ground water in the Kings River Water District service area meets the various local, state and federal water quality standards. It should be noted however, that the City of Sanger was involved in ground water quality litigation from producing wells west of Kings River Water District. Its requirements, in effect for the wastewater treatment plant of the City of Sanger and for the winery located in the east central part of Kings River Water District, are being met, although there have been isolated instances of violation of the standards.

Surface water supplies from Kings River channels is of excellent quality meeting various public water quality standards for drinking water and agricultural use.

Since drainage water from irrigated fields does not reach Kings River channels or ditches except in minor instances, this possible source of water quality degradation is not likely.

XV. INSTITUTIONAL MATTERS

Kings River Water District is bounded on the northwest by Fresno Irrigation District, on the southwest by Consolidated Irrigation District and on the east by Alta Irrigation District, each of which is a major Kings River water diverter. These three districts are all on higher land than Kings River Water

District which is in the Kings River bottom except for a portion of Alta Irrigation District which includes some lands in the Centerville Bottoms area on the southeast of the Kings River Water District.

Each of these districts has developed a ground water management plan by which ground water quality will be monitored to ascertain that ground water quality adjacent to Kings River Water District is maintained at a high level. There have been no indications of ground water quality problems in any of these areas adjoining Kings River Water District.

This is important due to the fact that some ground water inflow to Kings River Water District comes from each of these districts although the areas which contribute are limited to those close to the boundaries of Kings River Water District.

Kings River Conservation District also includes the Kings River Water District as well as the three adjoining districts. Kings River Conservation District has not and does not expect to prepare a ground water management plan for the area encompassed by Kings River Water District.

There are no other entities preparing ground water management plans which would encompass Kings River Water District and there are no institutional or interference problems involved in the preparation of a ground water management plan by Kings River Water District.

XVI. PROPOSED GROUND WATER MANAGEMENT PROGRAM

If approved and funds are available, Kings River Water District could undertake various activities in a staged manner over a period of several years.

A data collection program can be developed for observations of the ground water level under District lands. Initially, existing wells can be selected for

observation of ground water levels. Choice of such wells will depend on location, construction, accessibility and owner consent.

In addition, where existing wells are not available for observation, monitoring wells can be established on a grid system at several mile intervals so that with observed data ground water contours can be delineated. These contours can then be used to determine the slope and direction of ground water movement.

Constructed ground water monitoring wells similar to that shown on Plate 3 would be suitable for the observation program to supplement any existing ground water wells in the observation program.

It is recommended that the observation program include water quality tests both surface and underground water as well as ground water level determinations.

A monitoring program should include fall and spring observations with emphasis on the fall series to be taken after the irrigation season and before fall rains can affect observations. The monitoring program should be coordinated with local and state agencies so that duplication is avoided.

In the event that ground water levels rise to the extent that there are adverse affects on root systems of crops, it may be necessary to institute a drainage program through private or District sponsorship.

MAP OF THE KINGS RIVER WATER DISTRICT

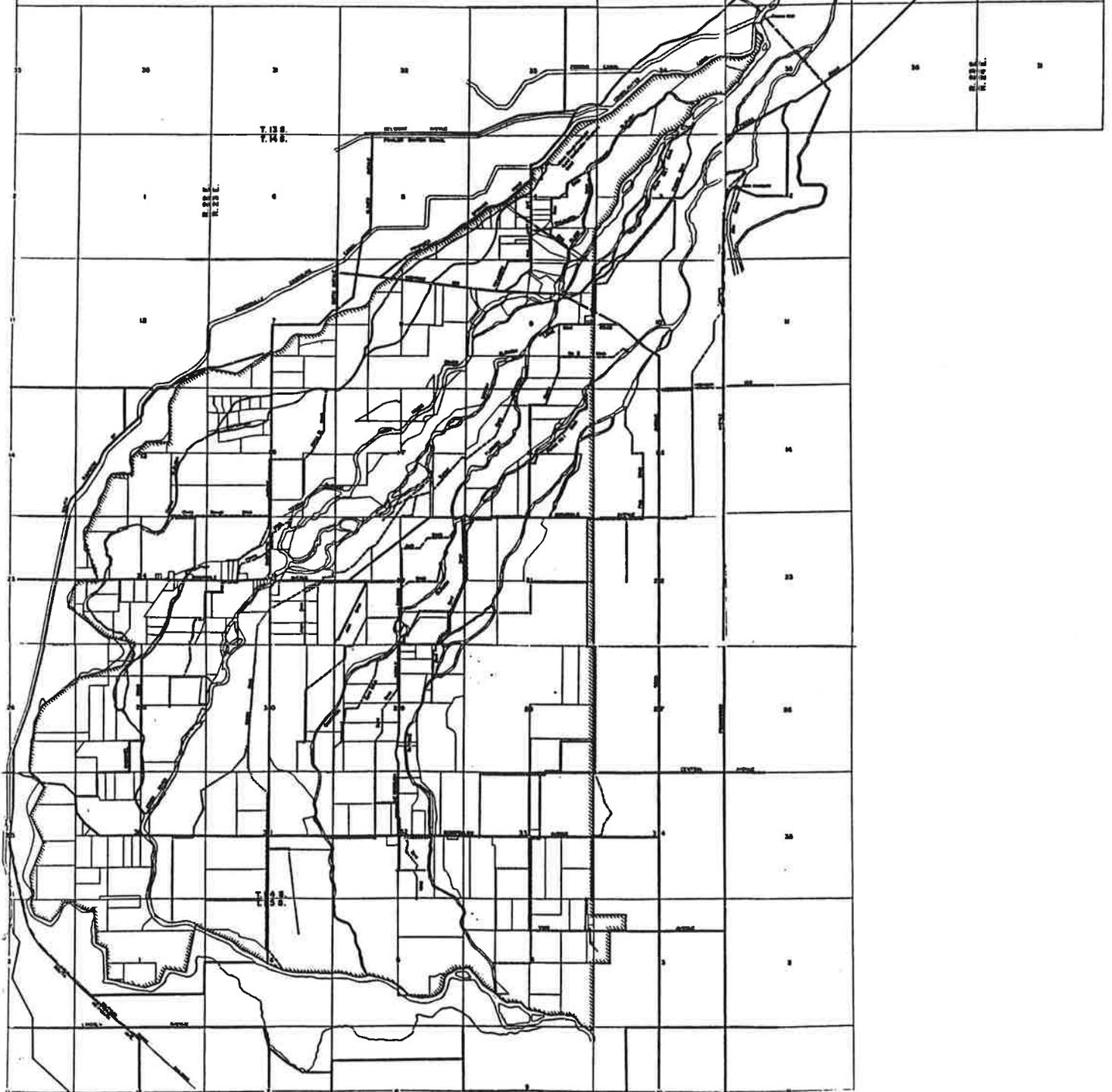
FRESNO COUNTY
CALIFORNIA

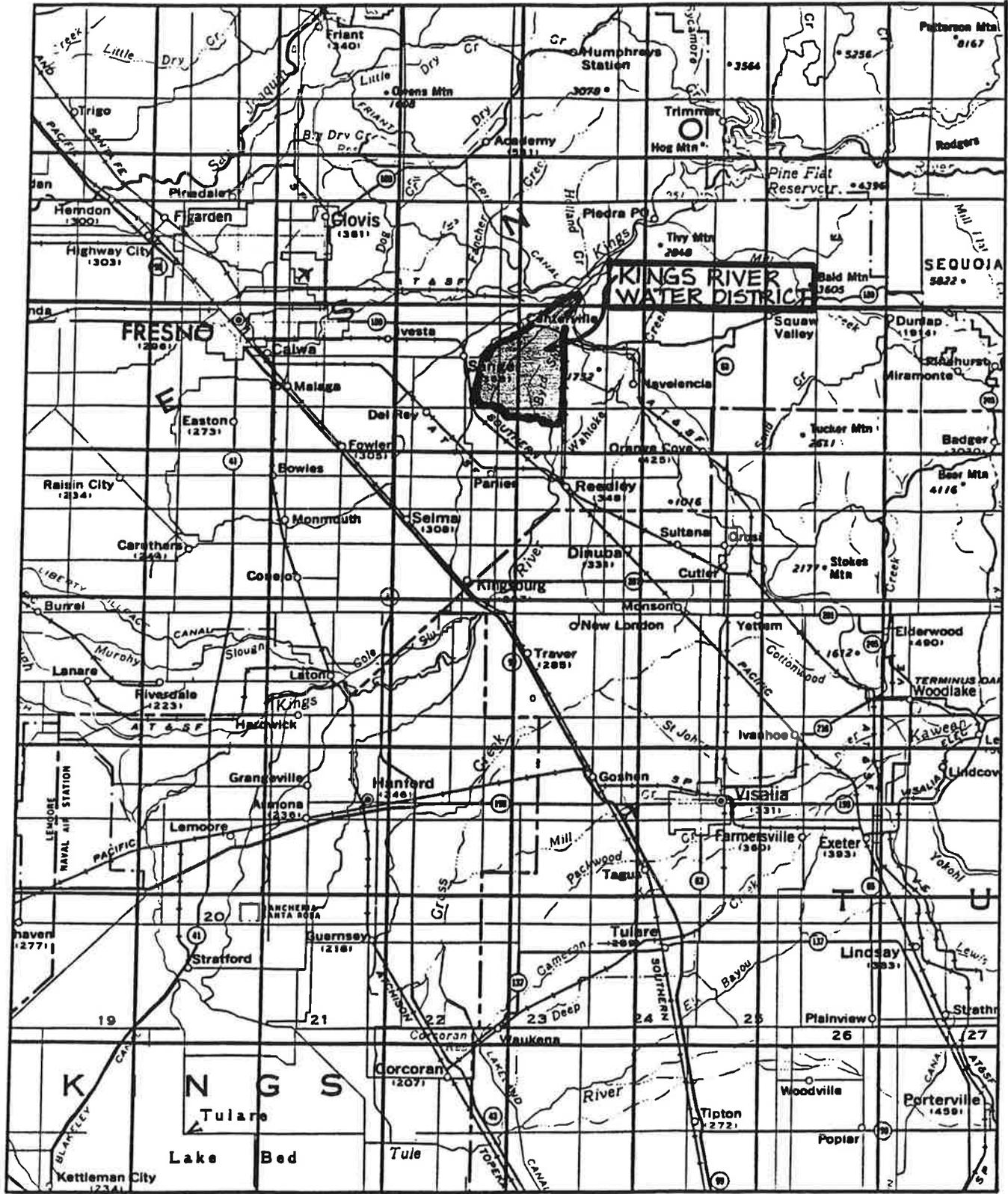
----- KINGS RIVER WATER DISTRICT BOUNDARY
----- DIVISION OF PIPELINES DEPTER MORE THAN ONE METER LONG
----- WATER DITCH
----- PIPELINE



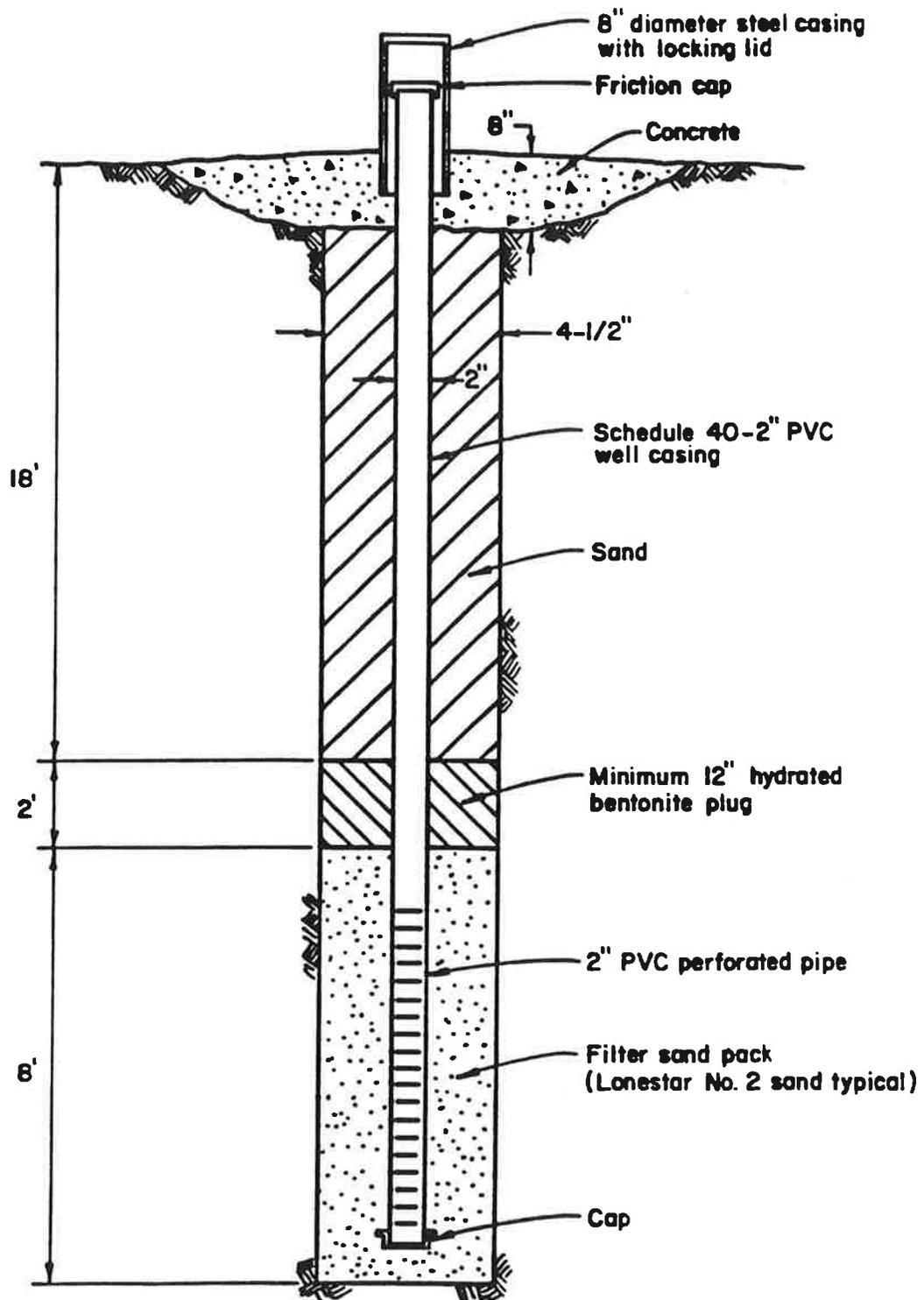
AUGUST, 1984

SCALE - 2 INCHES = 1 MILE





LOCATION MAP



TYPICAL
MONITORING WELL DESIGN

KINGS RIVER WATER DISTRICT

Average Scheduled Entitlement
(In Second Foot Days)

FOR THE 99 YEAR PERIOD: October 1895 - September 1994

October	1,800	SFD
November	1,816	
December	1,954	
January	2,034	
February	1,939	
March	2,162	
April	4,184	
May	4,641	
June	4,439	
July	4,059	
August	3,051	
September	<u>2,116</u>	
TOTAL	3,4195	SFD

TABLE 1