# WATER QUALITY SURVEY OF TILE DRAINAGE DISCHARGES IN THE SAN JOAQUIN RIVER BASIN

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## I. SUMMARY AND RECOMMENDATIONS

During April and June 1986, and June 1987, staff of the Central Valley Regional Water Quality Control Board completed three extensive surveys of subsurface drainage water being discharged from individual tile drainage systems in the San Joaquin River Basin. Additional data was collected from open waterways flowing into, through and past the study area. Results from 314 sites have been delineated by seven zones represented by either geologic setting or drainage patterns. The zones presented include Zone A (western portion of the Delta), Zone B (areas east of the San Joaquin River), Zone C (areas within San Joaquin County and west of the San Joaquin River), Zone D (areas in Stanislaus County west of the San Joaquin River), Zone E (an area west of the San Joaquin River that is primarily in the Basin Trough as described by Deverel et al.(1984)), Zone F (discharges located in the Panoche Fan area that flow toward the San Joaquin River), and Zone G (open waterways which flow into, through and past the study area).

Review of analytical results presents a general overview of subsurface drainage water quality in the San Joaquin River Basin and also areas and constituents of potential concern to water quality. Information from the analyses of major ions portrays the subsurface drainage water as alkaline with a pH greater than 7.0 and with median specific conductances between zones ranging from 865 umhos/cm in Zone B to 5,940 umhos/cm in Zone F. Drainage along the westside of the river downstream of the Grassland area has either sodium or non-dominant cation makeup with 75 percent of the samples showing no anion dominance and roughly 15 percent showing slight sulfate dominance. The drainage east of the San Joaquin River also shows either sodium or non-dominant cation composition. The eastside drainage water does not appear to have dominant anions. Water from the Panoche Fan Area, however, shows greater than 60 percent sodium dominance for cations. In addition, 95 percent of the samples show sulfate dominance. Over 50 percent of these drain water samples are potentially saturated or close to saturation with calcium sulfate (gypsum).

Thirteen trace elements were analyzed on most of the samples collected. These trace elements included arsenic, boron, cadmium, chromium, copper, lead, mercury, manganese, molybdenum, nickel, selenium, silver and zinc. With the exception of silver, detectable levels of each element were found in at least one sample. Only six of these trace elements, arsenic, boron, chromium, molybdenum, nickel and selenium were detected frequently. Concentrations varied throughout the discharge zones. Arsenic concentrations ranged from less than 1 ug/L to 63 ug/L with most of the positive values associated with Zones B and E which are areas whose soils are predominantly derived from the Sierra Nevada. High boron concentrations were detected in all subsurface drainage from the western side of the San Joaquin River and Delta. Little or no boron was detected in samples from Zones B and E. Median boron concentrations in the zones west of the San Joaquin River and Delta ranged from 1.2 mg/L in Zone D to 8 mg/L in Zone F. These median values exceed the 0.7 mg/L level considered safe for all types of agriculture including sensitive crops(Ayers and Westcot, 1985).

Chromium concentrations ranged from less than 1 to 268 ug/L for all samples collected in the Panoche Fan Area where 85 percent of the samples contained detectable levels of chromium with a median value of 18 ug/L. Elevated molybdenum concentrations were found in samples taken from the eastside areas(Zone B), basin trough area(Zone E) and the Panoche Fan Area(Zone F). Molybdenum concentrations in these areas ranged from 1 to 724 ug/L. Nickel, although detected in every zone except the Western Delta(Zone A), was predominantly reported below the 5 ug/L detection limit. The Panoche Fan Area(Zone F) showed the greatest number of positive nickel results, yet over over 80 percent of the nickel concentrations measured in this zone were below 10 ug/L. Selenium was detected in at least one sample from each discharge zone. The highest concentrations were detected in samples collected west of the San Joaquin River. A majority of these samples were from the Panoche Fan area which also showed the highest median selenium concentration at 108 ug/L.

Although additional elements were detected during the surveys, reported concentrations were either close to the detection limit or instances of positive results appeared isolated. Recommendations for future monitoring programs can be summarized by element:

Arsenic: Although detected throughout the study area, further monitoring should be limited to areas showing elevated concentrations with the emphasis on seasonal changes. No routine monitoring of arsenic should be proposed for dischargers unless the occurrence of arsenic becomes more widespread;

Boron: Continued discharger monitoring of boron is essential as it occurs frequently at highly elevated levels. Continued monitoring of boron on a seasonal basis would help determine impacts on agricultural supply waters. Boron monitoring on discharges from the eastside of the basin is of limited value;

Cadmium: Further confirmation sampling should be done at all sites showing concentrations in excess of the detection level used in this survey. Further monitoring of discharge sources should be considered when an acceptable method of analysis can be established which would provide information on the low level concentrations;

Chromium: Since total recoverable chromium was analyzed during the survey, follow up monitoring should distinguish both hexavalent and trivalent forms of chromium in areas of elevated concentrations. This monitoring would better relate to existing water quality criteria. Discharger monitoring should continue to include total chromium until such time as further studies can be completed;

Copper: Only 24 sites out of the 314 sampled showed copper at concentrations greater than 10 ug/L. Confirmation samples should be collected before further discharger monitoring is initiated. This additional study should include dissolved as well as total recoverable copper in addition to water hardness values;

Lead: Few samples had detectable levels of lead though positive values were scattered throughout the study area. Further investigation is needed to establish the reasons for elevated concentrations in the selected samples. Further widespread sampling should not be instituted until significantly lower detection levels can be achieved in the salty drainage water;

Manganese: Scattered positive values make recommendations difficult. Future studies should first focus on confirming the elevated levels already detected and secondly focus on downstream monitoring to determine if elevated concentrations are appearing in the San Joaquin River and Delta. Further discharger monitoring should not be instituted until these studies are completed and more information is known about the criteria levels needed to protect aquatic resources;

Mercury: Fourteen sites showed detectable levels of mercury ranging from 0.7 to 2.3 ug/L. These positive results should be confirmed and limited monitoring in the vicinity of the areas should be conducted. Because of the scattered nature of the areas where positive values were found, no discharger monitoring is proposed until the actual levels or sources are better defined;

Molybdenum: Discharger monitoring of molybdenum should be continued to determine the impact of elevated drainage water concentrations on agricultural water supplies. Open waterways in the Grassland Area show some canals exceeding the 10 ug/L water quality criterion suggested for irrigated agriculture(Ayers and Westcot, 1985). Seasonal variations in concentrations should be measured;

Nickel: Does not appear to be an element of concern. The present survey showed very low levels in the drainage water discharges. Because of its interaction with sediment, only dissolved samples downstream should be used for in-stream monitoring. Further monitoring may be necessary depending upon the limitations proposed in the Delta Hearing process. Discharger monitoring is not proposed at this time;

Selenium: Continued monitoring of selenium is needed to determine the impact of discharge of elevated drainage water concentrations on the aquatic resources. Further limited monitoring for seasonal changes is proposed for areas outside the Panoche Fan Area, however discharger monitoring is only proposed in the Grassland and Panoche Fan Areas;

Silver: Does not appear to be an element present at the detection levels used in this study;

Zinc: Extensive efforts would be needed by dischargers to avoid potential sources of zinc contamination, therefore it is recommended that in-stream monitoring be conducted for zinc in lieu of continued source monitoring. Source monitoring should only be reinstituted if the established in-stream criterion is being approached or exceeded.

The monitoring programs conducted in this study were for total recoverable trace elements. As most of the water quality criteria

are based on acid-soluble samples, it is not recommended that dissolved testing be conducted at the discharge source. First, the data developed for total recoverable becomes the most conservative case and second, the tile drainage discharges are normally free of sediment or other particulate matter which would give greatly different results from those obtained through a total recoverable sample. It is not recommended that the dischargers take on this additional expense until it is clearly shown that the total recoverable sample is not giving a true picture of the total load being discharged by individual tile drainage systems.

## II. INTRODUCTION

### a. Background

The potential impact of agricultural drainage on the beneficial uses of surface waters is being studied (SWRCB, 1987). Programs on the Federal, State and local levels have been initiated to investigate these potential impacts, find solutions and regulate the discharges of agricultural drainage. The State Water Resources Control Board and the Central Valley Regional Water Quality Control Board have initiated efforts to formulate water quality standards and implement regulatory programs.

The Central Valley Regional Water Quality Control Board has the primary responsibility for regulating the discharge of agricultural drainage in the San Joaquin Valley. This program will rely upon the cooperation of local water districts and drainage agencies in regulating agricultural discharges. An important part of formulating programs to control the pollutants in agricultural discharges is information about sources including the geographic distribution of sources and concentrations.

The California Legislature, through the Governor's 1985-86 budget, provided funding to state agencies and the University of California for an intensive look at selenium and its impact in California. Part of the funding was designated specifically for use in monitoring municipal and industrial discharges and agricultural subsurface drainage discharges for selenium and other trace elements. A report on the municipal and industrial discharges has been prepared as a separate report and this report will concentrate on selenium and trace elements in the agricultural subsurface drainage water discharges.

Due to the importance of selenium in the San Joaquin River Basin, the Central Valley Regional Water Quality Control Board sought to sample as many tile drainage sumps or other subsurface drainage discharges at the farm level as possible. This sampling was conducted in cooperation with local water, drainage, and resource management agencies within an area from Fresno County north to Contra Costa County. Prior to this sampling survey, a number of agencies and individuals were sampling the waterways and discharge points, but in most cases these samples represented a combination of tile drainage water, surface runoff from irrigated fields and natural runoff from

surface and ground waters. Additional emphasis was needed on monitoring at the farm level to give the local district managers a reliable data base upon which to make management decisions. To ensure proper quality control and sampling uniformity, all samples were to be collected by the Regional Water Quality Control Boards, and data analysis done in cooperation with the local agencies.

b. Purpose

The purpose is to provide local water management agencies and the Regional Board with sound water quality monitoring data on individual tile drainage systems, including changes in water quality with time. At the same time, this survey provides a data base planned and coordinated on a large geographic basis. The data developed will be used by local agencies and/or the Regional Board to:

a) develop follow-up water quality monitoring programs in areas where further data is needed;

b) evaluate existing water quality data programs and the need for increased quality control and quality assurance programs;

c) develop relationships between monitored parameters to decrease the need for monitoring numerous parameters;

d) increase the local agency's understanding of the geographical distribution of trace element concentrations within their agency boundaries, and the Regional Board's understanding of the geographical distribution of trace element concentrations throughout the San Joaquin Valley and Delta;

e) evaluate management options available to minimize the discharge of toxic elements. Evaluation will rely heavily on flow data being developed by the local agencies; and

f) evaluate the need for developing regulatory programs.

c. Scope

A survey was conducted of all tile drainage discharges within cooperating local water management agency boundaries. The survey area was the San Joaquin River Basin and Delta from Contra Costa County in the north to Fresno County in the south. Samples were collected once in April 1986 to represent the early irrigation season and a second time in June 1986 to represent the mid-irrigation season. The program was expanded in June 1987 to include 100 additional sampling locations as well as to confirm high levels of selenium detected during the 1986 surveys.

Sampling was done in cooperation with local agency personnel. Sites were sampled for standard minerals and trace elements. Regional Board staff were responsible for transport of samples to laboratories. Analyses were done by the Department of Water Resources Laboratory at Bryte (trace elements), U. S. Bureau of Reclamation Laboratory in

Sacramento (trace elements), South Dakota State University Laboratory in Brookings, SD (trace elements), Anlab Analytical Laboratory in Sacramento and California Water Laboratory in Modesto(standard minerals). In addition to laboratory internal QA/QC programs, a quality assurance program was also operated by the Regional Board. The program included site-anonymous sample IDs, duplicates, spikes, check samples and splits sent to different laboratories.

Data analysis was conducted jointly with local water and drainage management agencies. Data analysis includes interpretation of data in light of conditions when sampling was done, comparison of data with existing data, and assessment of data quality.

## III. PROCEDURES

### a. Sampling

During the three synoptic surveys, water samples were collected for selected minerals and metals from subsurface tile drain sumps, gravity tile drains and open drains receiving tile drainage. In addition to collecting samples for laboratory analyses, field work included electrical conductance (EC) and temperature measurements at each site and pH measurements at selected sites. Sample collection and preservation were conducted in accordance with U. S. Environmental Protection Agency and U. S. Geological Survey guidelines as outlined in National Handbook of Recommended Methods for Water Data Acquisition. For each of the surveys conducted for this study, the elements of concern were divided into three groups, each having similar collection and preservation techniques. The groups consisted of (1) minerals, (2) trace elements, and (3) selenium.

The minerals analyses requested were similar for all surveys. During the first and third surveys, minerals analyses consisted of EC, boron, chloride, sulfate, and total alkalinity. During the second survey, the minerals analyses included all analyses of the first synoptic survey as well as calcium, magnesium, sodium, potassium, carbonate alkalinity, bicarbonate alkalinity, and total hardness. Methods of collection and preservation were identical for all surveys with the only difference being in sample container size -- 1 liter for the partial scan and 1/2 gallon for the full mineral scan. In both cases, acid-washed polyethylene bottles were supplied by the laboratory. Containers used to collect the sample, as well as the sample bottle, were rinsed three times with water before the final collection. Once capped, the bottle was stored immediately on ice and transferred to the analyzing laboratory within 24 hours.

Trace element analyses included total recoverable arsenic, cadmium, copper, chromium, lead, manganese, nickel, molybdenum, silver, zinc, and selenium. The samples were collected in either 1 pint or 1 liter nitric acid-washed polyethylene bottles. The size depended on the analyzing laboratory. The same collection procedures were applied to the trace elements as were applied to the minerals, including each container being rinsed three times before the sample was taken. Since the analyses were for total concentration, each sample was acidified

with one ml Ultrex (ultra-pure) nitric acid per pint within 4 hours. The sample was then stored in a cool dark room until transferred for laboratory analysis.

Selenium samples were collected in 1 pint nitric acid-washed polyethylene bottles provided by the Regional Board. Sample collection was identical to that for trace elements, including the acidification process. The samples were again stored in a cool dark room until transfer to the analyzing laboratory. Selenium analyses were conducted by three separate laboratories -- U.S. Bureau of Reclamation (USBR), California Department of Water Resources (DWR), and South Dakota State University (SDSU).

Field methods were modified during the June 1987 survey to include an additional sample from each of the sample locations for mercury analysis. The mercury sample was collected in a washed and acid rinsed amber glass bottle that was rinsed three times with the drainage water prior to sample collection. The mercury sample was not filtered and was preserved with a potassium dichromate solution.

b. Quality Assurance

The Regional Board Agricultural Unit practices a standard quality assurance procedure with all its sampling programs. The procedure includes submitting duplicates, spikes, and standards with all sample sets submitted to analyzing laboratories. Additional blank samples containing 2 ml Ultrex (ultra-pure) nitric acid in 500 ml distilled water are also submitted at random to check possible contamination problems.

For minerals, the procedure includes collecting a minimum of 10 percent duplicates. The duplicates are submitted without being identified as such to provide a true measure of the laboratory capability. In addition, one mineral check sample is submitted with each sampling run of 10 or more samples. The check samples contain known quantities of sodium, calcium, magnesium, bicarbonate, chloride, sulfate, and boron, and are prepared by Regional Board staff. During the third survey, selected duplicate samples were spiked with known quantities of boron and chloride. These blind spikes were used as an arbitrary check on the ability of the laboratory to recover salts from a complex matrix.

Trace element (including selenium) quality assurance also includes the collection of 10 percent duplicates. However, for trace elements, only half of the extra samples are actually submitted as duplicates. The other half of the samples undergo a spiking procedure developed and conducted by Regional Board staff. The duplicate in the set is spiked with concentrations roughly equal to that expected in the original sample. In this manner, laboratory recoveries can be calculated.

In addition to the standard quality assurance methods during the synoptic survey one other method was incorporated -- samples from the same sites were submitted to more than one laboratory for the same

analysis. The extra step was an attempt to develop a comparison basis for sample sets sent to different laboratories.

All quality assurance samples analyzed by the laboratories fell within acceptable ranges of accuracy before being included in the final data set. A full analyses of the quality assurance results is in the Regional Board files.

## IV. FORMAT FOR DATA PRESENTATION

Three comprehensive surveys of tile drainage in the San Joaquin Valley were conducted by Regional Board staff and local agency personnel in April and June, 1986 and in June 1987. Water samples were collected at a total of 314 sites which included subsurface tile drainage sumps, surface drains receiving tile drainage water, and creeks entering the agricultural drainage problem areas. Most of the collection was done with the assistance of drainage district personnel familiar with site locations.

This report focuses on reporting the laboratory analysis of the major-ion and trace-element data for subsurface tile drainage discharges in the San Joaquin River Basin. Additional data has been collected by the U. S. Bureau of Reclamation and the U. S. Geological Survey for shallow groundwater and selected subsurface drainage discharges, however that data is not reported here as the focus of this study was to monitor only actively discharging subsurface tile drainage systems.

The sampling sites were widely scattered throughout the San Joaquin River Basin and Delta. Previous studies (Deverel et al., 1984) have shown that shallow groundwater quality is closely associated with the differing soils and topographic position in the basin. The data collected in this study have not been analyzed for this association. The data have been grouped into 7 drainage problem zones within the basin. The discharge zones established for this study are partly set on common discharge points into the River or its tributaries but often are set on the existence of localized areas of shallow groundwater which has necessitated the installation of tile drainage. This approach gives a better picture of the quality of discharges entering the San Joaquin River from a particular area. In most cases one zone may represent subsurface discharges from one or more of the physiographic areas defined by Deverel et al.(1984).

The data is presented by the 7 zones. One of these zones (Zone G) represents the open waterways within the basin and does not characterize subsurface tile drainage water. In Zone F, there are 12 samples that were taken from open drains within this area and do not characterize the subsurface discharges; these samples while noted in the data tables, were not included in the data analysis. The discharge zones established (Fig. 1) and their characteristics are:

Zone A Subsurface tile drains along the western portion of the Delta. Most are located within Contra Costa County from the Clifton

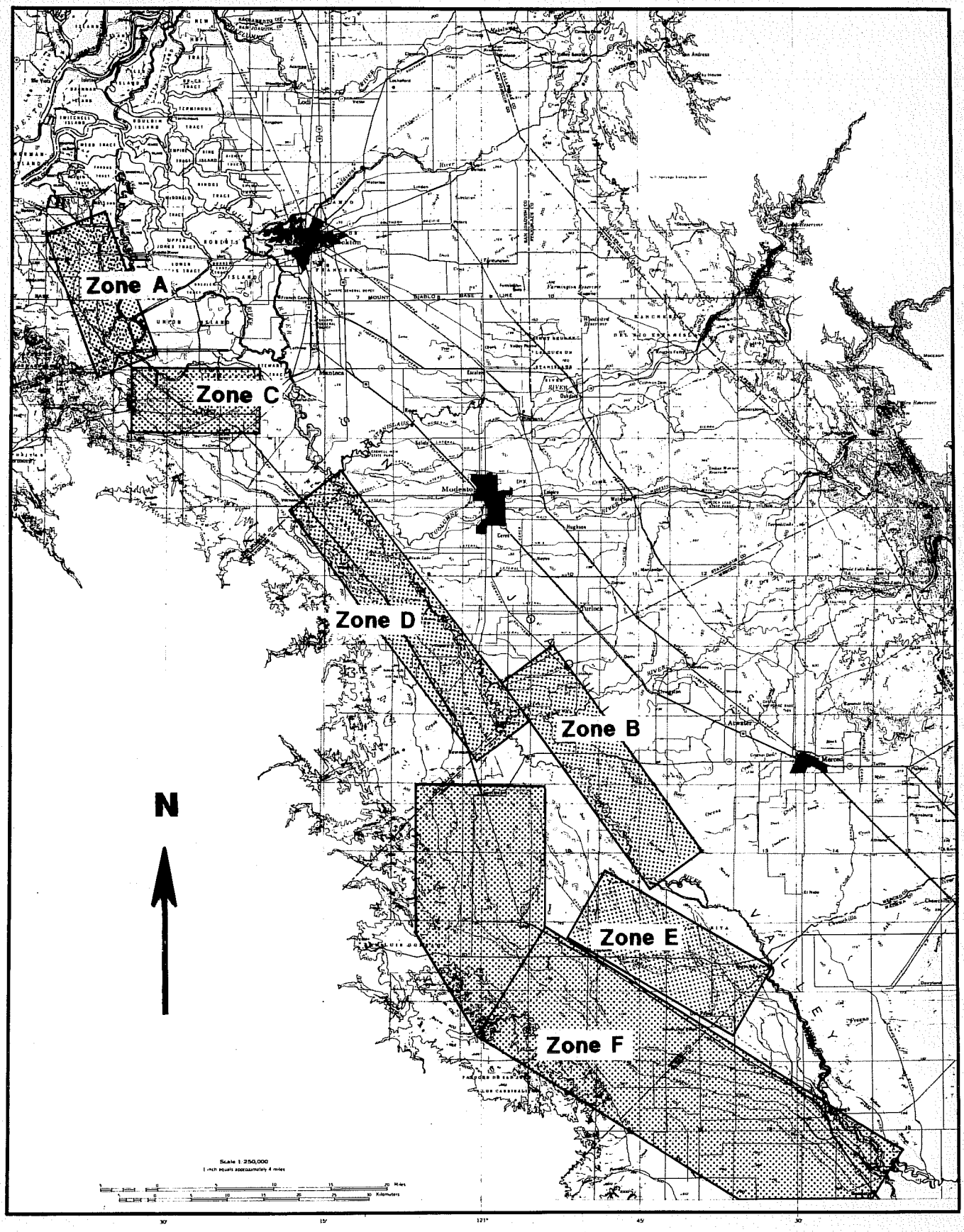



**Figure 1. Discharge Zones Monitored During the Central Valley Regional Water Quality Control Board Tile Drainage Survey, 1986 - 1987.**

Court Forebay north to the Contra Costa County Water District Intake Canal in Rock Slough. Eleven discharge sites were sampled within this zone;

Zone B Subsurface tile drains in scattered locations on the Eastern side of the San Joaquin River in Stanislaus and Merced Counties. The majority of these sites are near (within 2 miles) the San Joaquin River or a main eastside tributary. These drains are normally associated with localized zones of high groundwater rather than a widespread shallow groundwater condition more common to the western portion of the river basin. Nine widely scattered sites were sampled in this zone;

Zone C Subsurface tile drains in the western portion of San Joaquin County principally from the Delta Mendota pumping plant to just east of the City of Tracy. The majority of the drains lie along a line approximately 1 - 3 miles upslope from the San Joaquin River. Fourteen discharge sites were sampled within this zone;

Zone D Subsurface tile drains in the portion of Stanislaus County that lies west of the San Joaquin River. The majority of the drains lie approximately 1 - 4 miles upslope of the San Joaquin River and principally between the towns of Patterson and Newman and east of State Highway 33. Twenty-five discharge sites were sampled within this zone;

Zone E Subsurface tile drains in the portion of Merced County that is west of the San Joaquin River and lies primarily in the basin trough, an area whose sediment is derived chiefly from the Sierra Nevada to the east (Deverel et al., 1984). The drains are scattered throughout this zone which is bounded on the South by the City of Dos Palos and on the west by the old Santa Fe Grade Railroad right-of-way. Eighteen discharge sites were monitored within this zone;

Zone F Subsurface tile drains located principally in the Panoche Fan Area and discharge their flows through the Grassland Area to the San Joaquin River. The drains are located along a line from the town of Mendota to Los Banos with drains both upslope and downslope of the Delta-Mendota Canal. Scattered drains are located between Los Banos and the City of Gustine. A total of one hundred and seventy-three discharge sites were monitored within this zone;

Zone G These sites are all open waterways that either drain into the subsurface drainage areas or directly into the San Joaquin River. Because of the diversity of concentrations likely in these open waterways the data for this zone has been separated into 3 types of open waterways. The first is the San Joaquin River, which receives all the drainage water, the second is the open channels within the Grasslands Area which receive varying portions of agricultural drainage water and the third is selected creeks from the Coast Range that drain into the

drainage area or directly into the San Joaquin River. A total of sixty-four sites were monitored during this survey.

The discharge zones designated in this report provide an initial basis for assessing priorities for future water quality sampling and the differences in water quality for the various zones in the basin. Actual sampling locations have been presented by zone in Appendix A. Water quality assessment and comparisons were made on each of the discharge zones. Assessment of general chemical composition of the subsurface drainage water was based on the relative concentrations of the major ions - - calcium, magnesium, sodium, potassium, bicarbonate plus carbonate, chloride, and sulfate in each drainage zone. In addition to the major ions, an assessment was made of 13 trace elements including selenium. All water quality data for both standard minerals and trace elements for each sampling location is presented in Appendix B.

## V. DISTRIBUTION OF MAJOR IONS AND TRACE ELEMENTS

### a. Major Ions

Median (50 percent of the values are higher and 50 percent lower) and ranges for all major ions and related measurements are summarized for all of the subsurface tile drainage discharge samples collected (Table 1) and for each of the different discharge zones except Zone G (Table 2). The median specific conductance and field measured pH indicate

Table 1. Physical Properties and Major Ions in Subsurface Tile Drainage samples collected in the San Joaquin River Basin, 1986 - 1987.

| | Minimum | Median | Maximum |
|---|---|---|---|
| pH | 6.2 | 8.0 | 8.6 |
| EC (umhos/cm) | 580 | 4600 | 23000 |
| Temperature (F) | 57 | 64 | 89 |
| Total Dissolved Solids (mg/l) | 400 | 3400 | 22800 |
| Ca (mg/L) | 13 | 300 | 950 |
| Mg (mg/L) | 9 | 100 | 460 |
| Na (mg/L) | 37 | 520 | 4000 |
| K (mg/L) | 0.4 | 3.9 | 15 |
| Cl (mg/L) | 11 | 490 | 4900 |
| SO4 (mg/L) | 15 | 1788 | 12000 |
| CO3 (mg/L) | 0 | 0 | 50 |
| HCO3 (mg/L) | 80 | 210 | 760 |
| Total Alkalinty (mg/L) | 80 | 210 | 760 |
| Hardness (mg/L) | 68 | 1100 | 3300 |

Table 2. Physical Properties and Major Ions in Subsurface Tile Drainage Samples Presented by Discharge Zone, 1986 - 1987.

| | Zone A | | | Zone B | | | Zone C | | |
|---|---|---|---|---|---|---|---|---|---|
| | MIN | MED | MAX | MIN | MED | MAX | MIN | MED | MAX |
| pH | 7.7 | 8.1 | 8.3 | 7.9 | 8.5 | 8.6 | 8.0 | 8.2 | 8.5 |
| EC (umhos/cm) | 780 | 1749 | 2870 | 580 | 865 | 2300 | 1900 | 3025 | 4230 |
| TEMP (F) | 63 | 64 | 70 | 64 | 65 | 69 | 63 | 64 | 69 |
| TDS (mg/l) | 500 | 1100 | 1700 | 480 | 710 | 1500 | 1200 | 1800 | 2900 |
| Ca (mg/L) | 23 | 33 | 82 | 13 | 47 | 97 | 38 | 130 | 200 |
| Mg (mg/L) | 17 | 55 | 90 | 8.6 | 19 | 45 | 38 | 72 | 110 |
| Na (mg/L) | 86 | 190 | 360 | 37 | 95 | 450 | 170 | 370 | 600 |
| K (mg/L) | 0.4 | 1.5 | 5.1 | 1.5 | 2.8 | 6.7 | 0.6 | 1.7 | 3.3 |
| Cl (mg/L) | 87 | 230 | 540 | 29 | 67 | 360 | 260 | 522 | 840 |
| SO4 (mg/L) | 110 | 185 | 450 | 15 | 54 | 210 | 160 | 450 | 1421 |
| CO3 (mg/L) | 0 | 0 | 0 | 0 | 8 | 20 | 0 | 0 | 16 |
| HCO3 (mg/L) | 80 | 310 | 380 | 110 | 240 | 760 | 160 | 320 | 420 |
| T.Alk (mg/L) | 80 | 310 | 380 | 110 | 255 | 760 | 160 | 320 | 420 |
| Hard (mg/L) | 190 | 300 | 540 | 68 | 205 | 410 | 230 | 530 | 1000 |

| | Zone D | | | Zone E | | | Zone F | | |
|---|---|---|---|---|---|---|---|---|---|
| | MIN | MED | MAX | MIN | MED | MAX | MIN | MED | MAX |
| pH | 6.2 | 8.1 | 8.6 | 8.0 | 8.3 | 8.5 | 6.6 | 8.0 | 8.5 |
| EC (umhos/cm) | 630 | 2100 | 7500 | 880 | 1500 | 8000 | 690 | 6100 | 23000 |
| TEMP (F) | 58.5 | 66 | 89 | 60 | 63 | 68 | 57 | 64 | 71 |
| TDS (mg/l) | 500 | 1400 | 4800 | 680 | 930 | 5600 | 400 | 4800 | 22800 |
| Ca (mg/L) | 36 | 100 | 370 | 65 | 88 | 950 | 48 | 420 | 790 |
| Mg (mg/L) | 19 | 58 | 270 | 22 | 46 | 180 | 20 | 140 | 460 |
| Na (mg/L) | 75 | 270 | 1000 | 120 | 160 | 1300 | 55 | 820 | 4000 |
| K (mg/L) | 1.1 | 2.9 | 5.5 | 1.3 | 2.6 | 9.7 | 0.4 | 4.9 | 15 |
| Cl (mg/L) | 65 | 240 | 1400 | 87 | 240 | 1100 | 11 | 2400 | 4900 |
| SO4 (mg/L) | 92 | 335 | 2300 | 94 | 200 | 2400 | 68 | 2336 | 12000 |
| CO3 (mg/L) | 0 | 0 | 50 | 0 | 0 | 16 | 0 | 0 | 40 |
| HCO3 (mg/L) | 100 | 240 | 500 | 120 | 200 | 290 | 100 | 190 | 650 |
| T.Alk (mg/L) | 100 | 260 | 500 | 120 | 220 | 420 | 92 | 190 | 650 |
| Hard (mg/L) | 190 | 490 | 1800 | 90 | 330 | 1300 | 100 | 1790 | 3300 |

that most of the subsurface drainage water is alkaline (a pH greater than 7) and slightly saline, although median specific conductance (EC) varied between discharge zones. For example, Zones A, B, and E showed a median EC of less than 2,000 umhos/cm. Data for EC from the other zones indicates that Zone F, the Panoche Fan, had a significantly higher major ion concentration (median EC of 6,100 umhos/cm) followed by Zone C (San Joaquin County) at 3,025 and Zone D (Stanislaus County) at 2,100 umhos/cm.

Water hardness is a controlling factor in trace element toxicity. Normal toxicity appears to diminish as water hardness increases for some trace elements. Subsurface tile drainage water samples collected in the 6 discharge zones showed median hardness values ranging from 200 to 1,800 mg/L. Hardness values appeared to follow closely the total major ion concentrations. Thus the Panoche Fan (Zone F), San Joaquin County (Zone C) and Stanislaus County (Zone D) showed the highest concentrations. The hardness in the open waterways (Zone G) was also high. Channels within the Grassland area averaged 715 mg/L of total hardness with a median value of 770 mg/L. The natural westside creeks had an average hardness of 940 mg/L, but extreme values may be influencing this as the median value was 500 mg/L which is still considered high. These hardness values demonstrate the relatively poor quality water that comes from these natural streams.

The chemical composition of subsurface tile drainage water samples from three representative zones are depicted in simplified Piper diagrams (Fig. 2, 3, and 4) which show the relative contributions of major cations and anions to the total ion content of the water. Percentage scales along the sides of the diagrams indicate the relative concentration (in milliequivalents per liter) of each major ion. Cations are shown in the left triangle and anions in the right triangle. The central diamond integrates the data for cations and anions but is not essential to interpreting the data. Each water sample is represented by a point on the diagram.

The diagram with data for samples from Zone D (Fig. 2) which represents westside drainage downstream of the Grassland Area has 100 percent of the data points in either the sodium or no-dominant-type part of the cation triangle. The anion triangle shows that greater than 90 percent of the samples show no-dominant type for anions or they are slightly sulfate dominated. Over 75 percent fall in the no-dominant-type part of the triangle.

The diagram with data for samples from Zone E (Fig. 3) which represents areas on the eastside of the San Joaquin River also has 100 percent of the data points in either the sodium or no-dominant-type part of the cation triangle. The anion triangle however shows that all but one sample showed no-dominant type for anions.

In contrast, the diagram with data for samples from Zone F (Fig. 4) which represents subsurface tile drainage from the Panoche Fan Area has greater than 60 percent of the data points in the sodium-dominant-type part of the cation diagram. The anion triangle

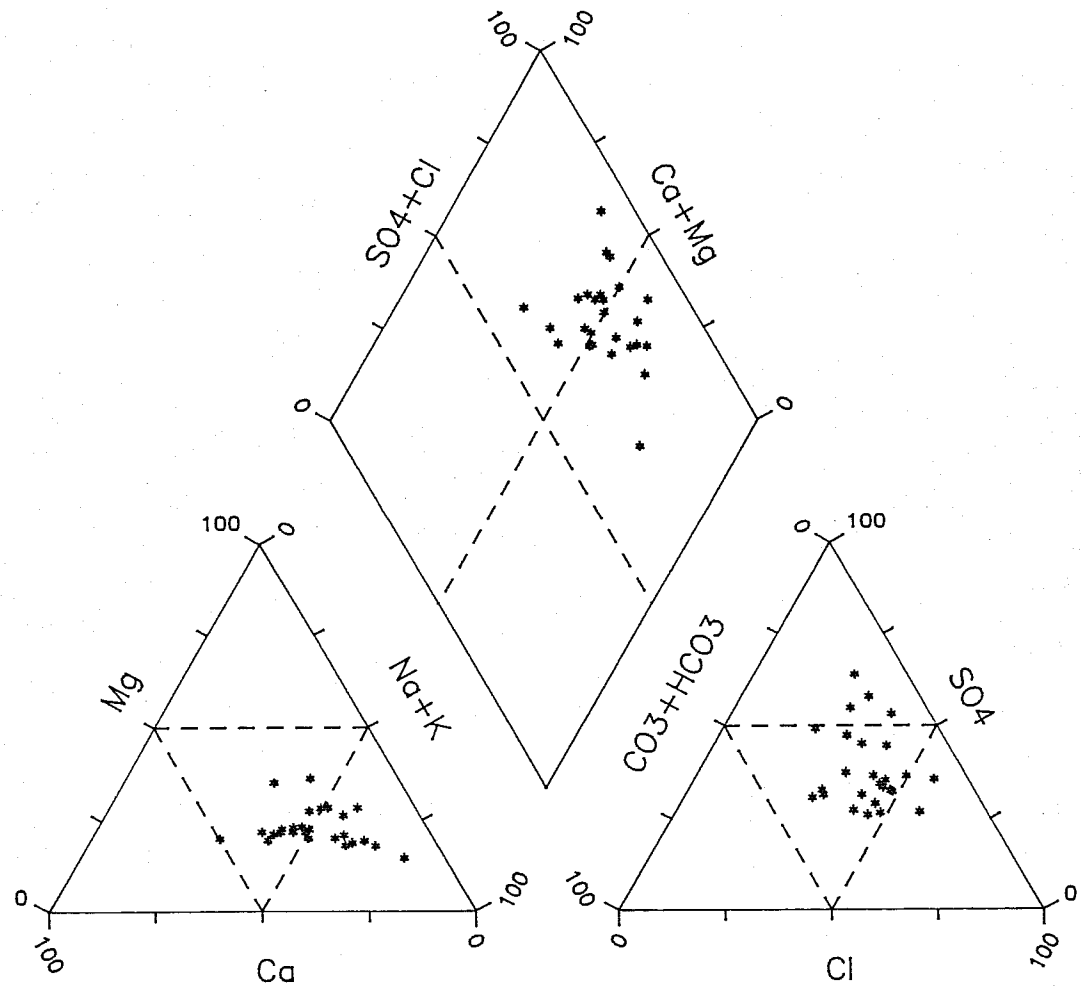



**Figure 2. Chemical Composition of Subsurface Tile Drainage in Zone D.**

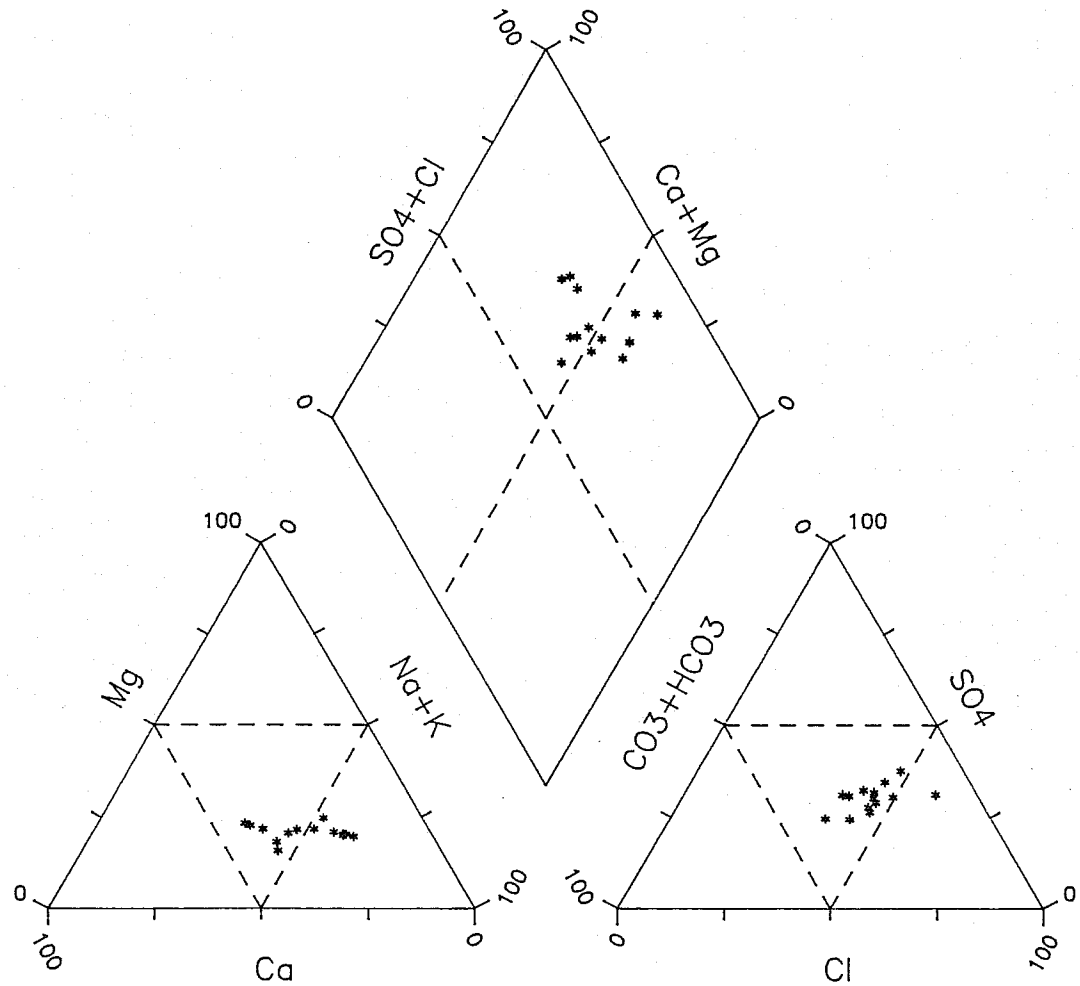



**Figure 3. Chemical Composition of Subsurface Tile Drainage in Zone E.**

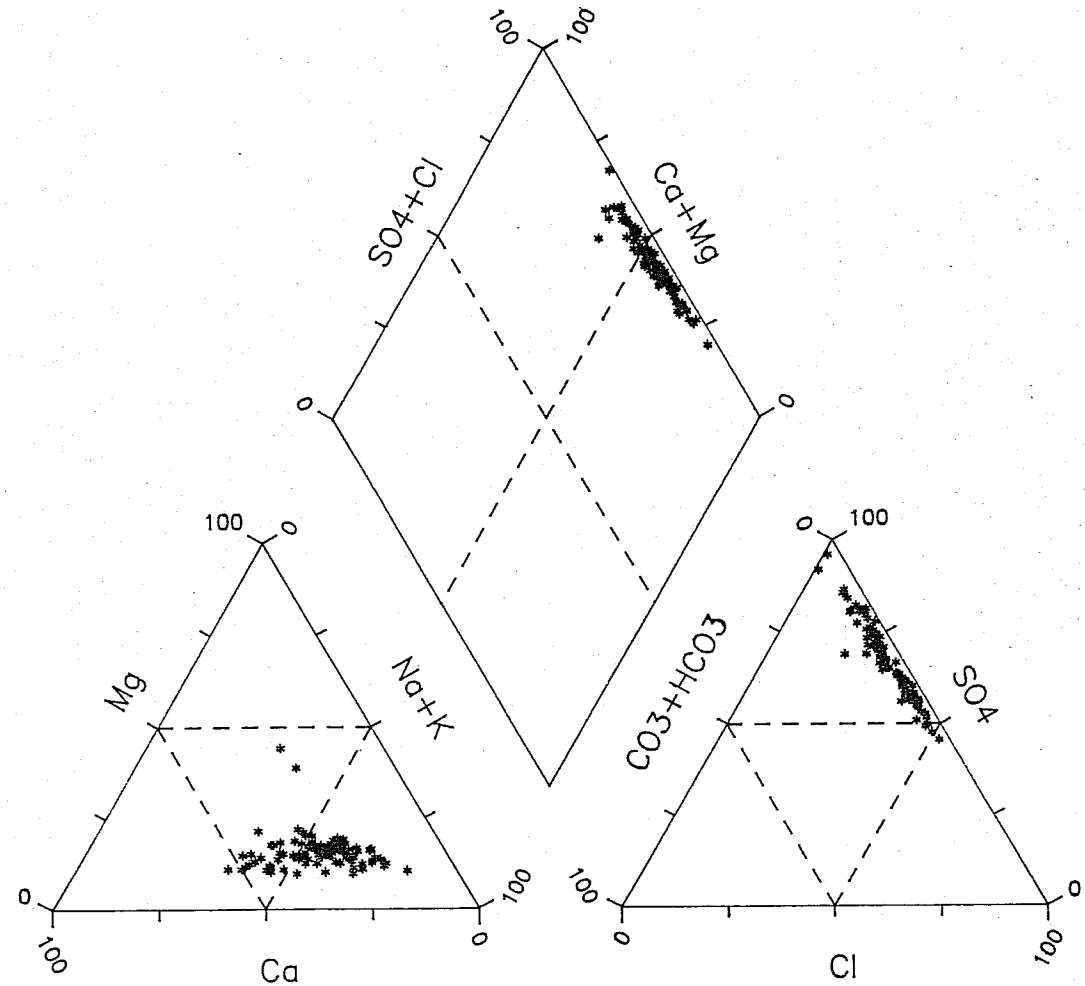



**Figure 4. Chemical Composition of Subsurface Tile Drainage in Zone F.**

Table 3. Summary of Trace Element Concentrations in Subsurface Tile Drainage samples collected in the San Joaquin River Basin, 1986 - 1987.

| | Minimum | Median | Maximum |
|---|---|---|---|
| B (mg/L) | <0.05 | 5.6 | 61 |
| As (ug/L) | <1 | 2 | 63 |
| Cd (ug/L) | <5 | <5 | 57 |
| Cr (ug/L) | <1 | 10 | 268 |
| Cu (ug/L) | <1 | <5 | 180 |
| Pb (ug/L) | <2 | <5 | 42 |
| Mn (ug/L) | <5 | 10 | 4660 |
| Hg (ug/L) | <0.2 | <0.2 | 4 |
| Mo (ug/L) | <5 | 17 | 724 |
| Ni (ug/L) | <1 | <5 | 230 |
| Se (ug/L) | <1 | 47 | 2812 |
| Ag (ug/L) | <5 | <5 | 4 |
| Zn (ug/L) | <1 | 1 | 1280 |

shows that greater than 95 percent of the samples show sulfate or strongly sulfate dominance. A similar characteristic was found by Deverel et al.(1984) for groundwater samples from the alluvial fan zone of the westside of the San Joaquin River, a large majority of which covers the Panoche Fan Area. In addition to this sodium-sulfate type water, the median calcium concentration shown in Table 2 for Zone F indicates that over 50 percent of the subsurface tile drainage water samples are saturated or close to saturation with calcium sulfate (gypsum), a common mineral in soils from the western portion of the San Joaquin River Basin.

b. Trace Elements

Median and ranges of the 13 trace elements that were determined are summarized in Table 3 for all the samples collected in the San Joaquin River Basin and in Table 4 for each of the discharge zones except Zone G. With the exception of silver, all of the trace elements were detected in at least one sample, however only 6 of these trace elements occur broadly at various levels across all the discharge zones. The frequency of occurrence of these six elements; arsenic, boron, chromium, molybdenum, nickel and selenium are summarized, by zone, in Table 5. A discussion of the data for each of the trace elements follows.

Table 4. Trace Element Concentrations in Subsurface Tile Drainage Samples Presented by Discharge Zone, 1986 - 1987.

| | Zone A | | | Zone B | | | Zone C | | |
|---|---|---|---|---|---|---|---|---|---|
| | MIN | MED | MAX | MIN | MED | MAX | MIN | MED | MAX |
| B (mg/L) | 0.6 | 2.9 | 6.8 | <0.05 | 0.1 | 0.5 | 0.5 | 3.0 | 5.9 |
| As (ug/L) | 1.0 | 1.5 | 28 | 1 | 6 | 63 | 1.0 | 3 | 9 |
| Cd (ug/L) | <5 | <5 | <5 | <5 | <5 | <10 | <5 | <5 | <5 |
| Cr (ug/L) | <1 | 4 | 15 | 1 | <5 | 5 | <1 | <5 | 11 |
| Cu (ug/L) | <1 | <5 | 11 | 1 | <5 | 12 | <1 | <5 | 8 |
| Pb (ug/L) | <5 | <5 | <5 | <5 | <5 | <10 | <5 | <5 | 7 |
| Mn (ug/L) | <5 | 9 | 720 | 8 | 294 | 3700 | <5 | 41 | 2520 |
| Hg (ug/L) | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | - | - | - |
| Mo (ug/L) | 1 | <5 | 41 | 1 | 6 | 165 | <5 | 6 | 18 |
| Ni (ug/L) | <5 | <5 | <5 | 1 | <5 | 7 | <5 | <5 | 9 |
| Se (ug/L) | <1 | 1 | 3.5 | <1 | <1 | 1 | <1 | 3 | 6 |
| Ag (ug/L) | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Zn (ug/L) | <1 | <5 | 14 | <1 | <5 | 34 | <1 | <5 | 31 |

| | Zone D | | | Zone E | | | Zone F | | |
|---|---|---|---|---|---|---|---|---|---|
| | MIN | MED | MAX | MIN | MED | MAX | MIN | MED | MAX |
| B (mg/L) | 0.3 | 1.2 | 9.6 | 0.1 | 0.6 | 17 | 0.3 | 7.9 | 61 |
| As (ug/L) | <1 | 1 | 57 | <1 | 4 | 53 | <1 | 1.0 | 10 |
| Cd (ug/L) | <5 | <5 | <10 | <5 | <10 | <10 | <5 | <5 | 57 |
| Cr (ug/L) | <2 | 6 | 268 | <1 | <5 | <10 | <1 | 16 | 160 |
| Cu (ug/L) | <5 | <5 | 180 | <1 | <5 | 14 | <1 | <5 | 52 |
| Pb (ug/L) | <5 | <5 | 42 | <2 | <5 | 21 | <2 | <5 | 14 |
| Mn (ug/L) | <5 | 15 | 4660 | 106 | 695 | 3690 | <5 | 6 | 308 |
| Hg (ug/L) | - | - | - | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | 4 |
| Mo (ug/L) | 1 | <5 | 32 | <5 | 14 | 232 | 1 | 29 | 724 |
| Ni (ug/L) | <5 | <5 | 230 | <5 | <5 | 8 | <5 | <5 | 69 |
| Se (ug/L) | <1 | 2 | 8 | <1 | <1 | 5 | <1 | 120 | 2812 |
| Ag (ug/L) | - | - | - | <5 | <5 | <5 | <5 | <5 | <5 |
| Zn (ug/L) | <5 | 6 | 92 | <1 | <10 | 84 | <1 | <5 | 1280 |

Table 5. Frequency Distribution for Selected Trace Element Concentrations Presented by Discharge Zone.

| | Range | Zone A % | Zone A n= | Zone B % | Zone B n= | Zone C % | Zone C n= | Zone D % | Zone D n= | Zone E % | Zone E n= | Zone F % | Zone F n= | Total % | Total n= |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Selenium | <2 | 67 | 14 | 100 | 13 | 25 | 7 | 32 | 17 | 94 | 45 | 5 | 20 | 22 | 116 |
| (ug/L) | 2-10 | 33 | 7 | | 0 | 75 | 21 | 68 | 36 | 6 | 3 | 7 | 24 | 18 | 91 |
| | 11-100 | | 0 | | 0 | | 0 | | 0 | | 0 | 35 | 126 | 24 | 126 |
| | 101-500 | | 0 | | 0 | | 0 | | 0 | | 0 | 47 | 167 | 32 | 167 |
| | >500 | | 0 | | 0 | | 0 | | 0 | | 0 | 6 | 22 | 4 | 22 |
| | total | | 21 | | 13 | | 28 | | 53 | | 48 | | 359 | | 522 |
| Molybdenum | <5 | 81 | 17 | 50 | 7 | 43 | 12 | 78 | 28 | 10 | 5 | 15 | 56 | 25 | 125 |
| (ug/L) | 5-25 | 14 | 3 | 36 | 5 | 57 | 16 | 17 | 6 | 73 | 35 | 33 | 120 | 36 | 185 |
| | 26-100 | 5 | 1 | | 0 | | 0 | 5 | 2 | 4 | 2 | 41 | 149 | 30 | 154 |
| | 101-500 | | 0 | 14 | 2 | | 0 | | 0 | 13 | 6 | 10 | 37 | 9 | 45 |
| | >500 | | 0 | | 0 | | 0 | | 0 | | 0 | 1 | 1 | <1 | 1 |
| | total | | 21 | | 14 | | 28 | | 36 | | 48 | | 363 | | 510 |
| Boron | <1 | 5 | 1 | 100 | 15 | 4 | 1 | 33 | 18 | 71 | 34 | 4 | 14 | 16 | 83 |
| (mg/L) | 1-5 | 90 | 20 | | 0 | 78 | 22 | 65 | 36 | 23 | 11 | 22 | 76 | 32 | 165 |
| | 6-10 | 5 | 1 | | 0 | 18 | 5 | 2 | 1 | | 0 | 44 | 155 | 31 | 162 |
| | 11-25 | | 0 | | 0 | | 0 | | 0 | 6 | 3 | 27 | 92 | 18 | 95 |
| | >25 | | 0 | | 0 | | 0 | | 0 | | 0 | 4 | 14 | 3 | 14 |
| | total | | 22 | | 15 | | 28 | | 55 | | 48 | | 351 | | 519 |
| Arsenic | <5 | 75 | 9 | 51 | 4 | 71 | 10 | 89 | 35 | 55 | 17 | 95 | 161 | 86 | 236 |
| (ug/L) | 5-10 | 17 | 2 | 25 | 2 | 29 | 4 | 5 | 2 | 35 | 11 | 4 | 7 | 11 | 28 |
| | 11-25 | | 0 | 12 | 1 | | 0 | 3 | 1 | 7 | 2 | 1 | 2 | 2 | 6 |
| | 26-100 | 8 | 1 | 12 | 1 | | 0 | 3 | 1 | 3 | 1 | | 0 | 1 | 4 |
| | >100 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 |
| | total | | 12 | | 8 | | 14 | | 39 | | 31 | | 170 | | 274 |
| Chromium | <5 | 57 | 12 | 93 | 14 | 75 | 21 | 31 | 12 | 71 | 34 | 15 | 55 | 29 | 148 |
| (ug/L) | 5-10 | 38 | 8 | 7 | 1 | 21 | 6 | 33 | 13 | 27 | 13 | 19 | 69 | 21 | 110 |
| | 11-25 | 5 | 1 | | 0 | 4 | 1 | 23 | 9 | 2 | 1 | 35 | 126 | 27 | 138 |
| | 26-100 | | 0 | | 0 | | 0 | 10 | 4 | | 0 | 30 | 108 | 22 | 112 |
| | >100 | | 0 | | 0 | | 0 | 3 | 1 | | 0 | 1 | 5 | 1 | 6 |
| | total | | 21 | | 15 | | 28 | | 39 | | 48 | | 363 | | 514 |
| Nickel | <5 | 100 | 22 | 93 | 14 | 83 | 24 | 81 | 33 | 79 | 38 | 58 | 181 | 67 | 312 |
| (ug/L) | 5-10 | | 0 | 7 | 1 | 17 | 5 | 10 | 4 | 17 | 8 | 26 | 80 | 21 | 98 |
| | 11-25 | | 0 | | 0 | | 0 | 3 | 1 | 4 | 2 | 11 | 34 | 8 | 37 |
| | 26-100 | | 0 | | 0 | | 0 | 3 | 1 | | 0 | 4 | 13 | 3 | 14 |
| | >100 | | 0 | | 0 | | 0 | 3 | 1 | | 0 | 1 | 1 | 1 | 2 |
| | total | | 22 | | 15 | | 29 | | 40 | | 48 | | 309 | | 463 |
| Total | <1000 | 23 | 3 | 75 | 6 | | 0 | 17 | 5 | 66 | 10 | 9 | 15 | 16 | 39 |
| Dissolved | 1000-2500 | 77 | 10 | 25 | 2 | 87 | 13 | 69 | 20 | 27 | 4 | 16 | 27 | 30 | 76 |
| Solids | 2501-5000 | | 0 | | 0 | 13 | 2 | 14 | 4 | | 0 | 32 | 55 | 24 | 61 |
| (mg/L) | 5001-10,000 | | 0 | | 0 | | 0 | | 0 | 7 | 1 | 40 | 70 | 28 | 71 |
| | >10,000 | | 0 | | 0 | | 0 | | 0 | | 0 | 3 | 6 | 2 | 6 |
| | total | | 13 | | 8 | | 15 | | 29 | | 15 | | 173 | | 253 |

% Percentage of samples in range.

n= Number of samples in range.

Arsenic: Arsenic was detected at elevated levels in several samples throughout the various zones ranging as high a 63 ug/L. However the median values are relatively low with the lowest median values being found in discharge zones on the western side of the San Joaquin River (Zones A, C, D, and F). Slightly higher median arsenic concentrations were found in subsurface tile drainage water samples from the basin trough (Zone E) and the eastern portion (Zone B) of the River Basin. All the discharge zones showed arsenic concentrations in greater than 70 percent of the samples collected to be less than 5 ug/L except for discharge Zone B and E where over 50 percent of the samples showed concentrations in excess of 5 ug/L. Figure 5 shows frequency distributions for representative discharge zones. Zone E is similar to Zone B while Zone C and D would be similar to Zone A. Zones F stands alone. This reflects findings in drainage systems in the Tulare Lake Basin where high arsenic levels are associated with geologic formations in the Sierra Nevada (DWR, 1985).

Boron: High boron was detected in all subsurface drainage water samples collected from the west side of the San Joaquin River except those samples taken in discharge Zone E (basin trough). Boron showed strong median concentrations (greater than 2.5 ug/L) in discharges from Contra Costa County (Zone A), San Joaquin County (Zone C) and the Panoche Fan (Zone F). The highest concentrations were detected in discharge samples from the Panoche Fan (Zone F). Figure 6 shows the frequency of detection of boron in samples from three representative discharge zones from the westside of the San Joaquin Valley. Boron concentrations in samples from discharges from the eastside discharges (Zone B) showed very low boron levels with a median value of 0.1 mg/L, far below the 0.7 mg/L level considered important for sensitive agricultural crops (Ayers and Westcot, 1985). The median value for the basin trough (Zone E) discharge samples was 0.5 mg/L, also below the agricultural use criterion. Greater than 80 percent of all the samples collected from these two latter discharge zones had boron concentrations less than 1.0 mg/L.

Cadmium: In only one zone (Zone F) did cadmium concentrations exceed the detection level. All median values were below the detection level. The detection levels (5 ug/L and 10 ug/L) however were higher than normally used because of salt matrix interferences. The detection levels were too high to evaluate the discharges in relation to water quality criteria. Further monitoring, using a lower detection level, is needed to quantify the levels present. In addition further confirmation sampling should be done at all the sites where values were detected in excess of the detection level, especially those showing greater than 10 ug/L total recoverable cadmium in the discharge.

Chromium: Chromium concentrations ranged from 1 to 268 ug/L for samples collected from all discharge zones. Median concentrations varied however depending upon discharge zone, with the highest median value being from the Panoche Fan Area (Zone F). In the Panoche Fan discharge zone, 85 percent of the samples contained detectable concentrations of chromium, the highest of any of the discharge zones. Frequency diagrams for the occurrence of chromium in samples from

Figure 5. Frequency Distribution for Arsenic in Subsurface Tile Drainage Waters.

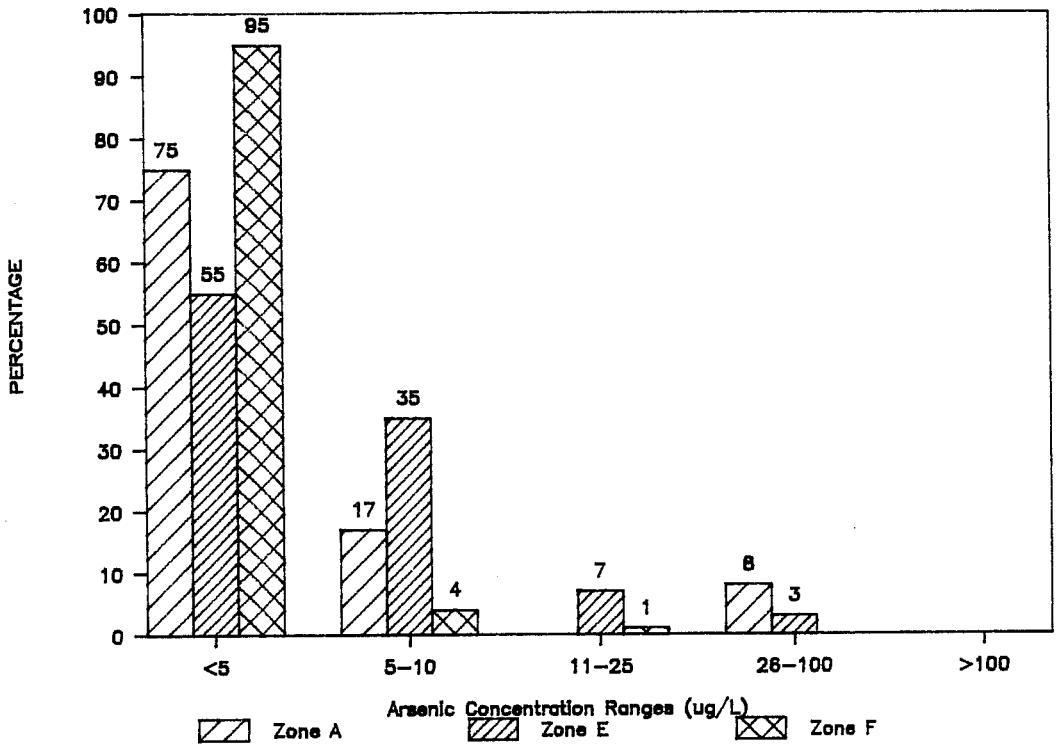
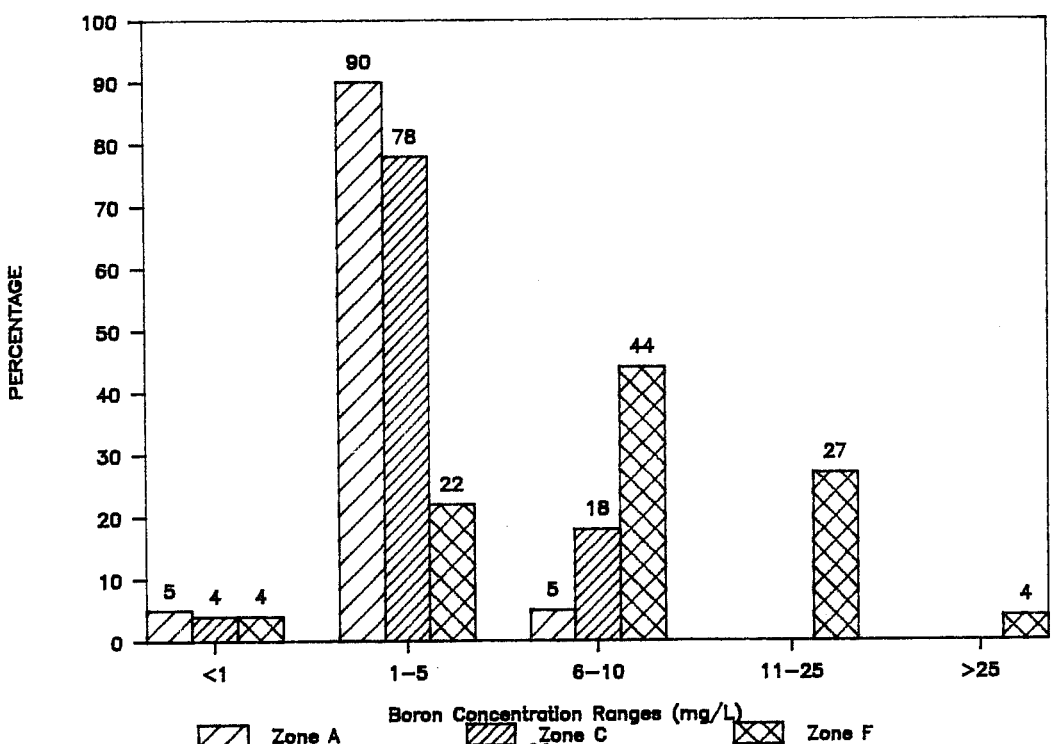



Figure 6. Frequency Distribution for Boron in Subsurface Tile Drainage Waters.



discharge Zones C, D, and F are shown in Figure 7. All three discharge zones show a higher frequency of detection at levels elevated above the detection limit. Over 65 percent of the samples showed detectable chromium above 10 ug/L in Zone F while in Zone D only 36 percent showed this level. Zone C showed only 25 percent of the samples collected with concentrations above the detection level with only 4 percent showing concentrations greater than 10 ug/L. For chromium, discharge Zone C was similar to discharge Zones A, B, and E. Total recoverable chromium concentrations reported here include both the hexavalent and trivalent forms of chromium in unknown proportions, therefore it is difficult to relate to existing water quality criteria which are specific to hexavalent or trivalent forms of this trace element. A follow up monitoring should include a determination of both forms of chromium, especially for discharges from the Panoche Fan Area (Zone F).

Copper: Copper was above detection in one or more samples from all of the discharge zones. The median concentration however was always less than the detection limit except in the Panoche Fan Area (Zone F) where it only slightly exceeded detection at 6 ug/L as the median value. Similar results were obtained during the study of Deverel et al.(1984) for a similar area and actual median concentrations in shallow groundwater were in the 2 - 3 ug/L range.

Lead: Lead was found above detection in 5 of the 7 discharge zones. The median concentrations for all zones were below the detection limit. Further investigation is needed to establish the reasons for the elevated levels found in some samples.

Manganese: Manganese was detected at widely varying concentrations throughout the river basin. The highest median concentrations were associated with sites on the eastside of the San Joaquin River (Zone B) and in the basin trough (Zone E). The lowest median concentration was found in the Panoche Fan Area (Zone F) with a median value of 6 ug/L, only slightly above the 5 ug/L detection level. Because of the widely scattered nature of the concentrations and sites showing elevated levels, no conclusions can be drawn.

Mercury: Mercury was checked on samples from only 5 of the 7 discharge zones. In all discharge zones sampled, except Zone F, mercury concentrations were below the detection limit of 0.2 ug/L in all samples. In Zone F, 14 sites showed slightly elevated mercury levels with positive values ranging from 0.5 ug/L to 4.0 ug/L. Further sampling will be needed to confirm the existence of mercury at these sites as most concentrations were near the analytical detection levels and the sites, except for one group of six sites, were widely scattered with no continuous trend showing detectable mercury concentrations.

Molybdenum: Molybdenum appears to be associated with discharges from throughout the river basin. Highest recorded and median values are associated with discharges occurring in the eastside area(Zone B), basin trough area(Zone E) and the Panoche Fan Area (Zone F). Median values for these zones respectively, are 6, 14, and 26 ug/L. Figure 8

Figure 7. Frequency Distribution for Chromium in Subsurface Tile Drainage Waters.

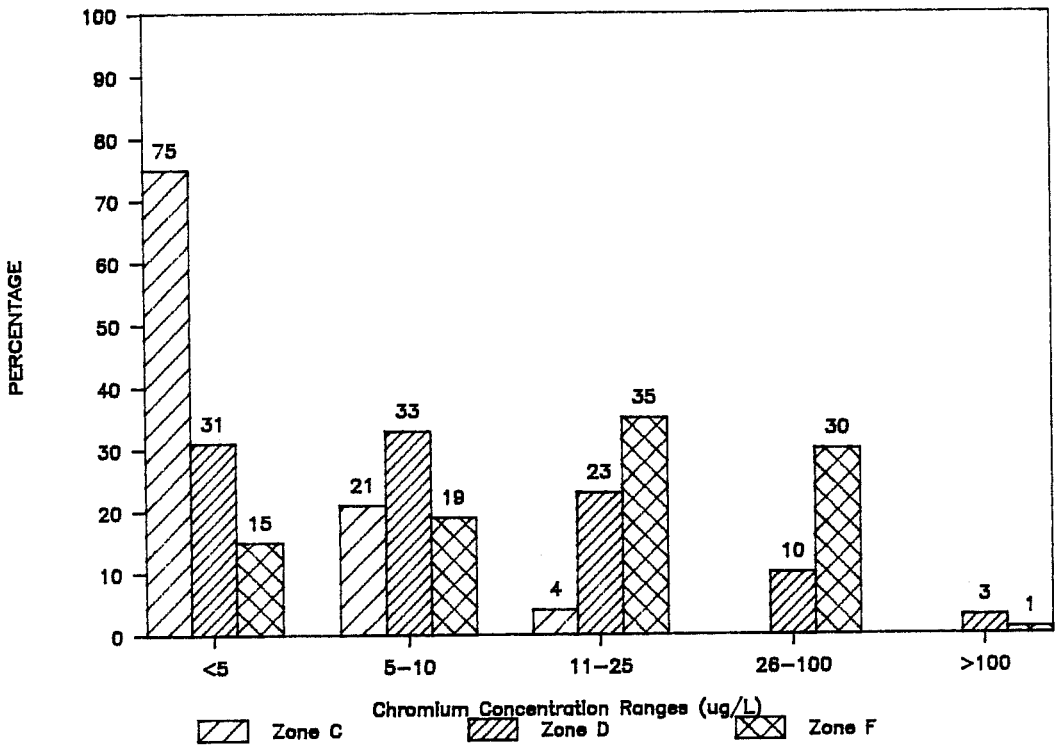
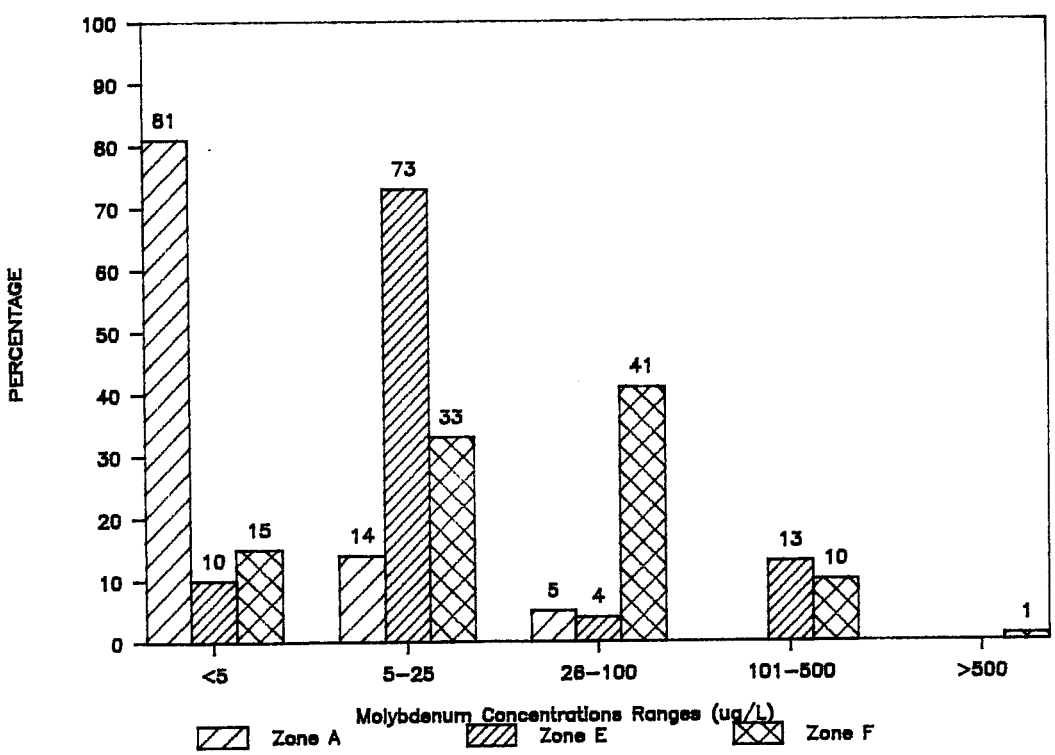



Figure 8. Frequency Distribution for Molybdenum in Subsurface Tile Drainage Waters.



shows the frequency distribution for 3 discharge zones which indicates the widely scattered nature of the samples collected from the various discharge zones although similarities do occur. For example discharge Zone D shows a similar pattern to Zone A while discharge Zones C and D show frequency distributions intermediate between Zones A and F. Zone F is the only zone that shows greater than 50 percent of the samples collected with molybdenum concentrations greater than 25 ug/L. Because of the large number of samples that exceed 5 ug/L, especially in the Panoche Fan and Basin Trough discharge zones, continued monitoring of the San Joaquin River and its tributaries is needed to ensure compliance with the existing 10 ug/L water quality criterion suggested for irrigated agricultural water use; a major water use in the basin. Data for Zone G shows that a number of the open waterways in the Grassland Area do exceed the 10 ug/L molybdenum criterion although the median concentration is 6 ug/L.

Nickel: Nickel was detected in at least one sample from each discharge zone except from the Contra Costa County Area (Zone A). The median concentration in all zones however was less than the 5 ug/L detection level. The distribution of sample concentrations for all discharge zones except Zone F (Panoche Fan Area) showed greater than 80 percent of all samples below the 5 ug/L detection level. Figure 9 shows the nickel concentrations of Zone F in relation to Zone B(east of the San Joaquin River) and Zone D (west of the San Joaquin River). For Zone F, the Panoche Fan, over 80 percent of the sample concentrations were less than 10 ug/L.

Selenium: Selenium was detected above the 1 ug/L detection level in at least one sample from each discharge zone. Higher concentrations (greater than 10 ug/L) and the highest levels recorded (greater than 500 ug/L) were from samples taken from the Panoche Fan Area (Zone F). The three zones depicted in Figure 10 are characteristic of the discharge zones. For example, discharge Zone D shows a similar pattern to Zone C while discharge Zone E on the figure has a similar pattern to discharge Zones A and B. From the data collected during this survey, the majority of the selenium being discharged in the San Joaquin River Basin from subsurface tile drains is from the Panoche Fan Area. The other discharge zones, although of lower concentration, do have sites that could cause localized water quality problems or if the volume of discharge is large, could cause excessive loading of selenium into certain aquatic resources. It is recommended that, in addition to continued selenium testing in the Panoche Fan Area, further selenium testing be done in selected higher concentration areas outside the Panoche Fan Area (Zone F) to ensure that seasonal or other temporal changes will not drive up the selenium levels. This program was only conducted as a one-time grab sample and was not meant to assess changes with time. For example, the largest direct discharge to the San Joaquin River downstream of the Grassland Area (New Jerusalem Drainage District) averaged 5 ug/L of total recoverable selenium over an 18 month period while individual grab samples showed concentrations from less than 1 ug/L to 10 ug/L during this same period(USBR, 1987).

Figure 9. Frequency Distribution for Nickel in Subsurface Tile Drainage Waters.

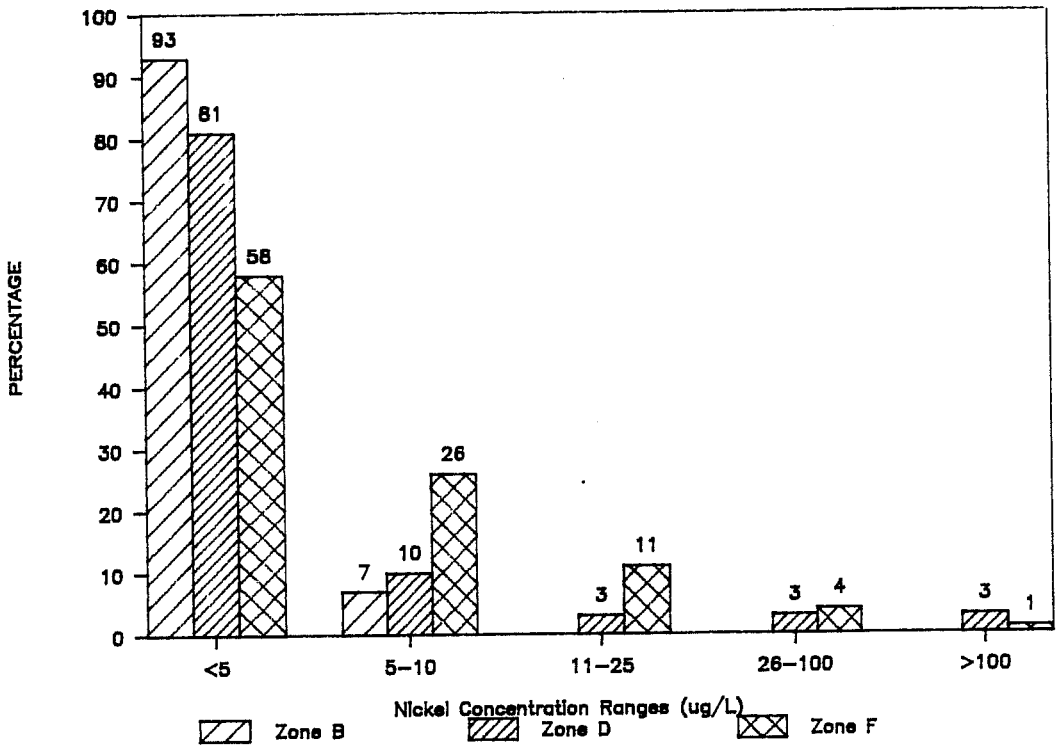
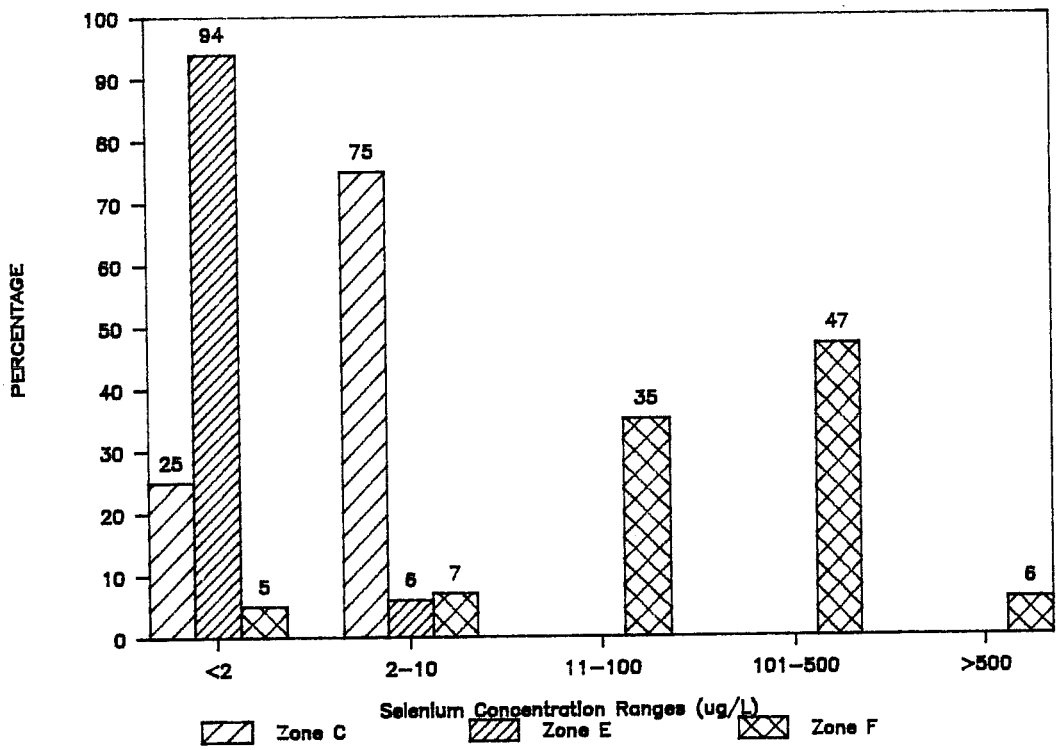



Figure 10. Frequency Distribution for Selenium in Subsurface Tile Drainage Waters.



Silver: Silver was not detected above the 5 ug/L detection limit in any of the samples tested. Further testing of shallow groundwater in the Panoche Fan Area (Zone F) by the U. S. Bureau of Reclamation showed no samples above the 1 ug/L detection level used in that study (Deverel et al., 1984).

Zinc: Zinc was detected above the 1 ug/L detection level in at least one sample in each of the discharge zones. The distribution of higher values was not related to any particular discharge zone and almost all zones had median values at or only slightly above the detection limit. The highest median value was 7 ug/L from the basin trough area (Zone E). As zinc coatings are often used on parts of piping and pumps, the widely scattered higher values may be related to contamination from these sources rather than actual concentrations in the shallow groundwater being discharged. Extensive efforts would be needed to avoid these potential sources of contamination, therefore it is recommended that in-stream monitoring be conducted for zinc in lieu of continued source monitoring, and only if the established criterion is being approached or exceeded should further source monitoring be conducted at the subsurface tile drainage discharges.

## REFERENCES


Ayers, R. S. and Westcot, D. W., 1985. Water quality for agriculture. Food and Agricultural Organization of the United Nations, Irrigation and Drainage Paper #29, Rev. 1. 174pp

Deverel, S. J., Gilliom, R. J., Fujii, R., Izbicki, J. A., and Fields, J. C., 1984. Areal distribution of selenium and other inorganic constituents in shallow ground water of the San Luis Drain Service Area, San Joaquin Valley, California; a preliminary report. U. S. Geological Survey Water Resources Investigation Report 84-4319. 67pp.

DWR, 1985. San Joaquin Valley Drainage Monitoring Program Annual Report. California Department of Water Resources. 56pp.

SWRCB, 1987. Technical committee report to the California State Water Resources Control Board on regulation of agricultural drainage to the San Joaquin River. California State Water Resources Control Board, Sacramento, California. 300pp.

USBR, 1987. United States Bureau of Reclamation Water Quality Analyses Report for the West Side of the San Joaquin Valley. 117pp

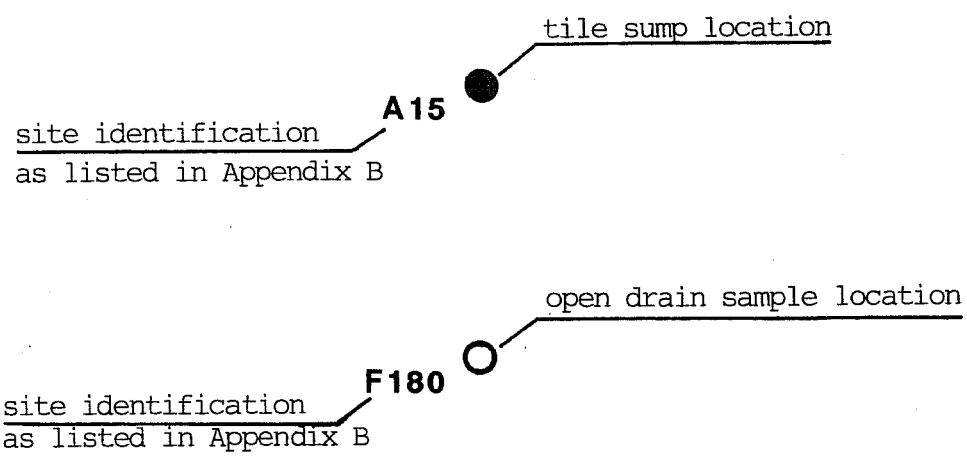
# APPENDIX A

## Sampling Location Within the San Joaquin River Basin

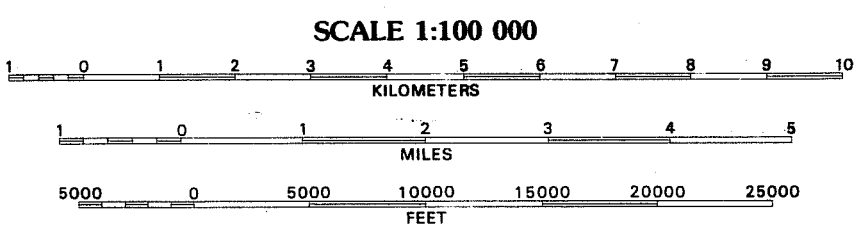
KEY TO SUBSURFACE TILE DRAINAGE

SITE LOCATION MAPS

Figure A-1 relates the discharge zone maps to the San Joaquin River Basin. All maps are oriented north to south when reading top to bottom. The following key applies to all sites indicated on the discharge zone maps.




The following scale is appropriate for all discharge zone maps.




**CONTOUR INTERVAL 50 METERS**

WITH SUPPLEMENTARY CONTOURS AT 10-METER INTERVALS

NATIONAL GEODETIC VERTICAL DATUM OF 1929

**To convert meters to feet multiply by 3.2808**

**To convert feet to meters multiply by 0.3048**

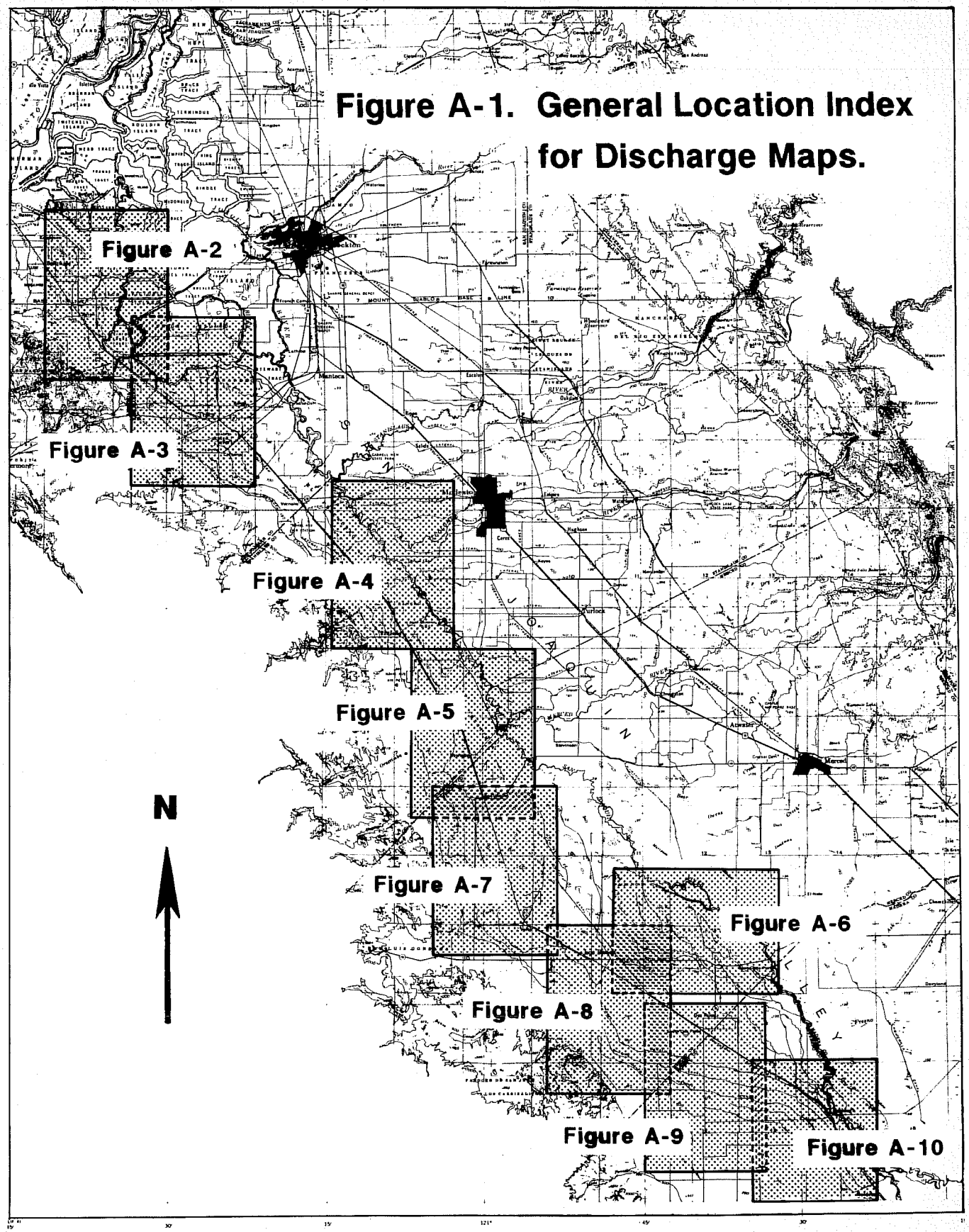



Figure A-1. General Location Index for Discharge Maps.

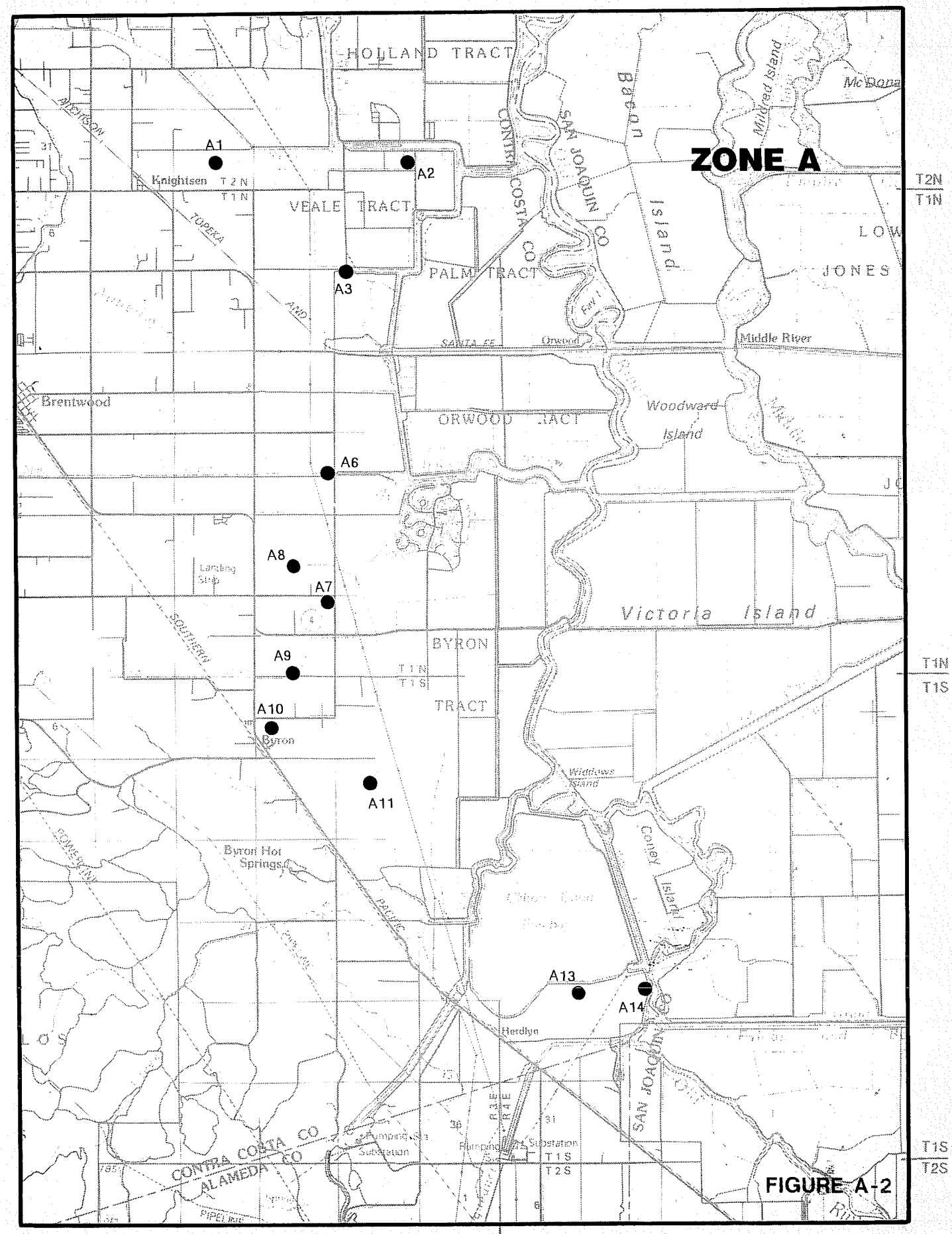

ZONE A
HOLLAND TRACT
VEALE TRACT
PALM TRACT
ORWOOD TRACT
BYRON TRACT
Victoria Island
Woodward Island
Bacon Island
Mildred Island
Middle River
Orwood
Knightsen
Brentwood
Byron
Byron Hot Springs
Herdlyn
Coney Island
Widdows Island
Landing Strip
CONTRA COSTA CO
SAN JOAQUIN CO
ALAMEDA CO
T2N
T1N
T1S
T2S
R3E
R4E
A1
A2
A3
A6
A7
A8
A9
A10
A11
A13
A14

FIGURE A-2

ZONE B: EAST OF THE SAN JOAQUIN RIVER

| SITE ID | LOCATION | TOWNSHIP-RANGE-SECTION |
|---|---|---|
| B1 | Near Sand Slu & Turner Is. Rds | T8S-R11E-S34 |
| B2 | Nr Hayden Rd & Le Grande Canal | T7S-R15E-S23 |
| B3 | Near Lander Ave and 4th Ave | T7S-R10E-S14 |
| B4 | Near Geer Rd and Lateral No. 7 | T6S-R10E-S20 |
| B5 | Near August and Washington Rds | T6S-R10E-S18 |
| B6 | Alhem Ranch No. 4 | T6S-R9E-S21 |
| B7 | Alhem Ranch No. 3 | T6S-R9E-S21 |
| B8 | Columbus Ave & Lateral No. 8 | T6S-R10E-S33 |
| B9 | At August and Faith Home Rds. | T6S-R10E-S18 |

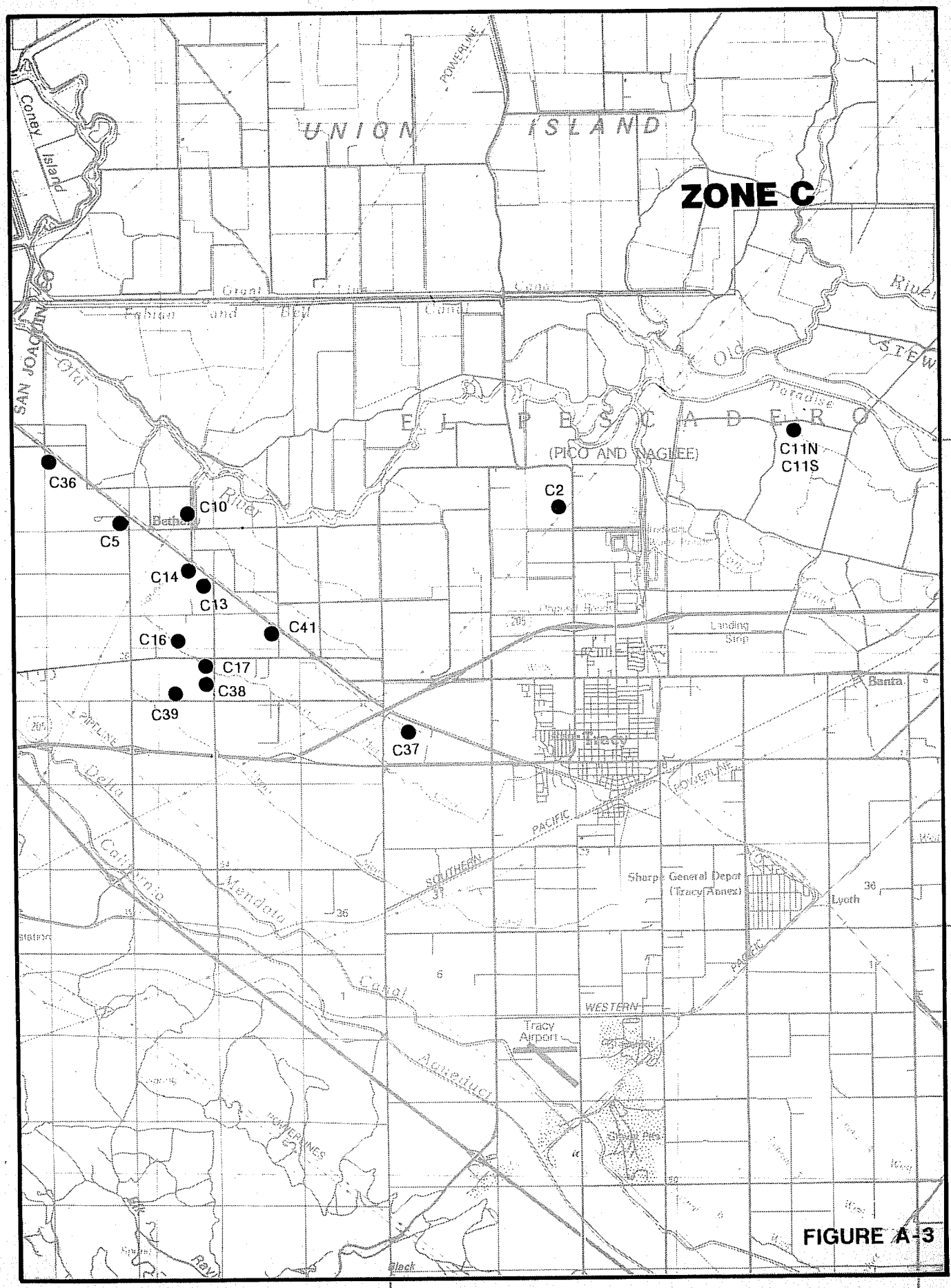

ZONE C
UNION ISLAND
Coney Island
SAN JOAQUIN CO
EL PESCADERO
(PICO AND NAGLEE)
Old River
Paradise
Bethany
Tracy
Banta
Lyoth
Sharpe General Depot (Tracy Annex)
Tracy Airport
Delta Mendota Canal
California Aqueduct
SOUTHERN PACIFIC
WESTERN PACIFIC
POWERLINE
PIPELINE
Landing Strip
C36
C10
C5
C14
C13
C41
C16
C17
C38
C39
C37
C2
C11N
C11S
T1S
T2S
T3S
R4E
R5E
R6E

FIGURE A-3

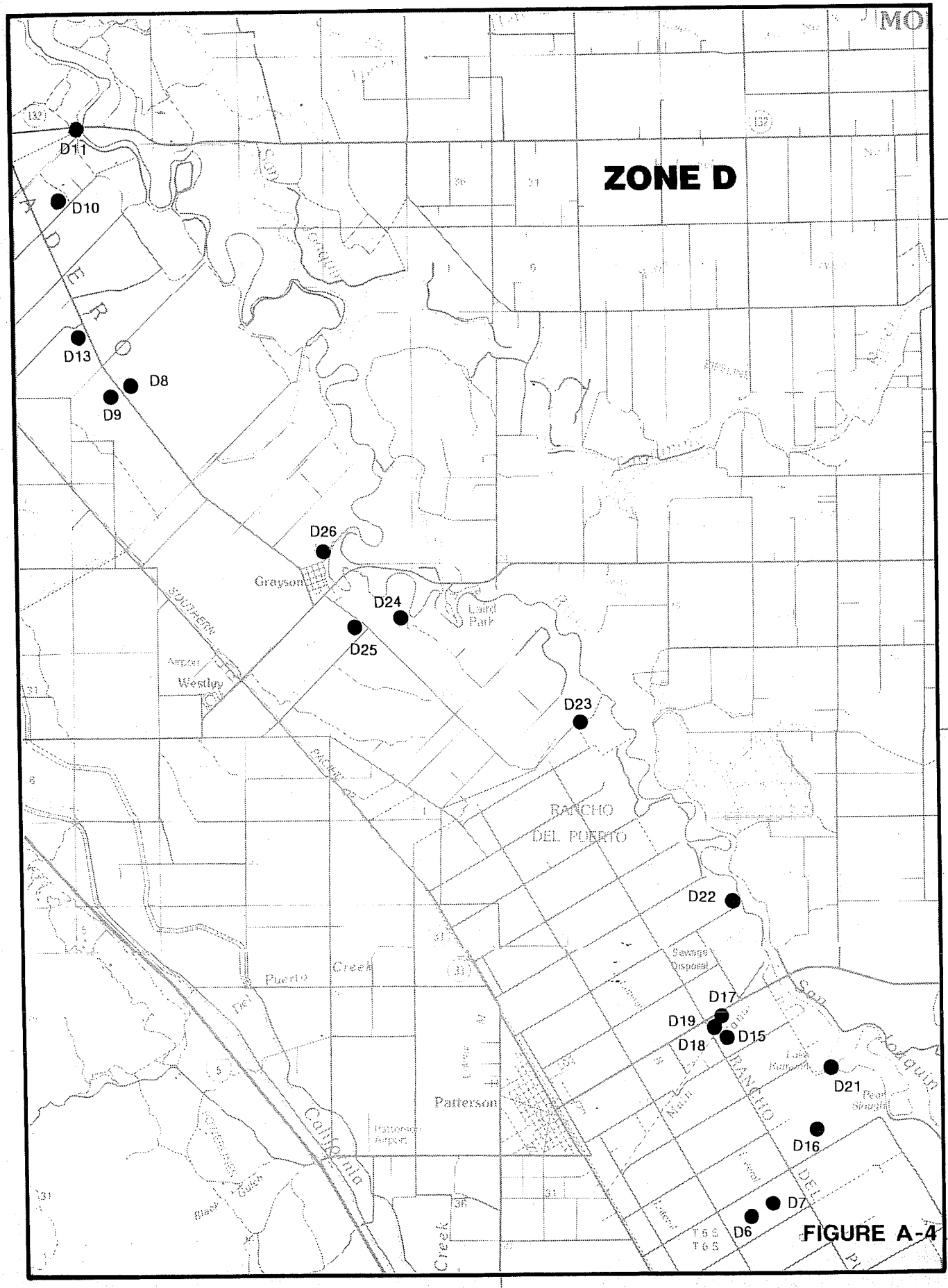

ZONE D
D11
D10
D13
D8
D9
D26
D24
D25
D23
D22
D17
D19
D18
D15
D21
D16
D7
D6
Grayson
Westley
Laird Park
RANCHO DEL PUERTO
Sewage Disposal
Puerto Creek
Patterson
Patterson Airport
California
Creek
San Joaquin
T3S
T4S
T5S
T6S
R7E
R8E

FIGURE A-4

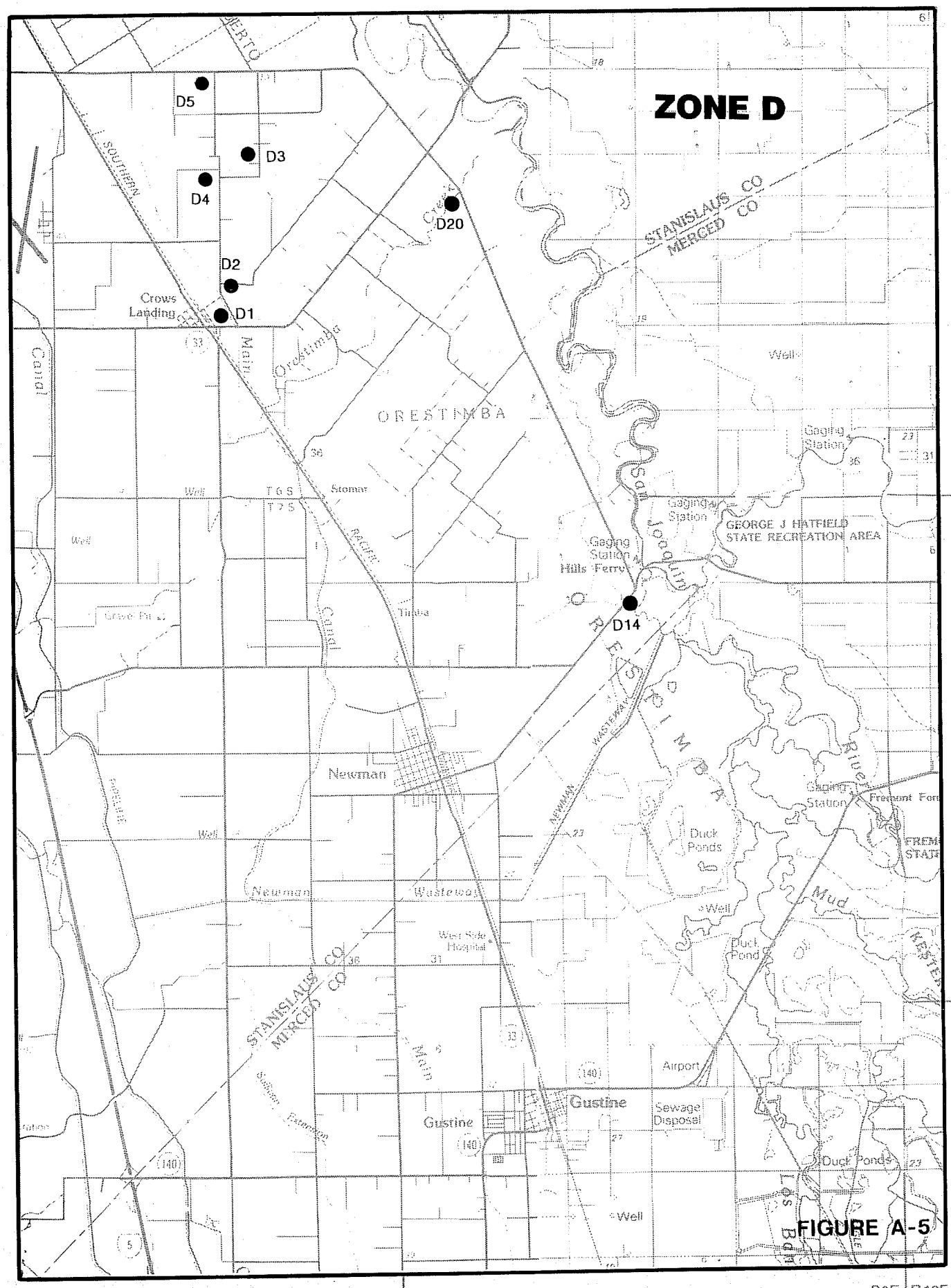

ZONE D
D5
D3
D4
D20
D2
D1
D14
Crows Landing
ORESTIMBA
Newman
Gustine
Hills Ferry
GEORGE J HATFIELD STATE RECREATION AREA
Duck Ponds
Airport
Sewage Disposal
West Side Hospital
Stomar
Gaging Station
Well
STANISLAUS CO
MERCED CO
T6S
T7S
T8S
R8E
R9E
R10E

FIGURE A-5

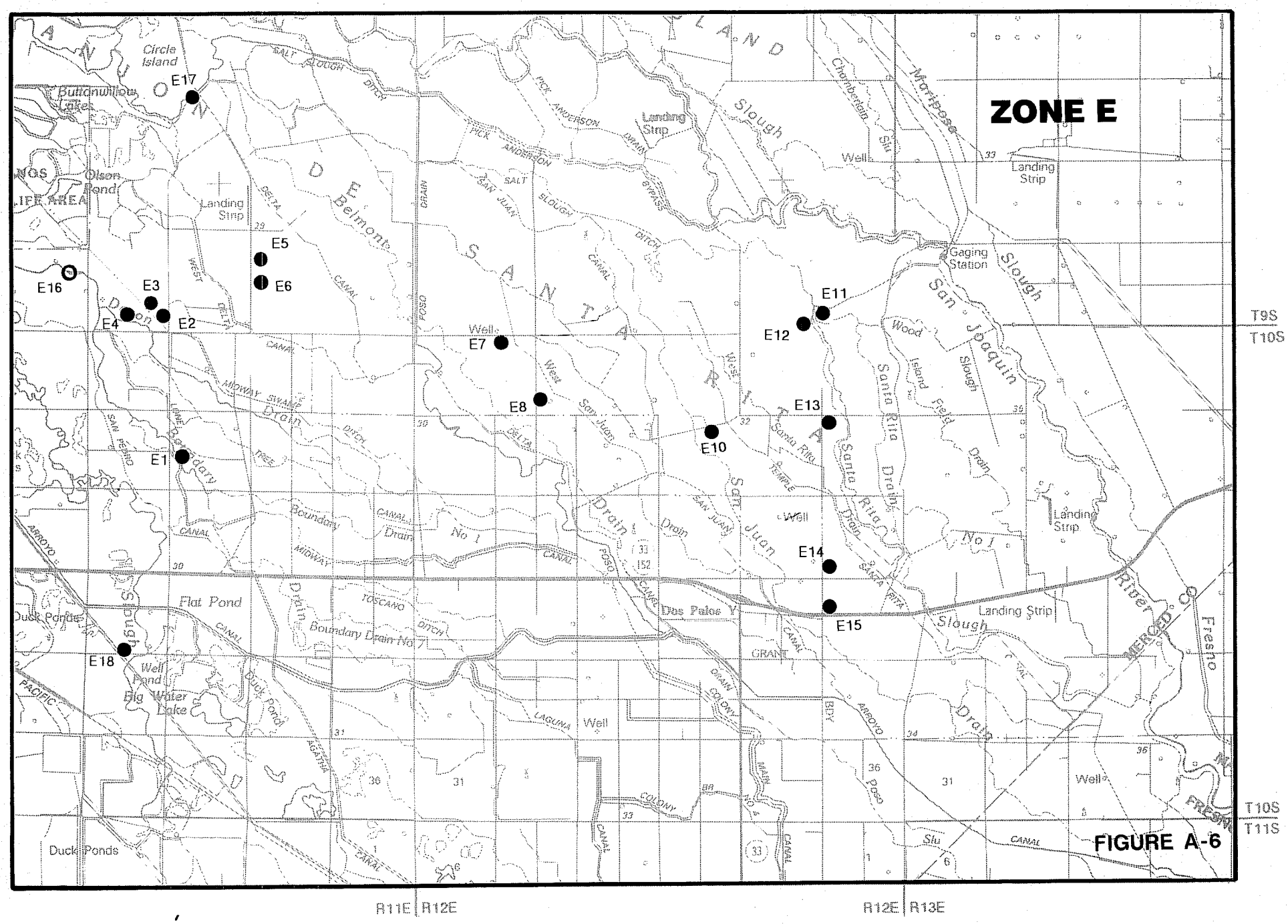

ZONE E
E1
E2
E3
E4
E5
E6
E7
E8
E10
E11
E12
E13
E14
E15
E16
E17
E18
Circle Island
Buttonwillow Lakes
Olson Pond
Landing Strip
Belmont
Gaging Station
San Joaquin
Santa Rita
Wood Island Field Drain
Boundary Drain No 1
Boundary Drain No 7
Flat Pond
Duck Ponds
Well Pond
Big Water Lake
Dos Palos Y
Fresno
MERCED CO
T9S
T10S
T11S
R11E
R12E
R13E

FIGURE A-6

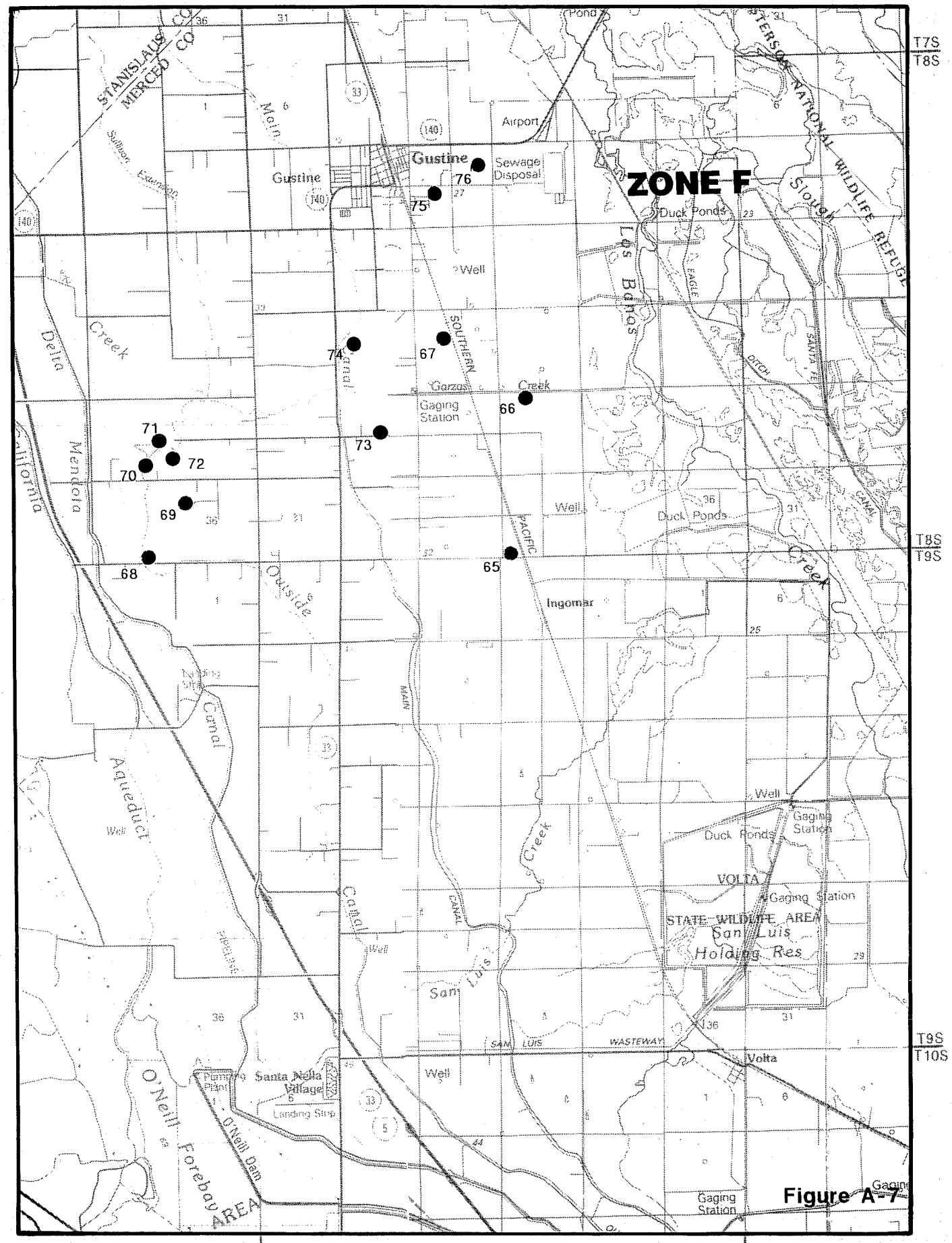

ZONE F
STANISLAUS CO
MERCED CO
Gustine
Sewage Disposal
Airport
Duck Ponds
Los Banos
Slough
Well
Garzas Creek
Gaging Station
Delta Creek
Mendota
California
Outside Canal
Ingomar
Aqueduct
Canal
Creek
VOLTA
STATE WILDLIFE AREA
San Luis Holding Res
San Luis
SAN LUIS WASTEWAY
Volta
Santa Nella Village
Landing Strip
O'Neill Forebay AREA
O'Neill Dam
Pumping Plant
Gaging Station
T7S
T8S
T9S
T10S
R8E
R9E
R10E
65
66
67
68
69
70
71
72
73
74
75
76

Figure A-7

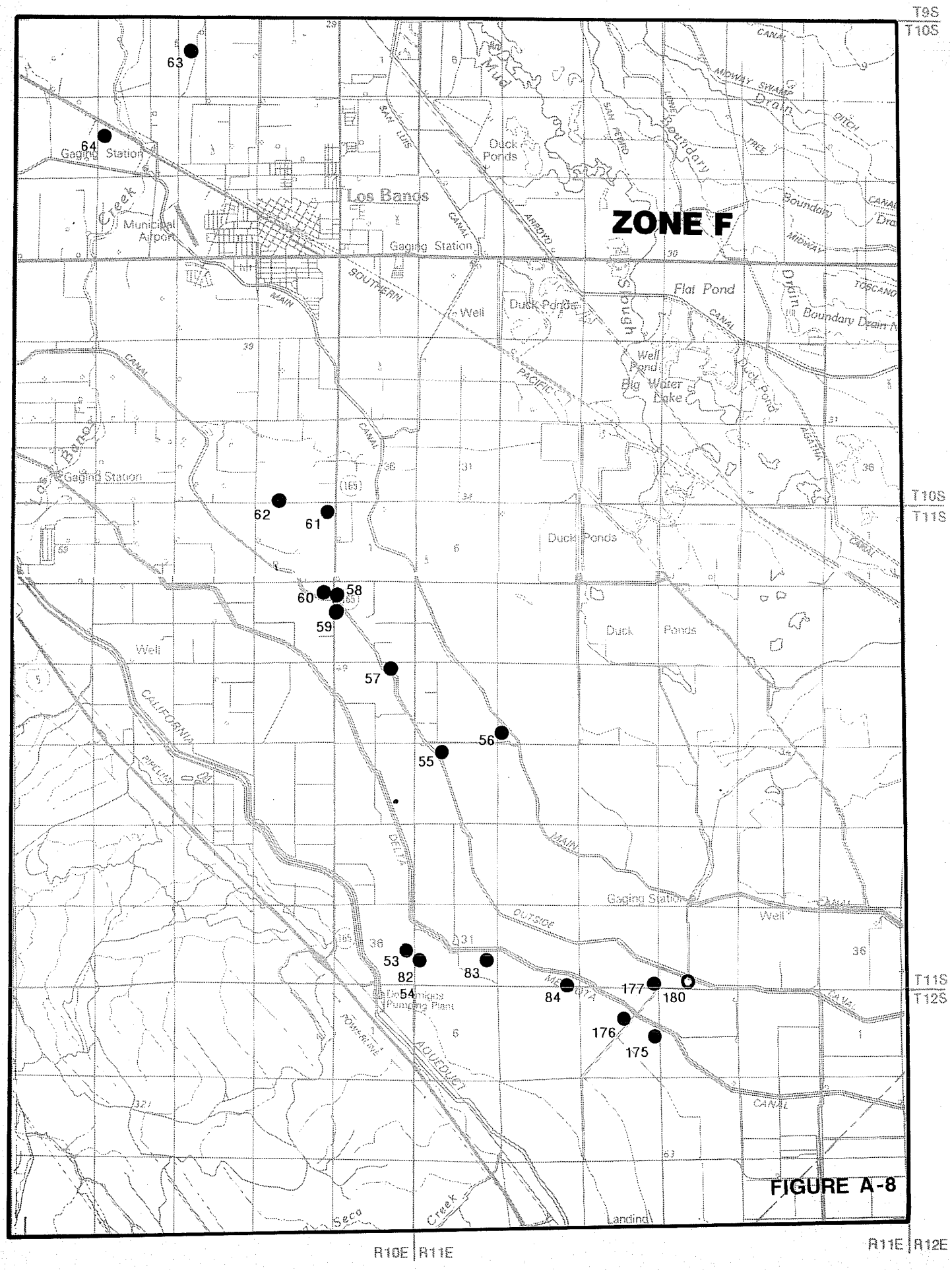

ZONE F
T9S
T10S
T11S
T12S
R10E
R11E
R12E
Los Banos
Gaging Station
Municipal Airport
Duck Ponds
Flat Pond
Well
Well Pond
Big Water Lake
Mud Slough
Boundary Drain
Boundary Drain N
Los Banos Creek
Seco Creek
Landing
Dos Amigos Pumping Plant
CALIFORNIA
AQUEDUCT
MAIN
OUTSIDE
DELTA
MENDOTA
SOUTHERN
PACIFIC
CANAL
MIDWAY SWAMP
63
64
62
61
60
58
59
57
56
55
53
82
54
83
84
177
180
176
175

FIGURE A-8

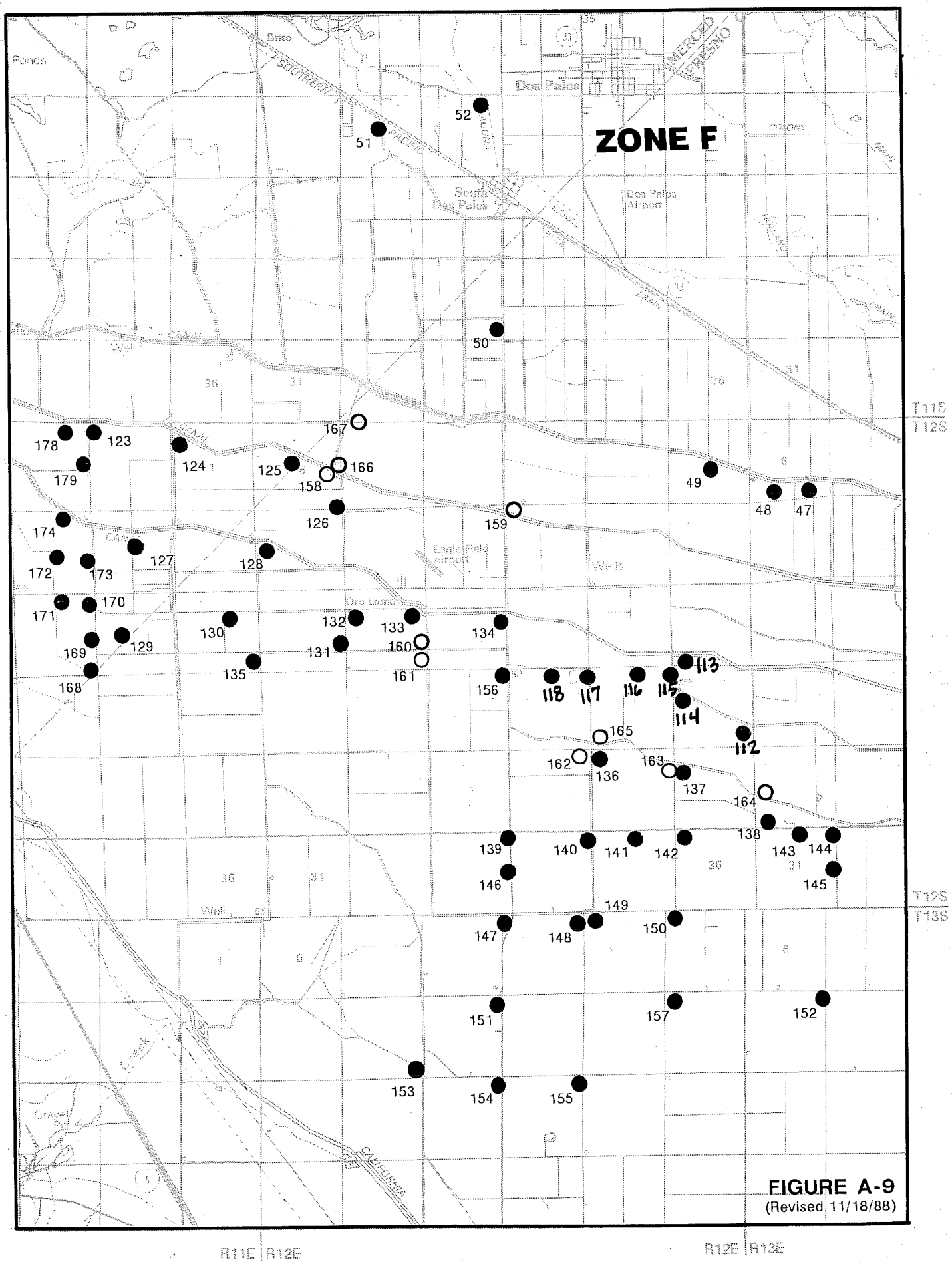



FIGURE A-9
(Revised 11/18/88)

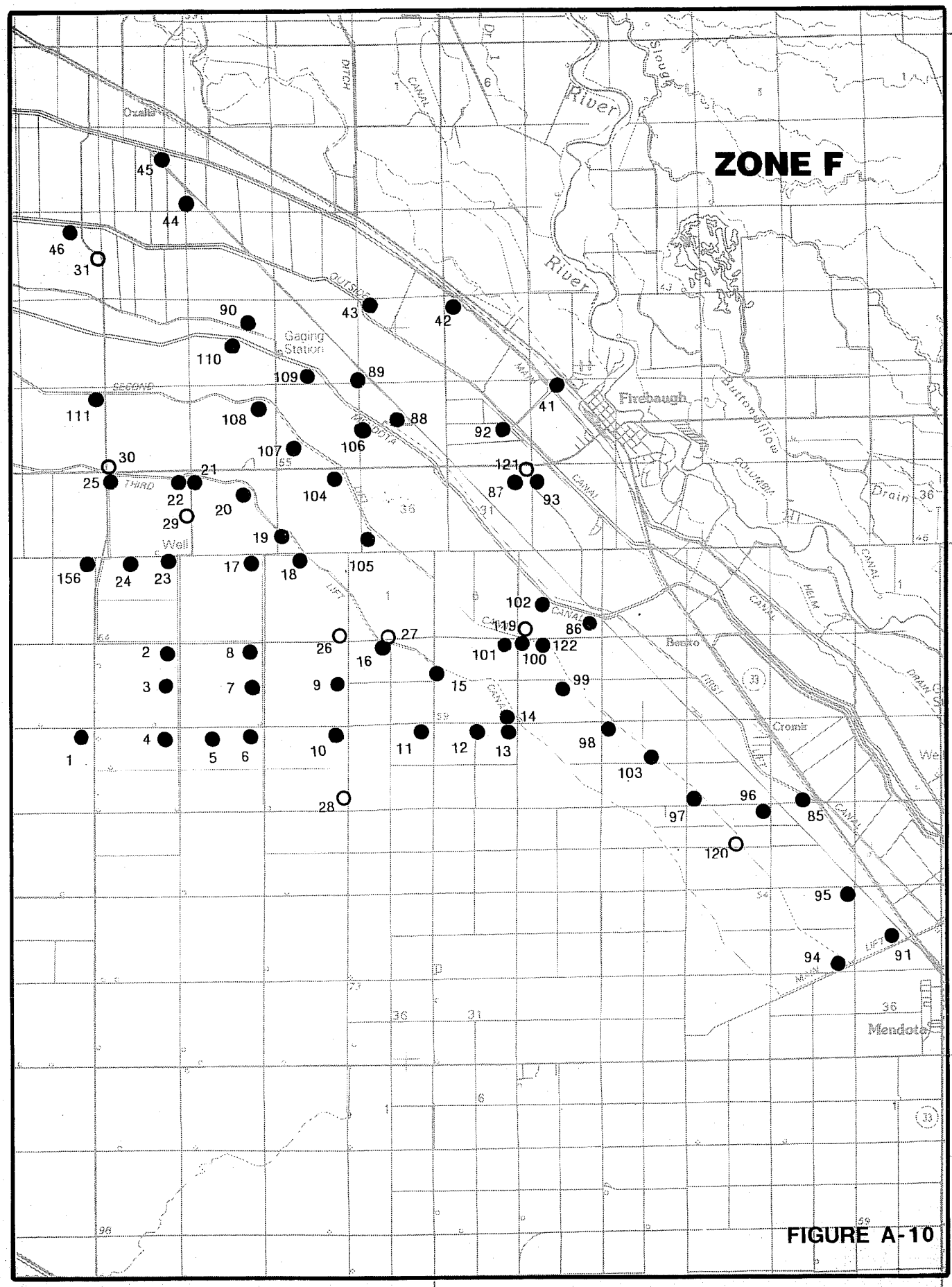

ZONE F
T11S
T12S
T12S
T13S
T13S
T14S
R13E
R14E
R14E
R15E
Firebaugh
Mendota
Cromir
Benito
Gaging Station
Well
River
Slough
Buttonwillow
Drain
OUTSIDE
SECOND
THIRD
MENDOTA
MAIN
CANAL
LIFT
FIRST
HELM
DITCH
Oxalis
45
44
46
31
43
42
90
110
109
89
41
111
108
88
92
106
107
30
25
21
22
20
104
121
87
93
29
19
105
156
24
23
17
18
102
86
119
122
26
27
16
101
100
2
8
3
7
9
15
99
14
1
4
5
6
10
11
12
13
98
103
28
96
97
85
120
95
94
91

FIGURE A-10

## ZONE G: OPEN WATER WAYS

| SITE ID | LOCATION | TOWNSHIP-RANGE-SECTION |
|---|---|---|
| SAN JOAQUIN RIVER | | |
| G1 | SJR at Lander Ave. | T4S-R10E-S27 |
| G2 | SJR at Mossdale | T2S-R6E-S3 |
| G3 | SJR at Airport Way | T3S-R6E-S13 |
| G4 | SJR at Maze Blvd. | T3S-R7E-S29 |
| G5 | SJR at Laird Slough | T4S-R7E-S25 |
| G6 | SJR at Patterson Bridge | T5S-R8E-S22 |
| G7 | SJR at Crows Landing | T6S-R9E-S7 |
| G8 | SJR at Hills Ferry | T7S-R9E-S9 |
| G9 | SJR at Fremont Ford (HWY 140) | T7S-R9E-S24 |
| GRASSLANDS | | |
| G10 | Almond Drain W of OHSLA Club | T11S-R11E-S6 |
| G11 | CCID Main at Almond Drive | T11S-R11E-S7 |
| G12 | Charleston at CCID Main | T11S-R11E-S29 |
| G13 | Camp 13 North of CCID Main | T11S-R11E-S27 |
| G14 | Firebaugh Drain at Camp 13 | T11S-R11E-S27 |
| G15 | Hamburg Drain at Camp 13 | T11S-R11E S27 |
| G16 | Helm Canal at Weir | T11S-R12E-S31 |
| G17 | Agatha Canal N of CCID Main | T11S-R12E-S31 |
| G18 | Panoche @ O'Banion Gaging Stat | T11S-R12E-S32 |
| G19 | Mercy Springs at Agatha | T11S-R12E-S31 |
| G20 | Rice Drain at Mallard Road | T11S-R12E-S7 |
| G22 | Santa Fe Canal at HWY 152 | T10S-R11E-S17 |
| G23 | San Luis Canal at HWY 152 | T10S-R11E-S18 |
| G24 | Santa Fe Canal @ Henry Miller | T10S-R10E-S1 |
| G25 | City Ditch Discharge | T9S-R11E-S19 |
| G26 | Boundary Drain at DFG Pumps | T9S-R11E-S32 |
| G27 | Salt Slough at Hereford Rd. | T9S-R11E-S22 |
| G28 | Salt Slough at Wolfson Ranch | T9S-R11E-S7 |
| G29 | Salt Slough at Lander Ave. | T8S-R10E-S10 |
| G31 | Newman Wasteway at STP | T7S-R9E-S16 |
| G32 | Garzas Creek at Hunt Road | T8S-R9E-S20 |
| G33 | CCID Main at Gun Club Rd. | T8S-R9E-S17 |
| G34 | Los Banos Creek at Gun Club Rd | T8S-R9E-S14 |
| G35 | Eagle Ditch at Gun Club Rd. | T8S-R9E-S13 |
| G36 | Santa Fe Canal At Gun Club Rd. | T8S-R10E-S19 |
| G37 | Mud Slough at Gun Club Rd. | T8S-R10E-S20 |
| G38 | Fremont Canal at Gun Club Rd. | T8S-R10E-S15 |
| G39 | Mud Slough at HWY 140 | T7S-R9E-S26 |
| G40 | Los Banos Creek at HWY 140 | T7S-R9E-S35 |
| G41 | Mud Slough at Newman Gun Club | T7S-R9E-S23 |
| G42 | Newman Wasteway at HWY 33 | T7S-R9E-S16 |
| G43 | Kern Canon Creek | T5S-R7E-S7 |
| CREEKS | | |
| G44 | Black Gultch | T5S-R7E-S34 |
| G46 | Corral Hollow | T3S-R4E-S24 |
| G47 | Crow | T7S-R7E-S24 |
| G48 | Deer | T1N-R2E-S20 |
| G49 | Del Puerto | T5S-R7E-S29 |
| G51 | Garzas | T8S-R8E-S17 |
| G52 | Hospital | T4S-R6E-S7 |
| G53 | Ingram | T4S-R6E-S35 |
| G54 | Kellogg | T1S-R3E-S7 |
| G55 | Los Banos Ck above Dam | T11S-R9E-S12 |
| G57 | Lone Tree | T4S-R5E-S1 |
| G58 | Little Panoche Ck above Dam | T13S-R10E-S35 |
| G59 | Little Panoche Ck below Dam | T13S-R11E-S20 |
| G60 | Marsh | T1S-R2E-S2 |
| G61 | Mountain House | T2S-R4E-S19 |
| G62 | Orestimba | T7S-R8E-S19 |
| G63 | Ortigalita | T11S-R10E-S31 |
| G64 | Panoche | T15S-R12E-S10 |
| G65 | Quinto | T9S-R8E-S15 |
| G66 | Romero | T9S-R8E-S27 |
| G67 | Salado | T6S-R7E-S10 |
| G68 | Sand | T1N-R2E-S8 |
| G69 | Silver | T15S-R12E-S31 |

# APPENDIX B

## Water Quality Data for the Sampling Sites Within the San Joaquin River Basin

APPENDIX B Table 1. Subsurface Tile Drainage Physical Properties and Chemical Concentrations.
Zone A - Contra Costa County

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| A1 | 06/13/86 | 8.1 | 1600 | 64 | 1000 | 38 | 67 | 180 | 1.5 | 200 | 200 | 380 | 380 | 410 | 1.9 | 2 | <5 | <5 | <5 | <5 | | 6 | <5 | <5 | 3 | <5 | <5 |
| A1 | 06/01/87 | | 1620 | | | | | | | 167 | 155 | | | | 1.8 | | | 1 | <1 | <5 | | | 3 | <5 | 2 | | <1 |
| A2 | 06/13/86 | 8.2 | 2700 | 64 | 1700 | 82 | 90 | 360 | 5.1 | 540 | 360 | 370 | 370 | 540 | 2.2 | 28 | <5 | <5 | <5 | <5 | | 720 | <5 | <5 | <1 | <5 | <5 |
| A2 | 06/01/87 | | 2870 | | | | | | | 417 | 450 | | | | 2.3 | | | 3 | 2 | <5 | <0.2 | | 10 | <5 | 1 | | 6 |
| A3 | 06/13/86 | 8.3 | 1900 | 63 | 1300 | 51 | 62 | 190 | 1.8 | 260 | 260 | 295 | 295 | 360 | 2.5 | 2 | <5 | 5 | <5 | <5 | | 9 | 41 | <5 | 1 | <5 | <5 |
| A3 | 06/01/87 | | 2220 | | | | | | | 279 | 312 | | | | 3.3 | | | 3 | <1 | <5 | <0.2 | | 3 | <5 | 3 | | 1 |
| A6 | 06/13/86 | 7.7 | 1900 | 64 | 1300 | 31 | 55 | 240 | 0.9 | 240 | 270 | 330 | 330 | 300 | 4.5 | 1 | <5 | <5 | <5 | <5 | | 12 | <5 | <5 | <1 | <5 | <5 |
| A6 | 06/01/87 | | 2050 | | | | | | | 232 | 237 | | | | 4.7 | | | 2 | <1 | <5 | <0.2 | | 4 | <5 | 1 | | <1 |
| A7 | 06/13/86 | 8.1 | 1600 | 64 | 1100 | 31 | 42 | 210 | 1.0 | 230 | 180 | 280 | 280 | 240 | 3.0 | 1 | <5 | 7 | <5 | <5 | | <5 | <5 | <5 | 1 | <5 | <5 |
| A7 | 06/01/87 | | 1720 | | | | | | | 219 | 146 | | | | 2.9 | | | 4 | <1 | <5 | <0.2 | | 1 | <5 | 2 | | <1 |
| A8 | 06/13/86 | 8.2 | 1600 | 64 | 1000 | 26 | 56 | 190 | 0.7 | 200 | 170 | 270 | 270 | 300 | 3.1 | 1 | <5 | 6 | <5 | <5 | | 9 | <5 | <5 | 1 | <5 | <5 |
| A8 | 06/01/87 | | 1810 | | | | | | | 200 | 161 | | | | 3.7 | | | <1 | <1 | <5 | <0.2 | | 2 | <5 | 2 | | <1 |
| A9 | 06/13/86 | 8.0 | 1400 | 64 | 830 | 28 | 53 | 140 | 0.5 | 160 | 130 | 310 | 310 | 260 | 2.3 | 1 | <5 | 5 | <5 | <5 | | 7 | <5 | <5 | 2 | <5 | <5 |
| A9 | 06/01/87 | | 1440 | | | | | | | 147 | 111 | | | | 2.8 | | | 3 | <1 | <5 | | | 2 | <5 | 1 | | <1 |
| A10 | 06/13/86 | 8.2 | 1300 | 64 | 850 | 23 | 56 | 160 | 0.4 | 150 | 130 | 320 | 320 | 250 | 2.6 | 1 | <5 | 5 | <5 | <5 | | 11 | <5 | <5 | 1 | <5 | <5 |
| A10 | 06/01/87 | | 1440 | | | | | | | 138 | 113 | | | | 2.4 | | | 3 | <1 | <5 | | | 2 | <5 | <1 | | <1 |
| A11 | 06/13/86 | 7.9 | 1800 | 64 | 1200 | 32 | 43 | 260 | 1.9 | 240 | 190 | 370 | 370 | 250 | 4.7 | 2 | <5 | 6 | <5 | <5 | | <5 | <5 | <5 | 1 | <5 | <5 |
| A11 | 06/01/87 | | 2490 | | | | | | | 303 | 250 | | | | 6.8 | | | 3 | <1 | <5 | | | 3 | <5 | 2 | | <1 |
| A13 | 06/13/86 | 8.0 | 2200 | 66 | 1500 | 63 | 47 | 340 | 2.4 | 430 | 250 | 130 | 130 | 380 | 4.0 | 5 | <5 | 15 | 11 | <5 | | 500 | 18 | <5 | 1 | <5 | 14 |
| A14 | 06/13/86 | 8.3 | 780 | 70 | 500 | 37 | 17 | 86 | 2.7 | 87 | 110 | 80 | 80 | 190 | 0.6 | 7 | <5 | 10 | 8 | <5 | | 440 | 10 | <5 | 1 | <5 | 10 |

APPENDIX B Table 2. Subsurface Tile Drainage Physical Properties and Chemical Concentrations.
Zone B - Eastside San Joaquin River

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| B1 | 06/12/86 | 8.1 | 2000 | 65 | 1300 | 97 | 45 | 190 | 3.1 | 360 | 210 | 260 | 260 | 410 | 0.1 | 11 | <5 | <5 | <5 | <5 | | 3700 | 7 | <5 | | <5 | 34 |
| B1 | 06/02/87 | | 1320 | | | | | | | 195 | 160 | | | | 0.1 | | | <1 | <1 | <5 | <0.2 | | 10 | 2 | <1 | | 2 |
| B2 | 06/12/86 | 8.5 | 640 | 69 | 480 | 36 | 21 | 37 | 2.0 | 43 | 50 | 190 | 198 | 170 | <0.05 | 2 | <5 | <5 | <5 | <5 | | 9 | <5 | <5 | <1 | <5 | <5 |
| B2 | 06/02/87 | | 580 | | | | | | | 29 | 15 | | | | <0.05 | | | 1 | <1 | <5 | <0.2 | | 1 | <1 | <1 | | <1 |
| B3 | 06/12/86 | 8.2 | 2300 | 65 | 1500 | 13 | 12 | 450 | 6.7 | 220 | 110 | 760 | 760 | 80 | 0.5 | 63 | <5 | <5 | 12 | <5 | | 1190 | 133 | <5 | <1 | <5 | <5 |
| B4 | 06/12/86 | 7.9 | 850 | 65 | 560 | 58 | 17 | 66 | 1.5 | 110 | 54 | 110 | 110 | 240 | 0.1 | 2 | <5 | <5 | <5 | <5 | | 8 | <5 | <5 | 1 | <5 | <5 |
| B4 | 06/02/87 | | 670 | | | | | | | 85 | 39 | | | | 0.1 | | | <1 | 2 | <5 | <0.2 | | 2 | 1 | <1 | | 1 |
| B4 | 06/02/87 | | 668 | | | | | | | 86 | 39 | | | | 0.1 | | | <1 | 2 | <5 | <0.2 | | 2 | 1 | <1 | | 1 |
| B5 | 06/12/86 | 8.5 | 900 | 66 | 710 | 78 | 26 | 69 | 5.8 | 42 | 62 | 250 | 266 | 330 | 0.2 | 8 | <5 | 5 | 7 | <5 | | 218 | <5 | <5 | 1 | <5 | <5 |
| B5 | 06/12/86 | | | | | | | | | | | | | | | 8 | <10 | <2 | <10 | <10 | | | | <5 | | | <10 |
| B5 | 06/02/87 | | 1070 | | | | | | | 63 | 67 | | | | 0.1 | | | <1 | 5 | <5 | <0.2 | | 7 | 3 | 1 | | 3 |
| B6 | 06/12/86 | 8.4 | 1100 | 64 | 710 | 17 | 10 | 190 | 2.4 | 89 | 39 | 410 | 418 | 84 | 0.2 | 4 | <5 | <5 | <5 | <5 | | 354 | 165 | <5 | <1 | <5 | <5 |
| B7 | 06/12/86 | 8.5 | 800 | 64 | 560 | 13 | 9 | 120 | 1.7 | 67 | 43 | 220 | 228 | 68 | 0.2 | 1 | <5 | <5 | <5 | <5 | | 294 | 7 | <5 | <1 | <5 | <5 |
| B8 | 06/12/86 | 8.6 | 900 | | 710 | 77 | 23 | 67 | 5.7 | 41 | 61 | 230 | 250 | 330 | 0.2 | | | | | | | | | | | | |
| B8 | 06/02/87 | | 662 | | | | | | | 34 | 48 | | | | 0.1 | | | <1 | 2 | <5 | <0.2 | | 6 | 7 | 1 | | 7 |
| B9 | 06/02/87 | | 865 | | | | | | | 57 | 59 | | | | 0.1 | | | <1 | 1 | <5 | <0.2 | | 4 | <1 | <1 | | <1 |

APPENDIX B Table 3. Subsurface Tile Drainage Physical Properties and Chemical Concentrations.
Zone C - San Joaquin County

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| C2 | 06/16/86 | 8.1 | 3400 | 63 | 2300 | 170 | 110 | 330 | 0.6 | 600 | 530 | 310 | 310 | 1000 | 1.0 | 3 | <5 | <5 | <5 | <5 | | 84 | 13 | <5 | 1 | <5 | <5 |
| C2 | 06/02/87 | | 3210 | | | | | | | 568 | 535 | | | | 1.3 | | | <1 | <1 | <5 | | | 18 | <5 | 3 | | 2 |
| C5 | 06/16/86 | 8.3 | 2500 | 63 | 1500 | 43 | 43 | 400 | 1.0 | 450 | 260 | 330 | 330 | 310 | 1.0 | 2 | <5 | 10 | <5 | <5 | | 62 | <5 | <5 | 3 | <5 | <5 |
| C5 | 06/02/87 | | 2540 | | | | | | | 424 | 383 | | | | 4.4 | | | 6 | 1 | <5 | | | 2 | <5 | 4 | | 1 |
| C10 | 06/16/86 | 8.5 | 1900 | 69 | 1200 | 110 | 45 | 210 | 3.1 | 280 | 250 | 220 | 236 | 470 | 1.8 | 3 | <5 | <5 | <5 | <5 | | 72 | <5 | 7 | 1 | <5 | 31 |
| C10 | 06/02/87 | | 2290 | | | | | | | 367 | 425 | | | | 2.5 | | | 5 | 3 | <5 | | | 3 | <5 | 2 | | 9 |
| C11n | 06/16/86 | 8.1 | 2300 | 63 | 1300 | 130 | 75 | 170 | 2.4 | 500 | 240 | 160 | 160 | 710 | 1.0 | 9 | <5 | <5 | <5 | <5 | | 2520 | 10 | <5 | <1 | <5 | <5 |
| C11n | 06/02/87 | | 2900 | | | | | | | 642 | 390 | | | | 0.5 | | | <1 | <1 | <5 | | | 6 | <5 | 3 | | 7 |
| C11s | 06/16/86 | 8.1 | 3300 | 64 | 1800 | 180 | 110 | 300 | 0.9 | 730 | 410 | 210 | 210 | 940 | 1.0 | 2 | <5 | <5 | <5 | <5 | | 386 | 9 | 9 | 1 | <5 | <5 |
| C13 | 06/16/86 | 8.0 | 4000 | 65 | 2300 | 140 | 80 | 600 | 3.3 | 800 | 620 | 320 | 320 | 610 | 4.9 | 1 | <5 | 5 | <5 | <5 | | 74 | <5 | 6 | 4 | <5 | <5 |
| C13 | 06/02/87 | | 4230 | | | | | | | 728 | 982 | | | | 5.6 | | | 4 | 1 | <5 | | | 2 | <5 | 4 | | <1 |
| C14 | 06/16/86 | 8.0 | 3100 | 64 | 2200 | 130 | 64 | 390 | 2.0 | 490 | 590 | 420 | 420 | 530 | 3.3 | 2 | <5 | <5 | <5 | <5 | | 42 | <5 | <5 | 1 | <5 | <5 |
| C14 | 06/02/87 | | 4040 | | | | | | | 539 | 830 | | | | 5.7 | | | 2 | 2 | <5 | | | 3 | <5 | 4 | | <1 |
| C16 | 06/16/86 | 8.2 | 2500 | 65 | 1600 | 62 | 44 | 370 | 2.1 | 440 | 240 | 320 | 320 | 280 | 2.5 | 6 | <5 | <5 | <5 | <5 | | 41 | 8 | <5 | 3 | <5 | <5 |
| C16 | 06/02/87 | | 2990 | | | | | | | 476 | 510 | | | | 2.9 | | | <1 | 1 | <5 | | | 4 | <5 | 1 | | <1 |
| C17 | 06/16/86 | 8.2 | 4000 | 63 | 2700 | 180 | 76 | 570 | 1.9 | 840 | 600 | 310 | 310 | 630 | 4.7 | 4 | <5 | <5 | <5 | <5 | | <5 | 8 | <5 | 4 | <5 | <5 |
| C17 | 06/02/87 | | 3840 | | | | | | | 677 | 630 | | | | 5.3 | | | 1 | 5 | <5 | | | 9 | <5 | 4 | | <1 |
| C36 | 06/16/86 | 8.4 | 2300 | 63 | 1400 | 39 | 38 | 350 | 0.9 | 260 | 160 | 340 | 348 | 230 | 4.7 | 2 | <5 | 8 | <5 | <5 | | 6 | 6 | <5 | 2 | <5 | <5 |
| C36 | 06/02/87 | | 2350 | | | | | | | 373 | 284 | | | | 4.9 | | | 6 | <1 | <5 | | | 2 | <5 | 2 | | 1 |
| C37 | 06/16/86 | 8.0 | 3100 | 63 | 2200 | 150 | 73 | 370 | 1.5 | 560 | 640 | 240 | 240 | 620 | 3.5 | 2 | <5 | 11 | <5 | <5 | | <5 | <5 | <5 | 4 | <5 | <5 |
| C37 | 06/02/87 | | 3060 | | | | | | | 505 | 704 | | | | 3.6 | | | 2 | <1 | 6 | | | 3 | <5 | 4 | | 1 |
| C38 | 06/16/86 | 8.2 | 3400 | 64 | 2300 | 88 | 72 | 490 | 1.5 | 680 | 450 | 410 | 410 | 470 | 2.9 | 5 | <5 | <5 | <5 | <5 | | 23 | 8 | 5 | 2 | <5 | <5 |
| C38 | 06/02/87 | | 3550 | | | | | | | 654 | 449 | | | | 3.0 | | | <1 | <1 | <5 | | | 5 | <5 | 1 | | 1 |
| C39 | 06/16/86 | 8.3 | 2300 | 64 | 1500 | 41 | 38 | 350 | 1.7 | 395 | 220 | 360 | 360 | 270 | 2.2 | 6 | <5 | <5 | <5 | <5 | | <5 | 13 | <5 | 3 | <5 | <5 |
| C39 | 06/02/87 | | 2380 | | | | | | | 379 | 255 | | | | 2.3 | | | <1 | <1 | 7 | | | 13 | <5 | 2 | | <1 |
| C41 | 06/16/86 | 8.3 | 4000 | 64 | 2900 | 200 | 99 | 500 | 0.9 | 600 | 1000 | 260 | 260 | 810 | 5.9 | 2 | <5 | <5 | <5 | <5 | | <5 | 6 | 8 | 6 | <5 | <5 |
| C41 | 06/02/87 | | 4170 | | | | | | | 625 | 1421 | | | | 5.4 | | | 1 | 1 | 5 | | | 7 | <5 | 5 | | 2 |

APPENDIX B Table 4. Subsurface Tile Drainage Physical Properties and Chemical Concentrations.
Zone D - Stanilaus County

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| D1 | 04/10/86 | 6.2 | 1000 | 59 | | | | | | 86 | 120 | | 250 | | 0.4 | <1 | <10 | <2 | <10 | <10 | | | 1 | <5 | 2 | | 14 |
| D1 | 06/11/86 | 8.3 | 990 | 62 | 640 | 110 | 27 | 75 | 3.0 | 94 | 130 | 210 | 210 | 360 | 0.4 | 1 | <5 | <5 | <5 | <5 | | 56 | <5 | <5 | 2 | <5 | 5 |
| D2 | 04/10/86 | 7.0 | 880 | 63 | | | | | | 70 | 98 | | 210 | | 0.5 | <1 | <10 | 13 | <10 | <10 | | | 3 | <5 | 2 | | 10 |
| D2 | 06/11/86 | 8.2 | 960 | 64 | 630 | 82 | 28 | 94 | 1.1 | 92 | 130 | 180 | 180 | 280 | 0.4 | 1 | <5 | <5 | 6 | <5 | | 19 | <5 | <5 | 1 | <5 | 16 |
| D3 | 04/10/86 | 6.8 | 3700 | 61 | | | | | | 350 | 1000 | | 380 | | 2.1 | <1 | <10 | 3 | <10 | <10 | | | 2 | <5 | 2 | | <10 |
| D3 | 06/11/86 | 8.1 | 3400 | 64 | 2700 | 310 | 110 | 410 | 3.1 | 300 | 1100 | 270 | 270 | 1100 | 1.9 | 1 | <5 | <5 | <5 | <5 | | <5 | <5 | <5 | 3 | <5 | <5 |
| D3 | 06/13/86 | 8.0 | 2100 | 65 | 1400 | 64 | 58 | 230 | 2.4 | 310 | 370 | 280 | 280 | 430 | 1.8 | 2 | <5 | 6 | <5 | 13 | | <5 | <5 | <5 | <1 | <5 | <5 |
| D4 | 04/10/86 | 6.9 | 2200 | 62 | | | | | | 220 | 400 | | 280 | | 1.0 | <1 | <10 | <2 | 14 | <10 | | | 2 | <5 | 1 | | 12 |
| D4 | 06/11/86 | 7.9 | 1700 | 65 | 1100 | 130 | 53 | 190 | 1.7 | 140 | 300 | 180 | 180 | 580 | 0.6 | 1 | <5 | 5 | 47 | <5 | | 14 | <5 | <5 | <1 | <5 | 6 |
| D5 | 06/11/86 | 8.0 | 2500 | 62 | 1900 | 230 | 88 | 330 | 2.7 | 260 | 680 | 180 | 180 | 630 | 1.2 | 1 | <5 | <5 | <5 | <5 | | <5 | <5 | <5 | 2 | <5 | <5 |
| D5 | 07/28/87 | | 2200 | 68 | | | | | | 280 | | | | | 1.1 | | | | | | | | | | 4 | | |
| D6 | 04/10/86 | 7.0 | 2300 | 62 | | | | | | 240 | 360 | | 340 | | 0.9 | <1 | <10 | 6 | <10 | <10 | | | 1 | <5 | 3 | | <10 |
| D6 | 06/11/86 | 8.1 | 2900 | 63 | 2100 | 190 | 94 | 390 | 3.0 | 470 | 470 | 230 | 230 | 690 | 1.1 | 1 | <5 | <5 | <5 | <5 | | <5 | <5 | <5 | 3 | <5 | <5 |
| D7 | 04/10/86 | 7.1 | 2300 | 62 | | | | | | 240 | 330 | | 340 | | 0.9 | <1 | <10 | 6 | <10 | <10 | | | 1 | <5 | 3 | | <10 |
| D7 | 06/11/86 | 8.1 | 2300 | 62 | 1500 | 160 | 78 | 300 | 2.8 | 320 | 340 | 240 | 240 | 530 | 0.7 | 1 | <5 | 5 | <5 | <5 | | <5 | <5 | <5 | 2 | <5 | <5 |
| D8 | 04/10/86 | 7.3 | 2400 | 64 | | | | | | 380 | 340 | | 270 | | 1.8 | <1 | <10 | 29 | <10 | <10 | | | 1 | <5 | 2 | | <10 |
| D8 | 06/11/86 | 8.3 | 2200 | 65 | 1500 | 150 | 63 | 250 | 2.6 | 330 | 300 | 230 | 230 | 570 | 1.5 | 1 | <5 | 41 | 5 | <5 | | 85 | | 230 | 2 | <5 | 5 |
| D9 | 04/10/86 | 7.1 | 2900 | 63 | | | | | | 410 | 590 | | 320 | | 3.1 | <1 | <10 | 21 | <10 | <10 | | | 1 | <5 | 2 | | 12 |
| D9 | 06/11/86 | 8.2 | 1300 | 61 | 800 | 84 | 38 | 140 | 3.8 | 180 | 190 | 150 | 150 | 350 | 0.9 | 57 | <5 | 268 | 180 | 42 | | 3900 | | 8 | <1 | <5 | 92 |
| D9 | 07/28/87 | | 1900 | 65 | | | | | | 200 | | | | | 1.1 | | | | | | | | | | 2 | | |
| D10 | 06/11/86 | 8.3 | 2800 | 64 | 2000 | 99 | 75 | 530 | 2.8 | 310 | 550 | 310 | 310 | 430 | 4.5 | 1 | <5 | 38 | <5 | <5 | | 81 | 11 | <5 | 6 | <5 | <5 |
| D10 | 06/13/86 | 7.9 | 2700 | 63 | 1800 | 100 | 63 | 330 | 2.8 | 390 | 580 | 240 | 240 | 490 | 3.0 | 1 | <5 | 21 | <5 | <5 | | <5 | <5 | <5 | 2 | <5 | <5 |
| D10 | 07/28/87 | | 2000 | 68 | | | | | | 320 | | | | | 1.5 | | | | | | | | | | 2 | | |
| D11 | 06/11/86 | 8.2 | 2500 | 62 | 1800 | 110 | 65 | 400 | 3.0 | 230 | 630 | 260 | 260 | 480 | 3.6 | 1 | <5 | 10 | <5 | <5 | | <5 | 32 | <5 | 4 | <5 | <5 |
| D12 | 06/11/86 | 8.4 | 1700 | 65 | 1100 | 140 | 43 | 170 | 5.4 | 240 | 180 | 200 | 216 | 510 | 0.9 | 2 | <5 | 10 | <5 | <5 | | 93 | <5 | <5 | 2 | <5 | 9 |
| D13 | 04/10/86 | 7.3 | 2100 | 64 | | | | | | 310 | 290 | | 260 | | 1.8 | <1 | <10 | 17 | <10 | <10 | | | | <5 | | | 10 |
| D13 | 06/11/86 | 8.3 | 780 | 72 | 670 | 48 | 22 | 92 | 3.1 | 89 | 92 | 100 | 100 | 210 | 0.3 | 16 | <5 | 69 | 39 | 12 | | 940 | <5 | 56 | <1 | <5 | 61 |
| D14 | 06/11/86 | 8.3 | 2000 | 64 | 1300 | 92 | 100 | 220 | 5.5 | 220 | 290 | 420 | 420 | 600 | 1.3 | 2 | <5 | 11 | <5 | <5 | | 130 | <5 | <5 | 2 | <5 | <9 |

APPENDIX B Table 4. (cont.)

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| D14 | 07/28/87 | | 1400 | 64 | | | | | | 230 | | | | | 0.9 | | | | | | | | | | 1 | | |
| D15 | 06/11/86 | 8.2 | 2200 | 62 | 1500 | 130 | 87 | 280 | 3.0 | 240 | 350 | 330 | 330 | 520 | 1.0 | 2 | <5 | 11 | <5 | <5 | | 11 | <5 | <5 | 3 | <5 | <5 |
| D15 | 07/28/87 | | 730 | 65 | | | | | | 110 | | | | | 0.4 | | | | | | | | | | <1 | | |
| D16 | 04/10/86 | 7.2 | 2200 | 63 | | | | | | 230 | 370 | | 320 | | 1.0 | <1 | <10 | 6 | <10 | <10 | | | 1 | <5 | 4 | | 10 |
| D16 | 07/28/87 | | 990 | 66 | | | | | | 140 | | | | | 0.7 | | | | | | | | | | 2 | | |
| D17 | 04/10/86 | 7.1 | 3700 | 62 | | | | | | 470 | 800 | | 140 | | 1.9 | <1 | <10 | 11 | <10 | <10 | | | 2 | <5 | 3 | | <10 |
| D17 | 07/28/87 | | 850 | 68 | | | | | | 110 | | | | | 1.1 | | | | | | | | | | 2 | | |
| D18 | 06/13/86 | 8.2 | 2700 | 65 | 1900 | 80 | 58 | 360 | 2.5 | 550 | 350 | 260 | 260 | 480 | 2.4 | 5 | <5 | 5 | <5 | <5 | | 15 | 5 | <5 | 2 | <5 | <5 |
| D19 | 06/13/86 | 8.6 | 2100 | 63 | 1400 | 95 | 51 | 270 | 2.9 | 360 | 310 | 290 | 340 | 530 | 0.6 | 4 | <5 | <5 | <5 | <5 | | 140 | 19 | 6 | 3 | <5 | <5 |
| D19 | 07/28/87 | | 670 | 67 | | | | | | 95 | | | | | 1.1 | | | | | | | | | | 1 | | |
| D20 | 06/13/86 | 8.3 | 2100 | 64 | 1300 | 36 | 34 | 330 | 3.1 | 280 | 250 | 360 | 360 | 240 | 2.2 | 3 | <5 | <5 | <5 | <5 | | <5 | <5 | <5 | <1 | <5 | 3 |
| D20 | 07/28/87 | | 4900 | 72 | | | | | | 1100 | | | | | 1.6 | | | | | | | | | | <1 | | |
| D21 | 06/13/86 | 8.2 | 1800 | 69 | 1200 | 56 | 48 | 160 | 3.4 | 270 | 210 | 290 | 290 | 350 | 1.4 | 2 | <5 | 7 | <5 | <5 | | 12 | 10 | <5 | <1 | <5 | 9 |
| D21 | 07/28/87 | | 900 | 72 | | | | | | 110 | | | | | 1.6 | | | | | | | | | | 3 | | |
| D22 | 06/13/86 | 7.7 | 6200 | 64 | 4400 | 370 | 270 | 510 | 2.5 | 1400 | 1200 | 340 | 340 | 1800 | 1.6 | 4 | <5 | <5 | <5 | <5 | | 4660 | 6 | 11 | <1 | <5 | <5 |
| D22 | 07/16/87 | | 1500 | 85 | | | | | | 220 | | | | | 1.3 | | | | | | | | | | 5 | | |
| D23 | 06/13/86 | 8.0 | 2100 | 64 | 1300 | 74 | 58 | 190 | 2.1 | 300 | 300 | 240 | 240 | 400 | 2.2 | 2 | <5 | 11 | 6 | <5 | | <5 | <5 | <5 | <1 | <5 | <5 |
| D23 | 07/16/87 | | 1700 | 84 | | | | | | 280 | | | | | 1.2 | | | | | | | | | | 5 | | |
| D24 | 06/13/86 | 8.2 | 810 | 64 | 500 | 45 | 19 | 87 | 5.4 | 65 | 200 | 150 | 150 | 190 | 0.6 | 3 | <5 | 9 | 5 | <5 | | 122 | <5 | 8 | <1 | <5 | 8 |
| D24 | 07/16/87 | | 630 | 83 | | | | | | 190 | | | | | 1.6 | | | | | | | | | | 2 | | |
| D25 | 06/13/86 | 8.1 | 7500 | 63 | 4800 | 200 | 260 | 1000 | 2.4 | 1200 | 2300 | 500 | 500 | 1500 | 9.6 | 5 | <5 | 7 | <5 | <5 | | 300 | 29 | <5 | 8 | <5 | <5 |
| D25 | 07/16/87 | | 1400 | 89 | | | | | | 230 | | | | | 1.2 | | | | | | | | | | 5 | | |
| D26 | 06/13/86 | 8.0 | 1800 | 62 | 1100 | 62 | 32 | 200 | 2.0 | 280 | 260 | 200 | 200 | 250 | 1.3 | 1 | <5 | 23 | 6 | <5 | | 25 | <5 | 8 | <1 | <5 | <5 |
| D26 | 07/16/87 | | 750 | 79 | | | | | | 130 | | | | | 0.5 | | | | | | | | | | 2 | | |

APPENDIX B Table 5. Subsurface Tile Drainage Physical Properties and Chemical Concentrations.
Zone E - Basin Trough, Merced County

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| E1 | 04/03/86 | | 1800 | 63 | | | | | | 320 | 350 | | 140 | | 1.2 | 2 | <10 | <10 | <10 | <2 | | | 8 | <5 | 2 | | <10 |
| E1 | 06/12/86 | 8.3 | 2100 | 66 | 1300 | 79 | 51 | 300 | 4.3 | 420 | 300 | 120 | 120 | 370 | 0.8 | 2 | <5 | <5 | <5 | <5 | | 1280 | 10 | <5 | <1 | <5 | <5 |
| E1 | 06/02/87 | | 1490 | | | | | | | 240 | 174 | | | | 0.6 | | | <1 | <3 | <5 | <0.2 | | 9 | <5 | 2 | | 1 |
| E2 | 04/03/86 | | 3900 | 63 | | | | | | 690 | 750 | | 420 | | 1.9 | 3 | <10 | <10 | <10 | <2 | | | 20 | <5 | 1 | | <10 |
| E2 | 06/12/86 | 8.3 | 2000 | 62 | 1300 | 91 | 56 | 310 | 4.3 | 280 | 270 | 260 | 260 | 360 | 0.5 | 3 | <5 | <5 | <5 | <5 | | 1140 | 26 | <5 | <1 | <5 | <5 |
| E2 | 06/02/87 | | 2530 | | | | | | | 360 | 324 | | | | 0.7 | | | <1 | <3 | <5 | <0.2 | | 24 | <5 | 1 | | 4 |
| E3 | 04/03/86 | | 2100 | 63 | | | | | | 320 | 350 | | 340 | | 1.3 | 8 | <10 | <10 | <10 | <2 | | | 111 | 8 | 1 | | <10 |
| E3 | 06/12/86 | 8.2 | 2400 | 65 | 1600 | 110 | 66 | 360 | 4.3 | 370 | 380 | 280 | 280 | 90 | 0.7 | 2 | <5 | <5 | <5 | <5 | | 1050 | 20 | <5 | <1 | <5 | <5 |
| E3 | 06/02/87 | | 2530 | | | | | | | 382 | 253 | | | | 0.7 | | | <1 | <1 | <5 | <0.2 | | 11 | <5 | 1 | | 2 |
| E4 | 04/03/86 | | 2500 | 63 | | | | | | 490 | 360 | | 330 | | 1.3 | 2 | <10 | <10 | <10 | <2 | | | 17 | 6 | 1 | | <10 |
| E4 | 06/12/86 | 8.4 | 1500 | 68 | 920 | 65 | 38 | 210 | 4.4 | 240 | 200 | 160 | 168 | 300 | 0.5 | 53 | <5 | <5 | 5 | <5 | | 500 | 12 | 6 | <1 | <5 | 17 |
| E4 | 06/02/87 | | 2450 | | | | | | | 410 | 177 | | | | 0.6 | | | <1 | <3 | <5 | <0.2 | | 15 | <5 | 1 | | 2 |
| E5 | 04/03/86 | | 2800 | 60 | | | | | | 820 | 1400 | | 360 | | 1.4 | 5 | <10 | <10 | <10 | <2 | | | 149 | <5 | 2 | | 12 |
| E5 | 06/12/86 | 8.5 | 1400 | 64 | 860 | 70 | 46 | 180 | 3.8 | 200 | 210 | 200 | 216 | 330 | 0.3 | 5 | <5 | <5 | <5 | <5 | | 106 | 30 | <5 | 2 | <5 | <5 |
| E5 | 06/02/87 | | 2560 | | | | | | | 256 | 94 | | | | 0.9 | | | <1 | <1 | <5 | <0.2 | | 142 | <5 | 2 | | 2 |
| E6 | 04/03/86 | | 1500 | 61 | | | | | | 140 | 120 | | | | 1.3 | 13 | <10 | <10 | <10 | <2 | | | 15 | 7 | <1 | | 20 |
| E6 | 06/02/87 | | 1040 | | | | | | | 87 | 175 | | | | 0.4 | | | <1 | 2 | <5 | <0.2 | | 14 | <5 | 1 | | 1 |
| E7 | 04/03/86 | | 1200 | 63 | | | | | | 170 | 190 | | | | 0.9 | 3 | <10 | <10 | <10 | <2 | | | 24 | <5 | <1 | | 12 |
| E7 | 06/12/86 | 8.4 | 1200 | 63 | 760 | 73 | 36 | 160 | 1.8 | 140 | 150 | 180 | 188 | 260 | 0.3 | 3 | <5 | <5 | <5 | <5 | | 1050 | 23 | <5 | <1 | <5 | <5 |
| E7 | 06/02/87 | | 1030 | | | | | | | 109 | 113 | | | | 0.4 | | | <1 | <1 | <5 | <0.2 | | 18 | <5 | 1 | | 3 |
| E8 | 06/02/87 | | 1070 | | | | | | | 138 | 175 | | | | 0.3 | | | <1 | 2 | <5 | <0.2 | | 11 | <5 | 1 | | 10 |
| E10 | 04/03/86 | | 1500 | 62 | | | | | | 240 | 200 | | | | 1.1 | <1 | <10 | <10 | <10 | 2 | | | 6 | <5 | <1 | | 9 |
| E10 | 06/12/86 | 8.4 | 1100 | 63 | 720 | 80 | 34 | 140 | 2.6 | 180 | 140 | 170 | 186 | 300 | 0.2 | 2 | <5 | <5 | <5 | 21 | | 210 | <5 | <5 | <1 | <5 | 7 |
| E10 | 06/02/87 | | 1420 | | | | | | | 213 | 167 | | | | 0.3 | | | <1 | <1 | <5 | <0.2 | | 9 | <5 | 1 | | 5 |
| E11 | 04/03/86 | | 880 | 61 | | | | | | 94 | 110 | | | | 1.2 | 6 | <10 | <10 | <10 | <2 | | | 12 | <5 | 1 | | 22 |
| E11 | 06/12/86 | 8.3 | 1000 | 64 | 680 | 87 | 22 | 120 | 1.3 | 120 | 110 | 220 | 220 | 280 | 0.1 | 13 | <5 | <5 | <5 | <5 | | 108 | 13 | <5 | <1 | <5 | 6 |
| E11 | 06/02/87 | | 1210 | | | | | | | 155 | 133 | | | | 0.2 | | | <1 | 2 | <5 | <0.2 | | 17 | <5 | 4 | | 2 |
| E12 | 04/03/86 | | 1100 | 62 | | | | | | 150 | 160 | | | | 0.9 | 5 | <10 | <2 | 10 | <10 | | | 9 | <5 | <1 | | 13 |

APPENDIX B Table 5. (cont.)

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| E12 | 06/12/86 | 8.3 | 1100 | 64 | 690 | 88 | 26 | 120 | 1.6 | 140 | 110 | 190 | 190 | 290 | 0.1 | 6 | <5 | <5 | <5 | <5 | | 480 | 6 | <5 | <1 | <5 | <5 |
| E12 | 06/02/87 | | 1150 | | | | | | | 149 | 138 | | | | 0.2 | | | <1 | <1 | <5 | <0.2 | | 10 | <5 | 1 | | 1 |
| E13 | 04/03/86 | | 1600 | 63 | | | | | | 290 | 280 | | | | 1.1 | 4 | <10 | <2 | 11 | <10 | | | 16 | <5 | <1 | | 13 |
| E13 | 06/12/86 | 8.2 | 1500 | 66 | 980 | 140 | 47 | 140 | 2.5 | 210 | 190 | 200 | 200 | 430 | 0.1 | 4 | <5 | <5 | <5 | <5 | | 1130 | 17 | <5 | <1 | <5 | <5 |
| E13 | 06/02/87 | | 1630 | | | | | | | 235 | 255 | | | | 0.2 | | | <1 | <1 | <5 | <0.2 | | 16 | <5 | <1 | | 1 |
| E14 | 04/03/86 | | 1900 | 60 | | | | | | 380 | 300 | | | | 1.0 | 5 | <10 | <2 | 14 | <10 | | | 12 | <5 | <1 | | 84 |
| E14 | 06/12/86 | 8.0 | 1700 | 64 | 1100 | 160 | 54 | 150 | 1.8 | 240 | 200 | 250 | 250 | 560 | 0.1 | 6 | <5 | <5 | <5 | <5 | | 780 | 16 | <5 | 1 | <5 | <5 |
| E14 | 06/02/87 | | 1700 | | | | | | | 287 | 208 | | | | 0.1 | | | <1 | <1 | <5 | <0.2 | | 15 | <5 | <1 | | 5 |
| E15 | 04/03/86 | | 1100 | 62 | | | | | | 140 | 150 | | | | 0.4 | 3 | <10 | <2 | <10 | <10 | | | 11 | <5 | 1 | | <10 |
| E15 | 06/12/86 | 8.4 | 1400 | 66 | 930 | 120 | 41 | 140 | 1.8 | 200 | 170 | 170 | 186 | 430 | 0.2 | 4 | <5 | <5 | <5 | <5 | | 204 | 14 | <5 | 2 | <5 | <5 |
| E15 | 06/02/87 | | 1290 | | | | | | | 178 | 182 | | | | 0.2 | | | <1 | 3 | 10 | <0.2 | | 14 | <5 | 1 | | 2 |
| * E16 | 04/03/86 | | 2400 | 50 | | | | | | 490 | 460 | | 170 | | 1.4 | 2 | <10 | <10 | <10 | <2 | | | 12 | <5 | <1 | | 11 |
| * E16 | 06/12/86 | 8.1 | 980 | 69 | 600 | 46 | 26 | 130 | 4.4 | 150 | 160 | 80 | 80 | 210 | 0.5 | 10 | <5 | 6 | 9 | <5 | | 610 | <5 | 10 | <1 | <5 | 19 |
| * E16 | 06/02/87 | | 1350 | | | | | | | 206 | 548 | | | | 0.6 | | | <1 | 5 | <5 | <0.2 | | 6 | 7 | 2 | | 12 |
| * E17 | 04/03/86 | | 730 | 58 | | | | | | 110 | 170 | | 100 | | 0.9 | 7 | <10 | <10 | <10 | 4 | | | 4 | 11 | 1 | | 27 |
| * E17 | 06/12/86 | 8.0 | 460 | 71 | 290 | 32 | 12 | 49 | 2.9 | 48 | 54 | 70 | 70 | 120 | 0.1 | 9 | <5 | 13 | 8 | <5 | | 380 | <5 | 11 | <1 | <5 | 26 |
| * E17 | 06/02/87 | | 872 | | | | | | | 120 | 181 | | | | 0.4 | | | 7 | 7 | <5 | <0.2 | | 3 | 10 | 2 | | 21 |
| E18 | 04/03/86 | | 8000 | 63 | | | | | | 1100 | 2400 | | 410 | | 17.0 | 2 | <10 | <2 | <10 | <10 | | | 232 | <5 | 1 | | <10 |
| E18 | 06/12/86 | 8.0 | 7000 | | 5600 | 950 | 180 | 1300 | 9.7 | 950 | 2200 | 290 | 290 | 1300 | 13.0 | 4 | <5 | <5 | <5 | <5 | | 3690 | 200 | 6 | 4 | <5 | <5 |
| E18 | 06/02/87 | | 7290 | | | | | | | 871 | 1940 | | | | 10.5 | | | <1 | <1 | <5 | <0.2 | | 192 | <5 | 5 | | 2 |

* Open Drain

APPENDIX B Table 6. Subsurface Tile Drainage Physical Properties and Chemical Concentrations.
Zone F - Panoche Fan Area

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| F1 | 04/03/86 | 6.9 | 6900 | 61 | | | | | | 890 | 2300 | | 210 | | 7.1 | 1 | <10 | 24 | <10 | <10 | | | 12 | <5 | 104 | | <10 |
| F1 | 06/12/86 | 8.0 | 6100 | 64 | 5700 | 630 | 170 | 1100 | 8.3 | 670 | 2500 | 160 | 160 | 2200 | 5.6 | 1 | <5 | 36 | <5 | <5 | | <5 | 62 | <5 | 128 | <5 | <5 |
| F1 | 06/02/87 | | 7650 | | | | | | | 1078 | 3496 | | | | 5.9 | | | 22 | <3 | <5 | <0.2 | | 15 | <5 | 192 | | <1 |
| F2 | 04/03/86 | 7.2 | 9600 | 60 | | | | | | 1900 | 2500 | | 270 | | 11 | 1 | <10 | 19 | <10 | <10 | | | 22 | 11 | 269 | | <10 |
| F2 | 06/12/86 | 7.9 | 9400 | 64 | 7800 | 670 | 200 | 1800 | 11 | 1900 | 2900 | 180 | 180 | 2400 | 9.2 | 1 | <5 | 19 | <5 | <5 | | 11 | 21 | 11 | 295 | <5 | <5 |
| F2 | 06/02/87 | | 8450 | | | | | | | 1312 | 3674 | | | | 7.8 | | | 7 | <3 | <5 | <0.2 | | 28 | 9 | 177 | | 1 |
| F3 | 04/03/86 | 7.2 | 8600 | 60 | | | | | | 1800 | 2100 | | 280 | | 6.9 | 2 | <10 | 30 | 19 | <10 | | | 16 | 22 | 64 | | 19 |
| F3 | 06/12/86 | 7.8 | 9000 | 65 | 6100 | 490 | 120 | 1500 | 11 | 1600 | 2300 | 180 | 180 | 1700 | 5.7 | 1 | <5 | 33 | 6 | <5 | | 8 | 22 | 13 | 53 | <5 | 12 |
| F3 | 06/02/87 | | 9540 | | | | | | | 1944 | 3251 | | | | 8.2 | | | 11 | <3 | <5 | <0.2 | | 18 | 7 | 111 | | 3 |
| F4 | 04/03/86 | 7.2 | 6600 | 60 | | | | | | 1000 | 2000 | | 180 | | 6.9 | 1 | <10 | 20 | <10 | <10 | | | 27 | 10 | 112 | | <10 |
| F4 | 06/12/86 | 8.1 | 6300 | 65 | 5600 | 490 | 170 | 980 | 9.4 | 990 | 2500 | 150 | 150 | 1550 | 5.6 | 1 | <5 | 25 | <5 | <5 | | 18 | 33 | 10 | 132 | <5 | <5 |
| F4 | 06/02/87 | | 6450 | | | | | | | 855 | 3071 | | | | 6.1 | | | 17 | <3 | <5 | <0.2 | | 22 | 10 | 99 | | 2 |
| F5 | 04/03/86 | 7.3 | 5700 | 60 | | | | | | 820 | 2000 | | 240 | | 4.7 | 1 | <10 | 21 | <10 | <10 | | | 20 | <5 | 68 | | <10 |
| F5 | 06/12/86 | 7.9 | 4900 | 65 | 4300 | 430 | 110 | 790 | 8.8 | 650 | 2000 | 170 | 170 | 1500 | 4.2 | <1 | <5 | 24 | <5 | <5 | | <5 | 31 | <5 | 52 | <5 | <5 |
| F5 | 06/02/87 | | 4970 | | | | | | | 522 | 2564 | | | | 4.5 | | | 14 | <3 | <5 | <0.2 | | 29 | <5 | 44 | | <1 |
| F6 | 04/03/86 | 7.3 | 6200 | 60 | | | | | | 900 | 2200 | | 200 | | 5.9 | 1 | <10 | 14 | <10 | <10 | | | 20 | <5 | 59 | | <10 |
| F6 | 06/12/86 | 8.2 | 5400 | 65 | 4800 | 510 | 130 | 770 | 7.2 | 630 | 2200 | 160 | 160 | 1900 | 4.3 | <1 | <5 | 18 | <5 | <5 | | 5 | 23 | <5 | 50 | <5 | <5 |
| F6 | 06/02/87 | | 5410 | | | | | | | 608 | 2919 | | | | 4.8 | | | 6 | <3 | <5 | <0.2 | 6 | 19 | <5 | 60 | | 1 |
| F7 | 04/03/86 | 7.3 | 7600 | 60 | | | | | | 1300 | 2500 | | 250 | | 10 | 1 | <10 | 18 | <10 | <10 | | | 27 | 12 | 91 | | 12 |
| F7 | 06/12/86 | 8.0 | 7100 | 65 | 5900 | 510 | 150 | 1300 | 11 | 1200 | 2500 | 190 | 190 | 1800 | 6.3 | 1 | <5 | 26 | <5 | <5 | | <5 | 27 | <5 | 76 | <5 | <5 |
| F7 | 06/02/87 | | 7470 | | | | | | | 1090 | 3560 | | | | 6.6 | | | 13 | 2 | <5 | <0.2 | | 25 | 8 | 83 | | 1 |
| F8 | 04/03/86 | 7.3 | 8000 | 60 | | | | | | 1500 | 2500 | | 240 | | 9.7 | 1 | <10 | 17 | <10 | <10 | | | 27 | 11 | 75 | | <10 |
| F8 | 06/12/86 | 8.0 | 7500 | 66 | 6400 | 580 | 190 | 1400 | 9.6 | 1300 | 2800 | 210 | 210 | 2200 | 7.5 | 1 | <5 | 20 | <5 | <5 | | <5 | 31 | 9 | 74 | <5 | <5 |
| F8 | 06/02/87 | | 4870 | | | | | | | 631 | 1788 | | | | 3.8 | | | 11 | <3 | <5 | <0.2 | | 26 | 7 | 51 | | 1 |
| F9 | 04/03/86 | 7.5 | 7900 | 60 | | | | | | 1600 | 2300 | | 170 | | 11 | 1 | <10 | 26 | <10 | <10 | | | 22 | <5 | 192 | | <10 |
| F9 | 06/12/86 | 8.1 | 9000 | 64 | 6800 | 600 | 200 | 1300 | 8.0 | 1500 | 2600 | 190 | 190 | 2300 | 8.6 | | <5 | 41 | <5 | <5 | | <5 | 18 | <5 | 178 | <5 | <5 |
| F9 | 06/02/87 | | 8900 | | | | | | | 1498 | 3861 | | | | 8.4 | | | 36 | <3 | <5 | <0.2 | | 20 | <5 | 177 | | 3 |
| F10 | 04/03/86 | 7.2 | 9500 | 61 | | | | | | 2000 | 2300 | | 220 | | 10.6 | <1 | <10 | 32 | <10 | <10 | | | 13 | <5 | 337 | | <10 |
| F10 | 06/12/86 | 8.0 | 9000 | 64 | 7500 | 730 | 220 | 1600 | 9.7 | 1700 | 2700 | 140 | 140 | 2200 | 8.8 | | <5 | 46 | <5 | <5 | | <5 | 14 | <5 | 298 | <5 | <5 |

APPENDIX B Table 6. (cont.)

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | ug/L | | | | | | | | | | | | |
| F10 | 06/02/87 | | 9200 | | | | | | | 2022 | 3916 | | | | 8.9 | | | 42 | <3 | <5 | <0.2 | | 15 | <5 | 285 | | <1 |
| F11 | 04/03/86 | 7.2 | 5800 | 60 | | | | | | 810 | 2200 | | 230 | | 8.1 | 1 | <10 | 23 | <10 | <10 | | | 22 | 6 | 73 | | <10 |
| F11 | 06/12/86 | 8.1 | 6500 | 63 | 5600 | 560 | 190 | 980 | 7.7 | 630 | 2600 | 190 | 190 | 1800 | 6.6 | | <5 | 36 | <5 | <5 | | <5 | 21 | <5 | 95 | <5 | <5 |
| F11 | 06/02/87 | | 5940 | | | | | | | 1052 | 3327 | | | | 5.6 | | | 23 | <3 | <5 | <0.2 | | 26 | <5 | 79 | | 2 |
| F12 | 04/03/86 | 7.3 | 7200 | 60 | | | | | | 1200 | 2400 | | 230 | | 9.0 | 1 | <10 | 5 | <10 | <10 | | | 28 | 10 | 134 | | <10 |
| F12 | 06/12/86 | 8.1 | 8000 | 65 | 6900 | 630 | 210 | 1500 | 8.6 | 1200 | 3100 | 200 | 200 | 2200 | 8.1 | | <5 | 14 | 6 | <5 | | 11 | 37 | 7 | 168 | <5 | 6 |
| F12 | 06/02/87 | | 7620 | | | | | | | 665 | 3671 | | | | 5.8 | | | 7 | 2 | <5 | <0.2 | | 33 | 6 | 125 | | 2 |
| F13 | 04/03/86 | 7.2 | 11000 | 60 | | | | | | 2000 | 3100 | | 250 | | 0.3 | 2 | <10 | 17 | <10 | <10 | | | 25 | 8 | 371 | | 10 |
| F13 | 06/12/86 | 8.1 | 11100 | 64 | 9500 | 650 | 310 | 1900 | 8.5 | 2100 | 3900 | 170 | 170 | 2400 | 12 | | <5 | 30 | <5 | <5 | | <5 | 30 | 5 | 394 | <5 | <5 |
| F13 | 06/02/87 | | 11500 | | | | | | | 1944 | 4598 | | | | 13 | | | 8 | <3 | <5 | <0.2 | | 26 | <5 | 422 | | 2 |
| F14 | 04/03/86 | 7.5 | 7400 | 60 | | | | | | 860 | 2800 | | 250 | | 10 | <1 | <10 | 7 | <10 | <10 | | | 39 | 7 | 219 | | <10 |
| F14 | 06/12/86 | 8.2 | 8400 | 63 | 7400 | 570 | 200 | 1800 | 9.6 | 840 | 3700 | 200 | 200 | 2300 | 10 | | <5 | 10 | <5 | <5 | | 40 | 41 | 6 | 253 | <5 | <5 |
| F14 | 06/02/87 | | 7140 | | | | | | | 483 | 3465 | | | | 8.7 | | | <1 | <3 | <5 | <0.2 | | 64 | <5 | 52 | | 6 |
| F15 | 04/03/86 | 7.3 | 6100 | 60 | | | | | | 570 | 2500 | | 250 | | 8.1 | <1 | <10 | 5 | <10 | <10 | | | 34 | 5 | 162 | | <10 |
| F15 | 06/12/86 | 8.2 | 8200 | 63 | 6300 | 530 | 250 | 1400 | 9.0 | 760 | 3800 | 190 | 190 | 2400 | 9.9 | | <5 | 24 | <5 | <5 | | 9 | 44 | <5 | 256 | <5 | <5 |
| F15 | 06/02/87 | | 8550 | | | | | | | 780 | 5367 | | | | 10.6 | | | 8 | <3 | <5 | <0.2 | | 51 | <5 | 248 | | 2 |
| F16 | 04/03/86 | 6.6 | 14750 | 57 | | | | | | 136 | 1000 | | 100 | | 2.5 | 1 | <10 | <10 | <10 | <2 | | | 12 | 8 | 35 | | <10 |
| F16 | 06/12/86 | 7.9 | 8300 | 64 | 7100 | 720 | 210 | 1300 | 9.9 | 1200 | 2800 | 160 | 160 | 2400 | 9.0 | | <5 | 45 | <5 | <5 | | 32 | 19 | 10 | 301 | <5 | 6 |
| F16 | 06/02/87 | | 11100 | | | | | | | 1828 | 4400 | | | | 13 | | | 40 | <3 | <5 | <0.2 | | 34 | <5 | 521 | | 4 |
| F17 | 04/03/86 | 7.1 | 6100 | 60 | | | | | | 890 | 2100 | | 210 | | 8.5 | 1 | <10 | 26 | <10 | <2 | | | 30 | <5 | 112 | | 11 |
| F17 | 06/12/86 | 8.2 | 5900 | 67 | 4700 | 480 | 170 | 980 | 9.0 | 650 | 2100 | 180 | 180 | 1800 | 6.5 | | <5 | 28 | <5 | <5 | | <5 | 33 | <5 | 103 | <5 | <5 |
| F17 | 06/02/87 | | 5930 | | | | | | | 720 | 2826 | | | | 6.2 | | | 19 | <3 | <5 | <0.2 | | 36 | <5 | 106 | | 3 |
| F18 | 04/03/86 | 7.2 | 11000 | 60 | | | | | | 2200 | 2600 | | 200 | | 16 | <1 | <10 | 41 | <10 | <2 | | | 33 | 11 | 334 | | <10 |
| F18 | 06/12/86 | 8.1 | 8600 | 66 | 7300 | 570 | 210 | 1700 | 9.6 | 1300 | 2500 | 200 | 200 | 2300 | 10 | | <5 | 36 | <5 | <5 | | 19 | 32 | 10 | 296 | <5 | <5 |
| F18 | 06/02/87 | | 11000 | | | | | | | 2019 | 4167 | | | | 11 | | | 46 | <3 | <5 | <0.2 | | 34 | 6 | 341 | | 8 |
| F19 | 04/03/86 | 7.2 | 8200 | 59 | | | | | | 910 | 2600 | | 220 | | 11 | <1 | <10 | 16 | <10 | <2 | | | 38 | 8 | 308 | | <10 |
| F19 | 06/12/86 | 8.3 | 8500 | 65 | 7600 | 560 | 240 | 1600 | 11 | 810 | 3600 | 160 | 160 | 2400 | 13 | | <5 | 21 | <5 | <5 | | <5 | 46 | 6 | 282 | <5 | <5 |
| F19 | 06/02/87 | | 8740 | | | | | | | 911 | 5000 | | | | 12 | | | 13 | <3 | <5 | <0.2 | | 54 | <5 | 334 | | 4 |
| F20 | 04/03/86 | 7.5 | 4500 | 60 | | | | | | 460 | 1500 | | 230 | | 7.5 | 1 | <10 | <10 | <10 | 9 | | | 24 | 9 | 93 | | 12 |
| F20 | 06/12/86 | 8.1 | 8000 | 67 | 7500 | 600 | 240 | 1800 | 11 | 940 | 3400 | 180 | 180 | 2400 | 11 | | <5 | 27 | <5 | <5 | | <5 | 39 | <5 | 281 | <5 | <5 |
| F20 | 06/02/87 | | 7380 | | | | | | | 745 | 4260 | | | | 9.0 | | | 4 | <3 | <5 | <0.2 | | 50 | 8 | 160 | | 3 |

APPENDIX B Table 6. (cont.)

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | ug/L | | | | | | | | | | | | |
| F21 | 04/03/86 | 7.2 | 11000 | 59 | | | | | | 1800 | 3000 | | 270 | | 15 | 1 | <10 | 20 | <10 | <2 | | | 17 | 18 | 409 | | 17 |
| F21 | 06/12/86 | 8.3 | 10000 | 63 | 9400 | 610 | 220 | 2200 | 12 | 1500 | 3800 | 240 | 240 | 2400 | 14 | 1 | <5 | 19 | <5 | <5 | | 6 | 13 | 17 | 338 | <5 | 8 |
| F21 | 06/02/87 | | 11100 | | | | | | | 1385 | 5233 | | | | 15 | | | 11 | <3 | <5 | <0.2 | | 22 | 16 | 382 | | 4 |
| F22 | 04/03/86 | 7.2 | 7600 | 60 | | | | | | 760 | 2200 | | 200 | | 15 | 1 | <10 | 18 | <10 | <2 | | | 45 | 11 | 235 | | 15 |
| F22 | 06/12/86 | 8.3 | 7600 | 66 | 7200 | 510 | 150 | 1600 | 8.9 | 860 | 3000 | 200 | 200 | 1900 | 12 | 1 | <5 | 26 | <5 | <5 | | <5 | 35 | <5 | 275 | <5 | <5 |
| F22 | 06/02/87 | | 7650 | | | | | | | 770 | 3700 | | | | 11 | | | 10 | <1 | <5 | <0.2 | | 43 | 7 | 228 | | 3 |
| F23 | 04/03/86 | 7.4 | 8000 | 60 | | | | | | 1100 | 2300 | | 240 | | 13 | 1 | <10 | 24 | <10 | <2 | | | 37 | 12 | 182 | | <10 |
| F23 | 06/12/86 | 8.1 | 8000 | 65 | 6900 | 480 | 150 | 1700 | 9.9 | 840 | 3200 | 260 | 260 | 1800 | 9.2 | 1 | <5 | 35 | <5 | <5 | | <5 | 24 | 13 | 194 | <5 | <5 |
| F23 | 06/02/87 | | 7860 | | | | | | | 942 | 3828 | | | | 8.8 | | | 18 | <3 | <5 | <0.2 | | 38 | 9 | 160 | | 4 |
| F24 | 04/03/86 | 7.0 | 23000 | 59 | | | | | | 4900 | 4800 | | 450 | | 33 | 1 | <10 | 11 | 10 | <10 | | | 15 | 13 | 2478 | | <10 |
| F24 | 06/12/86 | 8.1 | 16000 | 64 | 14100 | 670 | 300 | 3400 | 13 | 3600 | 4300 | 300 | 300 | 3300 | 24 | 1 | <5 | 22 | 6 | <5 | | <5 | 13 | 10 | 1830 | <5 | <5 |
| F24 | 06/02/87 | | 14000 | | | | | | | 2502 | 4988 | | | | 17 | | | 13 | <3 | <5 | <0.2 | | 26 | 8 | 974 | | 2 |
| F25 | 04/03/86 | 7.4 | 9600 | 60 | | | | | | 1500 | 3400 | | 230 | | 23 | 2 | <10 | 31 | <10 | <2 | | | 76 | 6 | 727 | | 13 |
| F25 | 06/12/86 | 8.3 | 8000 | 64 | 7700 | 490 | 190 | 1600 | 8.2 | 830 | 3200 | 190 | 190 | 2100 | 14 | 1 | <5 | 36 | <5 | <5 | | <5 | 52 | 5 | 940 | <5 | <5 |
| F25 | 06/02/87 | | 9730 | | | | | | | 1133 | 5425 | | | | 15 | | | 43 | 1 | 6 | <0.2 | | 77 | 10 | 731 | | 5 |
| * F26 | 04/03/86 | 8.1 | 8800 | 63 | | | | | | 1800 | 2300 | | 210 | | 11 | 2 | <10 | 34 | <10 | <10 | | | 14 | 7 | 289 | | 16 |
| * F26 | 06/12/86 | 8.4 | 3200 | 69 | 2300 | 200 | 73 | 430 | 8.6 | 420 | 850 | 170 | 170 | 860 | 2.7 | 2 | <5 | 28 | 7 | <5 | | 62 | 10 | 9 | 62 | <5 | <5 |
| * F26 | 06/02/87 | | 5040 | | | | | | | 803 | 1829 | | | | 3.9 | | | 74 | 59 | 8 | <0.2 | | 3 | 51 | 102 | | 120 |
| * F27 | 04/03/86 | 8.2 | 1450 | 66 | | | | | | 190 | 700 | | 110 | | 2.3 | 13 | <10 | 78 | 56 | 14 | | | 1 | 81 | 28 | | 150 |
| * F27 | 06/12/86 | 8.2 | 3600 | 72 | 2700 | 270 | 96 | 460 | 6.5 | 400 | 1200 | 130 | 130 | 1100 | 3.3 | | <5 | 28 | 23 | <5 | | 390 | <5 | 53 | 22 | <5 | 37 |
| * F27 | 06/02/87 | | 2950 | | | | | | | 322 | 1468 | | | | 2.6 | | | 32 | 10 | <5 | <0.2 | | 4 | 19 | 38 | | 37 |
| * F28 | 04/03/86 | 8.0 | 4000 | 67 | | | | | | 550 | 1400 | | 140 | | 4.8 | 4 | <10 | 23 | 10 | <2 | | | 11 | 13 | 58 | | 23 |
| * F28 | 06/12/86 | 8.0 | 3200 | 75 | 2000 | 210 | 74 | 490 | 5.6 | 320 | 830 | 120 | 120 | 820 | 2.8 | | <5 | 22 | 7 | <5 | | 119 | 10 | 18 | 28 | <5 | 16 |
| * F28 | 06/02/87 | | 3230 | | | | | | | 391 | 1210 | | | | 2.8 | | | 47 | 22 | <5 | <0.2 | | 3 | 48 | 38 | | 70 |
| * F29 | 04/03/86 | 8.3 | 8200 | 73 | | | | | | 1500 | 2200 | | 150 | | 12 | 1 | <10 | 21 | <10 | <2 | | | 24 | 10 | 247 | | 13 |
| * F29 | 06/12/86 | 8.1 | 1700 | 74 | 1000 | 92 | 28 | 210 | 6.5 | 200 | 360 | 98 | 98 | 370 | 1.3 | 13 | <5 | 62 | 28 | <5 | | 440 | <5 | 55 | 42 | <5 | 27 |
| * F29 | 06/02/87 | | 1900 | | | | | | | 237 | 675 | | | | 1.4 | | | 44 | 22 | <5 | <0.2 | | 2 | 32 | 30 | | 65 |
| * F30 | 04/03/86 | 8.0 | 3800 | 64 | | | | | | 520 | 1200 | | 140 | | 4.8 | 2 | <10 | 12 | 11 | <2 | | | 12 | 10 | 88 | | 11 |
| * F30 | 06/12/86 | 8.1 | 1800 | 67 | 1200 | 180 | 36 | 220 | 11 | 240 | 420 | 100 | 100 | 370 | 1.2 | | <5 | 190 | 158 | <5 | | 1830 | <5 | 400 | | <5 | 145 |
| * F30 | 06/02/87 | | 683 | | | | | | | 340 | 162 | | | | 0.4 | | | 5 | 3 | 6 | <0.2 | | 2 | <5 | 3 | | 6 |
| * F31 | 04/03/86 | 8.4 | 2800 | 60 | | | | | | 330 | 870 | | 110 | | 2.9 | 2 | <10 | <10 | <10 | <2 | | | 11 | 10 | 62 | | 15 |

APPENDIX B Table 6. (cont.)

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| * F31 | 06/12/86 | 8.2 | 2800 | 69 | 2100 | 180 | 65 | 380 | 7.5 | 380 | 790 | 110 | 110 | 820 | 2.4 | 3 | <5 | 20 | 6 | <5 | | 58 | 10 | 8 | 34 | <5 | <5 |
| * F31 | 06/02/87 | | 3270 | | | | | | | 398 | 1381 | | | | 3.2 | | | 11 | 3 | <5 | <0.2 | | 11 | 6 | 75 | | 8 |
| F41 | 05/05/86 | | | | | | | | | | | | | | | 2 | <5 | 6 | <5 | <5 | | <5 | 102 | | 15 | <5 | 12 |
| F41 | 06/23/87 | 8.0 | 5100 | | 4400 | 420 | 180 | 720 | 2.0 | 200 | 2500 | 150 | 150 | 1790 | 14 | | | 9 | 2 | <5 | <0.2 | | 154 | <5 | 26 | | 4 |
| F42 | 05/05/86 | | | | | | | | | | | | | | | 3 | <5 | 6 | <5 | <5 | | 5 | 45 | | 29 | <5 | 33 |
| F42 | 06/23/87 | 8.0 | 9500 | | 7900 | 430 | 250 | 1900 | 3.1 | 740 | 4300 | 170 | 170 | 1864 | 26 | | | 8 | <3 | 5 | <0.2 | | 235 | <5 | 44 | | 2 |
| F43 | 05/05/86 | | | | | | | | | | | | | | | 2 | <5 | 5 | <5 | <5 | | 11 | 36 | | 5 | <5 | <5 |
| F44 | 05/05/86 | | | | | | | | | | | | | | | 4 | 15 | <5 | 5 | <5 | | <5 | 56 | | 62 | <5 | 9 |
| F44 | 06/23/87 | 8.1 | 3900 | | 3000 | 220 | 66 | 660 | 3.4 | 240 | 1500 | 250 | 250 | 821 | 7.1 | | | <1 | 3 | <5 | <0.2 | | 105 | 5 | 25 | | 5 |
| F45 | 05/05/86 | | | | | | | | | | | | | | | 3 | <5 | <5 | <5 | 8 | | <5 | 188 | | 33 | <5 | 18 |
| F46 | 05/05/86 | | | | | | | | | | | | | | | 4 | <5 | <5 | <5 | <5 | | 23 | 186 | | 60 | <5 | 24 |
| F46 | 06/23/87 | 8.2 | 1400 | | 930 | 110 | 27 | 180 | 3.4 | 100 | 380 | 170 | 170 | 353 | 1.6 | | | <1 | <1 | <5 | <0.2 | | 17 | <5 | 5 | | <1 |
| F47 | 05/05/86 | | | | | | | | | | | | | | | 3 | 5 | 13 | <5 | <5 | | 6 | 195 | | 159 | <5 | 60 |
| F47 | 05/16/86 | | | | | | | | | | | | | | | 2 | <5 | 14 | <5 | <5 | | 6 | 170 | | 150 | <5 | 31 |
| F47 | 06/23/87 | 7.9 | 10000 | | 9200 | 530 | 270 | 1900 | 3.6 | 810 | 5200 | 120 | 120 | 2434 | 21 | | | 6 | 2 | 8 | 0.6 | | 242 | <5 | 152 | | 4 |
| F48 | 05/05/86 | | | | | | | | | | | | | | | 2 | 12 | 9 | <5 | <5 | | 13 | 38 | | 73 | <5 | 45 |
| F48 | 06/23/87 | 8.1 | 3000 | | 2100 | 160 | 68 | 480 | 3.6 | 260 | 900 | 220 | 220 | 651 | 4.1 | | | 2 | <1 | 6 | <0.2 | | 56 | 8 | 26 | | 2 |
| F49 | 05/05/86 | | | | | | | | | | | | | | | 2 | 5 | 14 | <5 | <5 | | <5 | 160 | | 202 | <5 | 43 |
| F49 | 06/23/87 | 8.0 | 7000 | | 5200 | 230 | 120 | 1300 | 4.2 | 650 | 2400 | 210 | 210 | 1027 | 14 | | | 8 | <3 | 5 | 0.7 | | 123 | 6 | 132 | | 3 |
| F50 | 06/23/87 | 7.9 | 7000 | | 5600 | 360 | 250 | 1200 | 4.1 | 850 | 2400 | 290 | 290 | 1903 | 31 | | | 14 | 2 | <5 | 1.1 | | 39 | <5 | 11 | | 1 |
| F51 | 06/23/87 | 7.9 | 5000 | | 4200 | 560 | 180 | 590 | 6.7 | 500 | 2000 | 280 | 280 | 2139 | 5.9 | | | 3 | 2 | 6 | <0.2 | | 126 | 8 | 3 | | 1 |
| F52 | 06/23/87 | 8.0 | 5900 | | 4300 | 300 | 210 | 860 | 3.6 | 950 | 1600 | 310 | 310 | 1317 | 3.0 | | | <1 | 1 | <5 | <0.2 | | 141 | <5 | 2 | | 2 |
| F53 | 06/23/87 | 7.8 | 7100 | | 5400 | 580 | 140 | 960 | 3.5 | 1100 | 2100 | 160 | 160 | 2024 | 5.9 | | | 8 | <3 | <5 | <0.2 | | 8 | <5 | 215 | | 5 |
| F54 | 05/19/86 | | | | | | | | | | | | | | | 2 | 6 | 6 | 5 | <5 | | 7 | 9 | | 193 | <5 | 26 |
| F54 | 06/23/87 | 7.8 | 5300 | | 4300 | 450 | 110 | 630 | 3.5 | 500 | 2000 | 180 | 180 | 1576 | 3.6 | | | 14 | <3 | <5 | <0.2 | | 7 | <5 | 145 | | 7 |
| F55 | 05/05/86 | | | | | | | | | | | | | | | 1 | <5 | <5 | <5 | <5 | | <5 | <5 | | <1 | <5 | 8 |
| F55 | 06/23/87 | | | | | | | | | | | | | | | | | 4 | <1 | <5 | <0.2 | | 3 | <5 | 1 | | 3 |
| F56 | 05/05/86 | | | | | | | | | | | | | | | 1 | <5 | 17 | <5 | <5 | | 14 | 12 | | 10 | <5 | <5 |
| F56 | 06/23/87 | 8.1 | 1300 | | 760 | 64 | 45 | 170 | 0.8 | 180 | 140 | 220 | 220 | 345 | 9.9 | | | 16 | <3 | <5 | 0.5 | | 11 | <5 | 12 | | 7 |
| F56 | 06/23/87 | 8.0 | 7600 | | 5200 | 300 | 300 | 950 | 2.5 | 550 | 2300 | 420 | 420 | 1984 | | | | | | | | | | | | | |
| F57 | 06/23/87 | 8.1 | 1800 | | 1100 | 130 | 60 | 200 | 4.0 | 220 | 220 | 320 | 320 | 555 | 1.5 | | | 23 | 2 | <5 | <0.2 | | 2 | <5 | 3 | | 6 |

APPENDIX B Table 6. (cont.)

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| F58 | 05/05/86 | | | | | | | | | | | | | | | 1 | 57 | <5 | 5 | <5 | | <5 | <5 | | 0 | <5 | 31 |
| F58 | 06/23/87 | 8.2 | 690 | | 400 | 48 | 20 | 57 | 1.2 | 84 | 68 | 140 | 140 | 202 | 0.3 | | | <1 | <1 | <5 | <0.2 | | 7 | <5 | 1 | | <1 |
| F59 | 05/05/86 | | | | | | | | | | | | | | | 10 | 49 | 39 | 40 | 6 | | 300 | <5 | | <1 | <5 | 82 |
| F60 | 05/05/86 | | | | | | | | | | | | | | | 1 | <5 | <5 | <5 | <5 | | <5 | 6 | | <1 | <5 | <5 |
| F60 | 06/23/87 | 8.0 | 710 | | 410 | 50 | 22 | 55 | 1.2 | 100 | 76 | 140 | 140 | 215 | 0.3 | | | 3 | <1 | <5 | <0.2 | | 8 | <5 | <1 | | <1 |
| F61 | 05/05/86 | | | | | | | | | | | | | | | 2 | 5 | 42 | <5 | <5 | | 34 | 5 | | 9 | <5 | <5 |
| F61 | 06/23/87 | 7.8 | 6200 | | 5000 | 380 | 220 | 930 | 3.8 | 850 | 2200 | 340 | 340 | 1854 | 11 | | | 42 | <3 | 6 | 0.8 | | 4 | <5 | 11 | | 1 |
| F62 | 05/05/86 | | | | | | | | | | | | | | | 4 | <5 | 31 | <5 | <5 | | 13 | <5 | | 4 | <5 | <5 |
| F62 | 06/23/87 | 7.8 | 3400 | | 2400 | 210 | 120 | 410 | 4.4 | 390 | 780 | 400 | 400 | 936 | 6.8 | | | <1 | <3 | <5 | <0.2 | | 2 | <5 | 3 | | <1 |
| F63 | 06/23/87 | 8.0 | 2800 | | 1800 | 110 | 100 | 410 | 3.9 | 340 | 400 | 480 | 480 | 686 | 2.1 | | | <1 | <1 | <5 | <0.2 | | 20 | <5 | 4 | | 2 |
| F64 | 06/23/87 | 8.1 | 1900 | | 1200 | 110 | 85 | 180 | 1.6 | 240 | 260 | 370 | 370 | 624 | 1.4 | | | <1 | <1 | <5 | <0.2 | | 6 | <5 | <1 | | <1 |
| F65 | 06/23/87 | 7.5 | 2000 | | 1300 | 140 | 72 | 230 | 13 | 190 | 420 | 320 | 320 | 621 | 1.8 | | | 6 | 6 | <5 | <0.2 | | 10 | 6 | 4 | | 8 |
| F66 | 06/23/87 | 8.0 | 3700 | | 2500 | 130 | 150 | 580 | 1.3 | 400 | 720 | 650 | 650 | 942 | 2.4 | | | <1 | <3 | <5 | <0.2 | | 36 | <5 | 1 | | < |
| F67 | 06/23/87 | 8.0 | 1700 | | 1100 | 130 | 81 | 160 | 5.4 | 240 | 260 | 330 | 330 | 658 | 0.9 | | | 3 | <1 | <5 | <0.2 | | 4 | <5 | 1 | | <1 |
| F68 | 06/23/87 | | | | | | | | | | | | | | | | | 3 | <1 | <5 | <0.2 | | 6 | <5 | 1 | | <1 |
| F69 | 06/23/87 | 8.0 | 1900 | | 1200 | 140 | 73 | 200 | 1.2 | 260 | 220 | 370 | 370 | 616 | 0.8 | | | <1 | <1 | <5 | <0.2 | | 3 | <5 | 1 | | <1 |
| F70 | 06/23/87 | 8.1 | 1000 | | 610 | 63 | 41 | 100 | 0.5 | 150 | 80 | 210 | 210 | 319 | 0.4 | | | <1 | <1 | <5 | <0.2 | | 5 | <5 | 1 | | <1 |
| F71 | 06/23/87 | 8.0 | 1100 | | 670 | 73 | 44 | 100 | 0.4 | 140 | 130 | 200 | 200 | 363 | 0.4 | | | 1 | <1 | <5 | <0.2 | | 6 | <5 | <1 | | <1 |
| F72 | 06/23/87 | 8.1 | 920 | | 550 | 72 | 36 | 78 | 0.7 | 100 | 75 | 240 | 240 | 328 | 0.3 | | | <1 | <1 | <5 | <0.2 | | 3 | <5 | 1 | | <1 |
| F73 | 06/23/87 | 8.1 | 1400 | | 860 | 85 | 53 | 160 | 0.8 | 150 | 190 | 310 | 310 | 430 | 0.8 | | | <1 | <1 | <5 | <0.2 | | 3 | <5 | <1 | | < |
| F74 | 06/23/87 | 8.2 | 1100 | | 700 | 95 | 35 | 98 | 0.9 | 140 | 140 | 230 | 230 | 381 | 0.5 | | | 2 | <1 | <5 | <0.2 | | 2 | <5 | 1 | | 2 |
| F75 | 06/23/87 | 8.2 | 2300 | | 1500 | 110 | 96 | 310 | 0.7 | 240 | 460 | 430 | 430 | 670 | 1.8 | | | 7 | <3 | <5 | <0.2 | | 7 | <5 | 6 | | 1 |
| F76 | 06/23/87 | 8.1 | 3400 | | 2500 | 131 | 150 | 510 | 0.9 | 330 | 900 | 510 | 510 | 860 | 2.9 | | | 3 | <3 | <5 | <0.2 | | 13 | <5 | 3 | | 1 |
| F77 | 06/23/87 | 7.9 | 4200 | | 3400 | 180 | 220 | 540 | 3.9 | 400 | 1300 | 510 | 510 | 1430 | 3.3 | | | 3 | <3 | <5 | <0.2 | | 8 | <5 | 2 | | 1 |
| F78 | 06/23/87 | 8.0 | 5900 | | 5100 | 390 | 400 | 730 | 8.4 | 490 | 2500 | 590 | 590 | 2496 | 4.4 | | | <1 | 5 | <5 | <0.2 | | 26 | 20 | 1 | | 2 |
| F79 | 06/23/87 | 7.8 | 8000 | | 6800 | 300 | 380 | 1400 | 1.7 | 650 | 3700 | 510 | 510 | 2313 | 4.9 | | | 3 | <3 | <5 | <0.2 | | 29 | 6 | 10 | | 2 |
| F80 | 05/05/86 | | | | | | | | | | | | | | | 2 | 22 | 36 | 6 | <5 | | 16 | 150 | | 186 | <5 | 20 |
| F81 | 05/05/86 | | | | | | | | | | | | | | | <1 | 14 | 25 | 9 | <5 | | <5 | 254 | | | <5 | 29 |
| F82 | 04/03/86 | 7.0 | 5200 | 62 | | | | | | 480 | 2100 | | 250 | | 5.2 | 1 | <10 | 2 | <10 | <10 | | | 62 | <5 | 161 | | 10 |
| F82 | 06/12/86 | 7.8 | 4400 | 64 | 2600 | 650 | 83 | 500 | 5.0 | 11 | 1800 | 180 | 180 | 1600 | 3.1 | 2 | <5 | <5 | <5 | <5 | | 8 | <5 | <5 | 96 | <5 | <5 |
| F83 | 04/03/86 | 7.0 | 5600 | 62 | | | | | | 720 | 2100 | | 160 | | 7.1 | <1 | <10 | 14 | <10 | <10 | | | 8 | <5 | 148 | | 12 |

APPENDIX B Table 6. (cont.)

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| F83 | 06/12/86 | 8.1 | 5500 | 65 | 4800 | 640 | 96 | 740 | 4.0 | 910 | 2400 | 160 | 160 | 1800 | 5.2 | 1 | <5 | 13 | <5 | <5 | | 11 | <5 | <5 | 150 | <5 | <5 |
| F83 | 06/02/87 | | 5520 | | | | | | | 615 | 1990 | | | | 5.5 | | | 10 | <1 | <5 | <0.2 | | 6 | <5 | 130 | | 2 |
| F84 | 04/03/86 | 7.1 | 5900 | 61 | | | | | | 1300 | 2000 | | 170 | | 7.4 | <1 | <10 | 13 | <10 | <10 | | | 8 | <5 | 236 | | <10 |
| F84 | 06/12/86 | 8.0 | 6700 | 65 | 5300 | 710 | 120 | 1100 | 5.1 | 1250 | 2500 | 220 | 220 | 2100 | 6.4 | 1 | <5 | 13 | <5 | <5 | | <5 | 7 | <5 | 225 | <5 | 11 |
| F84 | 06/02/87 | | 7310 | | | | | | | 1199 | 2300 | | | | 5.5 | | | 100 | <1 | <5 | <0.2 | | 4 | <5 | 235 | | 1 |
| F85 | 04/03/86 | 8.1 | 3900 | 61 | | | | | | 180 | 1600 | | 130 | | 8.0 | 2 | <5 | 17 | <5 | <5 | | 43 | 102 | | 196 | <5 | <5 |
| F85 | 06/12/86 | 8.2 | 3400 | 66 | 3000 | 410 | 72 | 420 | 2.7 | 140 | 1700 | 120 | 120 | 2400 | 6.2 | 2 | <5 | 5 | <5 | <5 | | 26 | 99 | <5 | 8 | <5 | <5 |
| F85 | 06/02/87 | | 2120 | | | | | | | 86 | 2336 | | | | 2.5 | | | <1 | <1 | 6 | <0.2 | | 60 | <5 | 9 | | <1 |
| F86 | 04/03/86 | 8.0 | 5200 | 60 | | | | | | 440 | 2500 | | 200 | | 8.4 | 1 | <5 | 18 | <5 | <5 | | 5 | 35 | | 236 | <5 | <5 |
| F86 | 06/12/86 | 8.2 | 3700 | 65 | 2800 | 310 | 100 | 400 | 3.6 | 270 | 1600 | 300 | 300 | 1300 | 4.8 | 1 | <5 | 28 | <5 | <5 | | <5 | 31 | <5 | 69 | <5 | <5 |
| F86 | 06/02/87 | | 2910 | | | | | | | 574 | 1421 | | | | 2.8 | | | 6 | <1 | <5 | <0.2 | | 26 | <5 | 33 | | <1 |
| F87 | 04/03/86 | | 12500 | 60 | | | | | | 1900 | 5000 | | 190 | | 22 | 2 | <5 | 22 | <5 | <5 | | <5 | 146 | | 429 | <5 | <5 |
| F87 | 06/12/86 | 8.1 | 10000 | 64 | 8700 | 460 | 240 | 2300 | 9.4 | 31 | 4700 | 190 | 190 | 2300 | 20 | 3 | <5 | 20 | 6 | <5 | | 16 | 115 | 10 | 310 | <5 | 23 |
| F87 | 06/02/87 | | 9160 | | | | | | | 735 | 4110 | | | | 16 | | | 20 | <1 | <5 | <0.2 | | 121 | 8 | 200 | | 2 |
| F88 | 04/03/86 | | 5800 | 60 | | | | | | 380 | 3100 | | 200 | | 11 | 2 | <5 | 13 | <5 | <5 | | 19 | 100 | | 57 | <5 | <5 |
| F88 | 06/02/87 | | 5940 | | | | | | | 222 | 2500 | | | | 10 | | | 10 | <1 | <5 | <0.2 | | 106 | <5 | 53 | | 4 |
| F89 | 04/03/86 | | 9000 | 60 | | | | | | 690 | 5300 | | 240 | | 21 | 2 | <5 | 14 | <5 | <5 | | 14 | 188 | | 200 | <5 | <5 |
| F89 | 06/12/86 | 8.4 | 8200 | 67 | 7300 | 290 | 190 | 1800 | 7.1 | 550 | 3700 | 220 | 228 | 1500 | 19 | 3 | <5 | 22 | <5 | <5 | | 45 | 149 | 11 | 125 | <5 | <5 |
| F89 | 06/02/87 | | 9880 | | | | | | | 715 | 4090 | | | | 21 | | | 15 | <1 | <5 | <0.2 | | 146 | 8 | 197 | | 2 |
| F90 | 04/03/86 | | 1450 | 60 | | | | | | 150 | 810 | | 200 | | 2.5 | 1 | <5 | <5 | <5 | <5 | | 16 | 44 | | 56 | <5 | <5 |
| F90 | 06/12/86 | 8.3 | 2000 | | 1700 | 220 | 61 | 220 | 3.7 | 120 | 740 | 190 | 190 | 790 | 1.9 | 1 | <5 | 7 | <5 | <5 | | 40 | 29 | 6 | 12 | <5 | 10 |
| F90 | 06/02/87 | | 2790 | | | | | | | 191 | 950 | | | | 3.6 | | | 1 | <1 | <5 | <0.2 | | 52 | <5 | 32 | | 1 |
| F91 | 04/03/86 | | 7000 | 60 | | | | | | 540 | 3300 | | 190 | | 13 | 6 | <5 | 33 | 22 | 5 | | 308 | 92 | | 105 | <5 | 45 |
| F91 | 06/12/86 | 7.8 | 22000 | 65 | 22800 | 410 | 460 | 610 | 15 | 2400 | 12000 | 210 | 210 | 3000 | 61 | 3 | <5 | 12 | <5 | <5 | | 16 | 724 | 12 | 308 | <5 | <5 |
| F91 | 06/02/87 | | 14700 | | | | | | | 1364 | 6585 | | | | 34 | | | 10 | 3 | <5 | <0.2 | | 286 | 9 | 181 | | <1 |
| F92 | 04/03/86 | | 5300 | 60 | | | | | | 340 | 2400 | | 240 | | 11 | 2 | <5 | 22 | <5 | <5 | | 6 | 86 | | 50 | <5 | <5 |
| F92 | 06/12/86 | 8.2 | 5100 | 66 | 4600 | 380 | 140 | 885 | 4.6 | 260 | 2500 | 170 | 170 | 1500 | 9.8 | 2 | <5 | 20 | <5 | <5 | | 14 | 99 | 8 | 35 | <5 | 5 |
| F92 | 06/02/87 | | 4190 | | | | | | | 232 | 1730 | | | | 6.5 | | | 7 | <1 | <5 | <0.2 | | 81 | <5 | 28 | | 2 |
| F93 | 04/03/86 | | 6600 | 60 | | | | | | 590 | 3400 | | 250 | | 14 | 6 | <5 | <5 | 7 | <5 | | 49 | 105 | | 57 | <5 | 11 |
| F93 | 06/12/86 | 8.1 | 5800 | 65 | 5700 | 560 | 140 | 870 | 8.7 | 380 | 3000 | 270 | 270 | 1800 | 13 | 7 | <5 | 6 | 5 | <5 | | 34 | 85 | 8 | 46 | <5 | 11 |
| F93 | 06/02/87 | | 3730 | | | | | | | 252 | 1859 | | | | 5.2 | | | 1 | 1 | <5 | <0.2 | | 30 | <5 | 17 | | 7 |

APPENDIX B Table 6. (cont.)

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| F94 | 04/03/86 | 7.7 | 5000 | 60 | | | | | | 460 | 1900 | | 180 | | 6.8 | 2 | <5 | 10 | <5 | <5 | | 11 | 53 | | 194 | <5 | <5 |
| F94 | 06/12/86 | 8.3 | 5300 | 62 | 4800 | 450 | 190 | 820 | 5.5 | 470 | 2400 | 170 | 170 | 1800 | 3.7 | 1 | <5 | 19 | <5 | <5 | | 5 | 48 | <5 | 158 | <5 | 5 |
| F94 | 06/02/87 | | 7300 | | | | | | | 629 | 1602 | | | | 10.4 | | | 14 | <1 | <5 | <0.2 | | 67 | <5 | 279 | | <1 |
| F95 | 04/03/86 | 8.0 | 4800 | 60 | | | | | | 330 | 2200 | | 130 | | 7.0 | 1 | <5 | <5 | <5 | <5 | | 17 | 81 | | 251 | <5 | <5 |
| F95 | 06/12/86 | 8.2 | 6700 | 64 | 6000 | 390 | 200 | 1200 | 6.0 | 520 | 3400 | 130 | 146 | 1700 | 12 | 1 | <5 | 9 | <5 | <5 | | <5 | 153 | <5 | 225 | <5 | 10 |
| F95 | 06/02/87 | | 3690 | | | | | | | 871 | 4805 | | | | 19 | | | 6 | <1 | <5 | 0.6 | | 207 | <5 | 345 | | 1 |
| F96 | 04/03/86 | | 3500 | 60 | | | | | | 210 | 1600 | | 210 | | 4.9 | 2 | <5 | 6 | <5 | <5 | | 52 | 55 | | 54 | <5 | <5 |
| F96 | 06/12/86 | 8.3 | 3500 | 65 | 2900 | 320 | 110 | 390 | 5.5 | 220 | 1500 | 180 | 180 | 1200 | 4.6 | 2 | <5 | 9 | <5 | <5 | | 41 | 57 | 5 | 69 | <5 | <5 |
| F96 | 06/02/87 | | 10300 | | | | | | | 242 | 2336 | | | | 5.3 | | | 5 | <1 | <5 | <0.2 | | 51 | <5 | 76 | | 1 |
| F97 | 04/03/86 | | 6800 | 60 | | | | | | 600 | 3100 | | 190 | | 11 | 2 | <5 | 12 | <5 | <5 | | 12 | 80 | | 329 | <5 | 5 |
| F97 | 06/12/86 | 8.3 | 2900 | 68 | 2400 | 300 | 81 | 320 | 4.4 | 170 | 1200 | 200 | 200 | 1100 | 2.7 | 1 | <5 | 8 | 5 | <5 | | 94 | 51 | <5 | 49 | <5 | 1280 |
| F97 | 06/02/87 | | 4240 | | | | | | | 317 | 2226 | | | | 5.5 | | | 1 | <1 | <5 | <0.2 | | 49 | <5 | 110 | | 220 |
| F98 | 04/03/86 | | 4600 | 61 | | | | | | 490 | 1700 | | 190 | | 5.1 | 8 | <5 | 11 | <5 | <5 | | <5 | 33 | | 164 | <5 | <5 |
| F98 | 06/12/86 | 8.0 | 4600 | 65 | 3800 | 380 | 140 | 670 | 5.2 | 430 | 1800 | 200 | 200 | 1500 | 5.5 | 8 | <5 | 18 | <5 | <5 | | 16 | 24 | 5 | 140 | <5 | <5 |
| F98 | 06/02/87 | | 4090 | | | | | | | 337 | 2232 | | | | 4.7 | | | 5 | <1 | <5 | <0.2 | | 19 | <5 | 108 | | <1 |
| F99 | 04/03/86 | | 6400 | 60 | | | | | | 710 | 2300 | | 240 | | 11 | 2 | <5 | <5 | 5 | <5 | | 24 | 28 | | 4 | <5 | 6 |
| F99 | 06/12/86 | 8.1 | 4900 | 66 | 4800 | 510 | 140 | 640 | 5.1 | 480 | 2200 | 140 | 140 | 1800 | 5.7 | 2 | <5 | 16 | 6 | <5 | | 50 | 25 | 8 | 108 | <5 | 11 |
| F99 | 06/02/87 | | 6110 | | | | | | | 624 | 3735 | | | | 8.0 | | | 3 | <1 | <5 | <0.2 | | 31 | <5 | 205 | | 2 |
| F100 | 04/03/86 | | 5600 | 60 | | | | | | 370 | 2300 | | 270 | | 7.8 | 1 | <5 | 12 | <5 | <5 | | 5 | 39 | | 179 | <5 | <5 |
| F100 | 06/12/86 | 7.9 | 3800 | 65 | 3400 | 320 | 110 | 570 | 4.8 | 210 | 1600 | 280 | 280 | 100 | 4.8 | 1 | <5 | 8 | <5 | <5 | | 26 | 25 | 7 | 65 | <5 | 6 |
| F100 | 06/02/87 | | 4040 | | | | | | | 267 | 2202 | | | | 4.9 | | | 6 | <1 | <5 | <0.2 | | 23 | <5 | 93 | | <1 |
| F101 | 04/03/86 | | 6100 | 60 | | | | | | 400 | 2500 | | 210 | | 5.0 | 1 | <5 | 14 | <5 | <5 | | <5 | 48 | | 155 | <5 | <5 |
| F101 | 06/12/86 | 8.2 | 6500 | 66 | 6200 | 430 | 190 | 1200 | 6.8 | 410 | 3200 | 170 | 170 | 1900 | 9.1 | 2 | <5 | 26 | <5 | <5 | | 6 | 50 | 7 | 281 | <5 | 81 |
| F101 | 06/02/87 | | 5350 | | | | | | | 322 | 3018 | | | | 5.5 | | | 10 | 5 | <5 | <0.2 | | 36 | 5 | 143 | | <1 |
| F102 | 04/03/86 | 7.8 | 6600 | 60 | | | | | | 440 | 3100 | | 180 | | 9.2 | 2 | <5 | 10 | <5 | <5 | | <5 | 98 | | 419 | <5 | 33 |
| F102 | 04/03/86 | | | | | | | | | | | | | | 11 | 2 | <5 | 12 | <5 | <5 | | 5 | 45 | | 375 | <5 | <5 |
| F102 | 06/12/86 | 8.1 | 9400 | 65 | 8800 | 440 | 220 | 2000 | 9.5 | 690 | 4500 | 160 | 160 | 2000 | 17 | 2 | <5 | 160 | <5 | <5 | | 5 | 92 | 5 | 548 | <5 | 7 |
| F102 | 06/02/87 | | 9550 | | | | | | | 760 | 5466 | | | | 15 | | | 14 | <1 | <5 | <0.2 | | 83 | <5 | 598 | | 2 |
| F103 | 04/03/86 | | 4200 | 60 | | | | | | 470 | 1700 | | 200 | | 5.6 | 2 | <5 | 10 | <5 | <5 | | <5 | 34 | | 88 | <5 | <5 |
| F103 | 06/12/86 | 7.9 | 4600 | 66 | 3700 | 500 | 150 | 680 | 5.9 | 500 | 1500 | 180 | 180 | 150 | 5.4 | 2 | <5 | 18 | <5 | <5 | | 18 | 32 | <5 | 131 | <5 | 8 |
| F103 | 06/02/87 | | 5480 | | | | | | | 574 | 2983 | | | | 6.6 | | | 10 | <1 | <5 | <0.2 | | 33 | <5 | 194 | | 1 |

APPENDIX B Table 6. (cont.)

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| F104 | 04/03/86 | | 6000 | 60 | | | | | | 530 | 2400 | | 240 | | 8.0 | | <5 | 24 | <5 | <5 | | 23 | 36 | | | <5 | 5 |
| F104 | 06/12/86 | 8.2 | 4900 | 66 | 4400 | 380 | 150 | 760 | 7.8 | 310 | 2500 | 190 | 190 | 1500 | 6.3 | 1 | <5 | 11 | <5 | 5 | | <5 | 39 | <5 | 97 | <5 | <5 |
| F104 | 06/02/87 | | 3560 | | | | | | | 287 | 1666 | | | | 3.9 | | | 4 | 1 | <5 | <0.2 | | 32 | <5 | 56 | | 2 |
| F105 | 04/03/86 | | 5200 | 60 | | | | | | 410 | 2100 | | 210 | | 6.3 | 1 | <5 | 9 | <5 | <5 | | 22 | 43 | | 175 | <5 | 5 |
| F105 | 06/12/86 | 8.3 | 5500 | 62 | 4900 | 380 | 140 | 890 | 6.5 | 370 | 2900 | 240 | 240 | 1600 | 7.9 | 2 | <5 | 19 | <5 | <5 | | 28 | 40 | 8 | 134 | <5 | <5 |
| F105 | 06/02/87 | | 4430 | | | | | | | 317 | 2389 | | | | 5.6 | | | 9 | 1 | <5 | <0.2 | | 32 | 8 | 106 | | 3 |
| F106 | 04/03/86 | | 6000 | 60 | | | | | | 380 | 2500 | | 280 | | 9.2 | 2 | <5 | 30 | <5 | <5 | | <5 | 65 | | 128 | <5 | <5 |
| F106 | 06/12/86 | 8.1 | 5200 | 65 | 4600 | 260 | 130 | 820 | 5.9 | 260 | 2000 | 210 | 210 | 1300 | 8.9 | 2 | <5 | 31 | <5 | <5 | | 8 | 44 | 23 | 115 | <5 | <5 |
| F106 | 06/02/87 | | 6130 | | | | | | | 378 | 2780 | | | | 9.4 | | | 21 | <1 | <5 | <0.2 | | 46 | 14 | 100 | | 3 |
| F107 | 04/03/86 | | 7500 | 62 | | | | | | 840 | 3000 | | 200 | | 13 | 2 | <5 | 13 | <5 | <5 | | 5 | 129 | | 386 | <5 | <5 |
| F107 | 06/12/86 | 8.3 | 8000 | 64 | 6800 | 420 | 200 | 1500 | 11 | 790 | 3100 | 180 | 180 | 2100 | 14 | 2 | <5 | 29 | <5 | <5 | | 6 | 35 | 11 | 476 | <5 | <5 |
| F107 | 06/02/87 | | 8240 | | | | | | | 846 | 4283 | | | | 13 | | | 21 | <1 | <5 | <0.2 | | 32 | 8 | 279 | | 2 |
| F108 | 04/03/86 | | 6400 | 60 | | | | | | 520 | 2300 | | 290 | | 7.7 | 1 | <5 | 22 | <5 | <5 | | 9 | 28 | | 122 | <5 | <5 |
| F108 | 06/12/86 | 8.4 | 9400 | 64 | 8900 | 460 | 260 | 2000 | 11 | 860 | 2500 | 220 | 220 | 2000 | 18 | 2 | <5 | 20 | <5 | <5 | | 9 | 53 | 12 | 228 | <5 | <5 |
| F108 | 06/02/87 | | 8490 | | | | | | | 715 | 4633 | | | | 13 | | | 15 | <1 | <5 | <0.2 | | 48 | 9 | 187 | | 4 |
| F109 | 04/03/86 | | 4600 | 60 | | | | | | 300 | 1900 | | 250 | | 7.1 | 2 | <5 | 34 | <5 | <5 | | <5 | 54 | | 94 | <5 | <5 |
| F109 | 06/12/86 | 8.4 | 6600 | 66 | 5300 | 320 | 140 | 1100 | 7.2 | 650 | 2300 | 240 | 240 | 1600 | 12 | 2 | <5 | 16 | <5 | <5 | | <5 | 51 | 13 | 246 | <5 | <5 |
| F109 | 06/02/87 | | 7530 | | | | | | | 574 | 3610 | | | | 13 | | | 16 | <1 | <5 | <0.2 | | 56 | <5 | 133 | | <1 |
| F110 | 04/03/86 | | 4800 | 60 | | | | | | 340 | 1900 | | 190 | | 6.7 | 1 | <5 | 10 | <5 | <5 | <0.2 | <5 | 49 | | 136 | <5 | <5 |
| F110 | 06/12/86 | 8.1 | 5200 | 65 | 4400 | 300 | 140 | 940 | 6.3 | 300 | 2000 | 180 | 180 | 890 | 8.7 | 2 | <5 | 11 | <5 | <5 | | 35 | 49 | 11 | 133 | <5 | <5 |
| F110 | 06/02/87 | | 4470 | | | | | | | 277 | 3094 | | | | 6.4 | | | 4 | 11 | <5 | | | 38 | 7 | 119 | | 1 |
| F111 | 04/03/86 | | 5700 | 60 | | | | | | 360 | 2200 | | 220 | | 10 | 1 | <5 | 30 | 7 | <5 | | 54 | 62 | | 246 | <5 | 37 |
| F111 | 06/12/86 | 8.3 | 5800 | 64 | 5100 | 420 | 160 | 1100 | 6.0 | 340 | 2100 | 190 | 190 | 1400 | 11 | 2 | <5 | 28 | 6 | <5 | | 68 | 56 | 41 | 228 | <5 | 34 |
| F111 | 06/02/87 | | 6630 | | | | | | | 473 | 4062 | | | | 12 | | | 37 | 2 | <5 | <0.2 | | 68 | 37 | 332 | | 24 |
| F112 | 04/03/86 | | 4800 | 60 | | | | | | 190 | 2000 | | 140 | | 6.6 | 1 | <5 | <5 | <5 | <5 | | <5 | 102 | | 54 | <5 | <5 |
| F112 | 06/12/86 | 8.0 | 3500 | 66 | 3100 | 340 | 100 | 470 | 4.5 | 160 | 1900 | 120 | 120 | 1100 | 5.7 | 2 | <5 | 10 | <5 | <5 | | <5 | 85 | <5 | 55 | <5 | <5 |
| F112 | 06/02/87 | | 4060 | | | | | | | 262 | 2779 | | | | 6.1 | | | 8 | 2 | <5 | <0.2 | | 69 | <5 | 51 | | 4 |
| F113 | 04/03/86 | | 7000 | 60 | | | | | | 540 | 2600 | | 140 | | 14 | 2 | <5 | 41 | <5 | <5 | | <5 | 70 | | 358 | <5 | <5 |
| F113 | 06/12/86 | 8.2 | 6800 | 64 | 6300 | 430 | 180 | 1100 | 6.2 | 350 | 2400 | 130 | 130 | 2000 | 14 | 2 | <5 | 42 | <5 | <5 | | <5 | 102 | <5 | 292 | <5 | <5 |
| F113 | 06/02/87 | | 7620 | | | | | | | 629 | 2990 | | | | 14 | | | 48 | <1 | <5 | <0.2 | | 100 | <5 | 342 | | 1 |
| F114 | 04/03/86 | | 6400 | 60 | | | | | | 570 | 2500 | | 190 | | 12 | 1 | <5 | 25 | <5 | <5 | | <5 | 56 | | 146 | <5 | <5 |

APPENDIX B Table 6. (cont.)

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | ug/L | | | | | | | | | | | | |
| F114 | 06/12/86 | 8.2 | 6700 | 65 | 6100 | 490 | 180 | 1200 | 8.8 | 510 | 3500 | 160 | 160 | 1800 | 13 | 2 | <5 | 26 | <5 | <5 | | <5 | 70 | <5 | 190 | <5 | <5 |
| F114 | 06/02/87 | | 4860 | | | | | | | 413 | 3147 | | | | 5.6 | | | 12 | <1 | <5 | <0.2 | | 40 | <5 | 72 | | 1 |
| F115 | 04/03/86 | | 6600 | 60 | | | | | | 690 | 2300 | | 150 | | 12 | 2 | <5 | 28 | <5 | <5 | | <5 | 76 | | 334 | <5 | <5 |
| F115 | 06/12/86 | 8.2 | 7900 | 64 | 7200 | 460 | 190 | 1400 | 7.3 | 880 | 3400 | 140 | 140 | 2000 | 15 | 2 | <5 | 40 | <5 | <5 | | <5 | 28 | <5 | 475 | <5 | <5 |
| F115 | 06/02/87 | | 11700 | | | | | | | 1450 | 4370 | | | | 19 | | | 49 | <1 | <5 | <0.2 | | 79 | <5 | 656 | | 2 |
| F116 | 04/03/86 | | 13500 | 60 | | | | | | 2280 | 4750 | | 150 | | 35 | 2 | <5 | 49 | <5 | <5 | | <5 | 97 | | 570 | <5 | <5 |
| F116 | 06/12/86 | 8.0 | 15000 | 64 | 13000 | 580 | 290 | 3100 | 11 | 2400 | 5100 | 150 | 150 | 2700 | 44 | 2 | <5 | 53 | <5 | <5 | | <5 | 103 | <5 | 592 | <5 | <5 |
| F116 | 06/02/87 | | 12100 | | | | | | | 2138 | 4015 | | | | 29 | | | 130 | <1 | <5 | 2.3 | | 56 | <5 | 592 | | 2 |
| F117 | 06/02/87 | | 19400 | | | | | | | 3620 | 6220 | | | | 48 | | | 82 | <1 | <5 | <0.2 | | 89 | <5 | 1067 | | <1 |
| F118 | 06/02/87 | | 7380 | | | | | | | 992 | 2110 | | | | 16.2 | | | 100 | <1 | <5 | | | 18 | <5 | 159 | | <1 |
| * F119 | 04/03/86 | | 5900 | 62 | | | | | | 490 | 3100 | | 260 | | 8.6 | 1 | <5 | 15 | <5 | <5 | | 19 | 28 | | 184 | <5 | <5 |
| * F119 | 06/12/86 | 8.1 | 4400 | 67 | 3800 | 330 | 120 | 720 | 5.1 | 240 | 1800 | 200 | 200 | 1100 | 5.6 | 1 | <5 | 12 | <5 | <5 | | 25 | 28 | 7 | 107 | <5 | 14 |
| * F119 | 06/02/87 | | 4290 | | | | | | | 272 | 2307 | | | | 4.8 | | | 6 | <1 | <5 | <0.2 | | 23 | <5 | 102 | | <1 |
| * F120 | 04/03/86 | | 4100 | 62 | | | | | | 420 | 1700 | | 230 | | 5.4 | 2 | <5 | 10 | <5 | <5 | | 214 | 27 | | 90 | <5 | 15 |
| * F120 | 06/12/86 | 5.1 | 400 | 63 | 340 | 36 | 5 | 15 | 13 | 21 | 27 | | | 110 | 0.8 | 4 | <5 | 19 | 10 | <5 | | 122 | <5 | 13 | <1 | <5 | 17 |
| * F120 | 06/02/87 | | 3470 | | | | | | | 715 | 1602 | | | | 4.2 | | | 3 | <1 | <5 | <0.2 | | 34 | <5 | 91 | | <1 |
| * F121 | 04/03/86 | | 1250 | 68 | | | | | | 68 | 500 | | 120 | | 2.0 | 5 | <5 | 11 | 11 | <5 | | 55 | 15 | | 6 | <5 | 13 |
| * F121 | 06/02/87 | | 1530 | | | | | | | 136 | 757 | | | | 12 | | | 1 | 1 | <5 | <0.2 | | 16 | <5 | 5 | | 1 |
| F122 | 06/02/87 | | 3420 | | | | | | | 297 | 1520 | | | | 4.1 | | | 3 | <1 | <5 | 0.5 | | 31 | <5 | 88 | | 1 |
| F123 | 06/23/87 | 7.6 | 7800 | | 5700 | 500 | 190 | 1000 | 3.3 | 1400 | 2200 | | 280 | 2100 | 15 | | | 60 | <3 | 8 | 2.1 | | 6 | <5 | 27 | | 3 |
| F124 | 06/23/87 | 7.6 | 7600 | | 5700 | 390 | 200 | 1100 | 3.4 | 1200 | 2500 | | 240 | 1800 | 18 | | | 51 | 3 | <5 | 1.9 | | 15 | <5 | 28 | | 3 |
| F125 | 06/23/87 | 7.4 | 10000 | | 7400 | 510 | 240 | 1500 | 4.6 | 1900 | 2500 | | 210 | 2300 | 21 | | | 63 | 6 | <5 | 4.0 | | 13 | <5 | 48 | | 5 |
| F126 | 06/23/87 | 7.7 | 9800 | | 7400 | 440 | 200 | 1400 | 2.9 | 1600 | 2800 | | 190 | 2000 | 22 | | | 100 | <1 | <5 | 1.9 | | 11 | <5 | 41 | | 4 |
| F127 | 06/23/87 | 7.5 | 5100 | | 3800 | 340 | 120 | 620 | 2.6 | 760 | 1400 | | 220 | 1300 | 10 | | | 45 | <3 | 6 | 0.9 | | 8 | <5 | 20 | | <1 |
| F128 | 06/23/87 | 7.8 | 4800 | | 3500 | 250 | 80 | 680 | 2.0 | 600 | 1400 | | 160 | 900 | 11 | | | 65 | <3 | <5 | <0.2 | | 6 | <5 | 14 | | 1 |
| F129 | 06/23/87 | 7.7 | 4800 | | 3500 | 380 | 86 | 470 | 2.8 | 720 | 1200 | | 150 | 1500 | 6.6 | | | 28 | <3 | 7 | <0.2 | | 2 | <5 | 57 | | 5 |
| F130 | 06/23/87 | 7.9 | 3600 | | 2400 | 210 | 54 | 420 | 2.4 | 560 | 800 | | 170 | 760 | 7.5 | | | 43 | 2 | <5 | <0.2 | | 2 | <5 | 10 | | 2 |
| F131 | 06/23/87 | 8.0 | 3700 | | 2500 | 180 | 51 | 520 | 2.7 | 560 | 900 | | 170 | 670 | 7.4 | | | 46 | <3 | 6 | <0.2 | | 5 | <5 | 18 | | 5 |
| F132 | 06/23/87 | 7.9 | 3600 | | 2600 | 190 | 59 | 510 | 1.8 | 480 | 1100 | | 160 | 740 | 7.7 | | | 68 | <3 | 6 | <0.2 | | 6 | <5 | 30 | | 1 |
| F133 | 06/23/87 | 7.8 | 4700 | | 3500 | 280 | 78 | 610 | 2.7 | 600 | 1300 | | 140 | 1100 | 11 | | | 120 | <3 | <5 | <0.2 | | 11 | <5 | 30 | | 2 |
| F134 | 06/23/87 | 7.5 | 8000 | | 6000 | 520 | 160 | 1100 | 3.7 | 1400 | 2300 | | 160 | 2000 | 16 | | | 68 | <3 | <5 | <0.2 | | 10 | <5 | 50 | | 5 |

APPENDIX B Table 6. (cont.)

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| F135 | 06/23/87 | 7.7 | 3600 | | 2400 | 220 | 54 | 410 | 2.5 | 600 | 860 | | 140 | 790 | 8.7 | | | 39 | <3 | <5 | <0.2 | | 2 | <5 | 13 | | 1 |
| F136 | 06/23/87 | 7.6 | 10000 | | 8000 | 490 | 260 | 1500 | 4.2 | 1300 | 2500 | | 230 | 2300 | 23 | | | 99 | <3 | <5 | 1.4 | | 40 | <5 | 406 | | 2 |
| F137 | 06/23/87 | 7.6 | 7600 | | 5800 | 380 | 180 | 1100 | 4.6 | 790 | 2800 | | 290 | 1700 | 11 | | | 27 | <3 | <5 | <0.2 | | 43 | 5 | 133 | | 3 |
| F138 | 06/23/87 | 7.8 | 7200 | | 5900 | 470 | 200 | 950 | 3.4 | 640 | 3000 | | 140 | 2000 | 10 | | | 19 | <3 | <5 | <0.2 | | 51 | <5 | 233 | | 4 |
| F139 | 06/23/87 | 7.7 | 3900 | | 3100 | 320 | 77 | 440 | 3.4 | 440 | 1300 | | 160 | 1200 | 7.6 | | | 82 | <3 | <5 | <0.2 | | 2 | <5 | 43 | | 2 |
| F140 | 06/23/87 | 7.5 | 8500 | | 7100 | 450 | 200 | 1200 | 4.2 | 1000 | 2900 | | 240 | 2100 | 14 | | | 120 | <3 | <5 | <0.2 | | 25 | 6 | 549 | | 2 |
| F141 | 06/23/87 | 7.7 | 8500 | | 7100 | 480 | 210 | 1300 | 4.8 | 1000 | 3200 | | 280 | 2000 | 13 | | | 34 | 6 | <5 | <0.2 | | 34 | 7 | 736 | | 3 |
| F142 | 06/23/87 | 7.6 | 5700 | | 4700 | 350 | 140 | 740 | 5.8 | 530 | 2200 | | 270 | 1500 | 7.2 | | | 15 | <3 | <5 | <0.2 | | 29 | 6 | 81 | | 8 |
| F143 | 06/23/87 | 7.7 | 14000 | | 12000 | 580 | 250 | 2500 | 6.4 | 2000 | 4600 | | 220 | 2500 | 28 | | | 48 | <3 | <5 | <0.2 | | 51 | <5 | 1332 | | 5 |
| F144 | 06/23/87 | 7.7 | 23000 | | 18000 | 510 | 290 | 4000 | 8.2 | 3000 | 7000 | | 310 | 2500 | 49 | | | 47 | 4 | <5 | <0.2 | | 80 | <5 | 2812 | | 6 |
| F145 | 06/23/87 | 8.1 | 3200 | | 2200 | 160 | 64 | 400 | 5.9 | 480 | 840 | | 110 | 650 | 3.9 | | | 19 | 9 | <5 | <0.2 | | 3 | 11 | 190 | | 25 |
| F146 | 06/23/87 | 7.7 | 3600 | | 2600 | 270 | 62 | 380 | 2.4 | 430 | 1000 | | 150 | 990 | 7.8 | | | 69 | <3 | <5 | <0.2 | | 3 | <5 | 24 | | 1 |
| F147 | 06/23/87 | 7.6 | 5600 | | 4500 | 440 | 120 | 540 | 2.8 | 760 | 1700 | | 140 | 1800 | 9.6 | | | 79 | <3 | 7 | <0.2 | | 2 | <5 | 59 | | 3 |
| F148 | 06/23/87 | 7.6 | 8300 | | 6900 | 500 | 200 | 1200 | 4.5 | 900 | 3100 | | 220 | 2000 | 12 | | | 79 | 12 | 8 | <0.2 | | 24 | 5 | 583 | | 5 |
| F149 | 06/23/87 | 7.6 | 6400 | | 5400 | 420 | 160 | 930 | 4.4 | 560 | 2600 | | 240 | 1700 | 9.2 | | | 20 | 1 | <5 | | | 28 | 6 | 269 | | 5 |
| F150 | 06/23/87 | 7.8 | 6200 | | 5100 | 390 | 150 | 820 | 3.8 | 640 | 2200 | | 200 | 1600 | 7.4 | | | 10 | <3 | <5 | <0.2 | | 23 | <5 | 314 | | 2 |
| F151 | 06/23/87 | 7.4 | 5100 | | 4100 | 340 | 120 | 580 | 8.3 | 490 | 1800 | | 160 | 1400 | 10 | | | 49 | 29 | 14 | <0.2 | | 2 | 45 | 66 | | 80 |
| F152 | 06/23/87 | 7.9 | 7200 | | 6100 | 530 | 180 | 1000 | 4.9 | 800 | 2800 | | 230 | 2100 | 8.0 | | | 15 | <3 | <5 | <0.2 | | 10 | <5 | 242 | | 3 |
| F153 | 06/23/87 | 7.9 | 2300 | | 1700 | 230 | 46 | 180 | 2.1 | 160 | 840 | | 140 | 790 | 3.3 | | | 2 | <3 | <5 | <0.2 | | 5 | <5 | 5 | | 1 |
| F154 | 06/23/87 | 7.8 | 6400 | | 5400 | 440 | 180 | 820 | 4.6 | 680 | 2500 | | 200 | 1900 | 12 | | | 12 | <3 | <5 | <0.2 | | 6 | <5 | 121 | | 2 |
| F155 | 06/23/87 | 7.7 | 7800 | | 6500 | 500 | 190 | 1000 | 7.8 | 800 | 2600 | | 290 | 2100 | 11 | | | 10 | <3 | 6 | <0.2 | | 11 | 7 | 368 | | 3 |
| F156 | 06/23/87 | 7.6 | 5500 | | 4100 | 340 | 91 | 760 | 2.8 | 630 | 1700 | | 180 | 1200 | 13 | | | 66 | 1 | <5 | | | 8 | <5 | 45 | | 3 |
| F157 | 06/23/87 | 8.0 | 6200 | | 5300 | 470 | 160 | 760 | 3.6 | 560 | 2400 | | 260 | 1900 | 6.5 | | | 16 | <3 | <5 | <0.2 | | 10 | <5 | 237 | | 3 |
| F158 | 06/23/87 | 7.8 | 5100 | | 3600 | 350 | 100 | 550 | 3.1 | 820 | 1400 | | 180 | 1400 | 9.0 | | | 28 | 3 | <5 | <0.2 | | 4 | <5 | 41 | | 4 |
| F159 | 06/23/87 | 7.9 | 3600 | | 2400 | 140 | 69 | 480 | 4.4 | 450 | 1000 | | 150 | 630 | 9.2 | | | 11 | 6 | <5 | <0.2 | | 18 | 12 | 12 | | 12 |
| F160 | 06/23/87 | 8.0 | 2900 | | 1900 | 170 | 42 | 330 | 3.4 | 420 | 660 | | 140 | 600 | 6.0 | | | 35 | 4 | <5 | <0.2 | | 2 | 5 | 11 | | 6 |
| F161 | 06/23/87 | 7.4 | 1500 | | 910 | 96 | 24 | 160 | 5.2 | 220 | 320 | | 92 | 350 | 2.5 | | | 22 | 9 | 6 | <0.2 | | 1 | 17 | 7 | | 21 |
| F162 | 06/23/87 | 7.3 | 5000 | | 3700 | 260 | 110 | 700 | 9.6 | 540 | 1500 | | 220 | 1100 | 7.3 | | | 25 | 8 | <5 | <0.2 | | 11 | 17 | 284 | | 22 |
| F163 | 06/23/87 | 7.4 | 2000 | | 1300 | 120 | 45 | 220 | 9.4 | 200 | 550 | | 140 | 500 | 1.9 | | | 12 | 9 | <5 | <0.2 | | 6 | 12 | 54 | | 19 |
| F164 | 06/23/87 | 7.7 | 1100 | | 660 | 60 | 24 | 130 | 7.6 | 140 | 200 | | 100 | 230 | 1.6 | | | 35 | 21 | 6 | <0.2 | | 1 | 26 | 38 | | 70 |
| F165 | 06/23/87 | 7.8 | 1400 | | 930 | 88 | 32 | 180 | 8.3 | 180 | 350 | | 120 | 320 | 1.6 | | | 70 | 52 | 14 | <0.2 | | 1 | 69 | 38 | | 150 |

APPENDIX B Table 6. (cont.)

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| F166 | 06/23/87 | 8.0 | 3900 | | 2700 | 200 | 68 | 480 | 2.5 | 550 | 1000 | | 190 | 810 | 7.8 | | | 30 | 3 | <5 | <0.2 | | 5 | <5 | 16 | | 7 |
| F167 | 06/23/87 | 7.8 | 3500 | | 2500 | 220 | 69 | 420 | 5.5 | 490 | 1000 | | 160 | 840 | 6.7 | | | 58 | 17 | 8 | <0.2 | | 3 | 30 | 47 | | 45 |
| F168 | 04/03/86 | | 4400 | 71 | | | | | | 500 | 1700 | | | | 5.8 | | <10 | 18 | <10 | <10 | | | 5 | <5 | 53 | | 15 |
| F168 | 06/12/86 | 8.0 | 4600 | 65 | 3900 | 530 | 85 | 510 | 4.4 | 470 | 1900 | 130 | 130 | 1900 | 6.1 | 1 | <5 | 23 | <5 | <5 | | 10 | <5 | <5 | 47 | <5 | <5 |
| F168 | 06/02/87 | | 4720 | | | | | | | 510 | 1520 | | | | 7.2 | | | 15 | <1 | <5 | <0.2 | | 4 | <5 | 51 | | <1 |
| F169 | 04/03/86 | | 4600 | 71 | | | | | | 560 | 1500 | | | | 5.6 | <1 | <10 | 27 | <10 | <10 | | | 4 | <5 | 62 | | <10 |
| F169 | 06/12/86 | 8.1 | 4200 | 65 | 3500 | 450 | 92 | 990 | 3.8 | 500 | 1600 | 110 | 110 | 1700 | 5.1 | <1 | <5 | 34 | <5 | <5 | | 6 | <5 | <5 | 54 | <5 | <5 |
| F169 | 06/02/87 | | 4590 | | | | | | | 560 | 1400 | | | | 5.9 | | | 24 | <1 | <5 | <0.2 | | 4 | <5 | 58 | | 3 |
| F170 | 04/03/86 | | 4800 | 65 | | | | | | 810 | 1400 | | | | 6.4 | | <10 | 22 | <10 | <10 | | | 5 | <5 | 106 | | <10 |
| F170 | 06/12/86 | 8.0 | 4700 | 65 | 3700 | 440 | 90 | 430 | 4.1 | 840 | 1200 | 120 | 120 | 1700 | 6.2 | <1 | <5 | 32 | <5 | <5 | | <5 | <5 | <5 | 97 | <5 | <5 |
| F170 | 06/02/87 | | 5140 | | | | | | | 910 | 1240 | | | | 5.8 | | | 25 | <1 | <5 | <0.2 | | 5 | <5 | 120 | | 3 |
| F171 | 04/03/86 | | 5200 | 65 | | | | | | 730 | 1600 | | | | 4.9 | 2 | <10 | 10 | <10 | <10 | | | 5 | <5 | 126 | | 14 |
| F171 | 06/12/86 | 8.0 | 4700 | 65 | 4000 | 540 | 80 | 500 | 3.9 | 670 | 1700 | 120 | 120 | 1700 | 4.0 | | | | | | | | | <5 | | | |
| F171 | 06/02/87 | | 4520 | | | | | | | 580 | 1380 | | | | 4.4 | | | 5 | <1 | <5 | <0.2 | | 5 | <5 | 89 | | 1 |
| F172 | 04/03/86 | | 6800 | 64 | | | | | | 950 | 2200 | | | | 8.3 | 1 | <10 | 8 | <10 | <10 | | | 5 | <5 | 167 | | 21 |
| F172 | 06/12/86 | 8.0 | 7000 | 64 | 5900 | 620 | 140 | 1100 | 6.1 | 940 | 2700 | 100 | 100 | 2100 | 7.8 | 1 | <5 | 12 | <5 | <5 | | <5 | 6 | <5 | 199 | <5 | <5 |
| F172 | 06/02/87 | | 7300 | | | | | | | 940 | 2680 | | | | 7.5 | | | 4 | <1 | <5 | <0.2 | | 5 | <5 | 150 | | 1 |
| F173 | 04/03/86 | | 4700 | 64 | | | | | | 700 | 1600 | | | | 7.9 | <1 | <10 | 29 | <10 | <10 | | | 10 | <5 | 46 | | 11 |
| F173 | 06/12/86 | 8.3 | 4500 | 64 | 3700 | 440 | 87 | 480 | 3.5 | 700 | 1600 | 120 | 120 | 1600 | 7.1 | <1 | <5 | 34 | <5 | <5 | | <5 | 10 | <5 | 40 | <5 | <5 |
| F173 | 06/02/87 | | 4860 | | | | | | | 720 | 1230 | | | | 8.0 | | | 27 | <1 | <5 | <0.2 | | 9 | <5 | 46 | | <1 |
| F174 | 04/03/86 | | 6200 | 64 | | | | | | 1300 | 2400 | | 130 | | 4.7 | <1 | <10 | 37 | <10 | <10 | | | 8 | <5 | 124 | | 10 |
| F174 | 06/12/86 | 8.5 | 6400 | 64 | 5200 | 730 | 99 | 650 | 5.4 | 1100 | 2100 | 100 | 140 | 2200 | 9.0 | <1 | <5 | 30 | <5 | <5 | | <5 | 6 | <5 | 139 | <5 | <5 |
| F174 | 06/02/87 | | 7540 | | | | | | | 1184 | 2180 | | | | 10 | | | 26 | <1 | <5 | <0.2 | | 6 | <5 | 148 | | <1 |
| F175 | 04/03/86 | | 6600 | 63 | | | | | | 1400 | 2600 | | 160 | | 3.5 | 1 | <10 | 5 | <10 | <10 | | | 5 | <5 | 307 | | 20 |
| F175 | 06/12/86 | 8.2 | 9200 | 64 | 7100 | 690 | 170 | 1400 | 7.6 | 1700 | 3000 | 180 | 180 | 1800 | 10 | 1 | <5 | 6 | <5 | <5 | | <5 | 7 | <5 | 281 | <5 | <5 |
| F175 | 06/02/87 | | 9170 | | | | | | | 1454 | 2980 | | | | 8.1 | | | 5 | <1 | <5 | <0.2 | | 7 | <5 | 267 | | 1 |
| F176 | 04/03/86 | | 8200 | 64 | | | | | | 1300 | 2400 | | 170 | | 3.3 | <1 | <10 | 9 | <10 | <10 | | | 4 | <5 | 285 | | 13 |
| F176 | 06/12/86 | 7.9 | 7000 | 65 | 5700 | 790 | 130 | 960 | 5.7 | 1300 | 2300 | 170 | 170 | 2100 | 6.2 | 2 | <5 | 12 | <5 | <5 | | <5 | <5 | <5 | 263 | <5 | <5 |
| F176 | 06/02/87 | | 7540 | | | | | | | 1434 | 2125 | | | | 4.8 | | | 8 | <1 | <5 | <0.2 | | 4 | <5 | 263 | | 1 |
| F177 | 04/03/86 | | 6000 | 66 | | | | | | 1100 | 2500 | | 160 | | 3.2 | <1 | <10 | 9 | <10 | <10 | | | 5 | <5 | 204 | | 11 |
| F177 | 06/12/86 | 8.0 | 6400 | 64 | 4450 | 730 | 120 | 880 | 5.0 | 1200 | 2200 | 130 | 130 | 2400 | 5.8 | 1 | <5 | 14 | <5 | <5 | | 7 | <5 | <5 | 141 | <5 | <5 |

APPENDIX B Table 6. (cont.)

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | .....mg/L..... | | | | | | | | | | | .....ug/L..... | | | | | | | | | | | |
| F177 | 06/02/87 | | 4540 | | | | | | | 640 | 1270 | | | | 2.8 | | | 5 | <1 | <5 | <0.2 | | 6 | <5 | 111 | | 1 |
| F178 | 04/03/86 | | 4700 | 63 | | | | | | 750 | 2400 | | 180 | | 5.4 | <1 | <10 | 31 | <10 | <10 | | | 6 | <5 | 36 | | 10 |
| F178 | 06/12/86 | 8.1 | 6000 | 64 | 4800 | 670 | 140 | 880 | 5.0 | 940 | 2300 | 150 | 150 | 1800 | 12 | 1 | <5 | 41 | <5 | <5 | | 5 | 6 | <5 | 46 | <5 | <5 |
| F179 | 04/03/86 | | 3100 | 64 | | | | | | 340 | 1900 | | 170 | | 5.4 | <1 | <10 | 19 | <10 | <10 | | | 7 | <5 | 22 | | 11 |
| F179 | 06/12/86 | 8.0 | 3500 | 63 | 2600 | 460 | 87 | 410 | 3.7 | 410 | 1400 | 130 | 130 | 1100 | 5.8 | <1 | <5 | 27 | <5 | <5 | | <5 | <5 | <5 | 28 | <5 | <5 |
| F179 | 06/02/87 | | 3950 | | | | | | | 405 | 1375 | | | | 5.9 | | | 15 | <1 | 10 | <0.2 | | 6 | <5 | 30 | | 1 |
| * F180 | 04/03/86 | | 3800 | 70 | | | | | | 640 | 2000 | | 120 | | 2.9 | 2 | <10 | 20 | <10 | <10 | | | 4 | 6 | 65 | | 12 |
| * F180 | 06/02/87 | | 3070 | | | | | | | 375 | 840 | | | | 3.4 | | | 11 | 3 | <5 | <0.2 | | 3 | 7 | 48 | | 9 |
| F181 | 06/02/87 | | 5335 | | | | | | | 515 | 2210 | | | | 7.2 | | | <1 | <1 | <5 | <0.2 | | 114 | 6 | 2 | | 2 |
| F182 | 04/03/86 | | | | | | | | | | | | | | | 2 | <10 | 3 | <10 | <10 | | | 62 | <5 | 208 | | 180 |

* Open Drain

APPENDIX B Table 7. Suburface Tile Drainage Physical Properties and Chemical Concentrations.
Zone G - Open Water Ways

San Joaquin River

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| G1 | 04/02/86 | | 65 | | | | | | | 3 | 4 | | 22 | | 0.5 | | | | | | | | | | <1 | | |
| G1 | 06/16/86 | | 230 | 77 | | | | | | 20 | 16 | | 60 | | <0.1 | | | 7 | 3 | <5 | <0.5 | | 2 | 4 | <1 | | 5 |
| G1 | 06/01/87 | | 1000 | | | | | | | 146 | 75 | | | | 0.2 | | | | | | | | 8 | | 1 | | |
| G2 | 04/02/86 | | 165 | 58 | | | | | | 16 | 48 | | 38 | | 0.2 | | | | | | | | | | | | |
| G2 | 06/01/87 | | 764 | | | | | | | 110 | 102 | | | | 0.4 | | | | | | | | 2 | | 3 | | |
| G3 | 04/02/86 | | 185 | 58 | | | | | | 20 | 58 | | 38 | | 0.3 | | | | | | | | | | <1 | | |
| G3 | 06/16/86 | | 290 | 69 | | | | | | 30 | 36 | | 40 | | 0.1 | | | 3 | 4 | <5 | <0.5 | | <1 | 5 | 1 | | 6 |
| G3 | 06/01/87 | | 714 | | | | | | | 86 | 85 | | | | 0.4 | | | | | | | | 1 | | 3 | | |
| G4 | 04/02/86 | | 175 | 58 | | | | | | 18 | 48 | | 38 | | 0.3 | | | | | | | | | | <1 | | |
| G4 | 06/16/86 | | 330 | 70 | | | | | | 42 | 44 | | 70 | | 0.2 | | | 8 | 4 | <5 | <0.5 | | <5 | 5 | 2 | | 7 |
| G4 | 06/01/87 | | 961 | | | | | | | 136 | 125 | | | | 0.6 | | | | | | | | | | 4 | | |
| G5 | 04/02/86 | | 225 | 61 | | | | | | 24 | 61 | | 44 | | 0.2 | | | | | | | | | | <1 | | |
| G5 | 06/01/87 | | 1260 | | | | | | | 151 | 210 | | | | 0.9 | | | | | | | | | | 5 | | |
| G6 | 04/02/86 | | 150 | 60 | | | | | | 23 | 64 | | 40 | | 0.3 | | | | | | | | | | <1 | | |
| G6 | 06/16/86 | | 600 | 75 | | | | | | 70 | 96 | | 100 | | 0.1 | | | 10 | 5 | <5 | <0.5 | | <5 | 7 | 2 | | 10 |
| G6 | 06/01/87 | | 1290 | | | | | | | 181 | 210 | | | | 0.9 | | | | | | | | | | 5 | | |
| G7 | 04/02/86 | | 190 | 60 | | | | | | 21 | 48 | | 40 | | 0.5 | | | | | | | | | | <1 | | |
| G7 | 06/16/86 | | 600 | 75 | | | | | | 67 | 98 | | 100 | | 0.2 | | | | | | | | | | 3 | | |
| G7 | 06/01/87 | | 1210 | | | | | | | 166 | 180 | | | | 0.9 | | | | | | | | 5 | | 6 | | |
| G8 | 04/02/86 | | 55 | 59 | | | | | | 60 | 160 | | 70 | | 0.7 | | | | | | | | | | 2 | | |
| G8 | 06/16/86 | | 890 | 76 | | | | | | 100 | 160 | | 116 | | 0.6 | | | 16 | 10 | <5 | <0.5 | | 4 | 9 | 4 | | 15 |
| G8 | 06/01/87 | | | | | | | | | | | | | | | | | 12 | 6 | <5 | | | 7 | 10 | 9 | | 16 |
| G9 | 04/02/86 | | 740 | 60 | | | | | | 5 | 5 | | 36 | | 2.6 | | | | | | | | | | <1 | | |
| G9 | 06/16/86 | | 590 | 78 | | | | | | 66 | 95 | | 100 | | 0.1 | | | 14 | 9 | <5 | <0.5 | | <5 | 7 | 2 | | 12 |
| G9 | 06/01/87 | | 1590 | | | | | | | 206 | 315 | | | | 1.5 | | | | | | | | | | 10 | | |

APPENDIX B Table 7. (cont.)

Grasslands

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| G10 | 04/02/86 | | 3100 | 56 | | | | | | 360 | 890 | | 300 | | 2.6 | | | | | | | | | | 5 | | |
| G10 | 06/01/87 | | 2140 | | | | | | | 237 | 530 | | | | 2.1 | | | | | | | | 2 | | 5 | | |
| G11 | 04/02/86 | | 360 | 59 | | | | | | 2 | 5 | | 24 | | 0.0 | | | | 45 | 19 | 8 | | | 36 | <1 | | 43 |
| G12 | 04/03/86 | | 5900 | 57 | | | | | | 890 | 1700 | | 150 | | 7.5 | | <10 | 15 | <10 | <10 | | | 6 | 8 | 125 | | 19 |
| G12 | 06/16/86 | 7.9 | 2900 | 69 | 2100 | 200 | 52 | 280 | 5.8 | 350 | 840 | 120 | 120 | 850 | 2 | | | 13 | 15 | 5 | <0.5 | | 4 | 39 | 54 | | 60 |
| G12 | 06/01/87 | | 3610 | | | | | | | 332 | 1170 | | | | 3.5 | | | | 50 | 22 | 15 | | 2 | 37 | 65 | | 76 |
| G13 | 04/02/86 | | 3200 | 57 | | | | | | 380 | 1000 | | 110 | | 5.2 | | | | | | | | | | 59 | | |
| G13 | 06/01/87 | | 2690 | | | | | | | 297 | 790 | | | | 3.8 | | | | | | | | 8 | | 40 | | |
| G14 | 04/03/86 | | 3200 | 57 | | | | | | 320 | 1200 | | 120 | | 4.9 | 5 | <10 | 28 | 17 | <10 | | | 13 | 27 | 66 | | 41 |
| G14 | 06/16/86 | 8.1 | 1900 | 68 | 1300 | 96 | 37 | 210 | 5.0 | 140 | 560 | 120 | 120 | 410 | 2.4 | | | 19 | 6 | <5 | <0.5 | | 17 | 13 | 33 | | 10 |
| G14 | 06/01/87 | | 2320 | | | | | | | 235 | 630 | | | | 2.9 | | | 30 | 15 | <5 | | | 9 | 28 | 40 | | 35 |
| G15 | 04/03/86 | | 3800 | 56 | | | | | | 590 | 1100 | | 120 | | 6.0 | 2 | <10 | 17 | <10 | <10 | | | 4 | 6 | 65 | | 13 |
| G15 | 06/16/86 | 7.4 | 3200 | 66 | 2400 | 220 | 57 | 290 | 2.9 | 400 | 940 | 100 | 100 | 950 | 3.1 | | | 6 | 5 | <5 | <0.5 | | 4 | 10 | 66 | | 11 |
| G15 | 06/01/87 | | 3180 | | | | | | | 445 | 950 | | | | 3.6 | | | 14 | <3 | <5 | | | 3 | 5 | 49 | | 6 |
| G16 | 04/02/86 | | 6400 | 59 | | | | | | <4 | 540 | | 20 | | 0.0 | | | | | | | | | | <1 | | |
| G17 | 04/02/86 | | 4000 | 58 | | | | | | 660 | 1500 | | 150 | | 6.8 | | | | | | | | | | 64 | | |
| G17 | 06/01/87 | | 3210 | | | | | | | 420 | 900 | | | | 5.6 | | | | | | | | 6 | | 38 | | |
| G18 | 04/03/86 | | 4200 | 58 | | | | | | 310 | 640 | | 170 | | 8.7 | 2 | <10 | 45 | <10 | <10 | | | 4 | 45 | 63 | | 23 |
| G18 | 06/16/86 | 8.0 | 3100 | 66 | 1800 | 180 | 54 | 320 | 5.5 | 380 | 740 | 150 | 150 | 770 | 5.4 | | | 16 | 5 | <5 | <0.5 | | 4 | 8 | 43 | | 6 |
| G18 | 06/01/87 | | 3400 | | | | | | | 445 | 900 | | | | 5.8 | | | | | | | | 6 | | 50 | | |
| G19 | 04/03/86 | | 6400 | 59 | | | | | | 550 | 1200 | | 190 | | 16.0 | 3 | <10 | 8 | <10 | <10 | | | 34 | 11 | 22 | | 14 |
| G19 | 06/16/86 | 8.1 | 3300 | 68 | 1900 | 200 | 75 | 400 | 3.8 | 240 | 1200 | 190 | 190 | 760 | 7.4 | | | 21 | 7 | <5 | <0.5 | | 6 | 14 | 16 | | 11 |
| G19 | 06/01/87 | | 2700 | | | | | | | 295 | 790 | | | | 5.1 | | | | | | | | 16 | | 6 | | |
| G20 | 04/02/86 | | 2800 | 59 | | | | | | 280 | 920 | | 120 | | 9.4 | | | | | | | | | | 3 | | |
| G20 | 06/01/87 | | 1910 | | | | | | | 195 | 510 | | | | 3.7 | | | | | | | | 10 | | 3 | | |
| G22 | 04/02/86 | | 2900 | 60 | | | | | | 380 | 940 | | 150 | | 5.8 | | | | | | | | | | 33 | | |
| G22 | 06/16/86 | 7.6 | 2300 | 70 | 1500 | 160 | 44 | 240 | 4.3 | 260 | 610 | 100 | 100 | 550 | 3.3 | | | 9 | 7 | <5 | <0.5 | | 16 | 15 | 29 | | 19 |
| G23 | 04/02/86 | | 1100 | 62 | | | | | | 900 | 250 | | 200 | | 1.8 | | | | | | | | | | <1 | | |
| G23 | 06/16/86 | | 1100 | 69 | | | | | | 100 | 200 | | 200 | | 0.9 | | | | | | | | | | 4 | | |

APPENDIX B Table 7. (cont.)

Grasslands

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| G23 | 06/01/87 | | 2640 | | | | | | | 295 | 650 | | | | 3.9 | | | | | | | | | | 4 | | |
| G24 | 04/02/86 | | 2700 | 60 | | | | | | 370 | 870 | | 150 | | 5.5 | | | | | | | | | | 27 | | |
| G25 | 04/03/86 | | 2600 | 62 | | | | | | 320 | 820 | | 140 | | 4.7 | 4 | <10 | 27 | 15 | <10 | | | 5 | 22 | 31 | | 36 |
| G26 | 04/03/86 | | 2400 | 64 | | | | | | 500 | 510 | | 160 | | 1.2 | | | | | | | | 6 | | 12 | | |
| G26 | 06/01/87 | | 1140 | | | | | | | 176 | 140 | | | | 0.5 | | | | | | | | 4 | | 2 | | |
| G27 | 04/02/86 | | 710 | 61 | | | | | | 88 | 130 | | 98 | | 0.5 | | | | | | | | | | <1 | | |
| G27 | 06/16/86 | | 640 | 77 | | | | | | 61 | 110 | | 110 | | 0.1 | | | | 8 | <5 | <0.5 | | <5 | 11 | 4 | | 23 |
| G27 | 06/01/87 | | 838 | | | | | | | 121 | 105 | | | | 0.3 | | | 31 | 7 | <5 | | | 3 | 11 | 2 | | 10 |
| G28 | 04/03/86 | | 1800 | 63 | | | | | | 230 | 430 | | 140 | | 4.4 | 5 | <10 | 10 | <10 | <10 | | | | 9 | 12 | | 23 |
| G28 | 06/01/87 | | 1560 | | | | | | | 196 | 340 | | | | 1.6 | | | 5 | 5 | <5 | | | 6 | 6 | 10 | | 2 |
| G29 | 04/02/86 | | 2100 | 61 | | | | | | 280 | 580 | | 152 | | 2.9 | | | | | | | | | | 13 | | |
| G29 | 06/16/86 | | 870 | 77 | | | | | | 100 | 150 | | 870 | | 0.5 | | | 22 | 6 | <5 | <0.5 | | 6 | 17 | 1 | | 18 |
| G29 | 06/01/87 | | 1570 | | | | | | | 201 | 370 | | | | 1.5 | | | | | | | | 7 | | 10 | | |
| G31 | 04/02/86 | | 680 | 63 | | | | | | 82 | 220 | | 110 | | 0.8 | | | | | | | | | | 2 | | |
| G32 | 04/02/86 | | 145 | 61 | | | | | | 12 | 27 | | 48 | | 0.4 | | | | | | | | | | <1 | | |
| G33 | 04/02/86 | | 165 | 60 | | | | | | 11 | 42 | | 48 | | 0.5 | | | | | | | | | | <1 | | |
| G34 | 04/02/86 | | 1650 | 64 | | | | | | 220 | 600 | | 290 | | 2.5 | | | | | | | | | | 1 | | |
| G35 | 04/02/86 | | 1700 | 68 | | | | | | 220 | 710 | | 320 | | 2.3 | | | | | | | | | | 3 | | |
| G36 | 04/02/86 | | 2600 | 62 | | | | | | 330 | 1000 | | 160 | | 4.9 | | | | | | | | | | 4 | | |
| G37 | 04/02/86 | | 1450 | 62 | | | | | | 220 | 760 | | 200 | | 2.4 | | | | | | | | | | <1 | | |
| G38 | 04/02/86 | | 1650 | 66 | | | | | | 400 | 980 | | 210 | | 3.0 | | | | | | | | | | 10 | | |
| G39 | 04/03/86 | | 1000 | 62 | | | | | | 130 | 460 | | 100 | | 1.0 | 4 | <10 | 5 | <10 | <10 | | | 4 | 6 | 5 | | 14 |
| G39 | 06/16/86 | | 2300 | 78 | | | | | | 270 | 630 | | 2300 | | 3.1 | | | 18 | 4 | <5 | <0.5 | | 8 | 10 | 22 | | 8 |
| G39 | 06/01/87 | | 2620 | | | | | | | 337 | 610 | | | | 3.5 | | | | | | | | 11 | | 19 | | |
| G40 | 04/03/86 | | 1690 | 64 | | | | | | 260 | 600 | | 290 | | 3.3 | 8 | <10 | 13 | <10 | <10 | | | 4 | 16 | 1 | | 29 |
| G40 | 06/01/87 | | 1320 | | | | | | | 171 | 250 | | | | 1.1 | | | | | | | | | | 1 | | |
| G41 | 04/02/86 | | 1000 | 64 | | | | | | 140 | 230 | | 130 | | 4.0 | | | | | | | | | | 3 | | |
| G41 | 06/01/87 | | 2450 | | | | | | | 307 | 515 | | | | 2.7 | | | | | | | | | | 11 | | |
| G42 | 04/02/86 | | 640 | 60 | | | | | | 55 | 180 | | 110 | | 0.4 | | | | | | | | | | <1 | | |
| G43 | 04/02/86 | | 4300 | 62 | | | | | | 200 | 1600 | | 520 | | 7.8 | | | | | | | | | | 6 | | |

APPENDIX B Table 7. (cont.)

Westside Creeks

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| G44 | 04/02/86 | 8.1 | 9100 | 62 | 7000 | 482 | 458 | 602 | 18 | 120 | 3200 | 350 | 350 | 3000 | 2.6 | | | | | | | | | | 51 | | |
| G44 | 06/11/86 | 8.3 | 8900 | 74 | 10500 | 430 | 1000 | 1100 | 20 | 170 | 6200 | 300 | 300 | 5100 | 5.9 | 5 | <10 | <2 | <10 | 23 | | | 8 | <5 | 31 | | 21 |
| G46 | 04/02/86 | 8.3 | 1600 | 53 | 1000 | 101 | 50 | 171 | 5.8 | 110 | 400 | 290 | 290 | 500 | 2.8 | | | | | | | | | | 2 | | |
| G46 | 06/11/86 | 8.1 | 1800 | 67 | 1200 | 50 | 49 | 220 | 6.0 | 160 | 460 | 260 | 260 | 440 | 3.9 | 4 | <10 | <2 | <10 | <2 | | | 5 | <5 | 1 | | <10 |
| G47 | 04/02/86 | 8.2 | 4000 | 63 | 3400 | 228 | 100 | 446 | 8.3 | 140 | 1900 | 240 | 240 | 1200 | 1.8 | | | | | | | | | | 14 | | |
| G47 | 06/11/86 | 8.2 | 4500 | 75 | 4300 | 310 | 220 | 530 | 4.5 | 110 | 2600 | 180 | 180 | 1800 | 2.6 | 3 | <10 | <2 | <10 | <2 | | | 5 | <5 | 13 | | <10 |
| G47 | 05/13/87 | | | | | | | | | | | | | | | | | | | | | | | | 7 | | |
| G48 | 04/02/86 | 7.9 | 4300 | 49 | 3800 | 355 | 197 | 524 | 3.2 | 370 | 2400 | 300 | 300 | 1840 | 1.0 | | | | | | | | | | 13 | | |
| G49 | 04/02/86 | 8.1 | 980 | 59 | 620 | 39 | 95 | 53 | 2.1 | 19 | 160 | 340 | 340 | 500 | 0.5 | | | | | | | | | | 1 | | |
| G49 | 06/11/86 | 8.8 | 1100 | 74 | 790 | 98 | 6 | 83 | 4.0 | 30 | 280 | 340 | 404 | 570 | 1.1 | | | | | | | | 2 | | 1 | | |
| G49 | 05/13/87 | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| G51 | 04/02/86 | 8.3 | 1000 | 64 | 680 | 61 | 52 | 87 | 3.6 | 52 | 340 | 210 | 210 | 360 | 0.4 | | | | | | | | | | <1 | | |
| G52 | 04/02/86 | 8.2 | 860 | 62 | 600 | 63 | 32 | 76 | 4.1 | 39 | 190 | 210 | 210 | 260 | 0.9 | | | | | | | | | | <1 | | |
| G52 | 06/11/86 | 8.5 | 920 | 76 | 650 | 30 | 55 | 79 | 4.4 | 44 | 230 | 152 | 160 | 310 | 1.2 | 2 | <10 | <2 | <10 | <2 | | | 2 | <5 | 1 | | <10 |
| G53 | 04/02/86 | 8.4 | 1600 | 62 | 1100 | 69 | 65 | 197 | 5.7 | 93 | 400 | 270 | 314 | 440 | 4.5 | | | | | | | | | | 3 | | |
| G53 | 06/11/86 | 8.6 | 2700 | 74 | 1900 | 76 | 120 | 400 | 10 | 170 | 990 | 210 | 320 | 630 | 7.0 | 2 | <10 | <2 | <10 | <2 | | | 4 | <5 | 6 | | 10 |
| G54 | 04/02/86 | 8.2 | 1000 | 54 | 610 | 63 | 36 | 115 | 2.4 | 97 | 110 | 300 | 320 | 610 | 2.3 | | | | | | | | | | 3 | | |
| G54 | 06/11/86 | 8.5 | 1500 | 68 | 910 | 24 | 43 | 240 | 2.6 | 210 | 170 | 290 | 290 | 280 | 4.9 | 1 | <10 | <2 | <10 | 2 | | | 2 | <5 | 4 | | 11 |
| G54 | 05/13/87 | 8.6 | 580 | 87 | 360 | 47 | 30 | 35 | 3.8 | 34 | 57 | 160 | 176 | 220 | | | | | | | | | | | 3 | | |
| G55 | 06/11/86 | | | | | | | | | | | | | | 0.4 | 9 | <10 | <2 | <10 | <2 | | | 1 | <5 | <1 | | <10 |
| G57 | 04/02/86 | 8.2 | 1700 | 58 | 1200 | 113 | 63 | 171 | 12 | 130 | 470 | 280 | 280 | 580 | 2.9 | | | | | | | | | | 2 | | |
| G58 | 04/02/86 | 7.9 | 2100 | 47 | 1200 | 110 | 46 | 246 | 4.1 | 520 | 170 | 230 | 230 | 460 | 8.5 | | | | | | | | | | <1 | | |
| G58 | 06/11/86 | 8.3 | 1700 | 84 | 940 | 86 | 40 | 210 | 5.8 | 300 | 120 | 200 | 200 | 340 | 5.7 | 2 | <10 | <2 | <10 | 2 | | | 4 | <5 | 1 | | 12 |
| G58 | 05/13/87 | | | | | | | | | | | | | | | | | | | | | | | | 1 | | |
| G59 | 04/03/86 | | 1800 | | | | | | | 350 | 200 | | 230 | | 6.6 | 3 | <10 | <2 | <10 | <10 | | | 2 | <5 | 1 | | <10 |
| G59 | 06/11/86 | 8.4 | 2900 | 76 | 1700 | 91 | 56 | 420 | 7.0 | 600 | 190 | 290 | 295 | 450 | 11.0 | 5 | <5 | <5 | <5 | <5 | | 85 | <5 | (<5) | 5 | <5 | <5 |
| G59 | 05/13/87 | | | | | | | | | | | | | | | | | | | | | | | | <1 | | |
| G60 | 04/02/86 | 8.3 | 980 | 52 | 590 | 65 | 42 | 81 | 2.7 | 62 | 140 | 260 | 272 | 360 | 1.6 | | | | | | | | | | <1 | | |
| G60 | 06/11/86 | 8.3 | 1200 | 67 | 780 | 30 | 45 | 130 | 4.4 | 110 | 200 | 250 | 250 | 340 | 3.2 | <1 | <10 | <2 | <10 | <2 | | | 1 | <5 | 1 | | <10 |

APPENDIX B Table 7. (cont.)

Westside Creeks

| RWQCB ID | DATE | pH | EC umhos/cm | TEMP F | TDS | Ca | Mg | Na | K | Cl | SO4 | HCO3 | Total Alk | Hard | B | As | Cd | Cr | Cu | Pb | Hg | Mn | Mo | Ni | Se | Ag | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | mg/L | | | | | | | | | | | ug/L | | | | | | | | | | | |
| G61 | 05/13/87 | | | | | | | | | | | | | | | | | | | | | | | | 15 | | |
| G62 | 04/02/86 | 8.4 | 940 | 63 | 640 | 66 | 49 | 62 | 3.6 | 31 | 300 | 220 | 232 | 330 | 0.3 | | | | | | | | | | <1 | | |
| G62 | 06/11/86 | 8.2 | 1100 | 76 | 790 | 100 | 61 | 73 | 9.3 | 31 | 360 | 180 | 180 | 400 | 0.3 | <1 | <10 | <2 | <10 | <2 | | | 1 | <5 | 1 | | <10 |
| G63 | 04/03/86 | 8.3 | 5700 | 68 | 4300 | 190 | 280 | 800 | 4.5 | 1200 | 1600 | 410 | 410 | 1500 | 5.7 | 1 | <10 | <2 | <10 | <10 | | | 4 | <5 | 6 | | <10 |
| G63 | 06/11/86 | 8.2 | 6000 | 82 | 4500 | 180 | 260 | 940 | 7.6 | 1000 | 1600 | 380 | 380 | 1500 | 5.9 | 2 | <10 | <2 | <10 | <2 | | | 5 | <5 | 6 | | <10 |
| G63 | 05/13/87 | | | | | | | | | | | | | | | | | | | | | | | | 6 | | |
| G64 | 04/03/86 | | 4400 | | | | | | | 140 | 2000 | | 400 | | 5.3 | 7 | <10 | 39 | 26 | <10 | | | 2 | 98 | 8 | | 420 |
| G65 | 04/03/86 | | 1000 | | | | | | | 76 | 150 | | 290 | | 1.6 | | <10 | <2 | <10 | <10 | | | 2 | <5 | 2 | | <10 |
| G66 | 04/03/86 | | 860 | | | | | | | 90 | 74 | | 230 | | 1.6 | 1 | <10 | <2 | <10 | <10 | | | 2 | <5 | 1 | | 12 |
| G66 | 06/11/86 | 8.4 | 1100 | 84 | 620 | 57 | 43 | 120 | 2.7 | 160 | 75 | 270 | 278 | 300 | 2.3 | 1 | <10 | <2 | <10 | <2 | | | 1 | <5 | <1 | | 11 |
| G67 | 04/02/86 | 8.2 | 1900 | 60 | 1400 | 97 | 99 | 180 | 4.3 | 53 | 600 | 270 | 270 | 630 | 0.8 | | | | | | | | | | 5 | | |
| G67 | 06/11/86 | 8.2 | 2700 | 73 | 2100 | 140 | 140 | 280 | 7.0 | 62 | 1200 | 240 | 240 | 1900 | 1.3 | 2 | <10 | <2 | <10 | <2 | | | 4 | <5 | 4 | | <10 |
| G67 | 05/13/87 | | | | | | | | | | | | | | | | | | | | | | | | 2 | | |
| G68 | 04/02/86 | 8.2 | 3000 | 48 | 2200 | 192 | 107 | 332 | 7.4 | 250 | 1000 | 180 | 180 | 1040 | 5.0 | | | | | | | | | | 4 | | |
| G69 | 04/03/86 | | 3700 | | | | | | | 75 | 1700 | | 390 | | 4.0 | 2 | <10 | 15 | <10 | <10 | | | 4 | 82 | 7 | | 340 |