STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

BULLETIN NO. 66-59

Quality of Ground Waters in California 1959

PART I
NORTHERN AND CENTRAL CALIFORNIA

EDMUND G. BROWN
Governor

WILLIAM E. WARNE
Director of Water Resources

July 1961

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* Ground water basin number; explanation on page four.

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3	Central Coastal Region
5	Central Valley Region

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Butte Valley	1
Carmel Valley	3
Central Coastal Region	3
Central Valley Region	5
Clayton Valley	2
Colusa County	See Sacramento Valley
East Bay Area	See Santa Clara Valley
Eel River Valley	1
Eureka Plain	1
Fresno County	See San Joaquin Valley
Gilroy-Hollister Basin	3
Glenn County	See Sacramento Valley
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Tehama County	See Sacramento Valley
Tulare County	See San Joaquin Valley

LIAM E. WARNE
DIRECTOR

EDMUND G. BROWN
GOVERNOR

ADDRESS REPLY TO
P. O. BOX 388 SACRAMENTO 2
1120 N STREET HICKORY 5-4711

STATE OF CALIFORNIA
Department of Water Resources
SACRAMENTO

October 3, 1961

Honorable Edmund G. Brown, Governor,
and Members of the Legislature of the
State of California

Water Pollution Control Boards

Gentlemen:

I have the honor to transmit herewith Bulletin No. 66-59 entitled "Quality of Ground Waters in California, 1959, Part I, Northern and Central California". The Southern California portion of this report will be published at a later date as Part II. This report covers the period January through December 1959.

This is the fifth in a continuing series of reports on the ground water quality monitoring program conducted by the Department of Water Resources. Under this program, water samples from representative wells in ground water basins throughout the State are collected and analyzed, and an annual evaluation of ground water quality conditions is made. Mineral and radiological analyses were made of ground waters taken from approximately 970 wells in 45 monitored areas in Northern and Central California.

In general, there were no significant ground water quality changes in Northern and Central California during 1959. Sea water, intruding inland into various coastal ground water basins, remained the primary source of degradation.

Very sincerely,

William E. Warne

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ORGANIZATION
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

EDMUND G. BROWN, Governor
WILLIAM E. WARNE, Director of Water Resources
ALFRED R. GOLZE', Chief Engineer

DIVISION OF RESOURCES PLANNING

William L. Berry . . . . Division Engineer
Irvin M. Ingerson . . . . Chief, Engineering Services Branch

The investigation leading to this report
was conducted under the direction
of

Meyer Kramsky . . . . Principal Engineer, Water Resources

by

Willard R. Slater . . . . Supervising Engineer, Water Resources

Assisted by

Eldon E. Rinehart . . . . Water Resources Engineering Associate
James C. Mosley . . . . Assistant Civil Engineer
Tom Y. Fujimoto . . . . Assistant Civil Engineer
W. Roger Hail . . . . Assistant Engineering Geologist
Chester Lao . . . . Assistant Engineering Geologist
Charles E. Labat . . . . Junior Civil Engineer
Jon A. Neely . . . . Junior Civil Engineer

ORGANIZATION

CALIFORNIA WATER COMMISSION

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John P. Bunker

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Chief Engineer

William M. Carah
Executive Secretary

ACKNOWLEDGMENTS

The extensive coverage of the ground water quality monitoring program, reported herein, is made possible through the cooperation of federal, state, and local agencies. The department appreciates the valuable assistance and cooperation of the following agencies:

Federal Agencies
- Department of the Interior
  - Geological Survey

State Agencies
- California Disaster Office, Radiological Service
- State Water Pollution Control Board

County Agencies
- Alameda County Flood Control and Water Conservation District
- Butte County Farm Advisor
- Colusa County Farm Advisor
- Del Norte County Farm Advisor
- Glenn County Farm Advisor
- Humboldt County Farm Advisor
- Kern County Farm Advisor
- Kings County Farm Advisor
- Madera County Farm Advisor
- Mendocino County Farm Advisor
- Monterey County Flood Control and Water Conservation District
- Sacramento County Farm Advisor
- Santa Clara Valley Water Conservation District
- Siskiyou County Farm Advisor
- Sonoma County Farm Advisor
- Stanislaus County Farm Advisor
- Sutter County Farm Advisor
- Tehama County Farm Advisor
- Tulare County Farm Advisor
- Yolo County Farm Advisor
- Yuba County Farm Advisor

Organized Public Agencies
- Alameda County Water District
- Buena Vista Water Storage District
- Central California Irrigation District
- Merced Irrigation District
- Turlock Irrigation District

Many of the analyses presented herein were made by the United States Geological Survey, Quality of Water Branch, at its Sacramento laboratory, under provisions of a continuing cooperative agreement with the Department of Water Resources.

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THE GROUND WATER QUALITY MONITORING PROGRAM

Water development to meet the needs of California's phenomenal growth during the past decade has become one of the major problems facing the State. As the water resources of California are more fully utilized to meet the requirements imposed by the rapid expansion in population, agriculture and industry, and as the number of suitable surface storage sites dwindles, water development planners are turning more and more to ground water supplies. Although the use of ground water has been, and is, one of the major factors contributing to the economy of the State, insufficient data are available regarding the mineral quality of such ground water supplies. The present widespread dependence upon ground water, together with the need for more intensive utilization of underground storage, requires constant vigilance coupled with remedial action, where necessary, to assure that the quality of ground water remains suitable for all intended uses. In view of the extensive occurrence of ground water and its relatively slow rate of movement, determination of ground water quality and detection of changes therein requires reliable long-term observation and records. Such data are essential to any program of quality control and are indispensable to formulation of plans for conjunctive operation of surface and underground storage. To help meet this need, a statewide program of observation and study of ground water quality was initiated by the Department of Water Resources in 1953.

Part I of this bulletin presents data and an evaluation of ground water quality conditions in Northern and Central California. The area comprises all of Water Pollution Control Regions 1, 2 and 5; Region 3 north of the San Antonio-Salinas River drainage boundary; and Region 6 north of the northern Mono Lake drainage boundary. Part II, to be published at a later date, will present data and an evaluation of ground water quality conditions in Region 3, south of the San Antonio-Salinas River drainage boundary; Region 6, south of the northern Mono Lake drainage boundary; and all of Regions 4, 7, 8 and 9. The northern and central areas of California monitored during the 1959 program are shown on Plate 1, "Ground Water Quality Monitored Areas 1959".

Data for previous periods are included in the following reports:

1. California Department of Public Works, Division of Water Resources, Water Quality Investigations, Report No. 14, "Ground Water Quality Monitoring Program in California, Progress Report 1953-1954"
2. California Department of Water Resources, Division of Resources Planning, Bulletin No. 66, "Quality of Ground Waters in California, 1955-1956"
3. ----, "Quality of Ground Waters in California, 1957"
4. ----, Bulletin No. 66-58, "Quality of Ground Waters in California, 1958"

The ground water quality monitoring program is authorized in Section 229 of the California Water Code, which directs that the department shall:

> " . . . investigate conditions of the quality of all waters within the State, including saline waters, coastal and inland, as related to all sources of pollution of whatever nature and shall report thereon to the Legislature and to the appropriate regional water pollution control board annually, and may recommend any steps which might be taken to improve or protect the quality of such waters."

The objectives of the program are:

(1) To provide information on the prevailing mineral quality of ground waters.

(2) To provide a reliable, continuing check on quality of ground waters.

(3) To secure data relating to significant changes in mineral quality, to evaluate the causes for these changes and to identify and delineate the areas affected by such changes.

(4) To provide the appropriate regulatory agencies with information on the status of quality of ground waters.

(5) To provide the required data on ground water quality for the purpose of water development planning and construction.

The broad coverage of this statewide ground water quality program is made possible through the combined efforts of many public and private agencies. Although the program was initiated by the Department of Water Resources, the present scope of the program could not have been achieved without the valuable assistance of these other agencies.

In establishing monitoring programs, requests and suggestions from regional water pollution control boards and other interested water agencies have been considered.

During 1959, the program in Northern and Central California led to the collection and analysis of samples taken from about 970 wells in 45 basins or portions of basins. The geographical location and areal extent of each of the areas is indicated on Plate 1, "Ground Water Quality Monitored Areas, 1959". The areas are grouped by water pollution control board regions, the boundaries of which, in most cases, coincide with those of the major drainage basins of the State.

Tests made of ground water quality include mineral and radiological determinations. The frequency of sampling, type of analysis, and density of the sampling network for mineral tests depends largely on the conditions in the area being monitored. In areas where water quality problems are known to exist and where extensive use is made of ground water supplies, samples are taken one or more times each year. In areas where limited use is made of ground waters, samples are taken periodically until sufficient data are collected to determine the water quality of the basin and thereafter as frequently as the land development and water use warrants. Radioassays of well waters are made at three year intervals; one-third of the monitoring network is tested each year. In general, only the minimum number of wells necessary to show the areal extent of problems, if any, or to evaluate ground water conditions, are included in the monitoring network.

The selection of individual wells is governed, to a large extent, by the availability of well logs. Sufficient information is desirable for each well such as depth, aquifers encountered, and depths of perforations to assure that data obtained are useful. Wells are added to or deleted from the network according to changing ground water conditions in an area. For example, a well showing prominent effects of sea-water intrusion is generally removed from productive use and, in many instances, sampling becomes impracticable. Accordingly, another well is substituted, if possible.

The information presented in the text for each monitored area includes: a brief description of the area and the monitoring program; the occurrence, development, and beneficial uses of ground water; a discussion of major waste discharges; an evaluation of and significant changes in ground water quality. Following the presentation for each area a graph shows conductivity and problem constituent ranges and, where meaningful, graphs of fluctuations of problem constituents in selected wells. A map of the monitored area shows monitored well locations and areas of ground water degradation, if any.

The region and basin numbers in this report are based on a decimal system in the form 0-00.00. The number to the left of the dash refers to the region of a water pollution control board. On the right of the dash the first digit or digits refer to the basin, valley or area. Digits to the right of the decimal, if any, refer to the sub-basin number as shown below.

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0-00.00
│ │  └────sub-basin
│ └────────basin, valley, or area
└──────────water pollution control board region
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These numbers are used to identify the monitored areas in the text, in the data tables and on Plate 1. A "monitored area" is defined as that portion of a ground water basin which lies generally within the limits of an established network of monitored wells. It does not necessarily include the entire ground water basin.

Wells selected for inclusion in the ground water quality monitoring network are assigned numbers by township, range and section, based upon their location. The numbering system is the same as that utilized by the United States Geological Survey. Under this system each section is divided into 40-acre plots, which are lettered as follows:

D	C	B	A
E	F	G	H
M	L	K	J
N	P	Q	R

Wells are numbered within each of these 40-acre plots according to the order in which they are selected for monitoring. For example, a well having a number 3N/6E-24A2 is located in Township 3 North, Range 6 East, and in Section 24. It is further identified as the second well selected in the 40-acre plot lettered A.

Reference may be made to the appendixes for more detailed information than is given in the main text. Appendix A presents discussions of types of mineral analyses employed in the monitoring program, of laboratory methods and procedures used, and criteria for appraising the suitability of water for drinking, irrigation, and industrial uses. Appendix B presents tabulations of all chemical and radiological analyses of samples collected in this program during 1959.

QUALITY OF GROUND WATERS IN NORTHERN AND CENTRAL CALIFORNIA, 1959

Ground water quality in Northern and Central California during 1959 remained essentially unchanged from that in 1958. The primary source of degradation continued to be sea-water intrusion into coastal aquifers as a consequence of ground water basin overdrafts. Slight to moderate inland advances of sea water were evidenced in Mad River, Petaluma, Napa-Sonoma, Ygnacio, Santa Clara, and Pajaro Valleys. In the Central Valley, significant changes in specific mineral constituents occurred only in a few individual wells or groups of wells in limited areas.

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NORTH COASTAL REGION (NO. 1)

The North Coastal Region, shown on Plate 1, comprises all of the basins draining into the Pacific Ocean from the California-Oregon state line to the northern boundary of Lagunitas Creek drainage area in Marin County. It extends approximately 270 miles from north to south, ranges in width from 180 miles at the Oregon boundary to about 30 miles in the southern portion, and encompasses an area of about 19,000 square miles.

The development and use of ground water in the North Coastal Region varies considerably. Each basin in the region is generally dependent upon the availability of surface water supplies. Ground water development ranges from very slight in some areas, primarily to supply domestic needs, to extensive in other areas where as much as 90 percent of water requirements are met from ground water supplies.

Of the 19 ground water basins which have been identified in the North Coastal Region, 11 have thus far been included in the ground water quality monitoring program. These areas, as well as the number of monitored wells in each and the sampling times, are listed in the following tabulation.

Monitored Area	Number of Wells	Sampling Time
Smith River Plain (1-1)	16	August to October
Butte Valley (1-3)	10	July to September
Shasta Valley (1-4)	8	July
Scott River Valley (1-5)	5	July
Mad River Valley (1-8)	12	September
Eureka Plain (1-9)	6	September
Eel River Valley (1-10)	15	July to October
Ukiah Valley (1-15)	11	September, October

Monitored Area	Number of Wells	Sampling Time
Sanel Valley (1-16)	6	September
Alexander Valley (1-17)	8	September
Santa Rosa Valley (1-18)	21	September

Although ground water quality in the North Coastal Region remained generally good to excellent during 1959, significant changes were noted in individual wells in a few of the monitored areas. Chlorides and total dissolved solids increased sharply in one well in Mad River Valley, probably due to sea-water intrusion. There were also wide fluctuations of chloride content in two wells located in the tidal portion of Eel River Valley. Iron remained high in a few wells in Smith River Plain. In most of the monitored areas of the North Coastal Region a boron decrease from 1958 to 1959 was noted. Future analyses will indicate whether or not a trend has been established.

SMITH RIVER PLAIN (1-1)

Smith River Plain is located adjacent to the coast in northwestern Del Norte County. The plain extends approximately 18 miles north to south, varies in width from about 4 to 7 miles, and contains an area of about 70 square miles. It is the largest alluvial area in the county.

Monitoring Program. The monitoring program in Smith River Plain was established in 1953 to maintain a check on ground water quality and to detect degradation which might result from sea-water intrusion or from local domestic waste discharges. In 1959, samples were collected from 16 wells in this area during the period of August - October.

Ground Water Occurrence. The principal source of ground water in the Crescent City area is the marine terrace deposits of the Battery formation. River terrace and flood plain deposits along the Smith River are locally important ground water sources. Aquifers of the area are interconnected and unconfined.

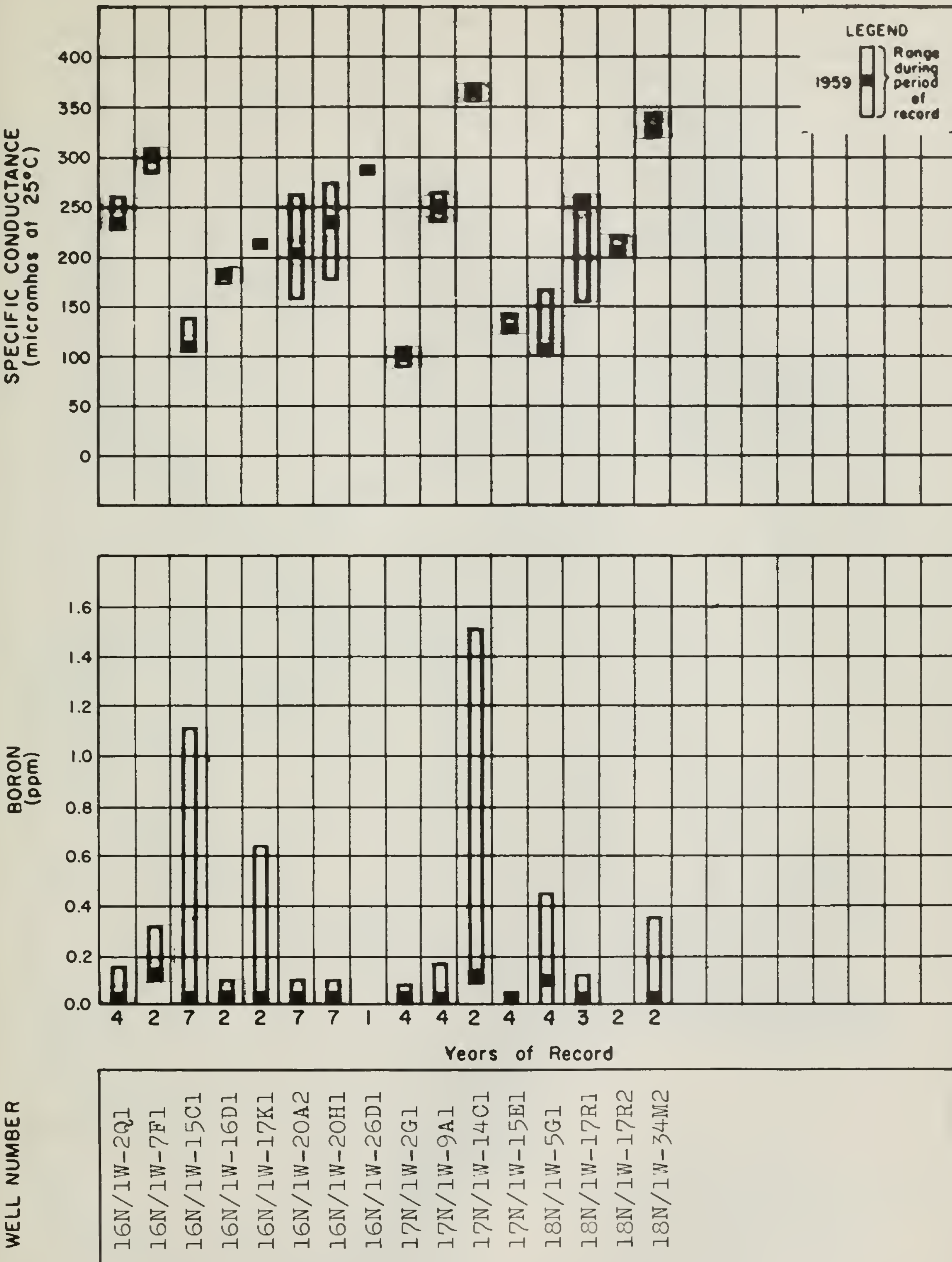
Ground Water Development. Ground water is moderately to extensively developed. It supplies approximately one-half of the water requirements in the area. Well yields range from about 20 gallons per minute (gpm) in the marine formation to 340 gpm in the stream channel and flood plain deposits.

Beneficial Uses of Ground Water. Ground water is used for irrigation, municipal, domestic and stock watering purposes.

Major Waste Discharges. There are no major waste discharges in the area which threaten ground water mineral quality. Effluent from the Crescent City sewage treatment plant is discharged into the ocean. However, there is the possibility of local contamination from individual septic tanks in the vicinity of Crescent City.

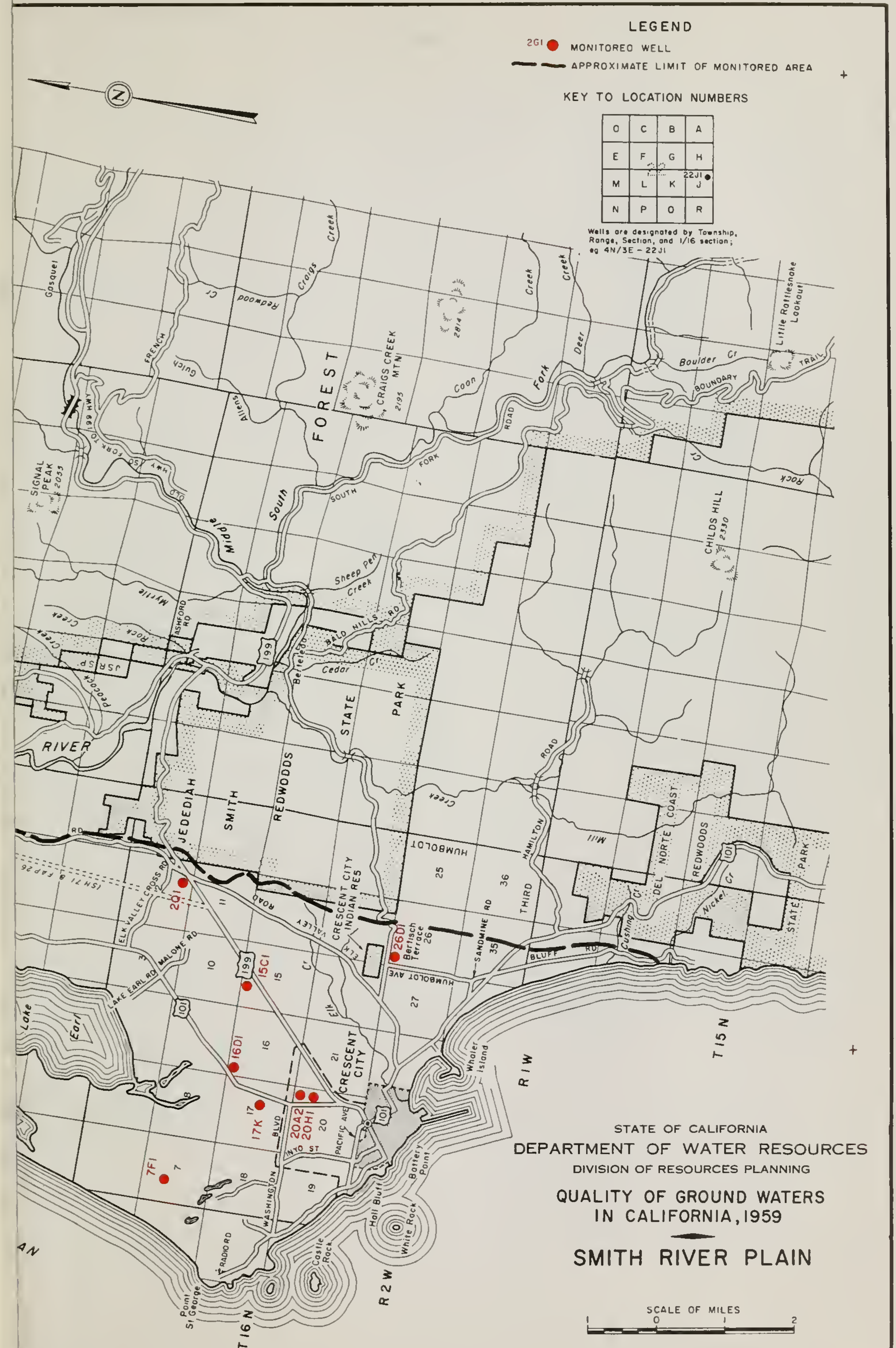
Evaluation of Water Quality. Ground waters of Smith River Plain are predominantly magnesium bicarbonate in type and of excellent mineral quality. Although no serious problems exist, high iron concentrations are found generally throughout the area, and there is a possibility of sea-water intrusion in that portion of the basin adjacent to the coast, should ground water levels be lowered to such an extent as to reverse the normal seaward hydraulic gradient. Total iron concentrations exceeded 0.3 parts per million (ppm) in five of the wells sampled in 1959. The highest concentration was 8.1 ppm in well 16N/1W-2Q1, located approximately 4 miles northeast of Crescent City. In 1958, boron was noted in a few of the monitored wells.

Significant Water Quality Changes. Comparison of the 1959 analyses with those of 1958 showed substantial decreases in boron content in two wells. Well 16N/1W-15C1, located approximately 2 miles northeast of Crescent City, and well 17N/1W-14C1, located near Fort Dick, showed decreases in boron from 1.1 to 0.0 ppm and from 1.5 to 0.1 ppm, respectively. The cause of the apparent high boron concentration in these two wells during 1958 has not been ascertained.



WATER QUALITY RANGES

SMITH RIVER PLAIN


LEGEND
2G1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section; eg 4N/3E - 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
SMITH RIVER PLAIN
SCALE OF MILES
1 0 1 2
2Q1
15C1
16D1
17K
20A2
20H1
26D1
7F1
JEDEDIAH SMITH REDWOODS STATE PARK
DEL NORTE COAST REDWOODS STATE PARK
CRESCENT CITY
CRESCENT CITY INDIAN RES
FOREST
RIVER
CRAIGS CREEK MTN 2195
CHILDS HILL 2330
SIGNAL PEAK 2033
Little Rattlesnake Lookout
Point St George
Battery Point
Whaler Island
Castle Rock
White Rock
Lake Earl
T 16 N
T 15 N
R 1 W
R 2 W


LEGEND
2G1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
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22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E - 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
SMITH RIVER PLAIN
SCALE OF MILES
0
1
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OREGON
CALIFORNIA
CURRY COUNTY
DEL NORTE COUNTY
SIX RIVERS
NATIONAL
FOREST
JEDEDIAH SMITH REDWOODS STATE PARK
DEL NORTE COAST REDWOODS STATE PARK
SMITH RIVER INDIAN RES
CRESCENT CITY INDIAN RES
CRESCENT CITY
PACIFIC
OCEAN
Lake Earl
Lake Talawa
GASQUET MTN
SIGNAL PEAK
CRAIGS CREEK MTN
CHILDS HILL
Little Rattlesnake Lookout
Stone Corral Lookout
PELICAN BEACH STATE PARK
Hunter Rock
Prince Island
Pyramid Point
Point St George
Castle Rock
White Rock
Battery Point
Whaler Island
Tillas Slough
R2E
R1E
R1W
R2W
T19N
T18N
T17N
T16N
T15N
2G1
3G1
17R1
17R2
34M2
9A
14C1
15E1
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BUTTE VALLEY (1-3)

Butte Valley lies in northeastern Siskiyou County about 30 miles south of the Oregon border and east of the Cascade Range. The valley floor is an irregularly shaped area comprising about 130 square miles.

Monitoring Program. In 1957, a monitoring program was established in Butte Valley to provide information on ground water quality and to detect changes or trends. Samples were collected from 10 wells during July - September, 1959.

Ground Water Occurrence. Ground water is contained in various lava flows and to a lesser extent in alluvial, fluvio-glacial and lake deposits. With a few exceptions, aquifers of this area are generally interconnected and unconfined.

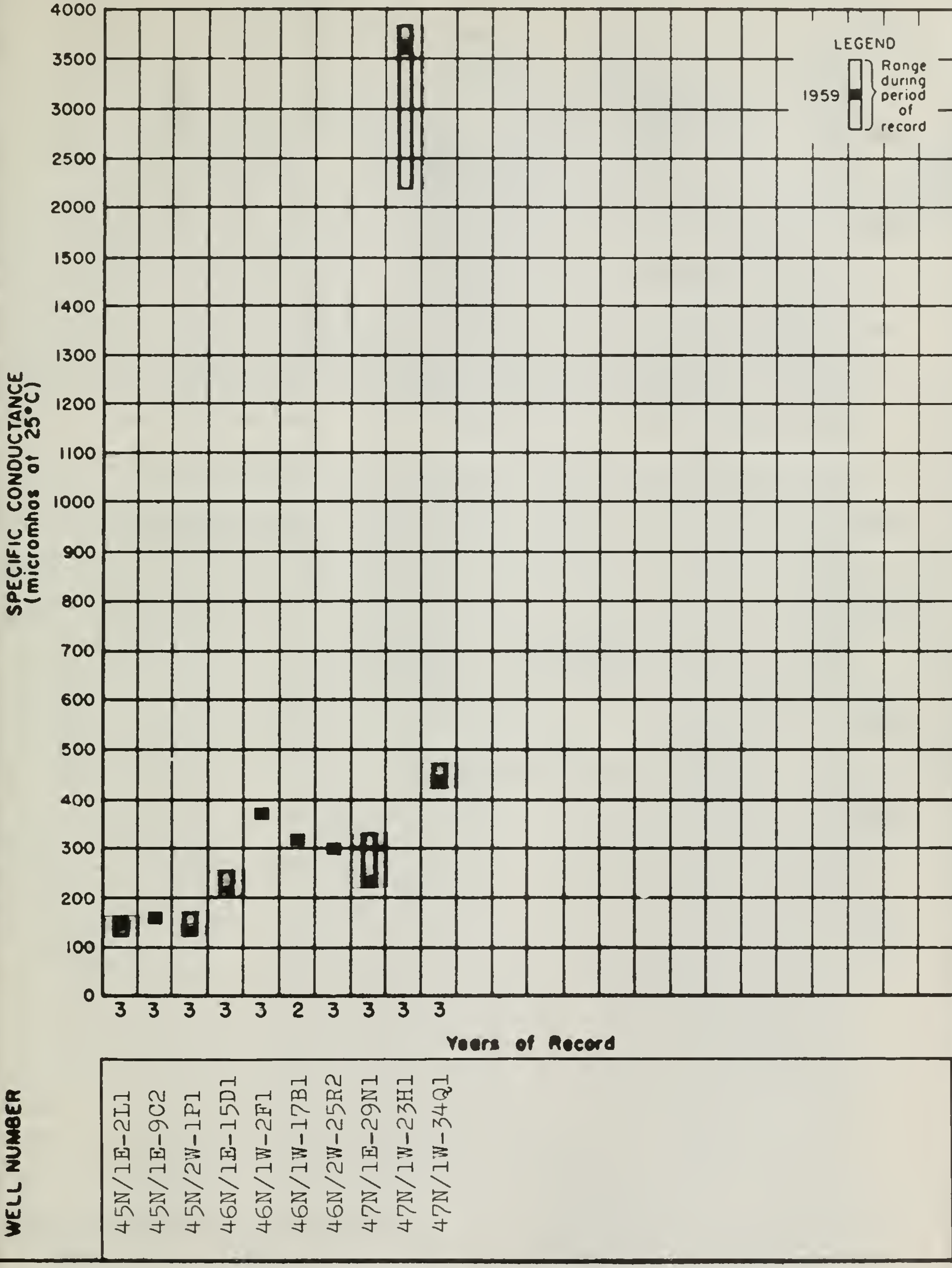
Ground Water Development. Ground water in Butte Valley is moderately to extensively developed. The fine-grained, relatively impermeable deposits do not yield large amounts of water. Along the eastern border of the valley irrigation wells yield 900 to 3,000 gpm. The higher yields are believed to come principally from the lava deposits.

Beneficial Uses of Ground Water. Ground water is used for irrigation, domestic and stock watering purposes.

Major Waste Discharges. There are no waste discharges in Butte Valley which seriously threaten ground water quality.

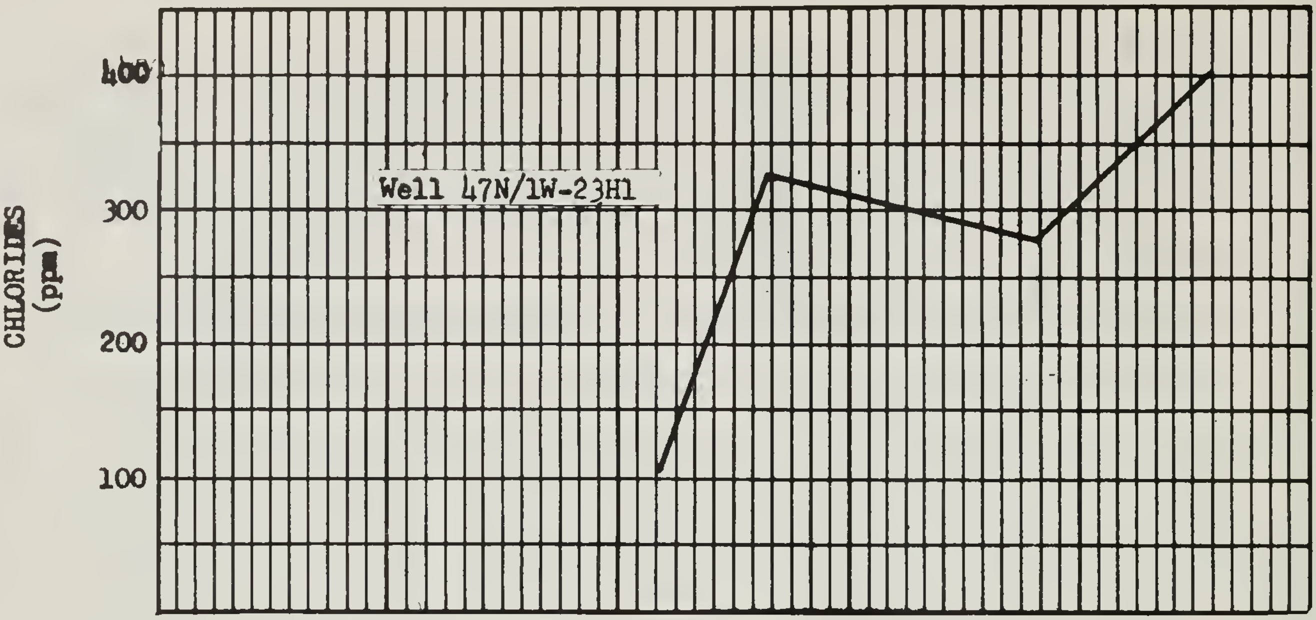
Evaluation of Water Quality. Ground waters of Butte Valley are generally bicarbonate in type, with low to moderate mineral concentrations. A few wells, however, produce highly mineralized water, probably originating in buried lakebed deposits in the east side of the valley. Past analyses of waters from well 47N/1W-23H1, located approximately 4 miles south of Dorris, indicate that this well contains total dissolved solids considerably in excess of that found in other monitored wells in the area.

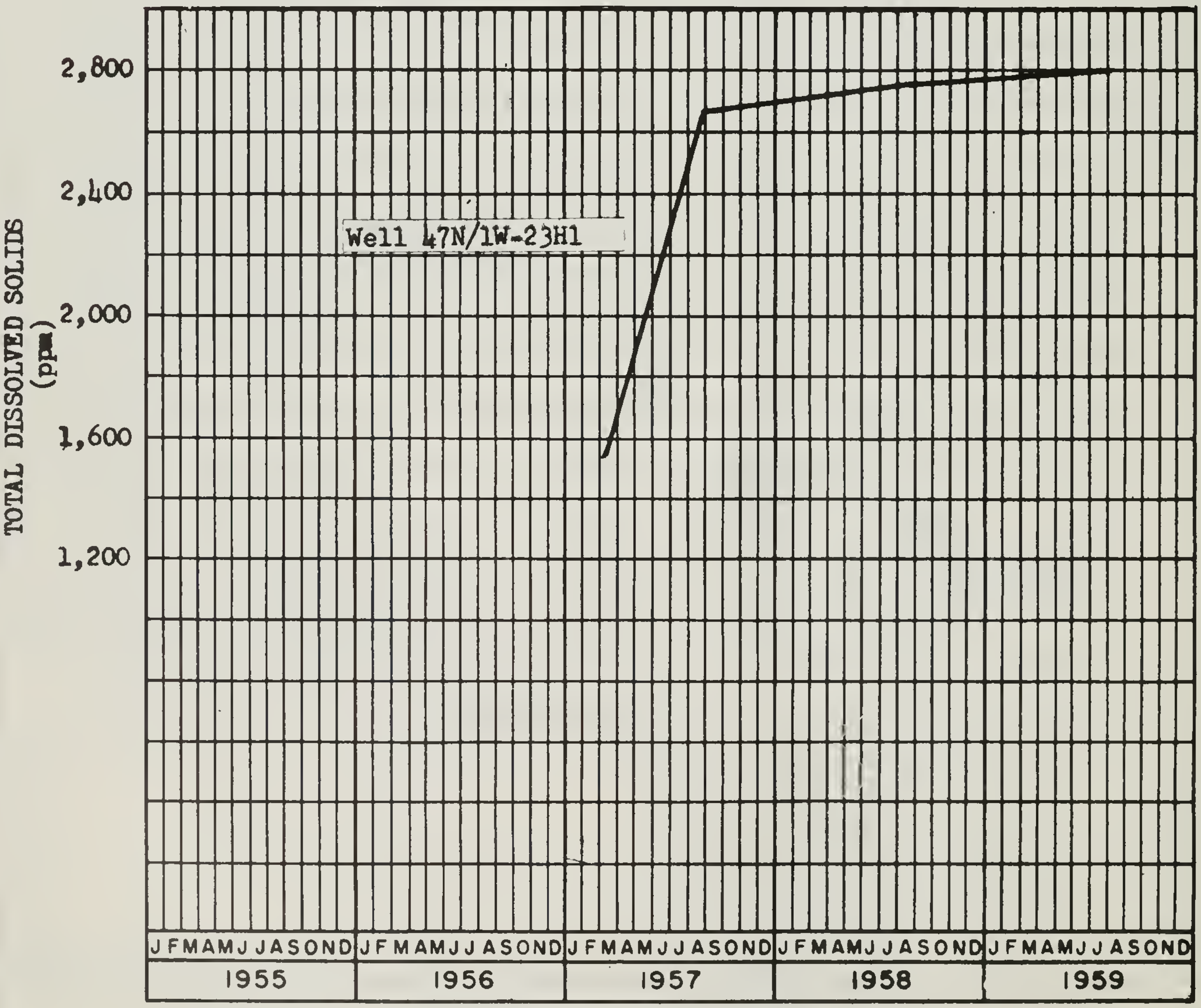
Significant Water Quality Changes. Well 47N/1W-23H1, mentioned above, has shown a progressive increase in mineralization since its inclusion in the monitoring program in March 1957, at which time the total dissolved solids content was 1,550 ppm. This increased to 2,670 ppm in August 1957, and to 2,800 ppm in July 1959. Chlorides also increased during this period (see fluctuation graph). The cause of the increased mineralization in well 47N/1W-23H1 is not known but may be due to casing failure resulting from rusting, permitting a greater portion of the water yield to come from the buried lake bed deposits which contain highly mineralized water. The 1959 analyses showed significant decreases in boron concentrations in 5 of the 10 monitored wells, the greatest of which was a decrease from 0.74 to 0.00 ppm in well 46N/1W-17B1, located near Macdoel.



WATER QUALITY RANGES

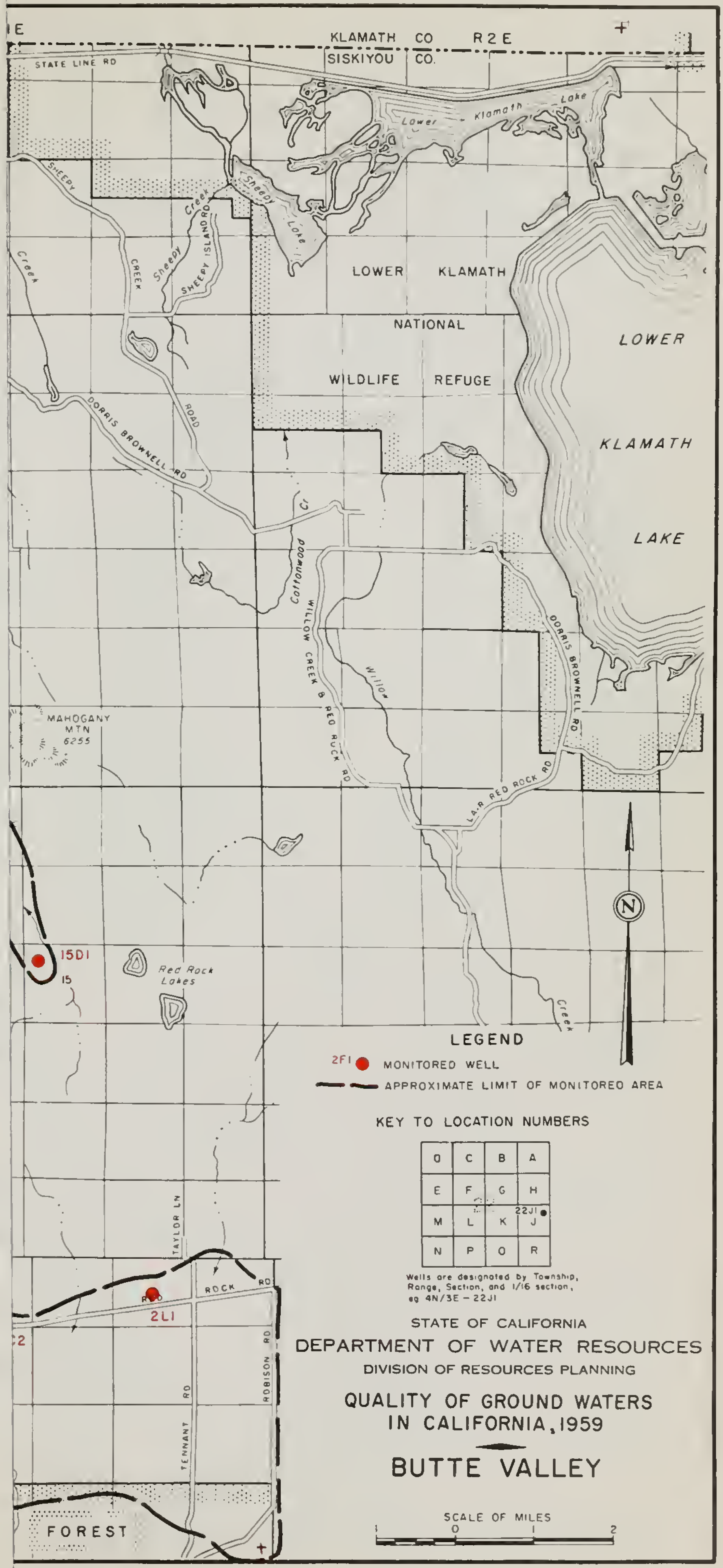
BUTTE VALLEY





FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

BUTTE VALLEY


KLAMATH CO
R2E
SISKIYOU CO.
STATE LINE RD
Lower Klamath Lake
SHEEPY
Sheepy Creek
Sheepy Lake
SHEEPY ISLAND RD
CREEK
Creek
LOWER KLAMATH
NATIONAL
WILDLIFE REFUGE
LOWER
KLAMATH
LAKE
ROAD
DORRIS BROWNELL RD
Cr
Cottonwood
WILLOW CREEK & RED ROCK RD
Willow
DORRIS BROWNELL RD
L.A.R. RED ROCK RD
MAHOGANY MTN 6255
15D1
15
Red Rock Lakes
Creek
TAYLOR LN
RED ROCK RD
2L1
C2
TENNANT RD
ROBISON RD
FOREST
LEGEND
2F1 MONITORED WELL
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BUTTE VALLEY
SCALE OF MILES
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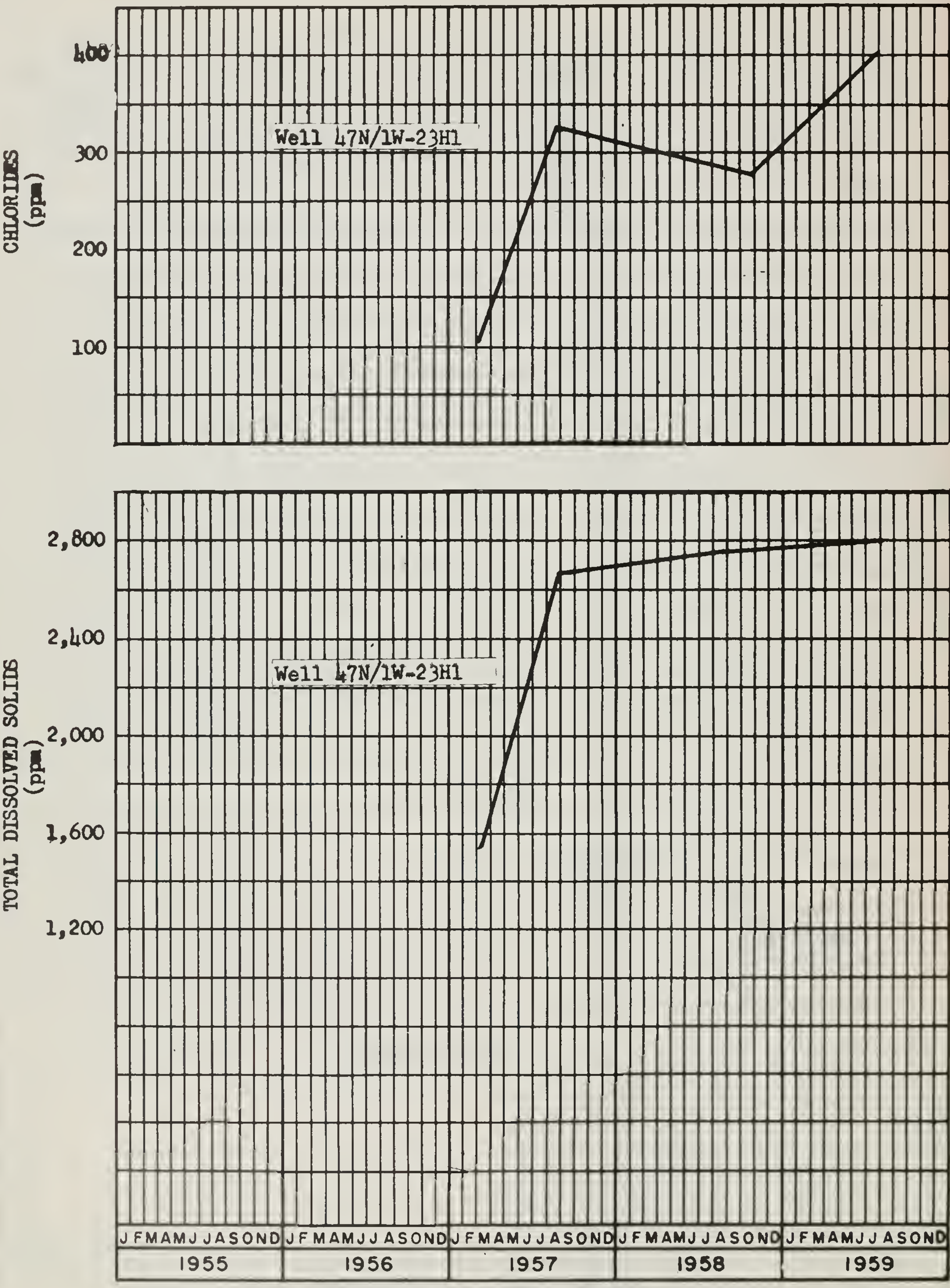

FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

BUTTE VALLEY

OREGON
CALIFORNIA
R1W
R1E
R2W
R3W
R2E
T48 N
T47 N
T46 N
T45 N
KLAMATH CO
SISKIYOU CO
KLAMATH RIVER
SECRET SPRING MTN
McGAVIN PEAK
Indian Tom Lake
Dorris
LOWER KLAMATH NATIONAL WILDLIFE REFUGE
LOWER KLAMATH LAKE
Lower Klamath Lake
CEDAR PT
MAHOGANY MTN
INLOW BUTTE
SHEEP MTN
Red Rock Lakes
Reservoir
IKES MTN
SHASTA NATIONAL FOREST
EAGLE ROCK
BLACK ROCK
WILLOW CREEK MTN
BALL MTN
Lake Juanita
Mud Lake
Macdoel
Mt Hebron
BUTTE VALLEY AIRPORT
MERIDIAN
DIABLO
23H1
29N1
34Q1
2F1
17B1
15D1
25R2
1P1
9C2
2L1
LEGEND
2F1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E-22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
BUTTE VALLEY
SCALE OF MILES
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SHASTA VALLEY (1-4)

Shasta Valley lies in central Siskiyou County, between the Klamath Mountains on the west and the Cascade Range on the east. The valley is nearly oval in shape, has a north-south length of about 30 miles, a maximum width of about 15 miles, and comprises an area of approximately 250 square miles.

Monitoring Program. The presence of highly mineralized ground waters, known to occur in certain geologic formations in the area, prompted the establishment of a monitoring program in Shasta Valley in 1957. The monitoring program includes all but a small area in the eastern portion of the valley. During 1959, samples were collected from eight wells, mostly in July.

Ground Water Occurrence. The most prolific aquifer in Shasta Valley is the Pluto's Cave basalt which is a highly permeable, black lava flow. Lenses of gravel and sand in the Recent alluvium and lavas of the Western Cascade series are locally important sources of ground water. In general, ground water is unconfined.

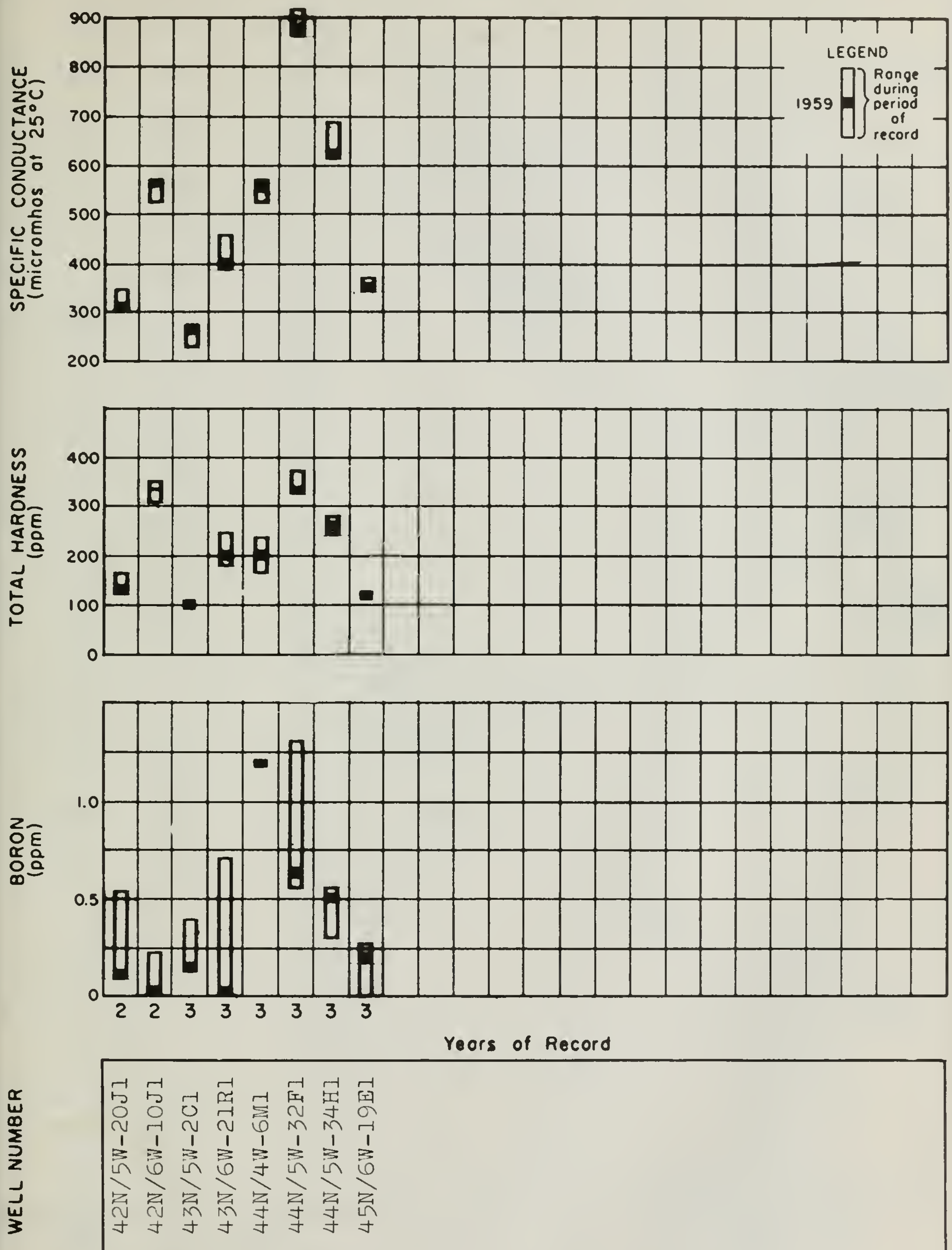
Ground Water Development. There is moderate to extensive development for domestic and stock watering needs and limited development for irrigation and municipal uses. Well yields range from 120 to 4,000 gpm and average about 1,300 gpm.

Beneficial Uses of Ground Water. Ground water is used primarily for domestic and stock watering purposes.

Major Waste Discharges. There are no large waste discharges in Shasta Valley. Municipal sewage originating from small communities is a source of limited water quality impairment. Proper disposal methods have prevented this from becoming a more serious water quality problem.

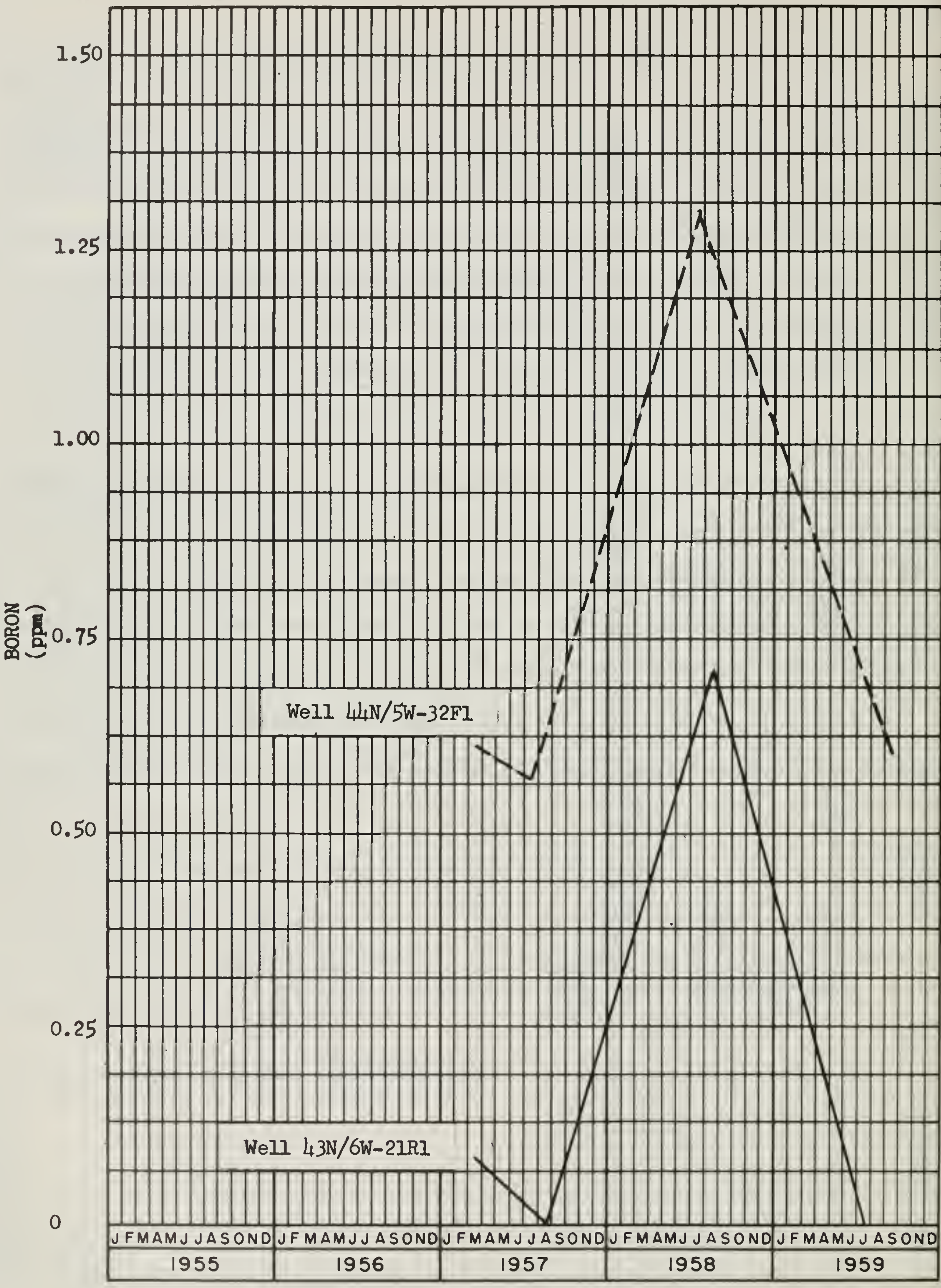
Evaluation of Water Quality. Ground waters of Shasta Valley are generally a calcium-magnesium bicarbonate type with good to excellent mineral qualities, although moderately to very hard. There are no extensive ground water quality problems; however, wells yielding high concentrations of boron, chloride, sodium and potassium are found in rather limited areas in the northern and central portion of the monitored area. Those waters high in boron appear to be derived from the older volcanic rocks of the Western Cascades.

Significant Water Quality Changes. Comparison of analyses of samples collected in 1959 with those of 1958 showed significant boron decreases in two wells. Boron in well 43N/6W-21R1, located 2 miles northwest of Gazelle, decreased from 0.7 ppm in 1958 to 0.0 ppm in 1959. In well 44N/5W-32F1, located 4 miles east of Montague, during the same period boron decreased from 1.3 to 0.6 ppm, as shown on the quality fluctuation graph. The highest boron concentration in 1959 was 1.2 ppm, in well 44N/4W-6M1, located 1.5 miles north of Big Springs.



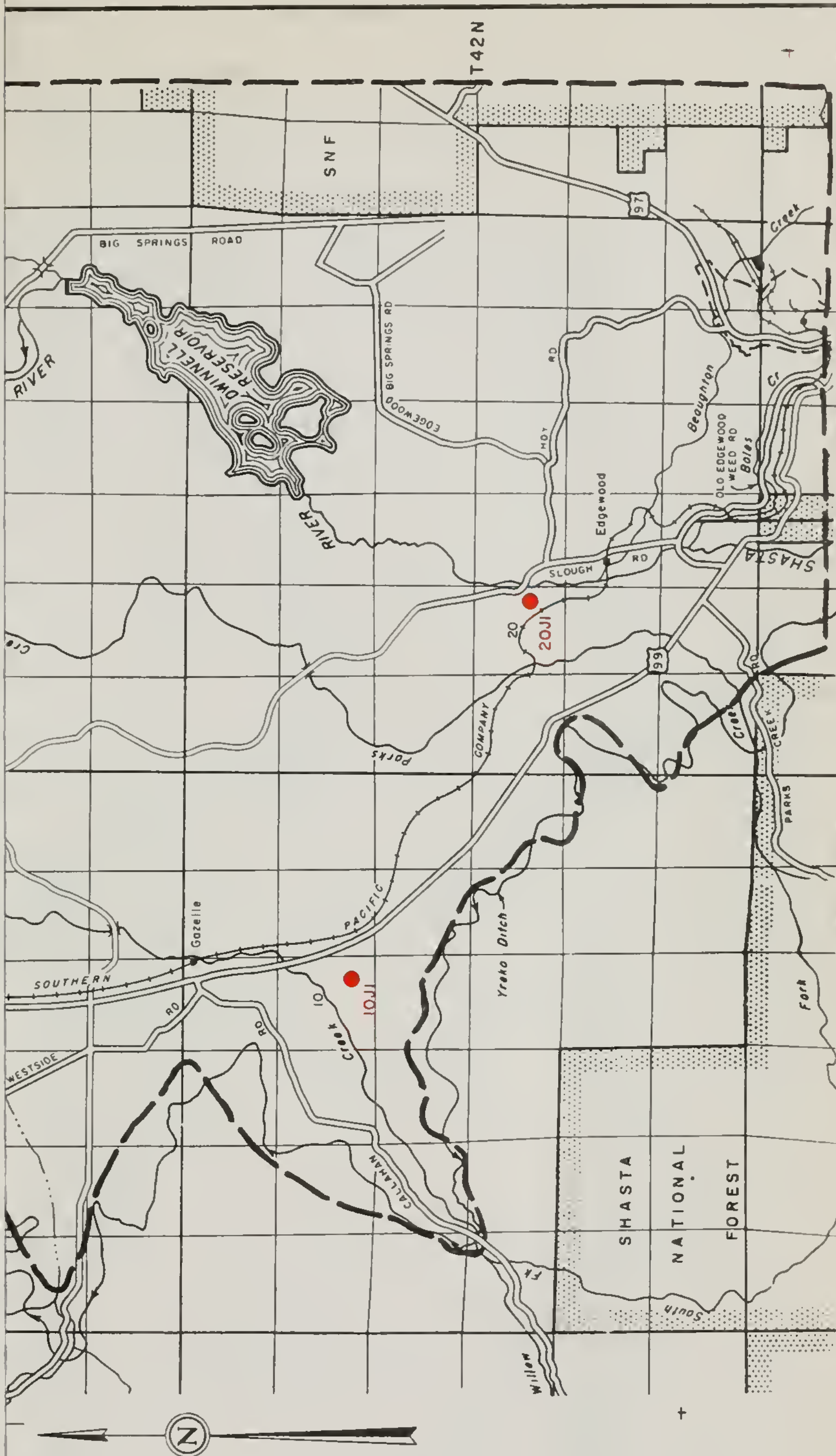
WATER QUALITY RANGES

SHASTA VALLEY



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

SHASTA VALLEY

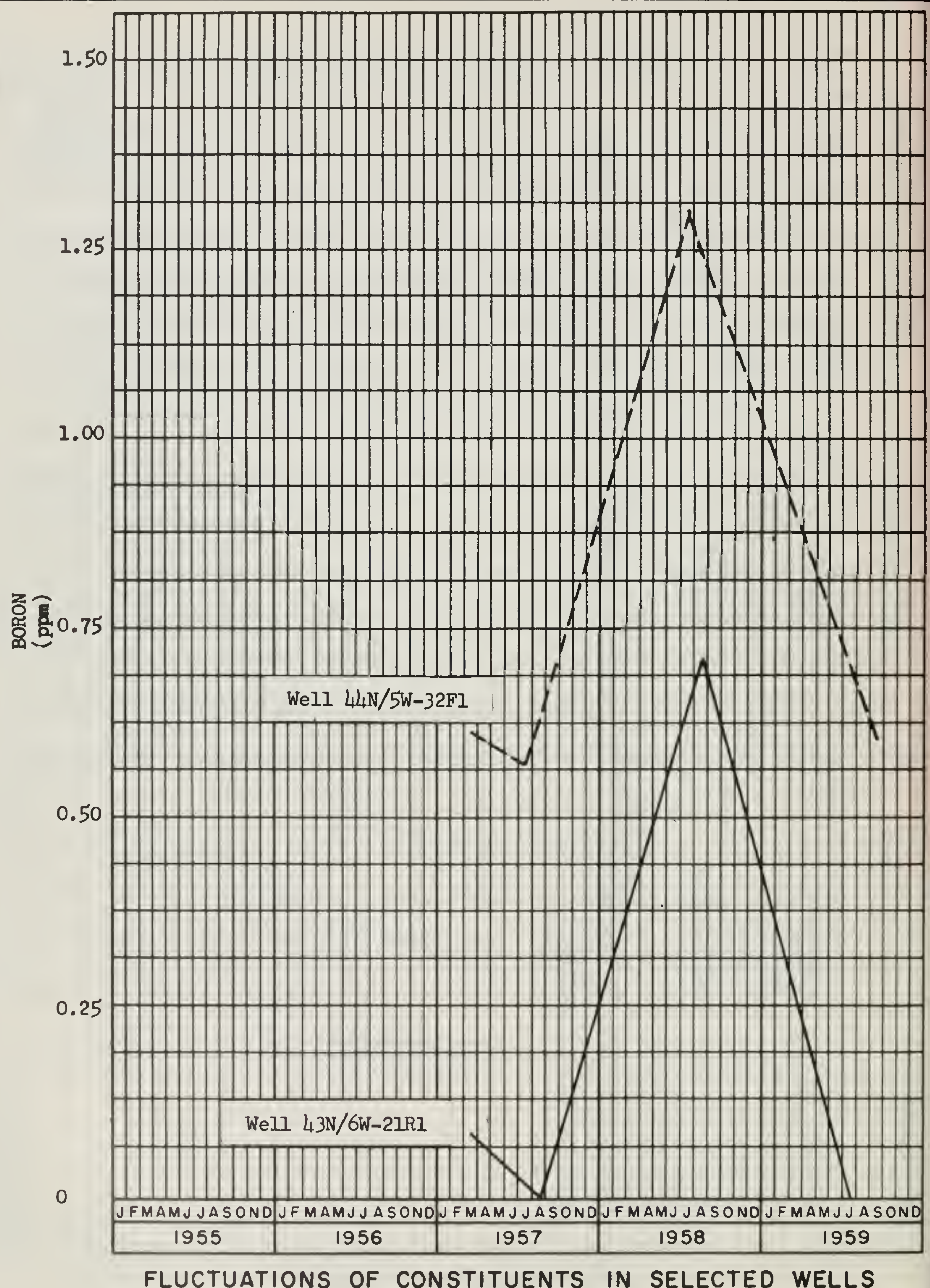


STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959

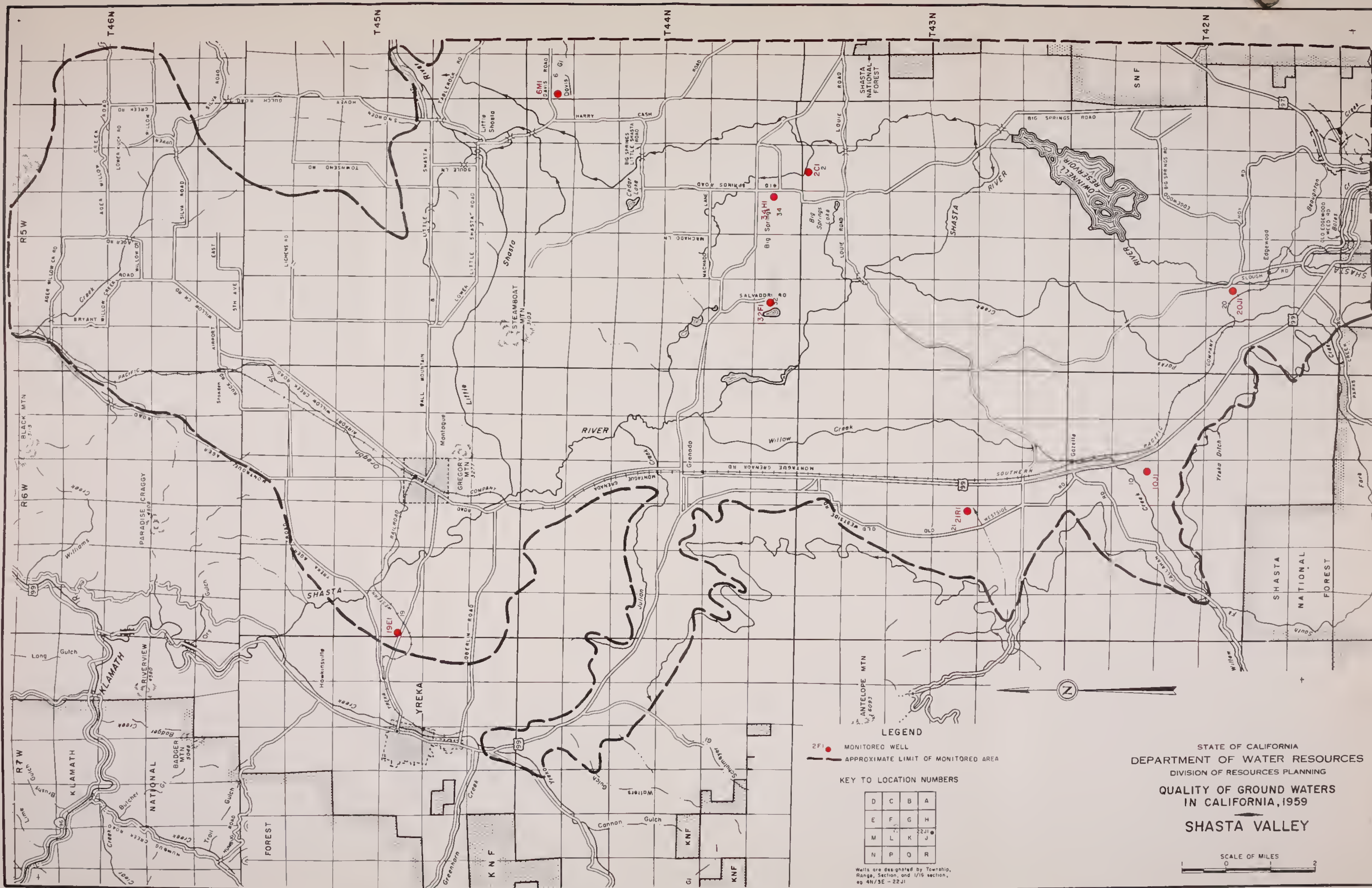
SHASTA VALLEY

SCALE OF MILES
1 0 1 2



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

SHASTA VALLEY



LEGEND
2F1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E - 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
SHASTA VALLEY
SCALE OF MILES
0
2
T46N
T45N
T44N
T43N
T42N
R5W
R6W
R7W
YREKA
SHASTA RIVER
KLAMATH RIVER
DWINNELL RESERVOIR
STEAMBOAT MTN
GREGORY MTN
ANTELOPE MTN
BLACK MTN
PARADISE CRAGGY
BADGER MTN
RIVERVIEW
SHASTA NATIONAL FOREST
KLAMATH NATIONAL FOREST
6M1
2C1
34H1
32F1
20J1
10J1
21R1
19E1

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SCOTT RIVER VALLEY (1-5)

Scott River Valley is located in western Siskiyou County about 28 miles south of the California-Oregon boundary. The monitored portion has a north-south length of 22 miles, a maximum width of about 10 miles, and comprises an area of approximately 80 square miles.

Monitoring Program. A monitoring program was established in Scott River Valley in 1957 to observe ground water quality and to detect significant changes. During July 1959, samples were collected from five wells in this area.

Ground Water Occurrence. The only water-bearing formation of importance is the younger alluvium comprised of stream channel, flood plain, and alluvial fan deposits. The most permeable deposits are located between Fort Jones and Etna. Ground water confinement occurs only in the west side alluvial fans.

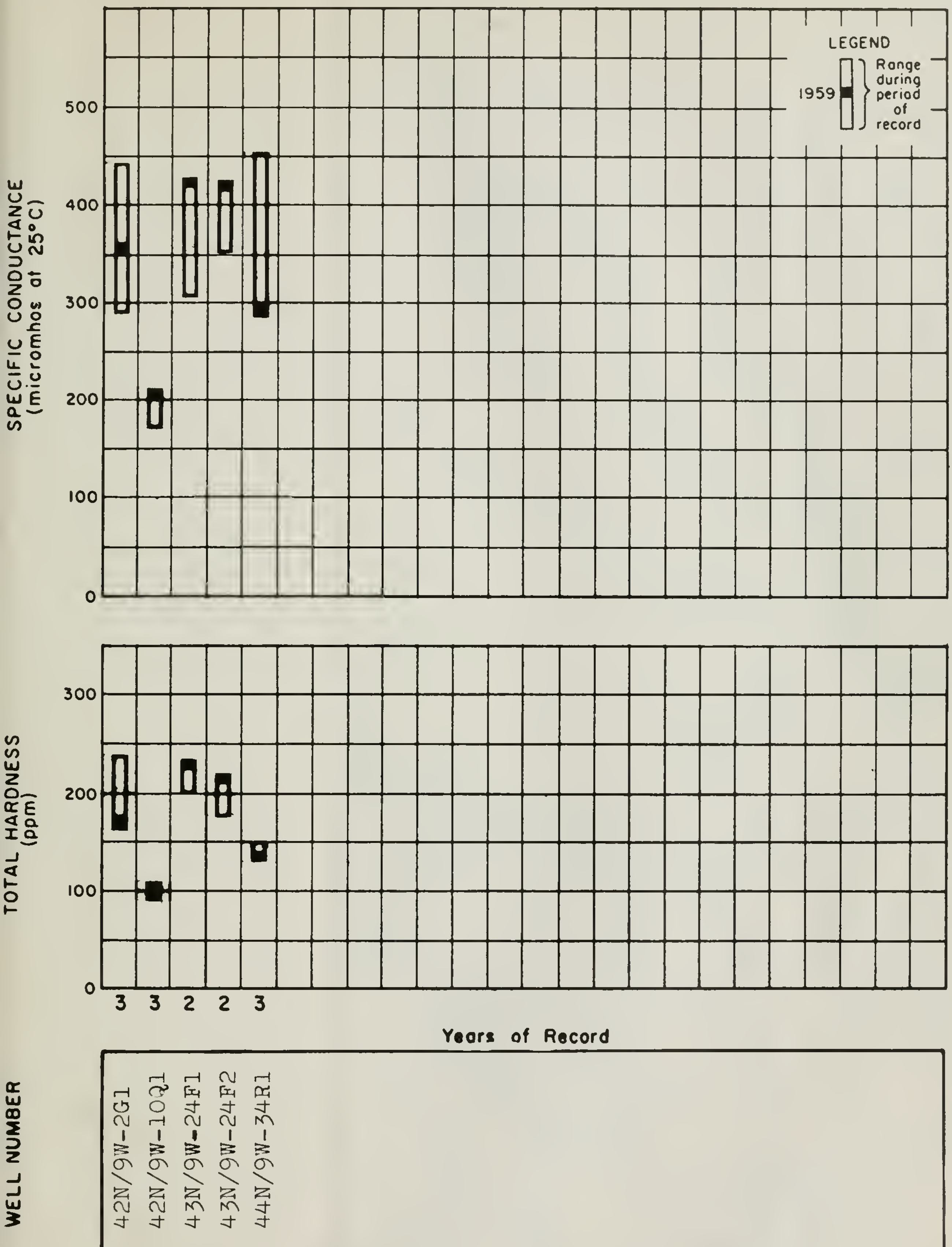
Ground Water Development. Ground water comprises only a small portion of the total amount of water used. There is moderate to extensive development for domestic and livestock supplies and limited development for irrigation. Yields of irrigation wells located in the stream channel and flood plain deposits range from 1,250 to 2,500 gpm.

Beneficial Uses of Ground Water. Ground waters are used principally for domestic purposes and to a lesser extent for irrigation.

Major Waste Discharges. There are no large waste discharges in Scott River Valley. Sewage from the towns of Etna, Fort Jones and other communities are minor and do not threaten the quality of ground water.

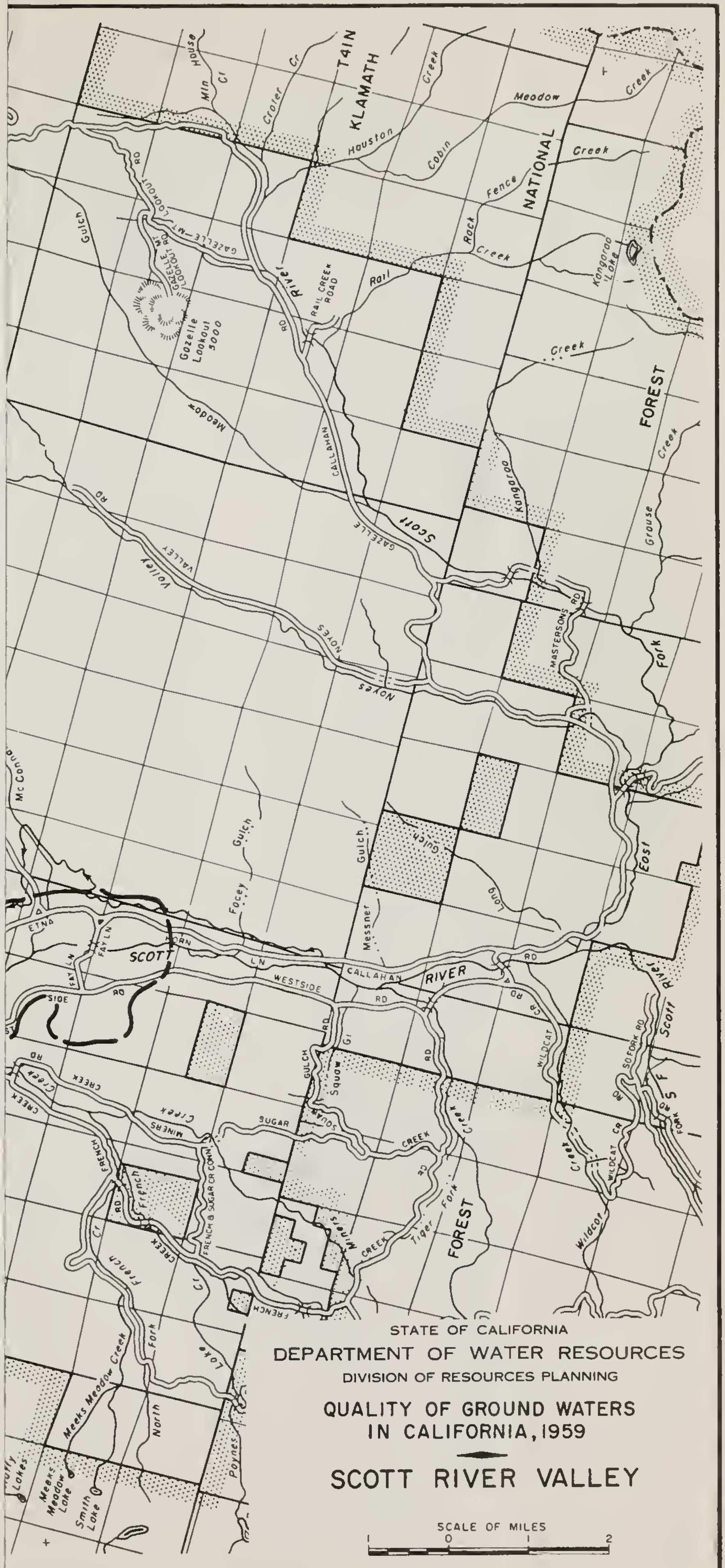
Evaluation of Water Quality. Ground waters of Scott River Valley are generally of excellent mineral quality and, although moderately to very hard, are suitable for most beneficial uses. While analyses showed significant concentrations of boron in three wells in 1958, none were found in 1959.

Significant Water Quality Changes. Comparison of analyses of samples collected in 1959 with those of 1958 showed decreases in boron concentrations in the three wells which contained boron in 1958. The greatest was a decrease from 0.8 to 0.0 ppm in well 44N/9W-34R1, located approximately 1 mile northwest of Fort Jones.



WATER QUALITY RANGES

SCOTT RIVER VALLEY


STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
SCOTT RIVER VALLEY
SCALE OF MILES
1 0 1 2
KLAMATH
NATIONAL
FOREST
T41N
Gazelle Lookout 5000
SCOTT RIVER
East Fork
Scott River
Kangaroo Lake
Meeks Meadow Lake
Smith Lake
French Creek
Miners Creek
Sugar Creek
Wildcat
Noyes Valley Rd
Callahan
Etna


LEGEND
2G1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E - 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
SCOTT RIVER VALLEY
SCALE OF MILES
1 0 1 2
T44N
T43N
T42N
T41N
R8W
R9W
R10W
KLAMATH NATIONAL FOREST
24F1
24F2
34R1
2G1
10D1
Fort Jones
Etna
SCOTT RIVER
QUARTZ VALLEY INDIAN RES
RUFFEYS INDIAN RESERVATION
DUZEL ROCK (Lookout) 6037
QUARTZ HILL (Lookout) 4229
Gazelle Lookout 3000

MAD RIVER VALLEY (1-8)

Mad River Valley is located in the coastal portion of Humboldt County immediately north of Humboldt Bay. It is bounded on the north and east by the Coast Range. The monitored area is approximately rectangular in shape, is about 10 miles in length, north to south, and extends inland an average of about 3 miles.

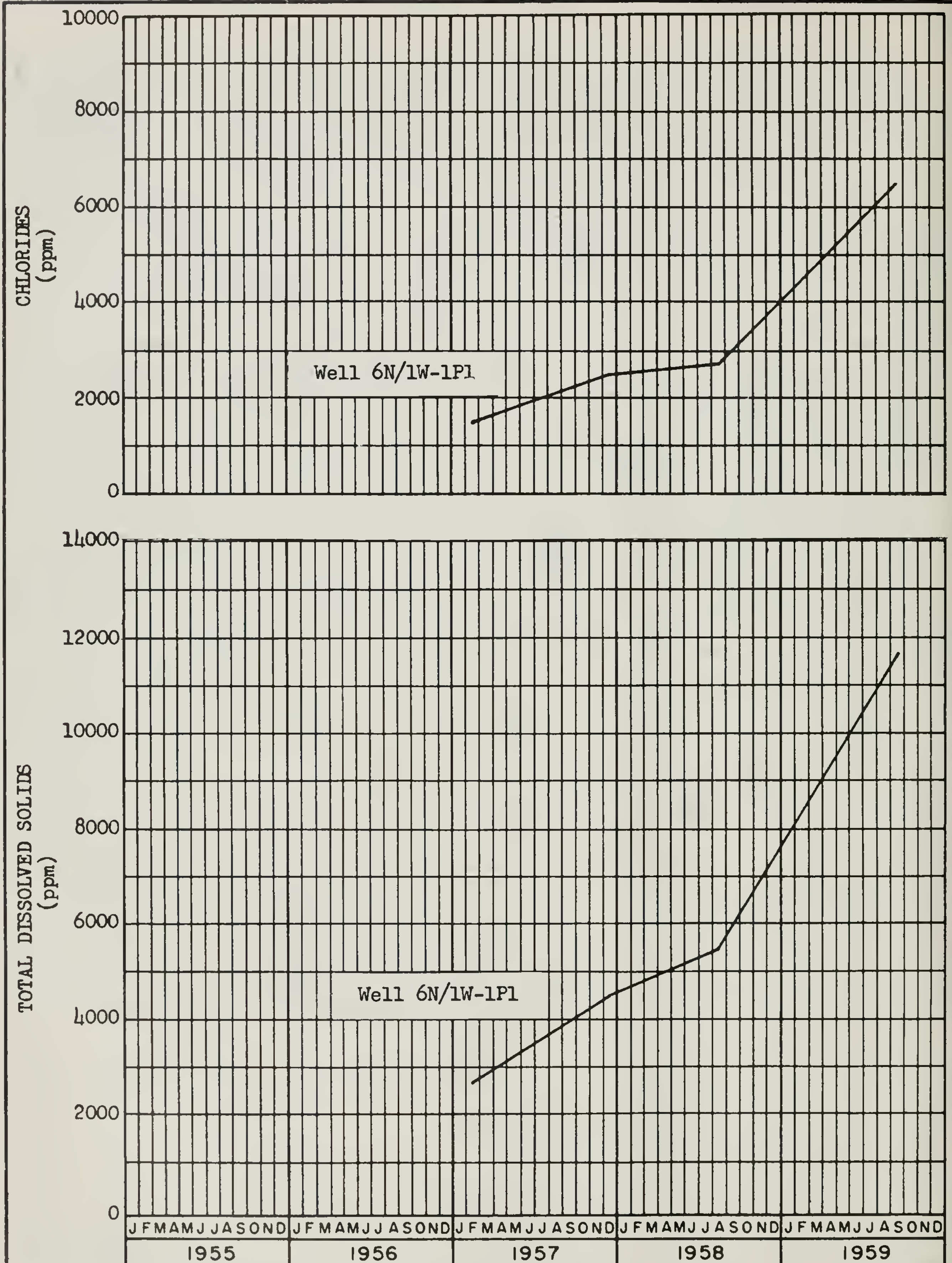
Monitoring Program. The monitoring program in Mad River Valley was established in 1957 to detect sea-water intrusion and observe the general quality of ground waters in the basin. Samples were collected from 12 wells in this area during September 1959.

Ground Water Occurrence. Alluvium constitutes the major source of ground water and includes stream terrace, flood plain and estuarine deposits; other water-bearing formations include the semi-consolidated Hookton formation and dune sand. Confined ground water occurs in the Hookton formation, which consists of continental and marine deposits.

Ground Water Development. Ground water is slightly to moderately developed, principally for domestic and irrigation supplies. Wells yield up to 100 gpm.

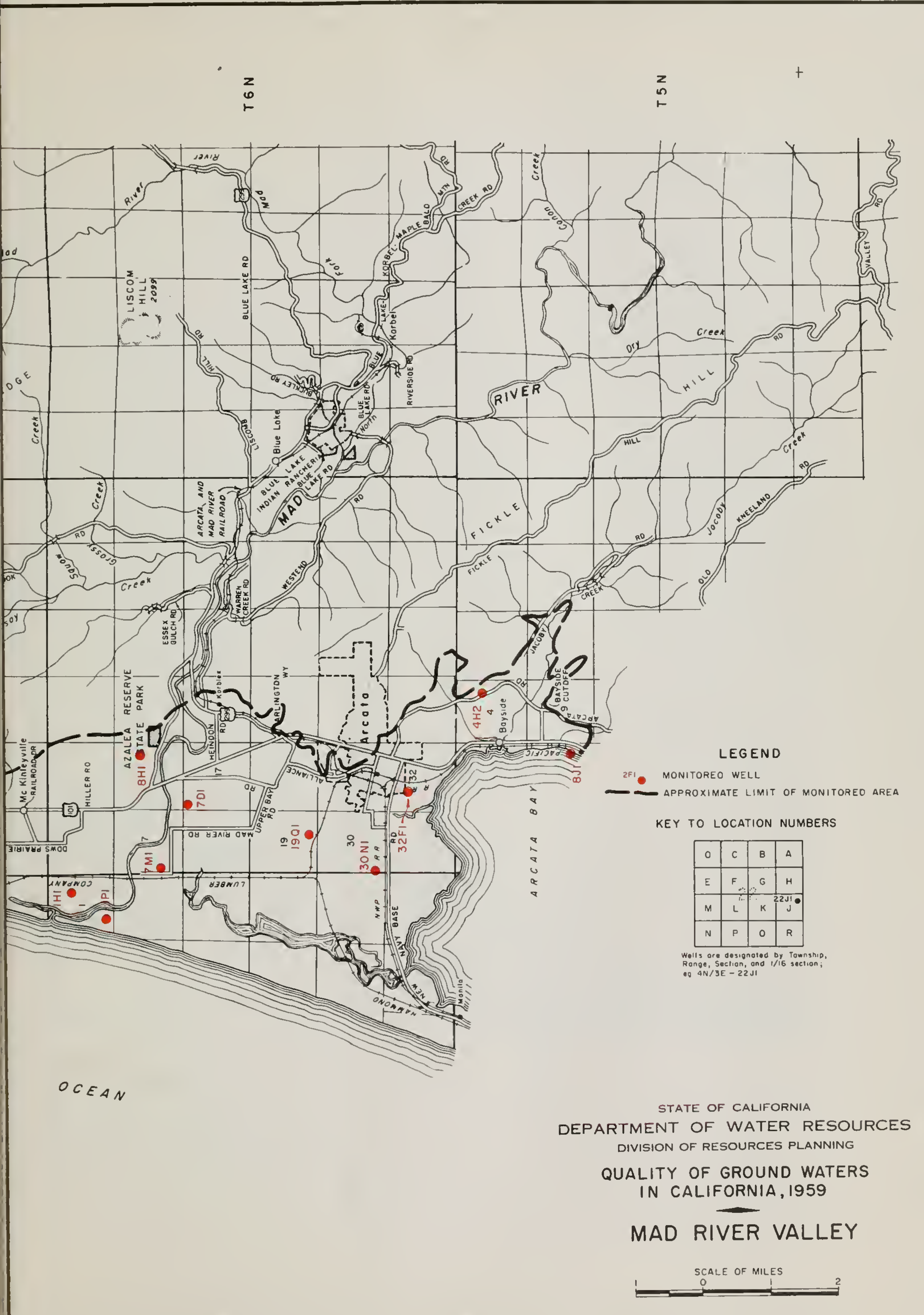
Beneficial Uses of Ground Water. Ground water is used for domestic, irrigation, municipal and industrial supplies.

Major Waste Discharges. Effluent from the City of Arcata sewage treatment plant is the only major waste discharge in this basin. It is discharged into Humboldt Bay. Waste discharges from the various small industries in the area do not constitute a threat to ground water quality at the present time.



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

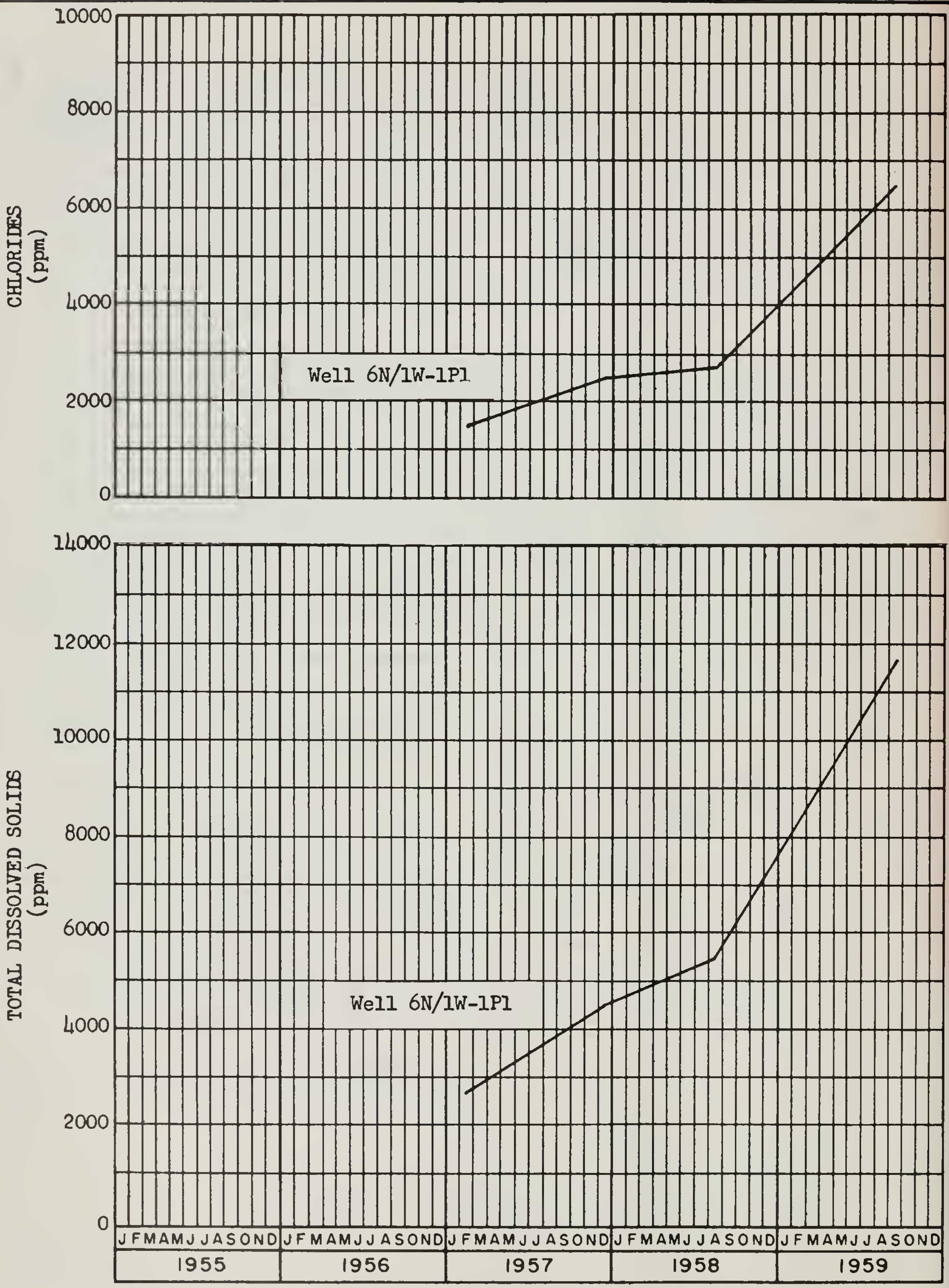
MAD RIVER VALLEY



STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

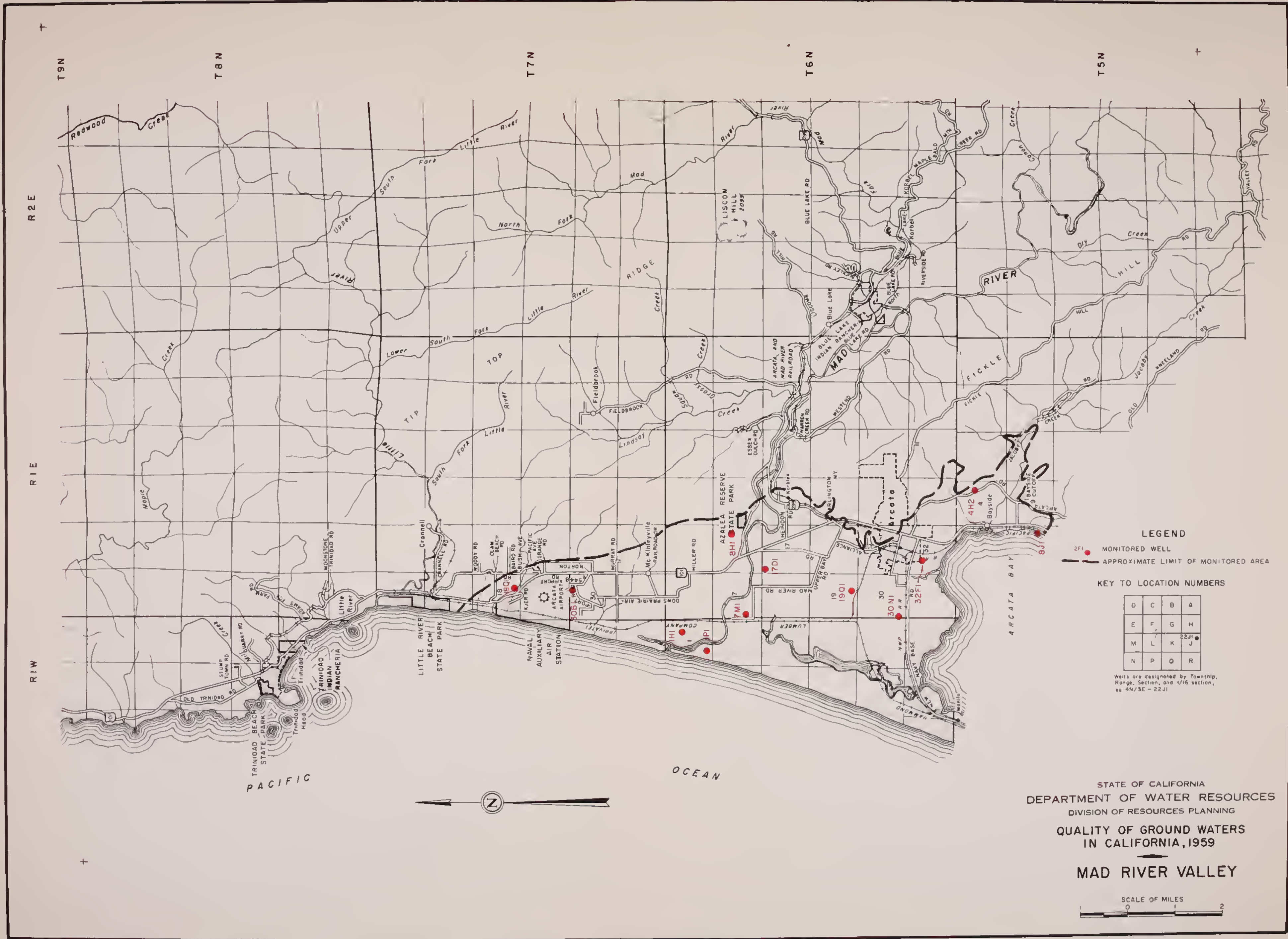
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959

MAD RIVER VALLEY



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

MAD RIVER VALLEY



STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959

MAD RIVER VALLEY

EUREKA PLAIN (1-9)

Eureka Plain is located in Humboldt County adjacent to Humboldt Bay. It varies up to approximately 6 miles in width, is about 12 miles long, and includes an area of about 70 square miles. Elk River is the principal stream in the basin.

Monitoring Program. The monitoring program in Eureka Plain was established in 1958 to detect evidence of sea-water intrusion and observe general ground water quality. In September 1959, samples were collected from six wells.

Ground Water Occurrence. The principal aquifer is the Hookton formation, of continental and marine origin, in which ground water is confined. Unconfined ground water occurs in alluvium and dune sand of limited area and thickness.

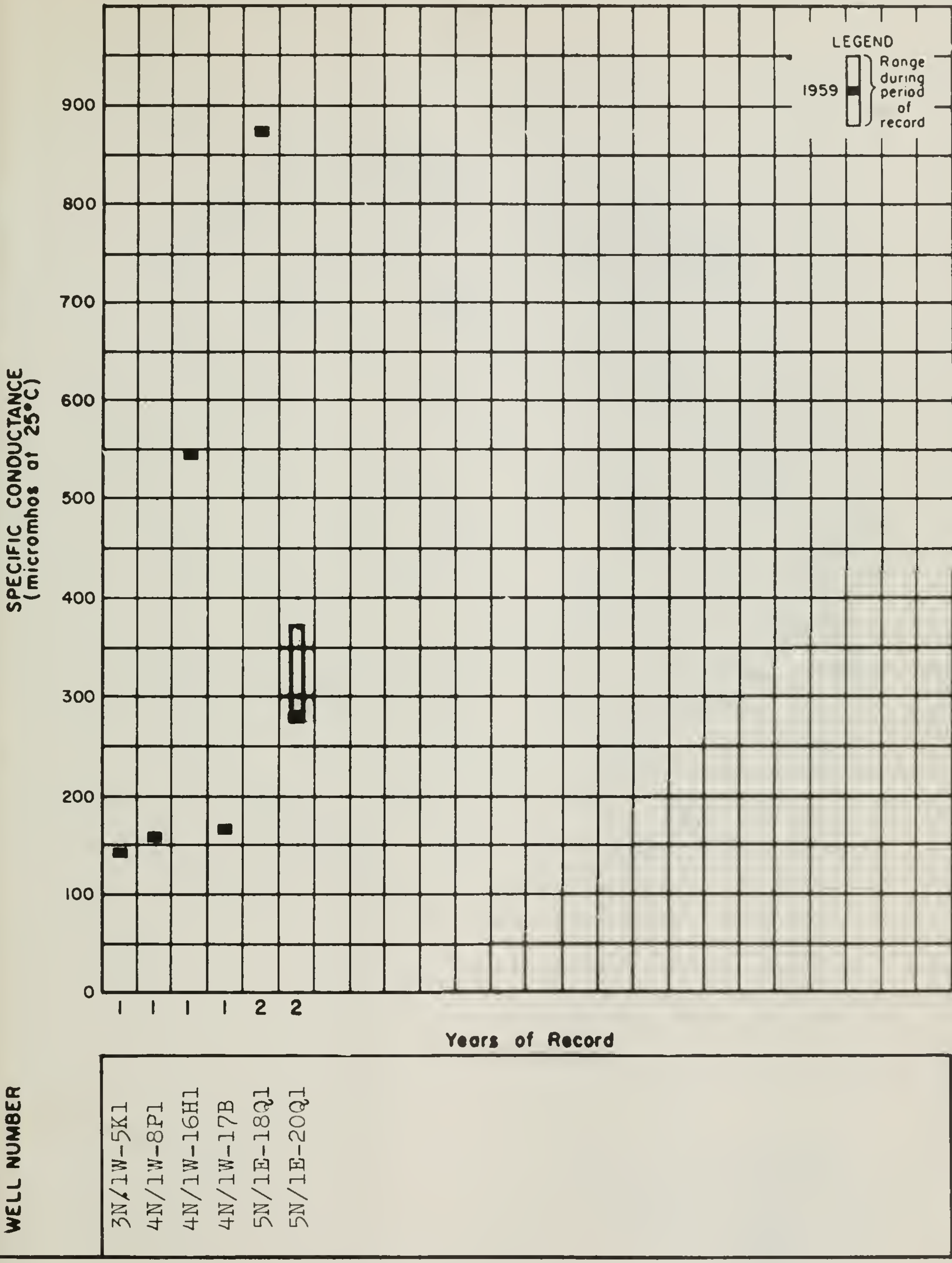
Ground Water Development. Ground water is slightly developed in this basin. Wells in the Hookton formation yield from 10 to 30 gpm.

Beneficial Uses of Ground Water. Ground water is used for domestic, irrigation and livestock watering purposes.

Major Waste Discharges. There are three major waste discharges in this area, all of which consist of effluent from sewage treatment plants serving the City of Eureka. Disposal is directly into Humboldt Bay.

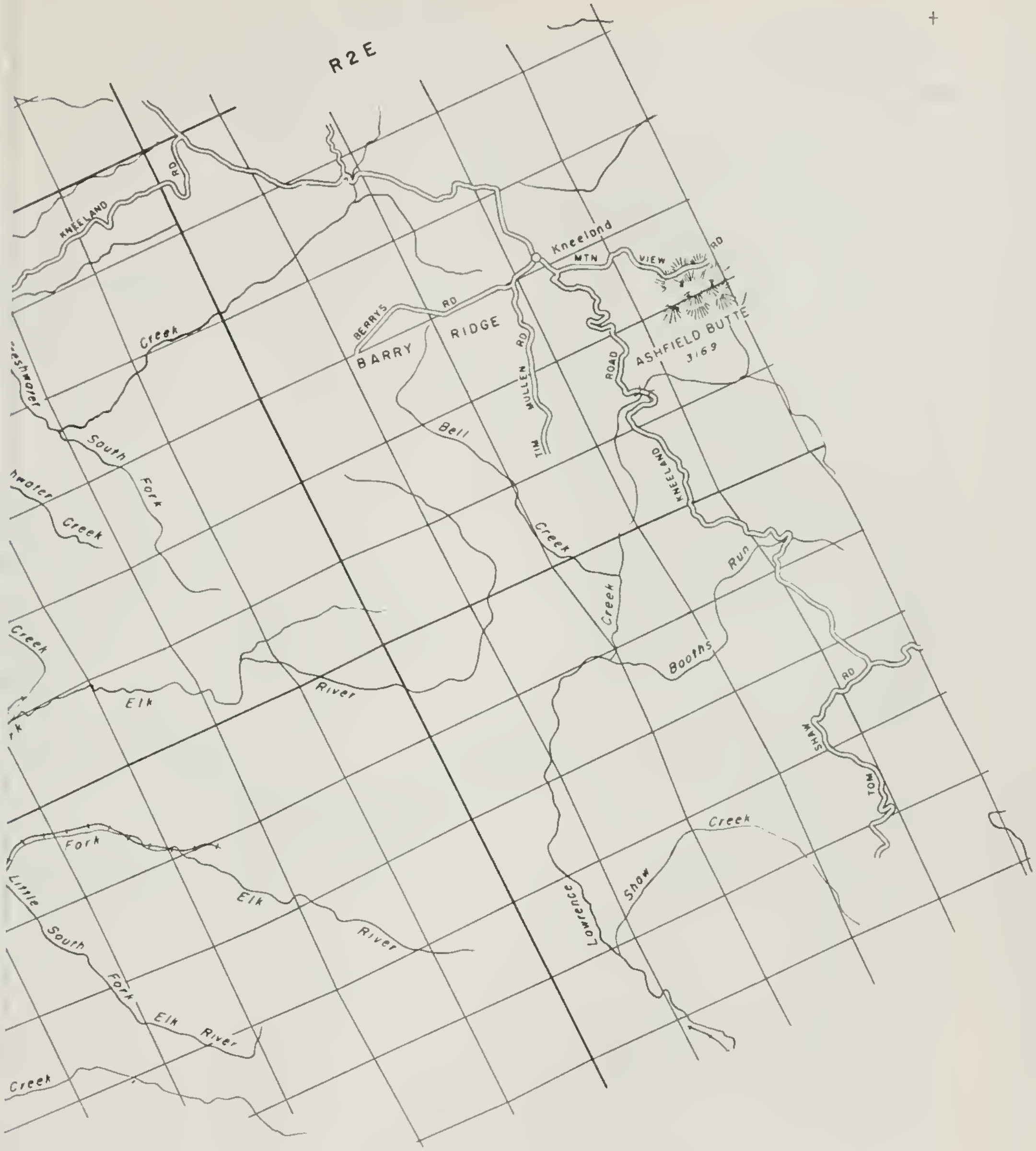
Evaluation of Water Quality. With the exception of water from a few wells near the coast which contain high mineral concentrations, the chemical quality of ground water in Eureka Plain is good. Waters from the alluvium are mostly calcium-magnesium bicarbonate in character and moderately hard, while waters from the dune sand near the shore are sodium chloride in character.

Significant Water Quality Changes. In well 5N/1E-18Q1 boron increased from 0.72 to 1.7 ppm between September 1958 and September 1959. The cause of this boron increase has not been ascertained.



WATER QUALITY RANGES

EUREKA PLAIN



D

T OF MONITORED AREA

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22J1 ● J	
R	

by Township,
1/16 section,

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959

EUREKA PLAIN

SCALE OF MILES
1 0 1 2

LEGEND

2F1 ● MONITORED WELL

APPROXIMATE LIMIT OF MONITORED AREA

KEY TO LOCATION NUMBERS

D	C	B	A
E	F	G	H
M	L	K	J 22J1 ●
N	P	Q	R

Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E - 22J1

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959

EUREKA PLAIN

SCALE OF MILES
1 0 1 2

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Eel River Valley is located in the west central portion of Humboldt County. The monitored portion is about 8 miles wide at the coast, extending inland about 18 miles. The valley contains an area of about 75 square miles.

Monitoring Program. The possibility of sea-water intrusion prompted the establishment of a monitoring program in the area in 1956. During 1959, samples were collected from 15 wells during the period July - October.

Ground Water Occurrence. The major source of ground water is alluvium. Secondary sources include dune sand and older, semi-consolidated sediments. Unconfined aquifers occur in the alluvium, while ground water in the older sediments is confined.

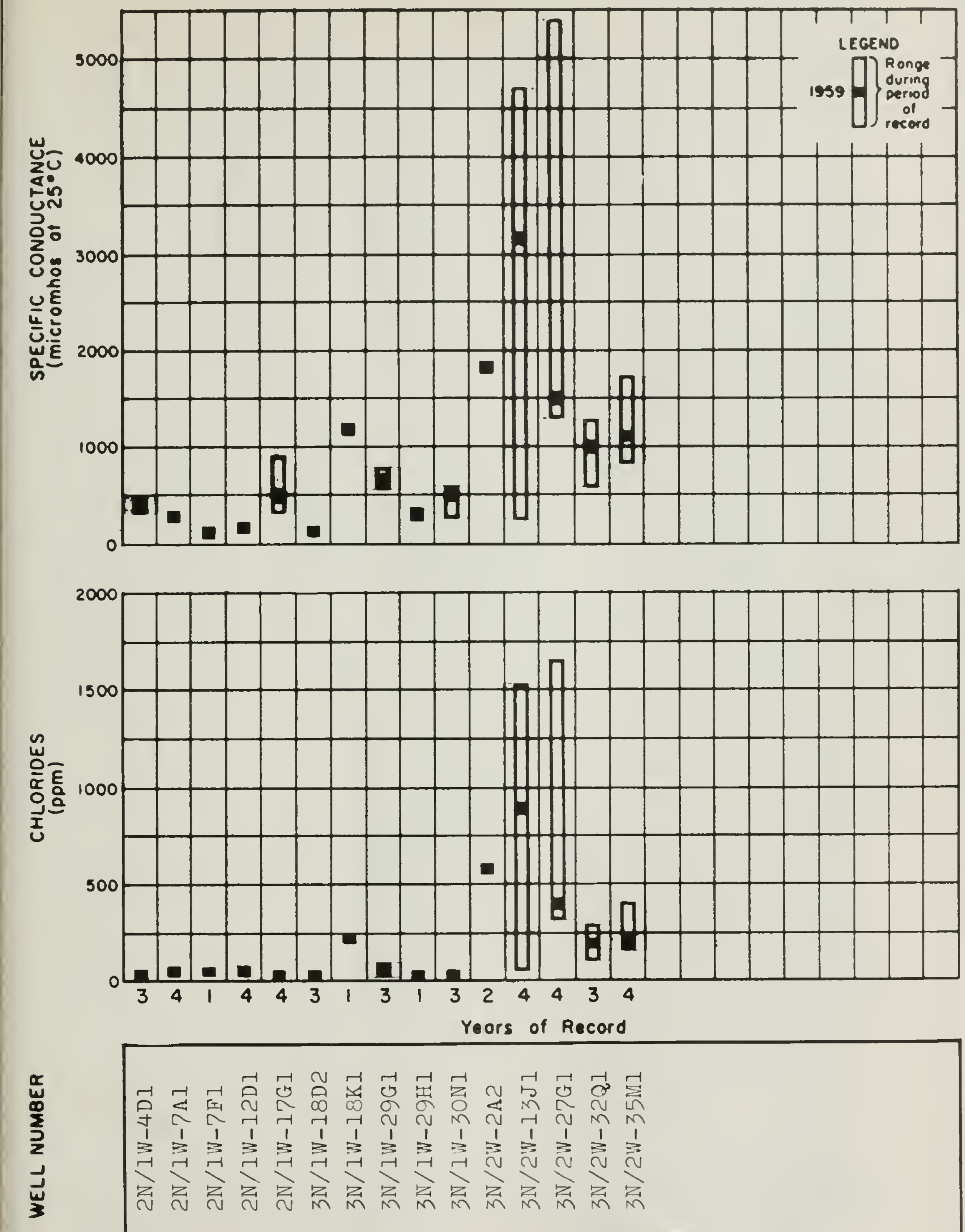
Ground Water Development. Ground water is moderately to extensively developed for domestic and irrigation uses. Wells in the alluvium yield more than 600 gpm. Those in the older, semi-consolidated sediments yield 30 gpm or less.

Beneficial Uses of Ground Water. Ground water is used primarily for domestic and irrigation purposes, and to a lesser extent for municipal purposes.

Major Waste Discharges. There are no major waste discharges in the area. Minor waste discharges consist mainly of sewage effluent from the various small towns in the area. Treated sewage from Ferndale is discharged into the Salt River, and from Rio Dell into the Eel River. Septic tanks are employed by individual householders in the remaining communities.

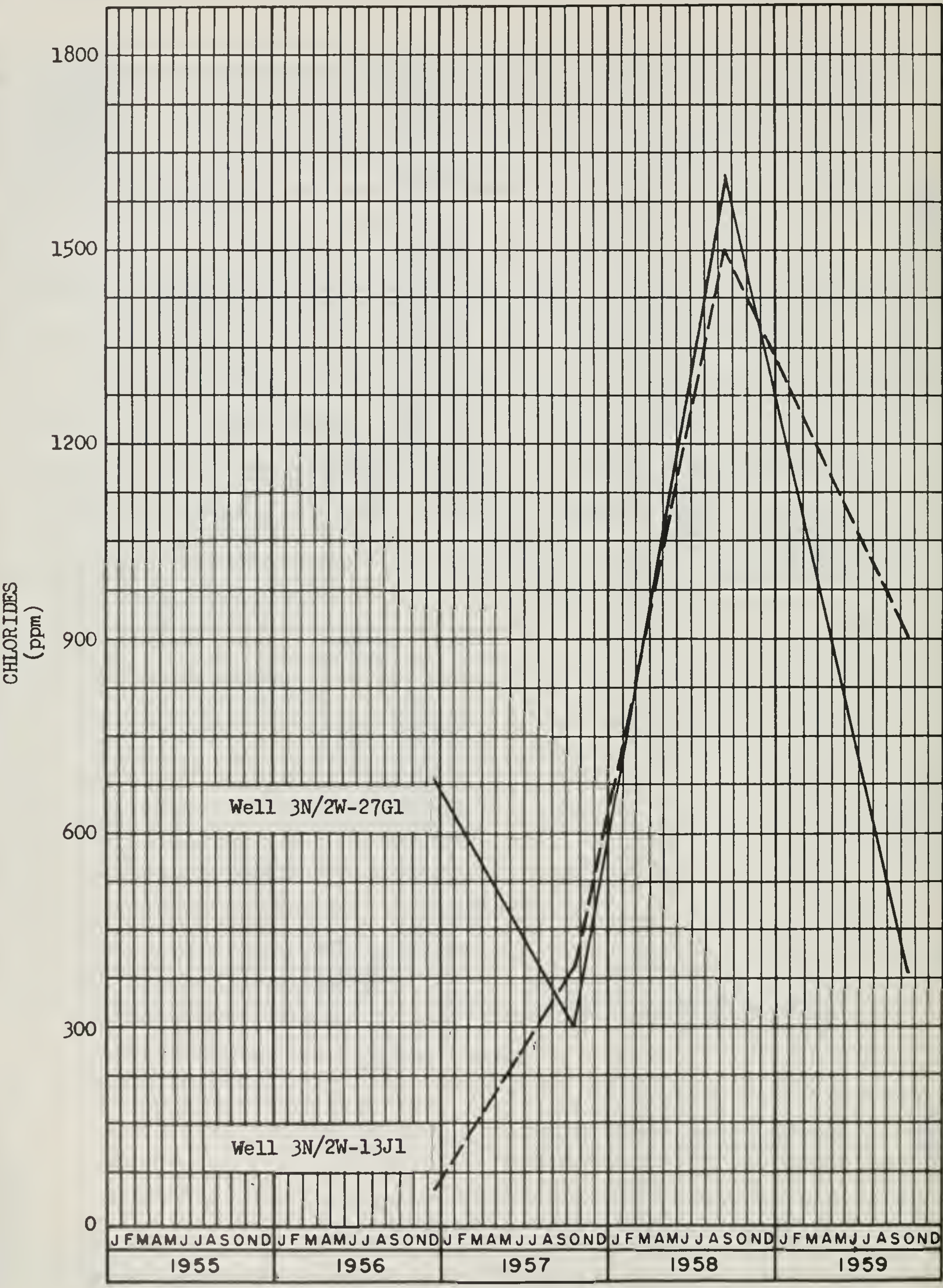
Evaluation of Water Quality. Ground waters of this area are generally of excellent mineral quality and suitable for most uses, except where affected by sea-water intrusion. A seaward hydraulic gradient normally exists; however, heavy ground water pumping during the summer frequently lowers the water table below sea level in a small area adjacent to the coast. This allows saline water from the tidal portion of Eel River to enter and degrade fresh water-bearing deposits.

Significant Water Quality Changes. Comparison of analyses of samples collected in 1959 with those of previous years showed wide fluctuations in chloride concentrations in two wells located in the tidal portion of Eel River. Since December 1956, chlorides in wells 3N/2W-13J1 and 27G1 have varied from 53 to 1,502 ppm and from 300 to 1,615 ppm, respectively (see fluctuation graphs). These fluctuations are due to sea-water intrusion. (See map of monitored area for the approximate limit of sea-water intrusion as determined by the line of 300 ppm chloride concentration.)



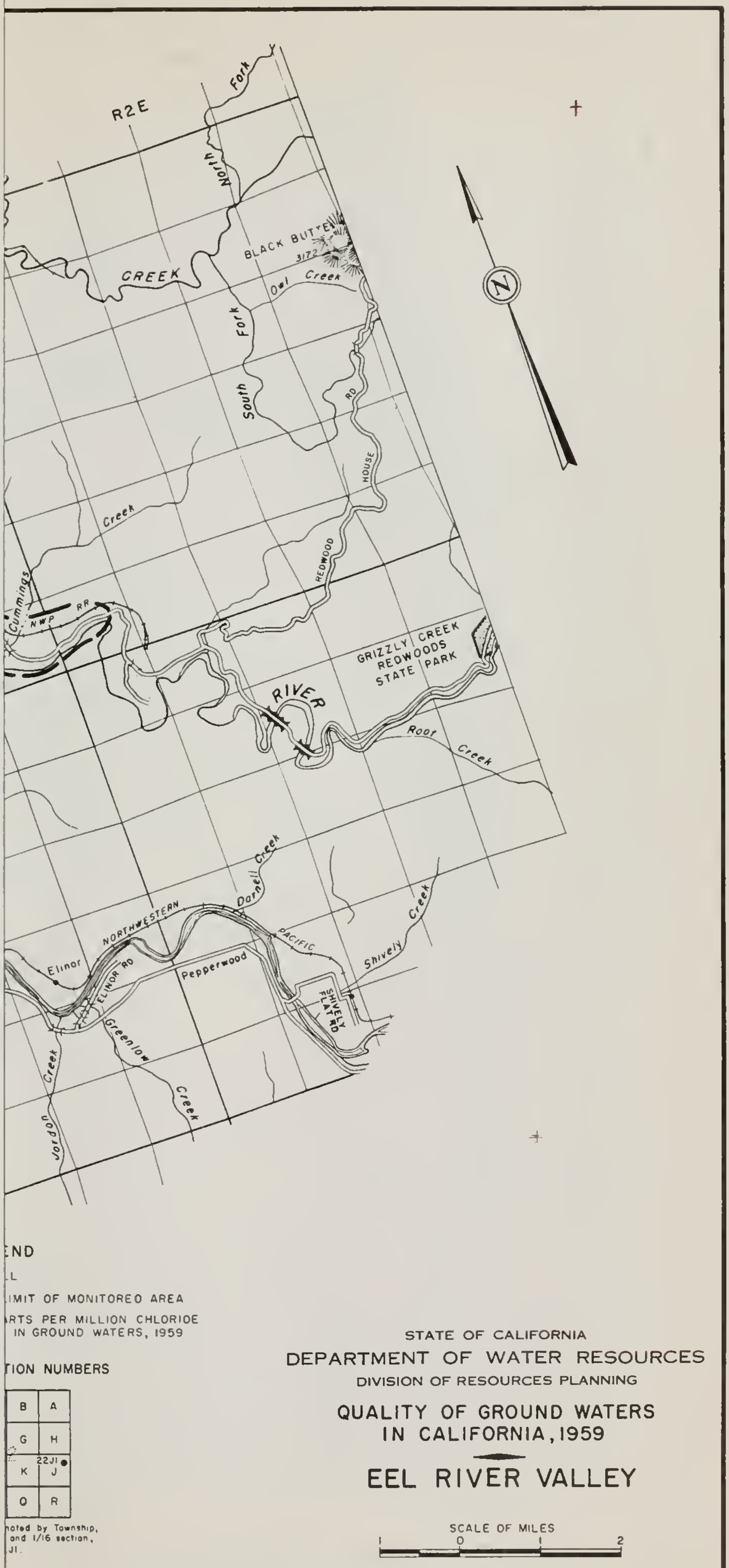
WATER QUALITY RANGES

EEL RIVER VALLEY



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

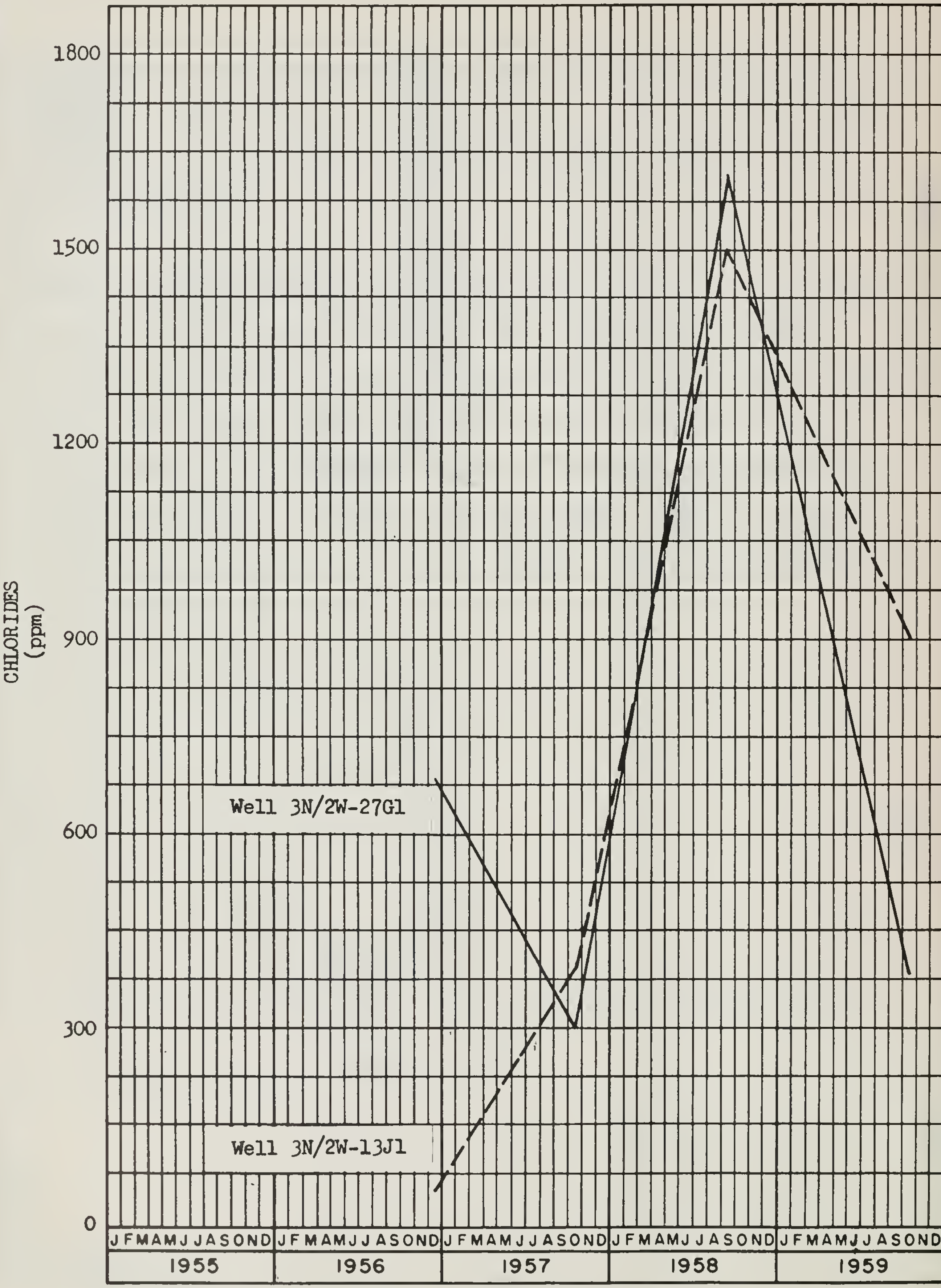
EEL RIVER VALLEY



STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

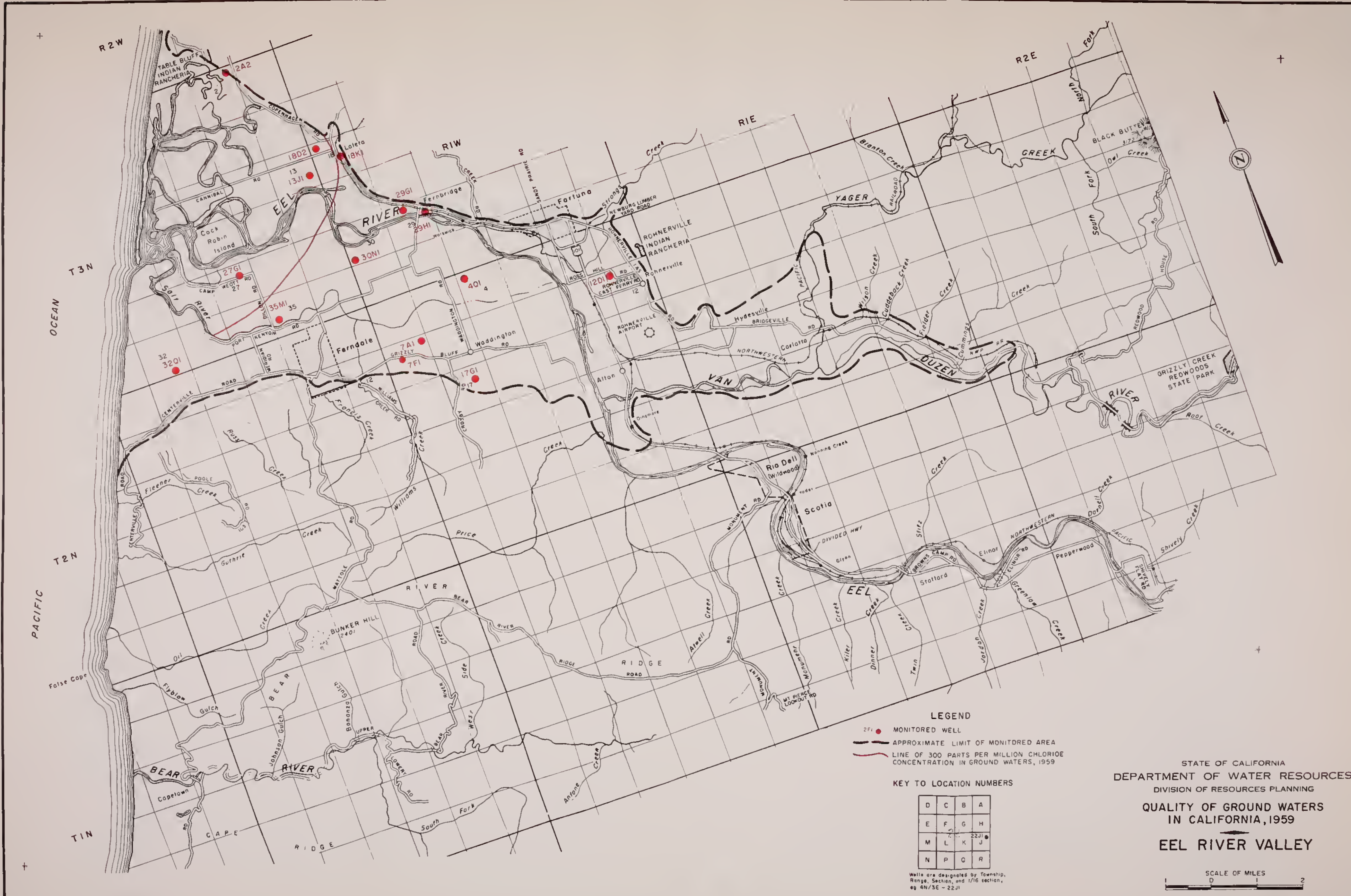
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959

EEL RIVER VALLEY



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

EEL RIVER VALLEY


STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
EEL RIVER VALLEY
SCALE OF MILES
0 1 2
LEGEND
MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
LINE OF 300 PARTS PER MILLION CHLORIDE CONCENTRATION IN GROUND WATERS, 1959
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E - 22J1
PACIFIC OCEAN
R2W
R1W
R1E
R2E
T3N
T2N
T1N
TABLE BLUFF INDIAN RANCHERIA
2A2
18D2
18K1
13J1
29G1
29H1
30N1
27G1
35M1
32D1
4D1
7A1
7F1
17G1
12D1
Loleta
Fernbridge
Fortuna
Rohnerville
ROHNERVILLE INDIAN RANCHERIA
ROHNERVILLE AIRPORT
Hydesville
Carlotta
Ferndale
Waddington
Alton
Rio Dell (Wildwood)
Scotia
Stafford
Elinor
Pepperwood
Capetown
False Cape
Cock Robin Island
EEL RIVER
VAN DUZEN RIVER
YAGER CREEK
SALT RIVER
BEAR RIVER
BUNKER HILL
GRIZZLY CREEK REDWOODS STATE PARK
BLACK BUTTE
North Fork
South Fork
Strongs Creek
Blanton Creek
Wilson Creek
Cuddeback Creek
Fielder Creek
Cummings Creek
Francis Creek
Williams Creek
Russ Creek
Fleener Creek
Guthrie Creek
Price Creek
Oil Creek
Flyblow Gulch
Johnson Gulch
Bonanza Gulch
Antone Creek
Atwell Creek
Monument Creek
Kiler Creek
Dinner Creek
Twin Creek
Jordan Creek
Greenlaw Creek
Dowd Creek
Shively Creek
Root Creek
Owl Creek
BEAR RIVER RIDGE
CAPE RIDGE
RIDGE ROAD
CENTERVILLE ROAD
GRIZZLY BLUFF RD
BRIDGEVILLE RD
DIVIDED HWY
NORTHWESTERN PACIFIC RR

UKIAH VALLEY (1-15)

Ukiah Valley lies along the Russian River in southeastern Mendocino County. It is approximately 22 miles in length with a maximum width of 5 miles and 65 square miles in area.

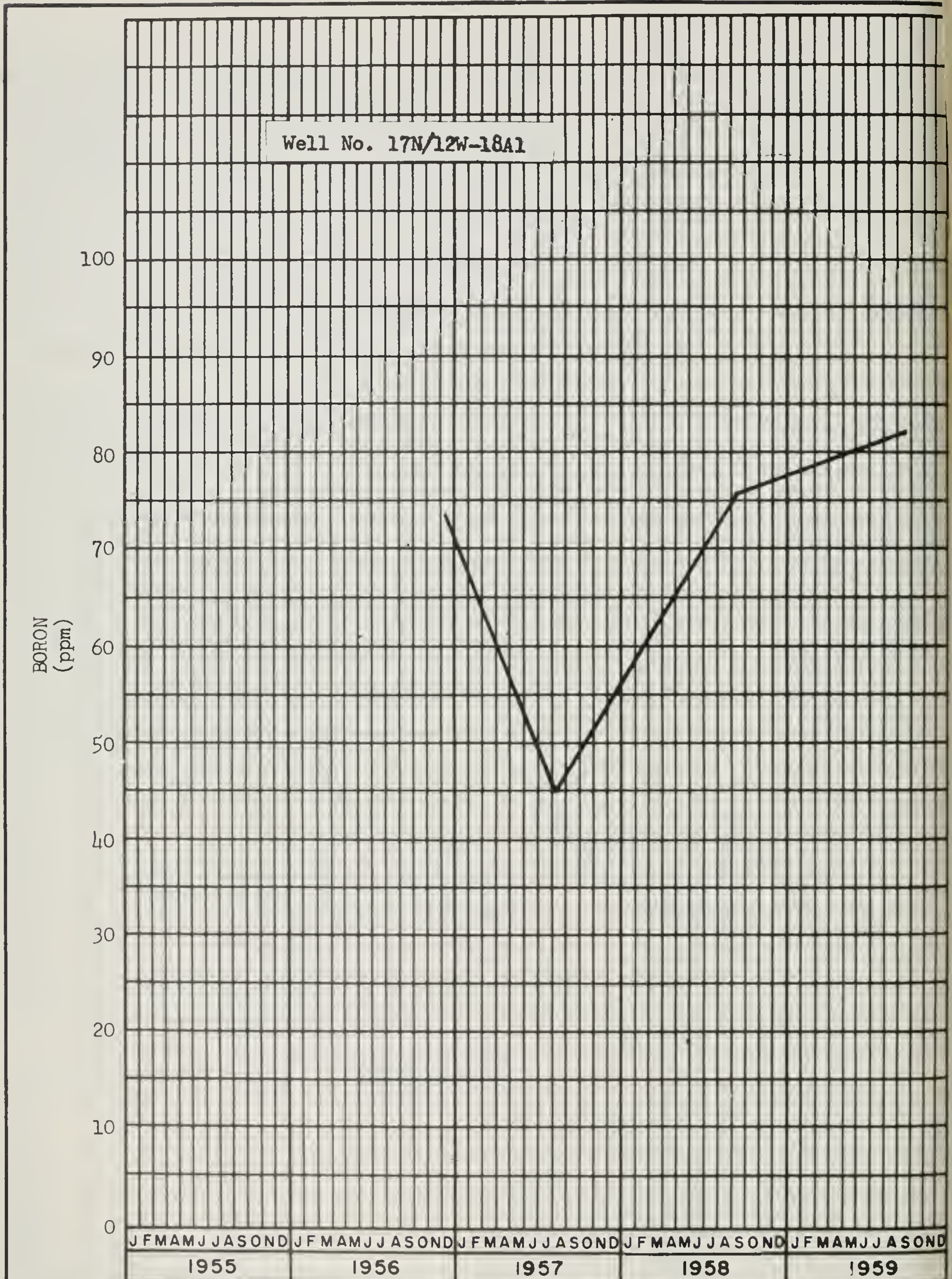
Monitoring Program. The monitoring program was established in Ukiah Valley in 1953 to detect quality changes that might result from mineralized springs which exist along the edges of the valley. Eleven wells were sampled in this area during the period September - October 1959.

Ground Water Development. The major source of ground water is alluvium, which is comprised of flood plain, stream terrace, and channel deposits. Semi-consolidated older sediments, exposed on the edges of the valley, constitute a secondary source. Aquifers in this area are unconfined.

Ground Water Development. There is slight to moderate ground water development. Wells in the terrace deposits yield up to 15 gpm, and those in the alluvium yield from 50 to 200 gpm.

Beneficial Uses of Ground Water. The principal uses of ground water are domestic, industrial and irrigation.

Major Waste Discharges. The major waste discharges in this area are: (1) 1.0 million gallons per day (mgd) effluent from the City of Ukiah sewage treatment plant, (2) 0.72 mgd industrial waste from the Masonite Corporation in Ukiah, and (3) 0.43 mgd effluent from the Mendocino State Hospital at Talmage. The latter waste is discharged, after treatment, into percolation ponds; the other two are discharged directly into the Russian River.



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

UKIAH VALLEY

LEGEND

5K1 ● MONITORED WELL

APPROXIMATE LIMIT OF MONITORED AREA

KEY TO LOCATION NUMBERS

D	C	B	A
E	F	G	H
M	L	K	J (22J1 ●)
N	P	Q	R

Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E – 22J1

STATE OF CALIFORNIA

DEPARTMENT OF WATER RESOURCES

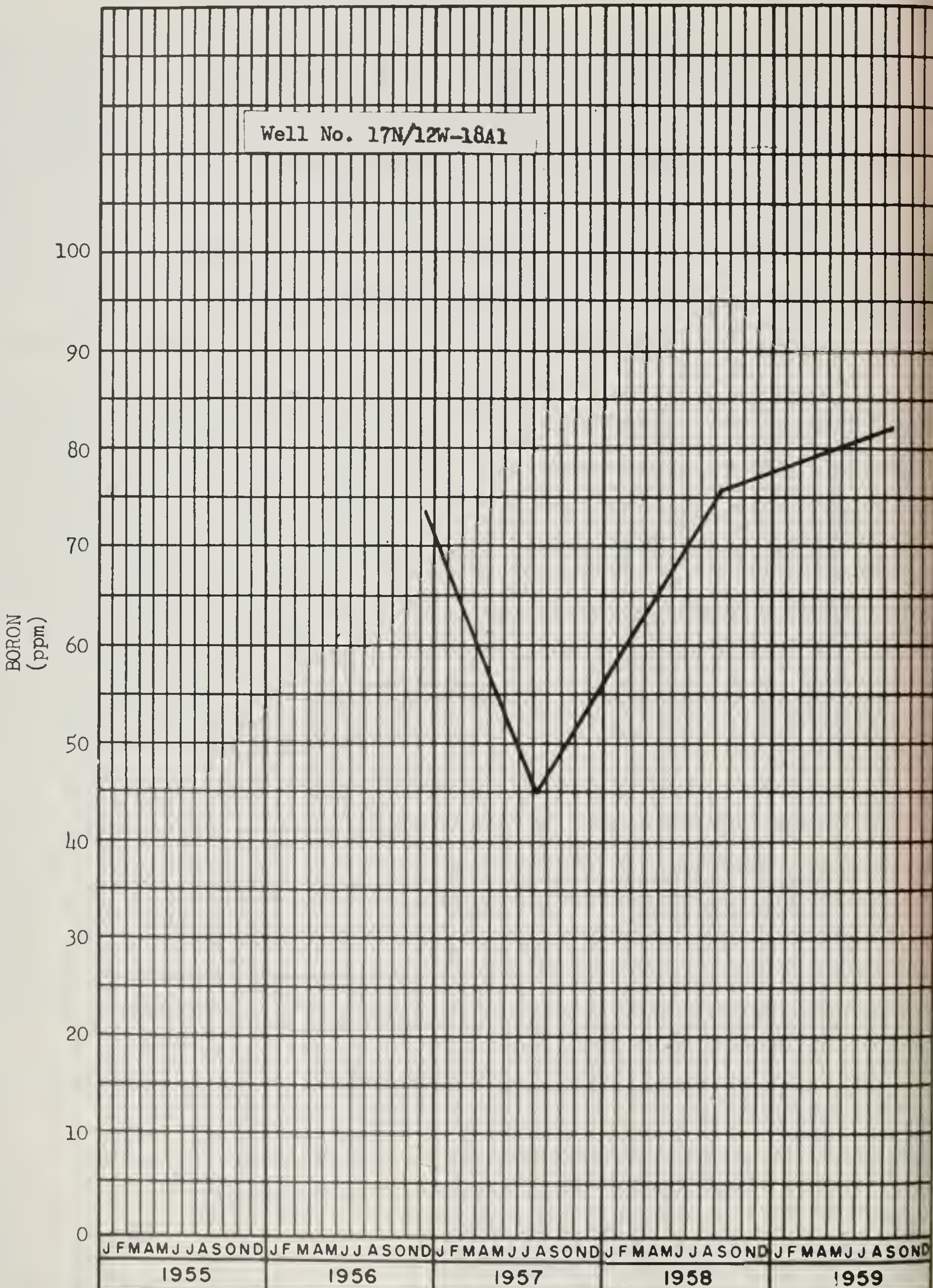
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959

UKIAH VALLEY

SCALE OF MILES

0 1 2



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

UKIAH VALLEY

LEGEND
5K1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
UKIAH VALLEY
SCALE OF MILES
R12W
R13W
T16N
T15N
T14N
RUSSIAN RIVER
EAST SIDE REDWOOD VALLEY ROAD
REDWOOD VALLEY INDIAN RANCHERIA
COYOTE VALLEY INDIAN RANCHERIA
GUIDIVILLE INDIAN RANCHERIA
PINOLEVILLE INDIAN RANCHERIA
RANCHO YOKAYA
RANCHO DE SANEL
UKIAH
LAKE MENDOCINO
LAKE CO
MENDOCINO CO
LOOKOUT PK 2690
HENRY & HOMER ROAD
18E1
28M1
5Q1
9Q1
8Q1
16E1
21H1
35Q1
11N1
26K1
5K1
Redwood Valley
Calpella
Forsythe
Hensley
York
Morrison
Parsons
Sulphur Creek
Robinson

SANEL VALLEY (1-16)

Sanel Valley lies along the Russian River in southeastern Mendocino County, about 12 miles south of Ukiah. It is an irregularly-shaped area of about 11.5 square miles.

Monitoring Program. A monitoring program was established in Sanel Valley in 1956 because of the presence in the area of ground waters containing excessive concentrations of boron. Samples were collected from six wells in September 1959.

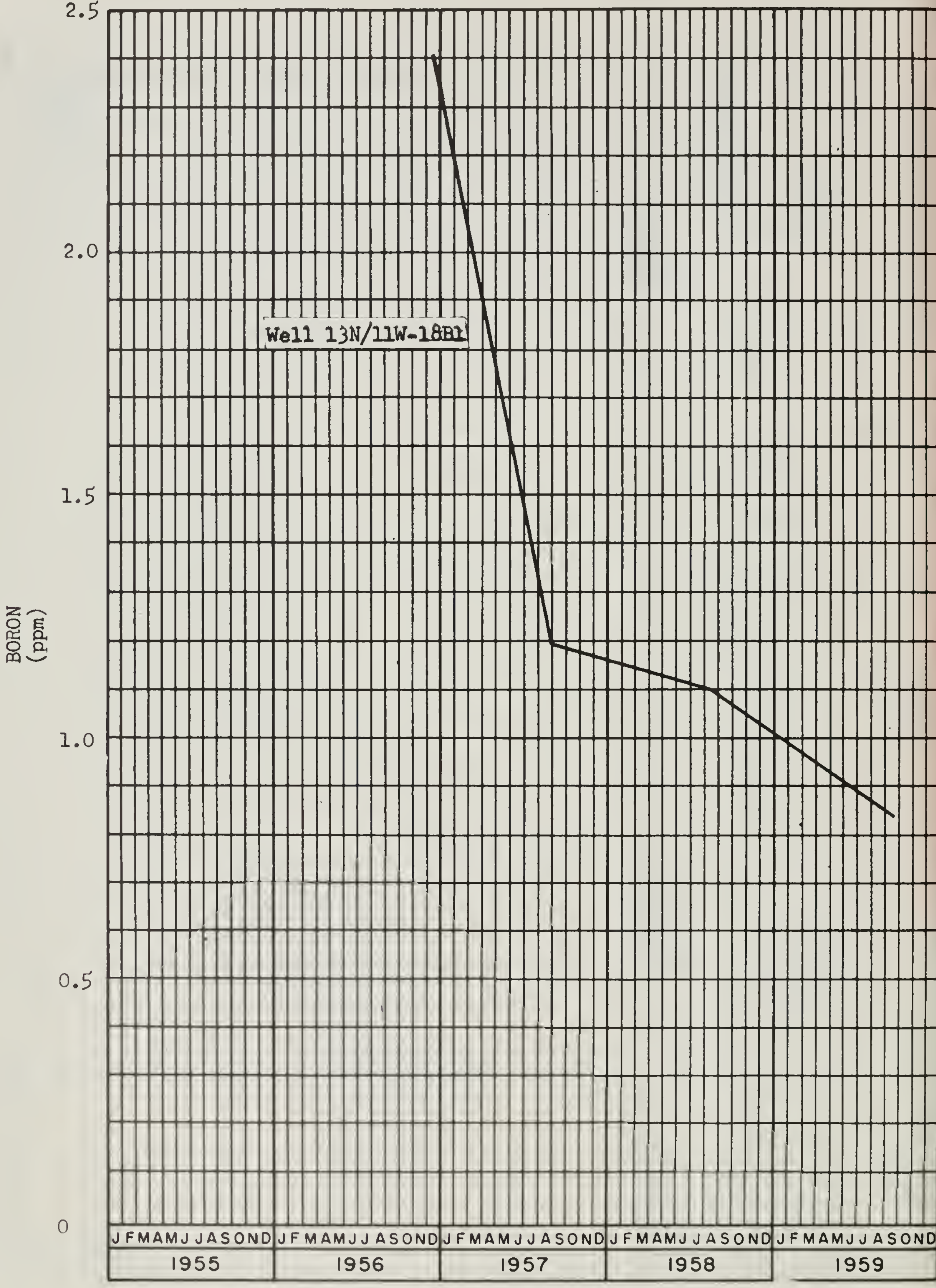
Ground Water Occurrence. The principal aquifer is the unconsolidated alluvium deposited by the Russian River. Ground water is generally unconfined, with the exception of local pressure effects.

Ground Water Development. Ground water is slightly to moderately developed. Wells located in terrace deposits yield from 5 to 50 gpm; those in coarse alluvium, from 750 to 1,250 gpm.

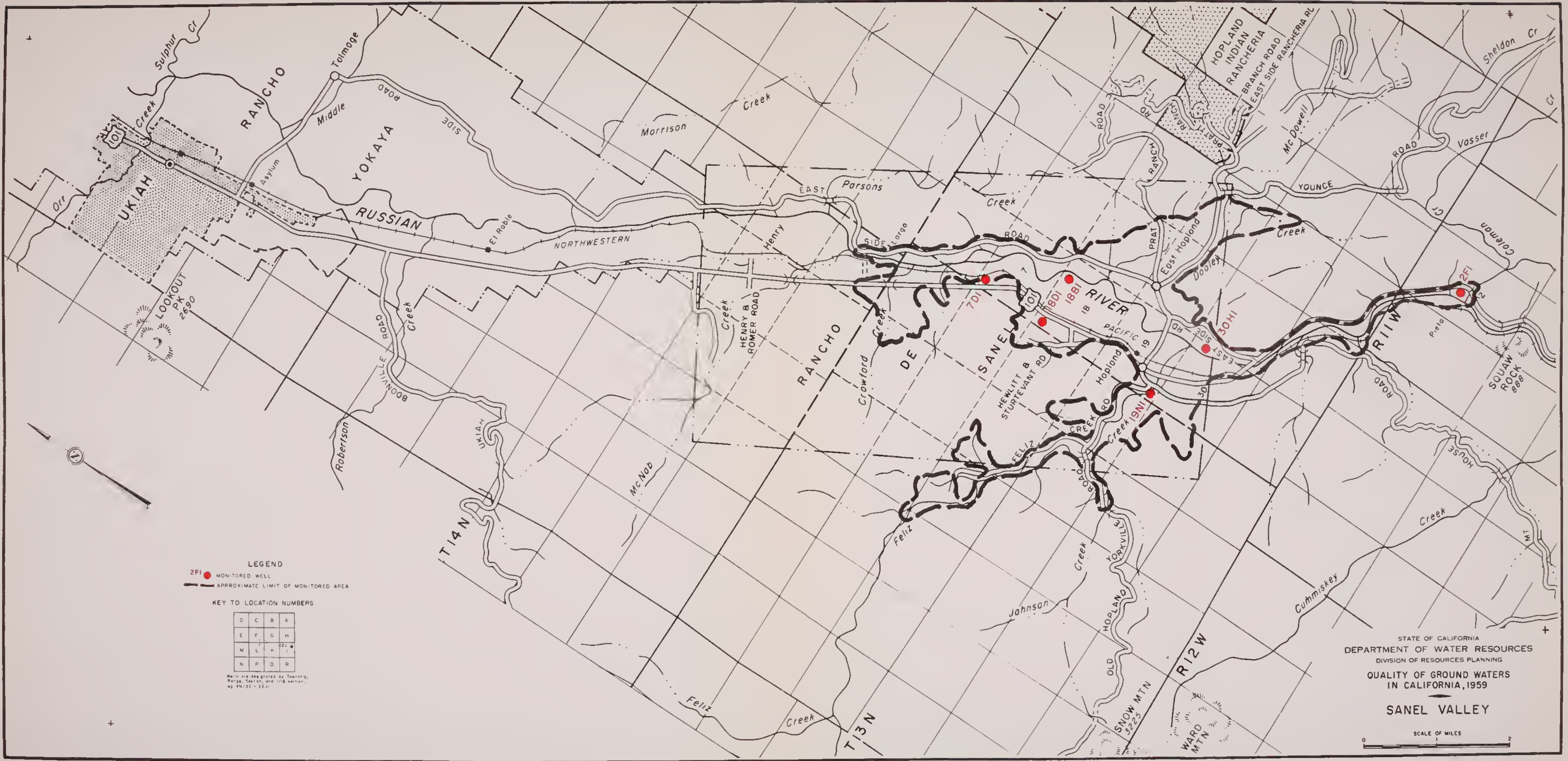
Beneficial Uses of Ground Water. Most domestic and municipal requirements are supplied by ground water. Irrigation requirements adjacent to the Russian River are met by direct diversion from the river. The remainder of the irrigated areas are served almost exclusively by ground water.

Major Waste Discharges. There are no large waste discharges in this area. Individual sewage disposal systems are commonly used for domestic wastes.

Evaluation of Water Quality. Ground waters in Sanel Valley are generally magnesium-calcium bicarbonate in type and, although moderately hard, are suitable for most beneficial uses. Ground waters high in boron are known to occur in underlying geologic formations.



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS
SANEL VALLEY



STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
SANEL VALLEY
SCALE OF MILES
0
2
LEGEND
2F1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
UKIAH
RANCHO
YOKAYA
RUSSIAN
RIVER
NORTHWESTERN
PACIFIC
RANCHO
DE
SANEL
HOPLAND
INDIAN
RANCHERIA
BRANCH ROAD
EAST SIDE RANCHERIA RD
Sulphur Cr
Orr Creek
Middle
Talmage
SIDE ROAD
Asylum
El Roble
Morrison
Creek
EAST
Parsons
Creek
SIDE
Largo
Henry
HENRY & ROMER ROAD
Crawford
Creek
LOOKOUT PK 2690
BOONVILLE ROAD
Creek
Robertson
UKIAH
McNab
Feliz
Creek
Feliz
Creek
FELIZ CREEK RD
Hopland
HEWLITT & STURTEVANT RD
East Hopland
Dooley
Creek
PRAT
RANCH
ROAD
RD
EAST SIDE RD
McDowell
YOUNCE
ROAD
Vasser
Sheldon Cr
Coleman
Cr
Pieta
SQUAW ROCK 888
ROAD
HOUSE
Creek
Cummiskey
MT
Johnson
Creek
YORKVILLE
OLD HOPLAND
SNOW MTN 3225
WARD MTN
T14N
T13N
R12W
R11W
101
7D1
18D1
18B1
30H1
19N1
2F1

ALEXANDER VALLEY (1-17)

Alexander Valley lies along the Russian River in northern Sonoma County. The monitored portion is approximately 14 miles long, about 1.5 miles wide, and comprises an area of about 20 square miles.

Monitoring Program. To detect quality changes a monitoring program was established in Alexander Valley in 1957. Samples were collected from eight wells in September 1959.

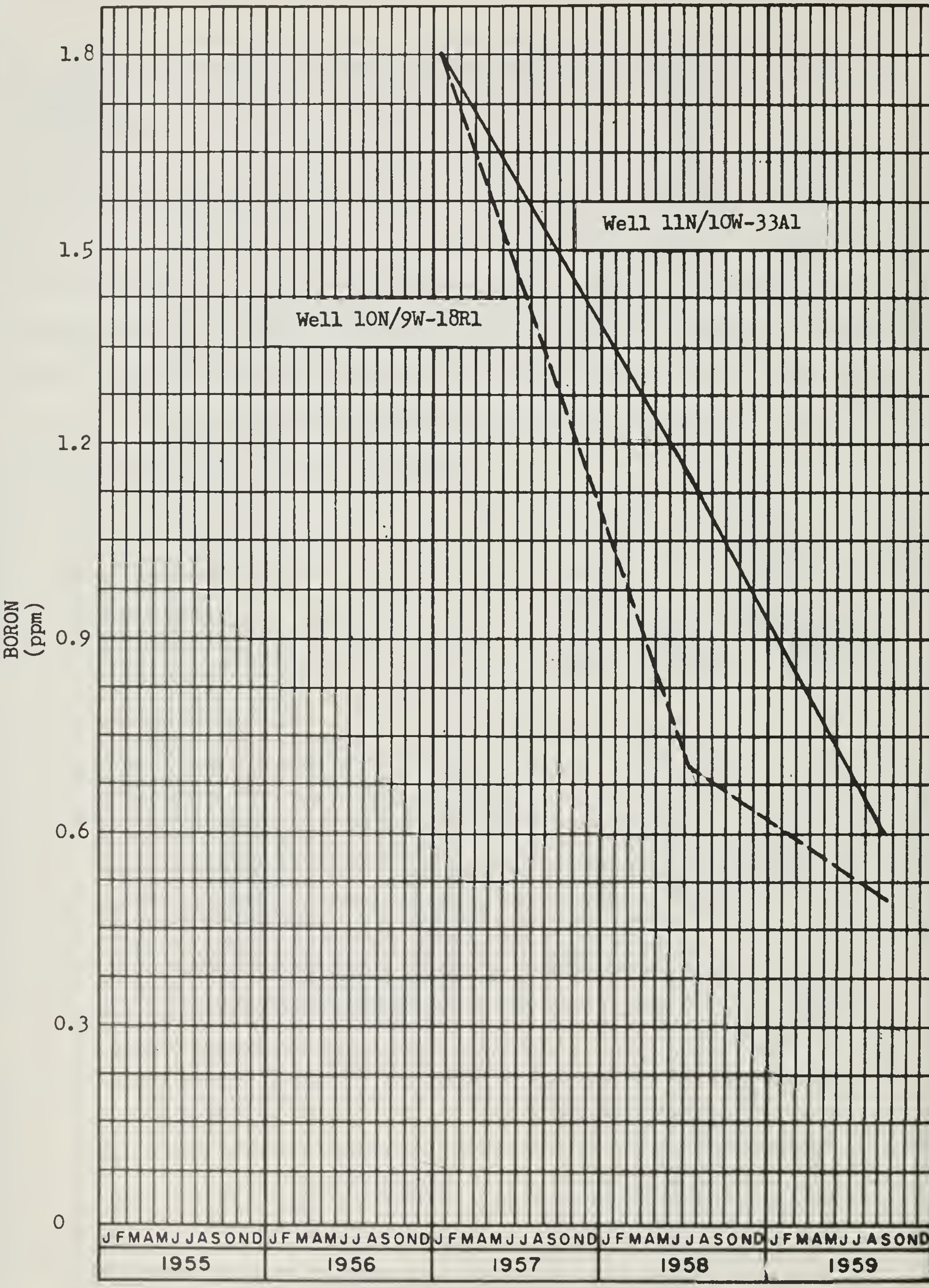
Ground Water Occurrence. The principal aquifers are the younger alluvium and the Glen Ellen formation. Older consolidated and volcanic rocks produce only meager yields.

Ground Water Development. There is moderate development for domestic purposes but only limited development for irrigation. The alluvium yields from 200 to 500 gpm and the Glen Ellen formation yields up to 400 gpm.

Beneficial Uses of Ground Water. Ground water is used primarily for domestic purposes.

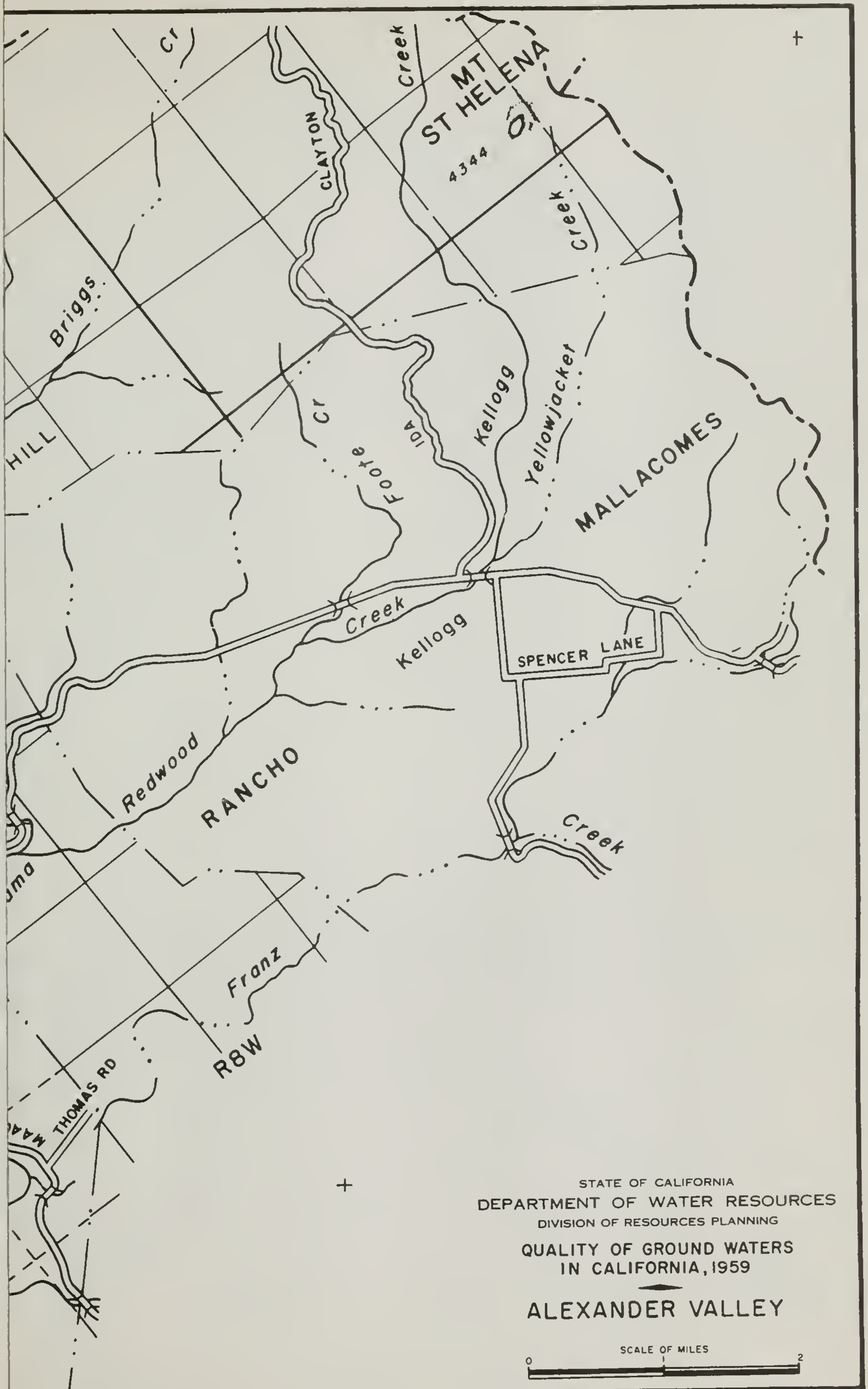
Major Waste Discharges. Disposal of winery waste water into unlined ponds is a potential source of degradation of ground water in the northern portion of Alexander Valley. Domestic sewage is generally disposed of by individual septic tanks and does not now constitute a threat to ground water quality.

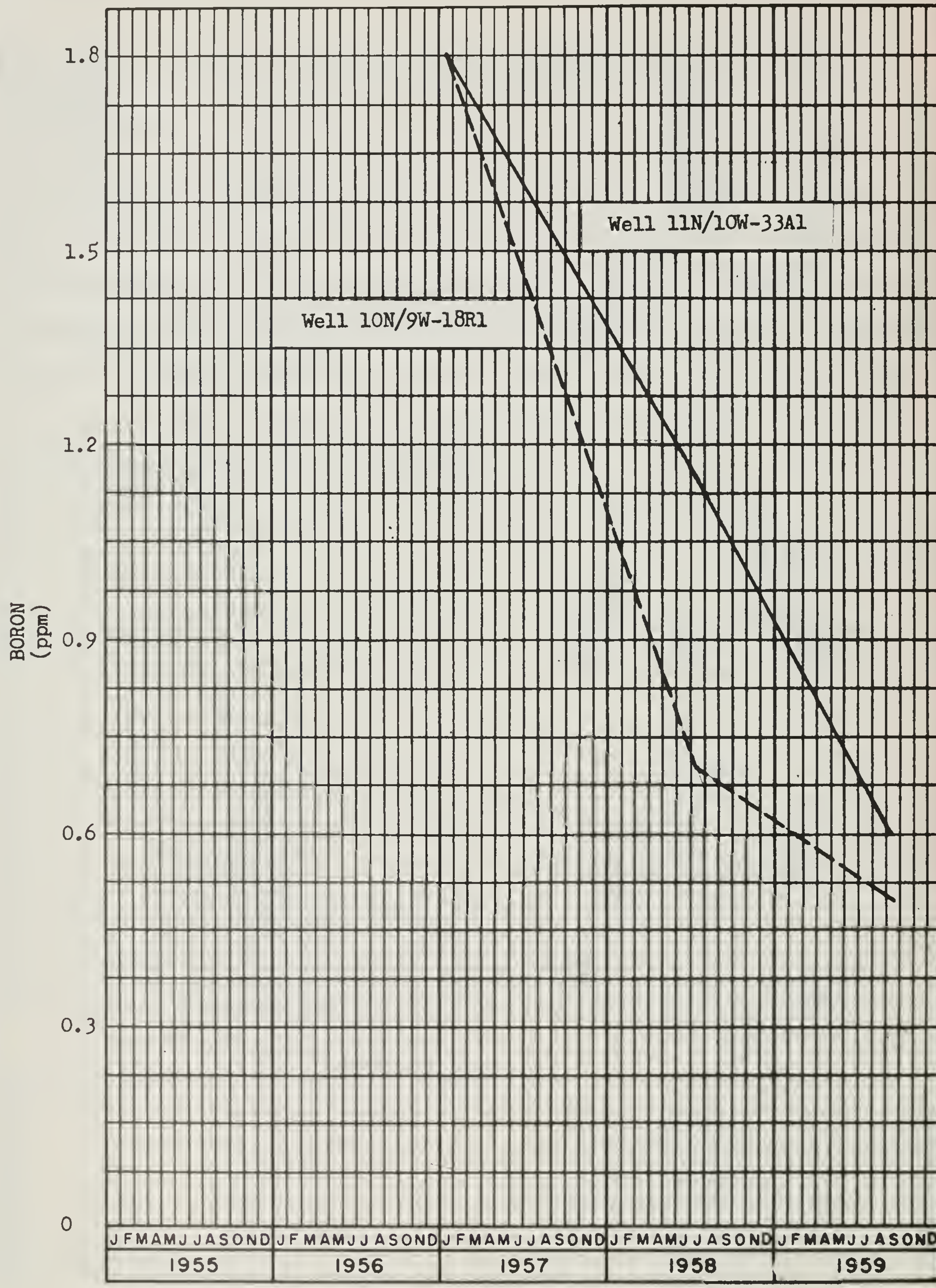
Evaluation of Water Quality. Ground waters in Alexander Valley are generally of low mineral content and suitable for most beneficial uses; however, some of the ground waters are moderately to very hard. Ground waters containing high concentrations of boron are known to occur in this valley. It is



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

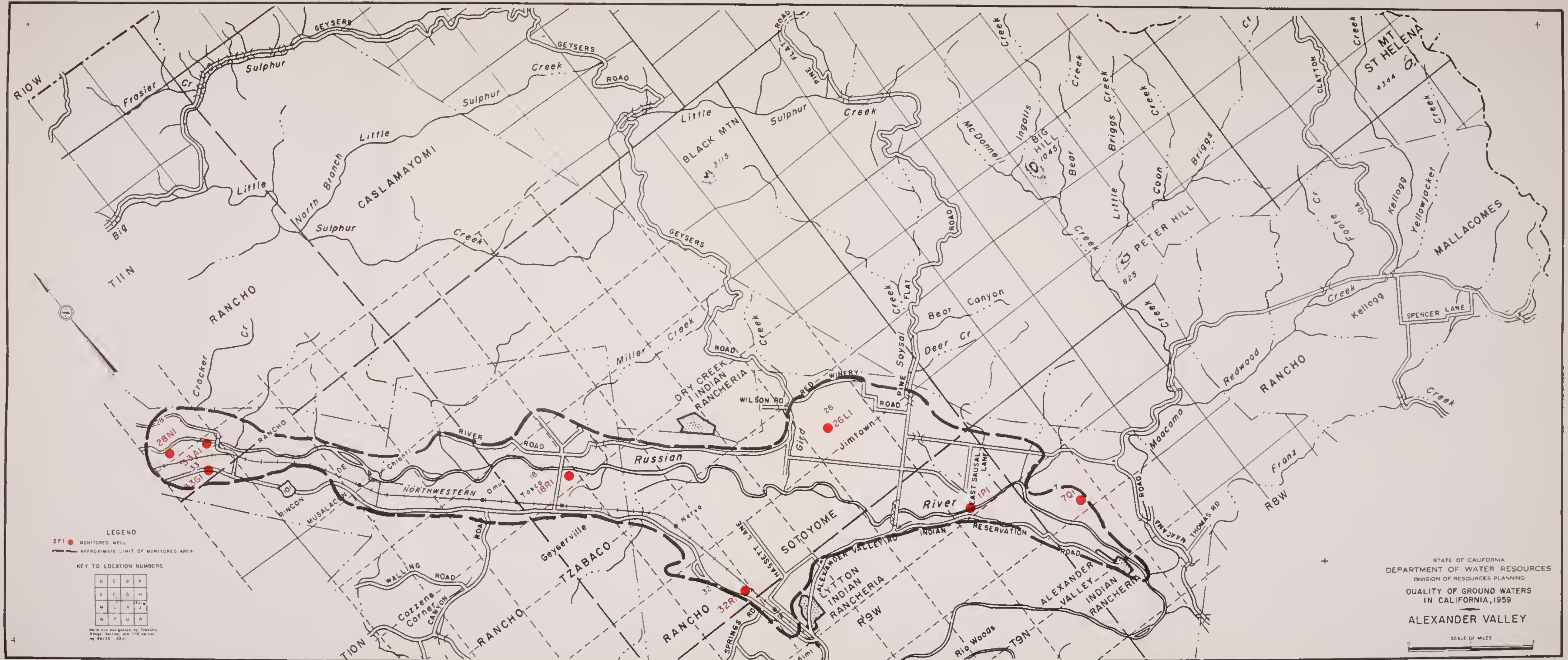
ALEXANDER VALLEY


MT ST HELENA
4344
CLAYTON
Creek
Cr
Briggs
HILL
Cr
Foote
IDA
Kellogg
Yellowjacket
Creek
MALLACOMES
Creek
Kellogg
SPENCER LANE
Redwood
RANCHO
Creek
Franz
R8W
THOMAS RD
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
ALEXANDER VALLEY
SCALE OF MILES
0
1
2



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

ALEXANDER VALLEY


STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
ALEXANDER VALLEY
SCALE OF MILES
LEGEND
2F1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
28N1
33A1
33G1
18R1
26L1
1P1
7Q1
32R1
MT ST HELENA
4344
BLACK MTN
BIG HILL
1045
PETER HILL
825
CASLAMAYOMI
MALLACOMES
SOTOYOME
TZABACO
RANCHO
DRY CREEK INDIAN RANCHERIA
LYTTON INDIAN RANCHERIA
ALEXANDER VALLEY INDIAN RANCHERIA
Russian River
GEYSERS ROAD
Sulphur Creek
Little Sulphur Creek
North Branch
Big
Frosier Cr
Cracker Cr
Miller Creek
McDonnell Creek
Ingolls Creek
Bear Creek
Briggs Creek
Little Briggs Creek
Coon Creek
Foote Cr
Kellogg Creek
Yellowjacket Creek
Redwood Creek
Maacama Creek
Franz Creek
Soysal Creek
Gird Creek
Bear Canyon
Deer Cr
PINE FLAT ROAD
SPENCER LANE
RED WINERY ROAD
WILSON RD
Jimtown
RIVER ROAD
NORTHWESTERN
Omus
Tosca
Nervo
Geyserville
Chianti
RINCON
MUSALACON
EAST SAUSAL LANE
INDIAN RESERVATION ROAD
ALEXANDER VALLEY RD
HASSETT LANE
SPRINGS RD
WALLING ROAD
Cozzens Corner
CANYON
THOMAS RD
Rio Woods
R10W
R9W
R8W
T11N
T10N
T9N

SANTA ROSA VALLEY (1-18)

Santa Rosa Valley lies in central Sonoma County. The monitored area includes Santa Rosa Valley, a portion of the Russian River flood plain bordering the Santa Rosa Valley on the northwest, and Bennett, Rincon, and Kenwood Valleys which lie to the east of Santa Rosa Valley. The area is about 25 miles long, 4 to 12 miles wide, and comprises approximately 150 square miles.

Monitoring Program. To maintain a check on existing ground water quality and to detect changes in quality due to high concentrations of boron and sodium, which occur locally in the area, a monitoring program was established in Santa Rosa Valley in 1957. During September 1959, samples were collected from 21 wells in this area.

Ground Water Occurrence. The principal aquifers are the Sonoma volcanics, the Glen Ellen formation and the Merced formation. Confinement occurs locally.

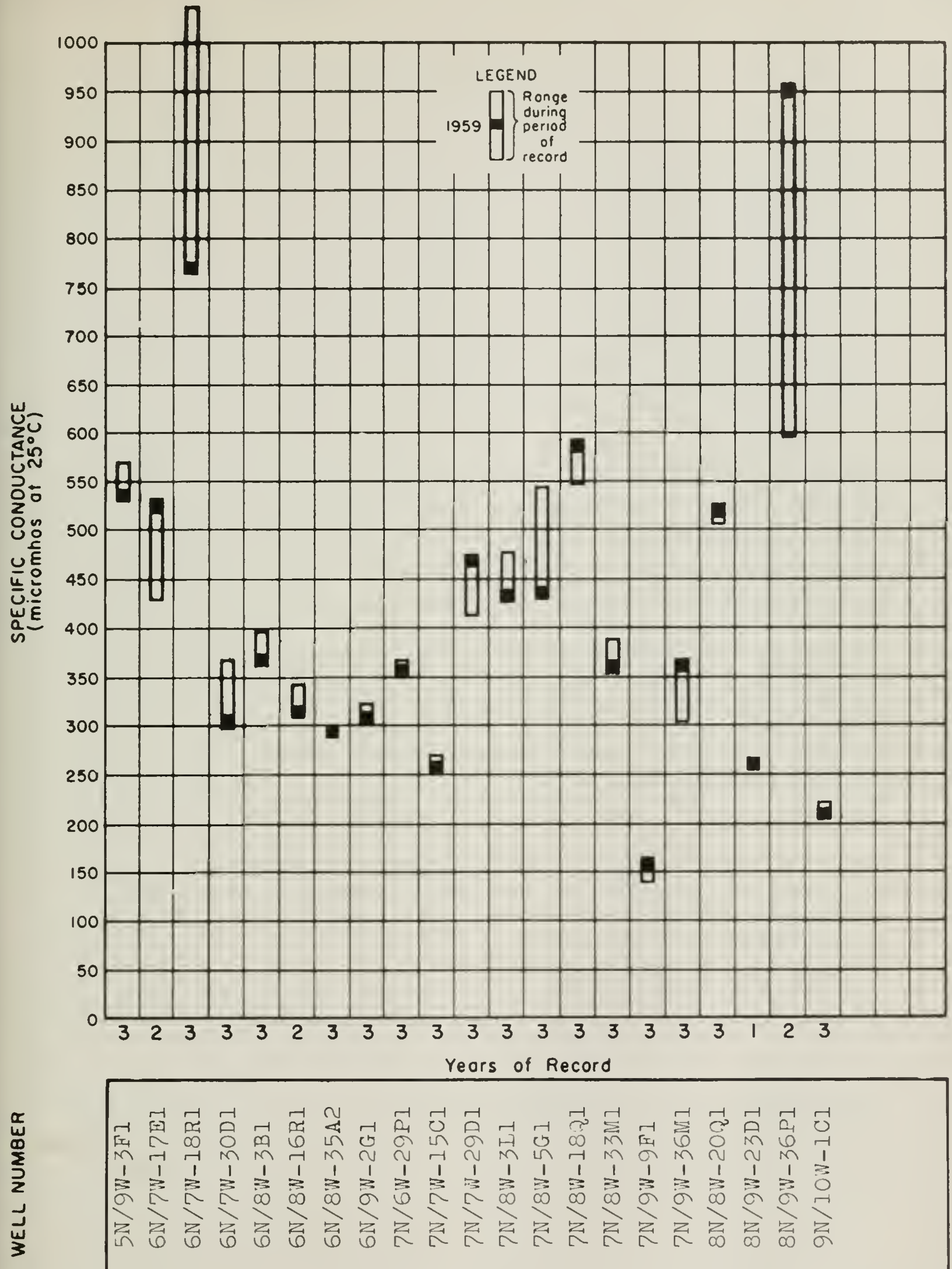
Ground Water Development. Ground water is extensively developed for most beneficial uses. It constitutes about 90 percent of the water used in the valley. Wells in the area yield up to 1,500 gpm.

Beneficial Uses of Ground Water. Ground water is used for domestic, municipal, industrial, irrigation and stock watering purposes.

Major Waste Discharges. The principal waste discharges in the area are effluent from sewage treatment plants serving the Cities of Santa Rosa, Sebastopol and Healdsburg. There are also several industrial waste discharges in the vicinity of Santa Rosa. After treatment, these sewages and industrial wastes are discharged into Santa Rosa Creek or Mark West Creek and thence into the Russian River.

Evaluation of Water Quality. Ground waters in Santa Rosa Valley are generally bicarbonate in type with sodium the predominant cation, although sodium seldom exceeds 50 percent of the base constituents. The waters, although moderately to very hard, are generally excellent in quality and suitable for most beneficial uses. However, high concentrations of boron occur locally, and sodium percentages in certain wells are in excess of those recommended for irrigation use.

Significant Water Quality Changes. Analyses of samples collected during 1959 showed significant changes in boron concentrations in four of the monitoring wells. In well 8N/9W-36P1, located approximately 1 mile south of the Sonoma County airport, boron increased from 0.62 to 4.0 ppm between July 1958 and September 1959. Chlorides in this well increased from 34 to 110 ppm during the same period. This well is 1,048 feet deep and may at times withdraw intermingled connate waters which occur at greater depths. Boron concentrations decreased significantly in three other wells. The greatest decrease was from 1.2 to 0.4 ppm in well 6N/7W-17E1, located approximately 3 miles northeast of Cotati.



WATER QUALITY RANGES

SANTA ROSA VALLEY

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

SAN FRANCISCO BAY REGION (NO. 2)

The San Francisco Bay Region includes all of the basins which drain into San Francisco Bay, San Pablo Bay and that portion of Suisun Bay below Antioch. It includes portions of Alameda, Contra Costa, Marin, Napa, Santa Clara, San Mateo, Solano and Sonoma Counties, and all of San Francisco County. This region extends about 125 miles from north to south, averages about 45 miles in an east-west direction and comprises an area of about 4,400 square miles (Plate 1).

Ground water development in the San Francisco Bay Region, while not as extensive as that in other areas of the State, has been an important factor in the economy of the area. In those portions of the region where surface supplies were not readily available, early development was accomplished by resorting to ground water pumping. As development of the region continued and demands for water exceeded the available supply, the major metropolitan areas undertook vast projects to import water supplies from great distances. Many of the agricultural, industrial and domestic requirements in the outlying areas are still met by ground water pumping.

Within the boundaries of this region, 11 major ground water basins have been identified. As of 1959, eight of these basins were included in the monitoring program. These areas, the number of wells in each, and the sampling times are listed in the following tabulation.

Monitored Area	Number of Wells	Sampling Time
Petaluma Valley (2-1)	26	March & September
Napa-Sonoma Valley (2-2)	36	March & September
Suisun-Fairfield Valley (2-3)	15	May & September
Pittsburg Plain (2-4)	3	July

Monitored Area	Number of Wells	Sampling Time
Clayton Valley (2-5)	8	July
Ygnacio Valley (2-6)	9	July
Santa Clara Valley (2-9)		
East Bay Area	58	May & November
South Bay Area	24	July
Livermore Valley (2-10)	19	July

There were no general changes observed in ground water quality in the San Francisco Bay Region during 1959. Individual wells in Santa Clara Valley showed progressive increases in chlorides, especially in wells pumping from the upper aquifer. These increases are attributed to continued sea-water intrusion in the area.

PETALUMA VALLEY (2-1)

Petaluma Valley is located at the north end of San Pablo Bay in Sonoma and Marin Counties. The valley extends northwestward from the bay for about 16 miles and occupies an area of approximately 45 square miles. The segment fronting the bay is reclaimed tidal marshlands.

Monitoring Program. The monitoring program in Petaluma Valley was established in 1958 to maintain a check on sea-water intrusion. The monitoring program for 1959 included sampling of 26 wells. Twenty of these wells, in the area affected by sea-water intrusion, were sampled in the spring and fall of 1959. The remaining six wells were sampled once during the fall of 1959.

Ground Water Occurrence. Petaluma Valley is a structural depression underlain with a thick series of water-bearing materials. Ground water occurs principally in younger alluvium, older alluvium and the Merced formation. Meager to moderate yields are also obtained from the Sonoma volcanics and the Petaluma formation.

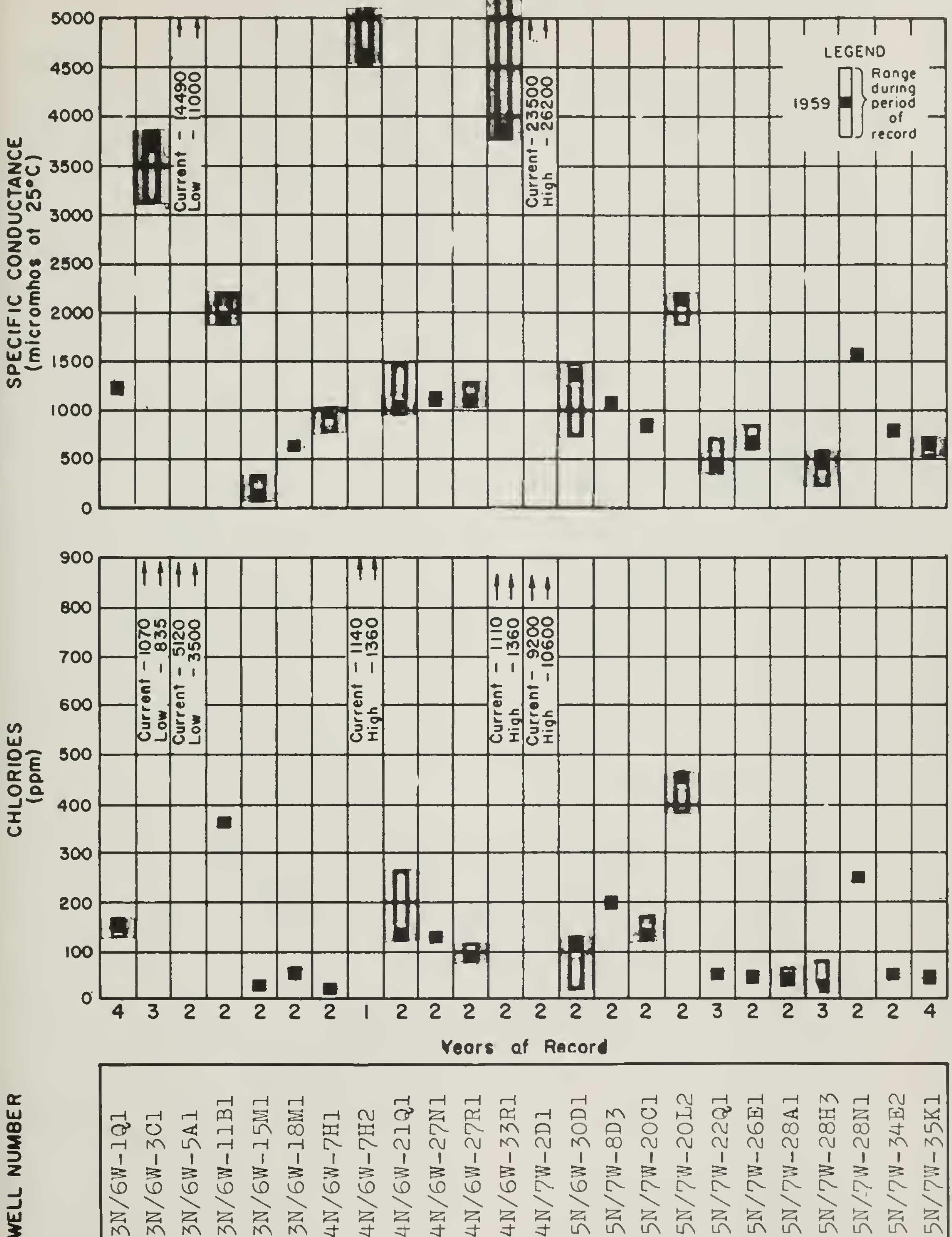
Ground Water Development. Most of the ground water development in the Petaluma Valley is in the northern portion, where wells generally yield from 150 to 300 gpm. One well, however, has a reported yield of about 650 gpm. In the southern part of the valley yields are generally less than 30 gpm.

Beneficial Uses of Ground Water. The greater part of southern Petaluma and Novato Valleys is at or below sea level, and much of this land has been reclaimed. Only the ground water in the upper portion of the valleys has been developed for agriculture and urban use.

Major Waste Discharges. The major waste discharge consists of domestic and industrial wastes from the City of Petaluma which are discharged to Petaluma Creek after secondary treatment. Domestic wastes from Hamilton Air Force Base are discharged directly to San Pablo Bay after primary treatment. Neither of these wastes is a present threat to ground water quality.

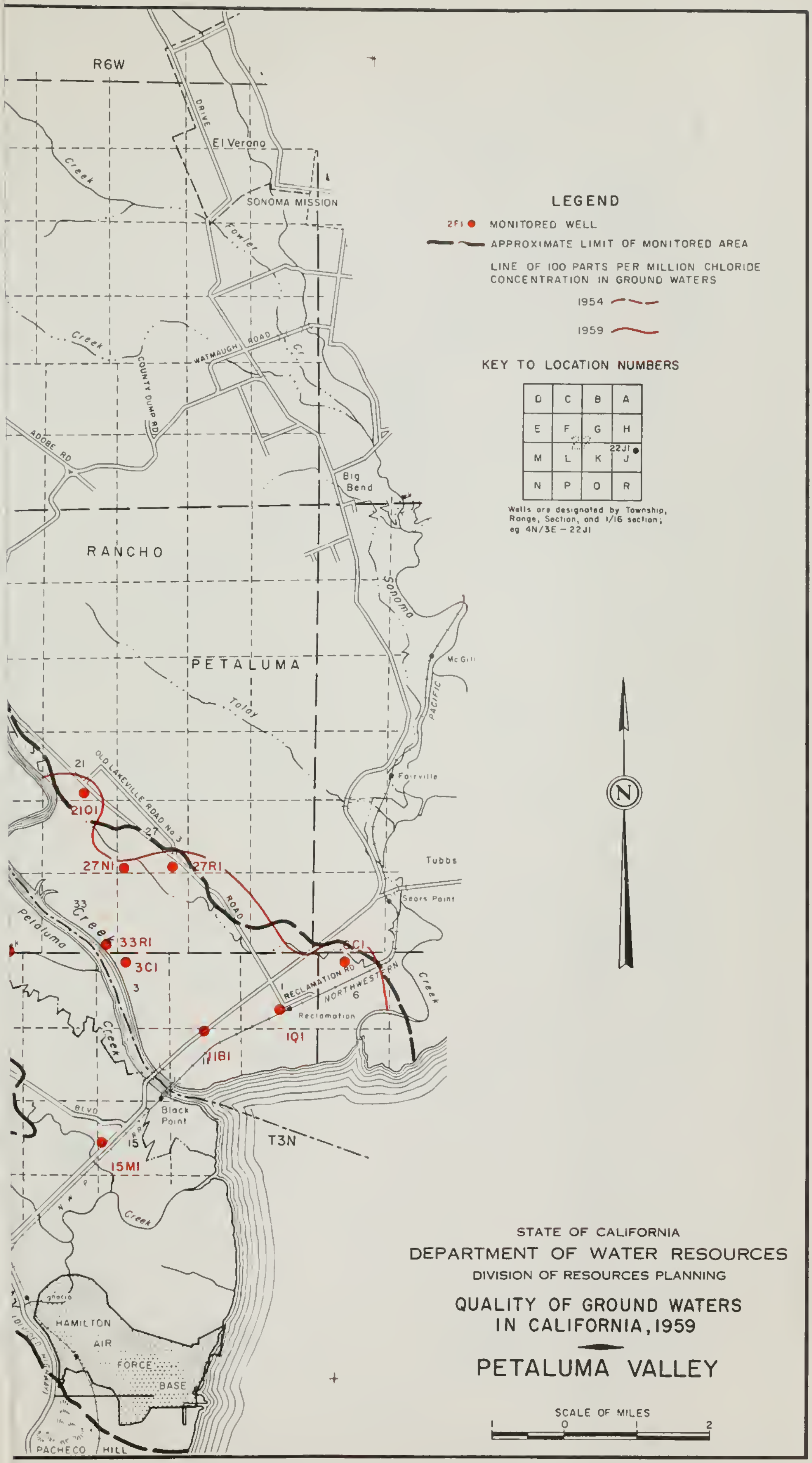
Evaluation of Water Quality. The water from the younger and older alluvium and the Merced formation is generally of good quality. Water from the shallower wells is of calcium bicarbonate type with deeper wells producing sodium bicarbonate type. Salt water has intruded the aquifers beneath the tidal marshlands and produced sodium chloride type water which is highly mineralized. Some wells in the southern and central portion of the area, adjacent to Petaluma Creek, produce water high in boron which makes them unsuitable for irrigation of some crops. A few wells in the valley show iron concentrations in excess of those recommended for domestic use. It appears that sea-water intrusion in Petaluma Valley is not occurring directly from the bay by subsurface inflow, but through the downward and lateral movement of surface and near-surface brackish and saline waters.

Significant Water Quality Changes. A comparison of analyses of 1958 with those of 1959 showed only minor changes in mineral concentrations. The seasonal fluctuations of wells sampled in the spring and fall of 1959 are, in general, not great. One well, 3N/6W-5A1, showed an increase in chloride concentration from 3,500 ppm in the spring of 1959 to 5,120 ppm in the fall of 1959. However, chlorides decreased in well 4N/7W-2D1 from 10,600 to 9,200 ppm during the same period. These two wells are located about 6 miles apart on the west side of Petaluma Creek. The area of degraded ground water in the vicinity of Petaluma has apparently increased and has moved northwestward during the period 1954 to 1959 as shown by the 100 ppm isochlors on the following map.



WATER QUALITY RANGES

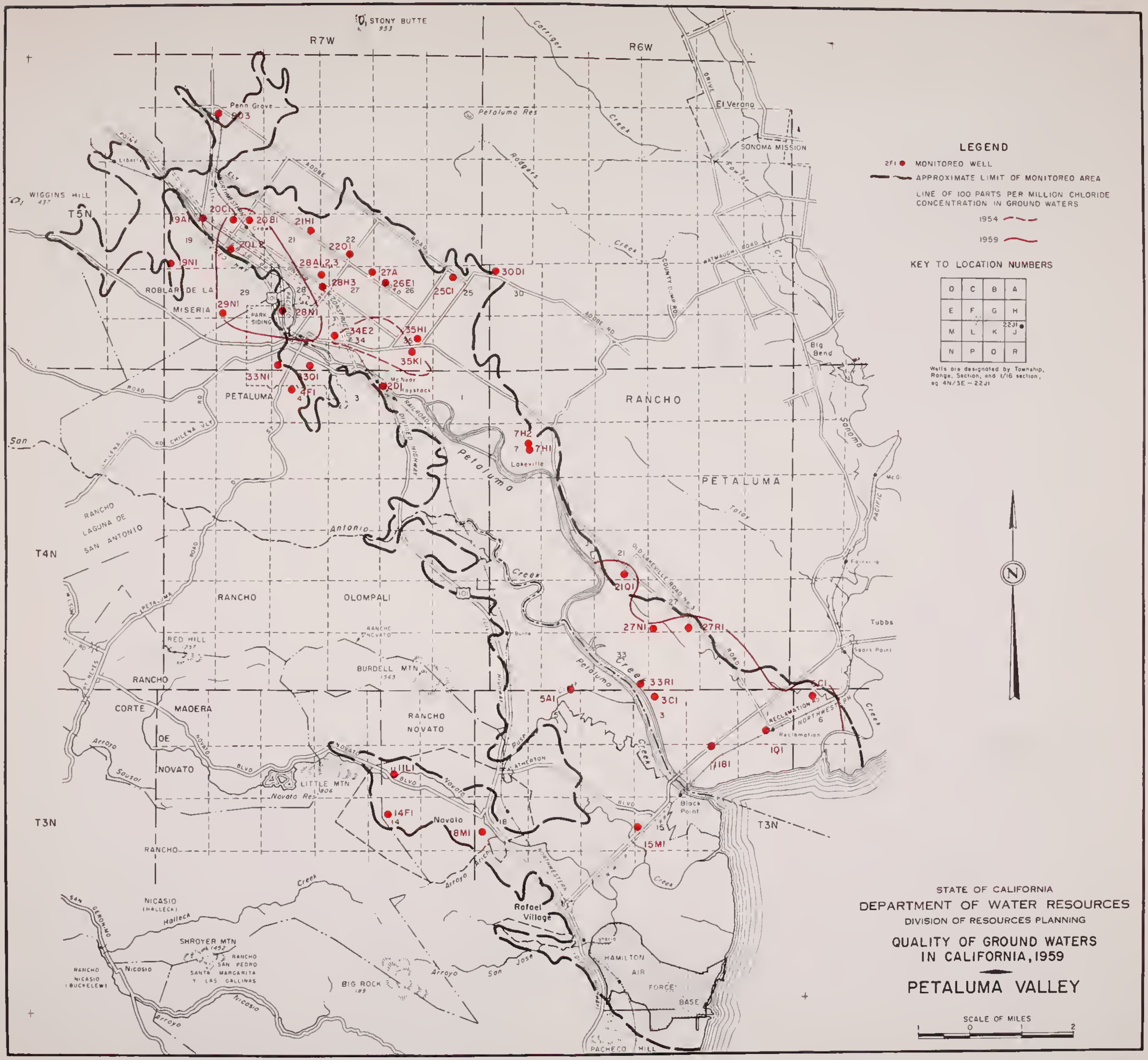
PETALUMA VALLEY



STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959

PETALUMA VALLEY


LEGEND
MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
LINE OF 100 PARTS PER MILLION CHLORIDE CONCENTRATION IN GROUND WATERS
1954
1959
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E-22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
PETALUMA VALLEY
SCALE OF MILES
0 1 2
STONY BUTTE
R7W
R6W
T5N
T4N
T3N
Penn Grove
El Verano
SONOMA MISSION
Petaluma Res
WIGGINS HILL
PETALUMA
RANCHO
PETALUMA
Lakeville
RANCHO LAGUNA DE SAN ANTONIO
RANCHO OLOMPALI
RED HILL
BURDELL MTN
RANCHO NOVATO
RANCHO CORTE MAODERA DE NOVATO
LITTLE MTN
Novato Res
Novato
Black Point
Reclamation
Big Bend
Tubbs
Sears Point
Rafael Village
HAMILTON AIR FORCE BASE
PACHECO HILL
NICASIO (HALLECK)
SHROYER MTN
BIG ROCK
RANCHO NICASIO (BUCKELEW)
RANCHO SAN PEDRO SANTA MARGARITA Y LAS GALLINAS
Petaluma Creek
San Antonio Creek
Novato Creek
Sonoma Creek
N

Napa and Sonoma Valleys are north-northwest trending, alluviated valleys located at the southern end of the northern Coast Range Mountains in Napa and Sonoma Counties. They occupy structural depressions and drain southerly into San Pablo Bay. The two valleys merge about 5 miles from the northern margin of San Pablo Bay and become marshland. The tidal marshlands along San Pablo Bay are at or near sea level. Some of the land has been reclaimed and is as much as 5 feet below sea level. Napa Valley and Sonoma Valley comprise about 85 and 35 square miles, respectively.

Monitoring Program. A ground water monitoring program was established in Napa-Sonoma Valley in 1958 to detect any evidence of sea-water intrusion. During 1959, 36 wells were sampled in the spring and fall.

Ground Water Occurrence. The principal body of ground water in Napa and Sonoma Valleys occurs in the younger and older alluvium. Appreciable quantities are also pumped locally from the Sonoma Volcanics. Ground water, generally unconfined, moves from the margins of the valleys to the center and then southward to the bay. Some confinement is indicated by the presence of a few flowing wells. The most productive of these artesian wells is reported to flow about 97 gpm.

Ground Water Development. Ground water in Napa-Sonoma Valley is moderately to extensively developed. The ground water supply is not abundant, and in some parts of the valleys, it is inadequate. Although the alluvium yields water freely to wells, large yields are uncommon because of limited thicknesses of the aquifers. The yields are generally in the order of 20 to 50 gpm, although a few large irrigation wells produce up to 400 gpm.

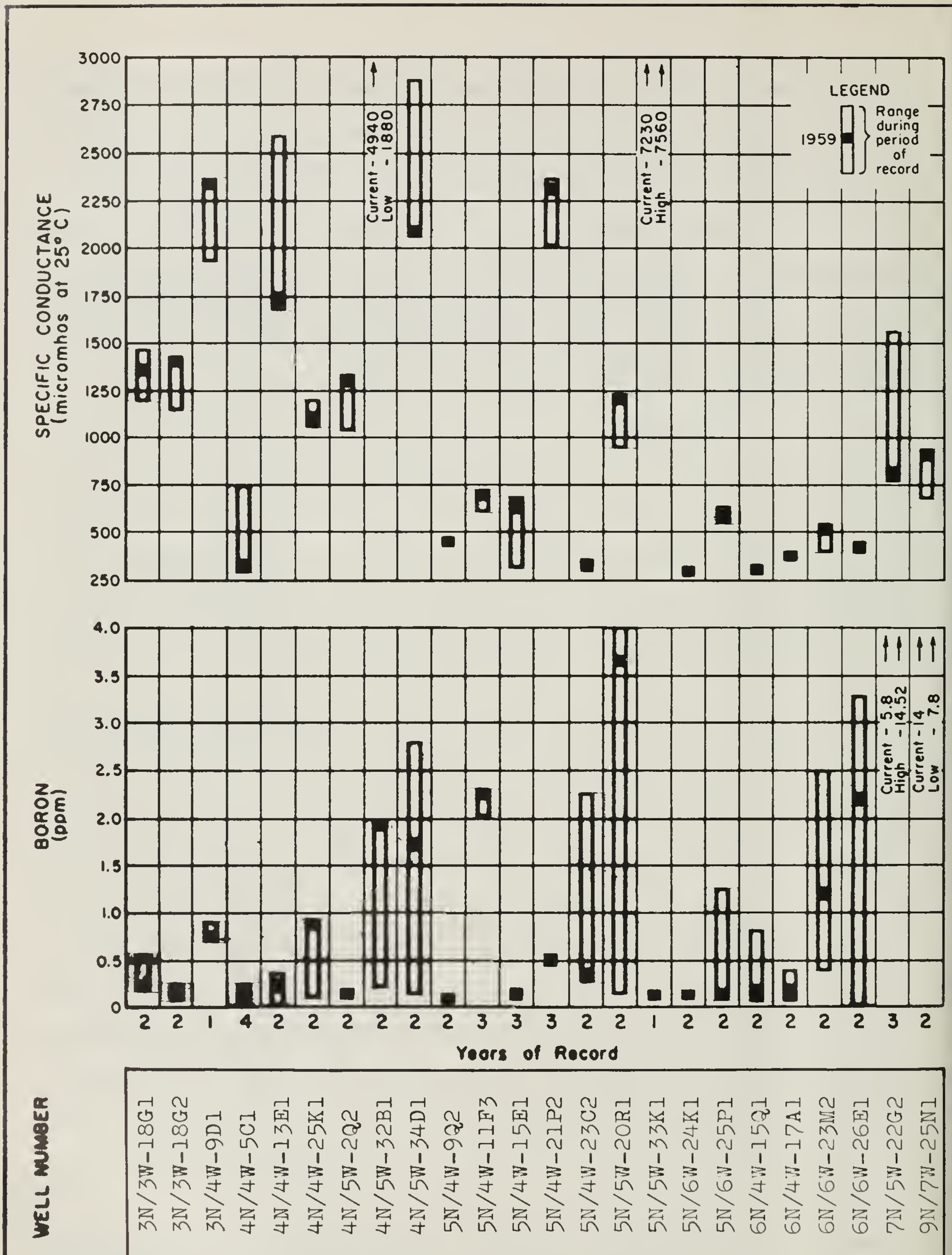
Beneficial Uses of Ground Water. Most of the water used in the two valleys is for domestic and irrigation requirements. Non-irrigated agriculture such as dairy and stock watering requires smaller amounts. There are some industrial uses in Napa Valley.

Major Waste Discharges. The major waste discharge in Napa Valley consists of effluent from Napa County Sanitation District No. 1. The sewage and industrial wastes amount to 4.1 mgd and are disposed of, after secondary treatment, in Napa River below the City of Napa. Smaller discharges are made by Napa State Hospital, the Veterans Home, and the communities of Yountville, Oakville, Rutherford, St. Helena and Calistoga. In Sonoma Valley, Sonoma Valley Sanitary District discharges 1.0 mgd of domestic wastes after secondary treatment to Schell Slough which is interconnected to San Pablo Bay by tidal waterways. Smaller discharges are made by Sonoma State Home and several wineries.

Evaluation of Water Quality. Ground water in most of Napa and Sonoma Valley is satisfactory for most uses. Sodium bicarbonate and sodium chloride are the most frequently occurring types of water in these basins. Better quality water is generally extracted from the alluvium than from the older formations. Ground water in the Sonoma volcanics is generally not as desirable in quality as that contained in the alluvium. Acid water, highly mineralized connate water, and water having undesirable taste, odor, or excessive boron and iron concentrations are encountered in many of the wells drilled into the Sonoma volcanics on the east side of Napa Valley. A potential intrusion of brackish waters from San Pablo Bay exists in the lower end of the valleys at times of heavy ground water withdrawals.

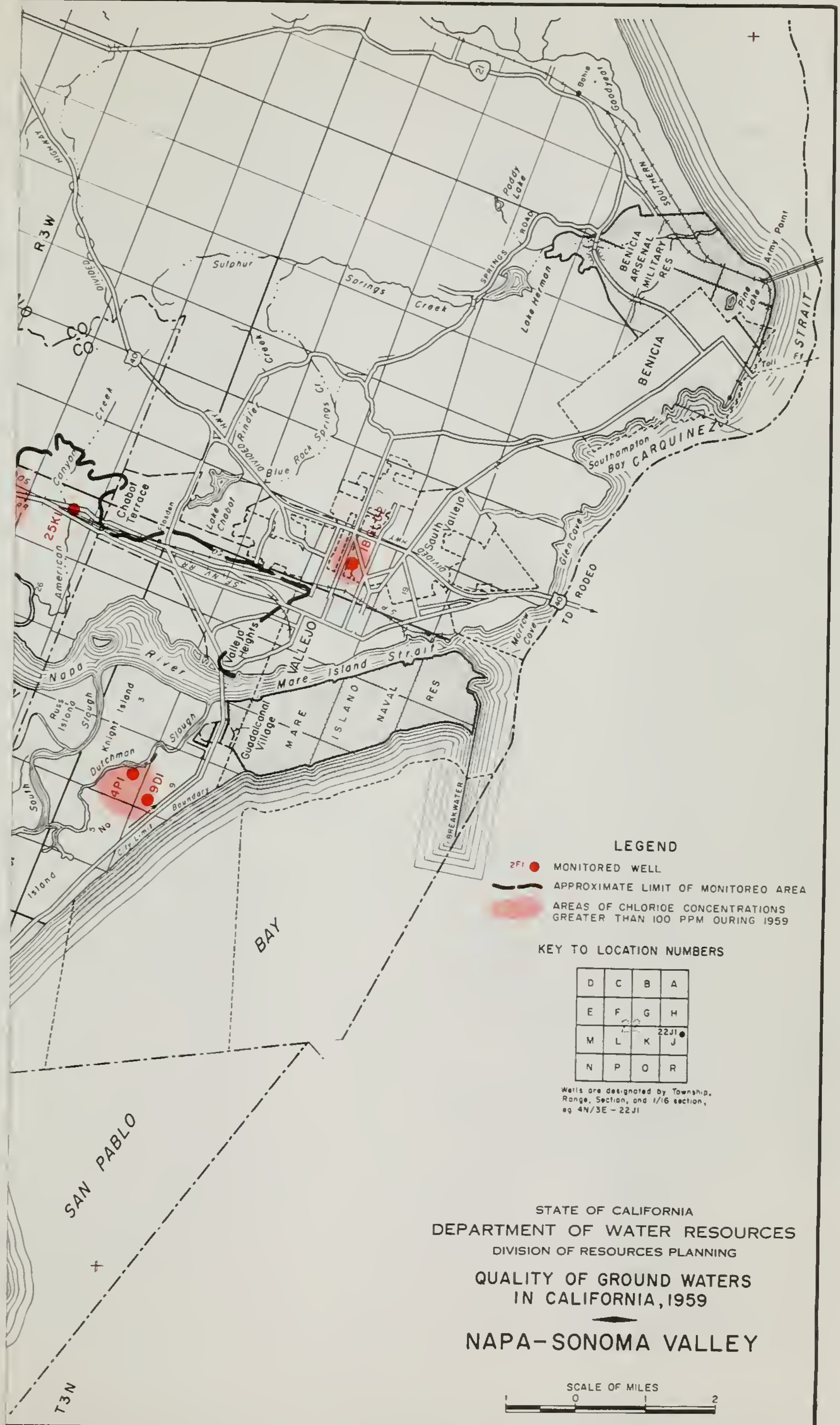
Significant Water Quality Changes. Chloride concentration in well 4N/5W-32B1 located near the bay showed a large increase, from 321 ppm in August 1958 to

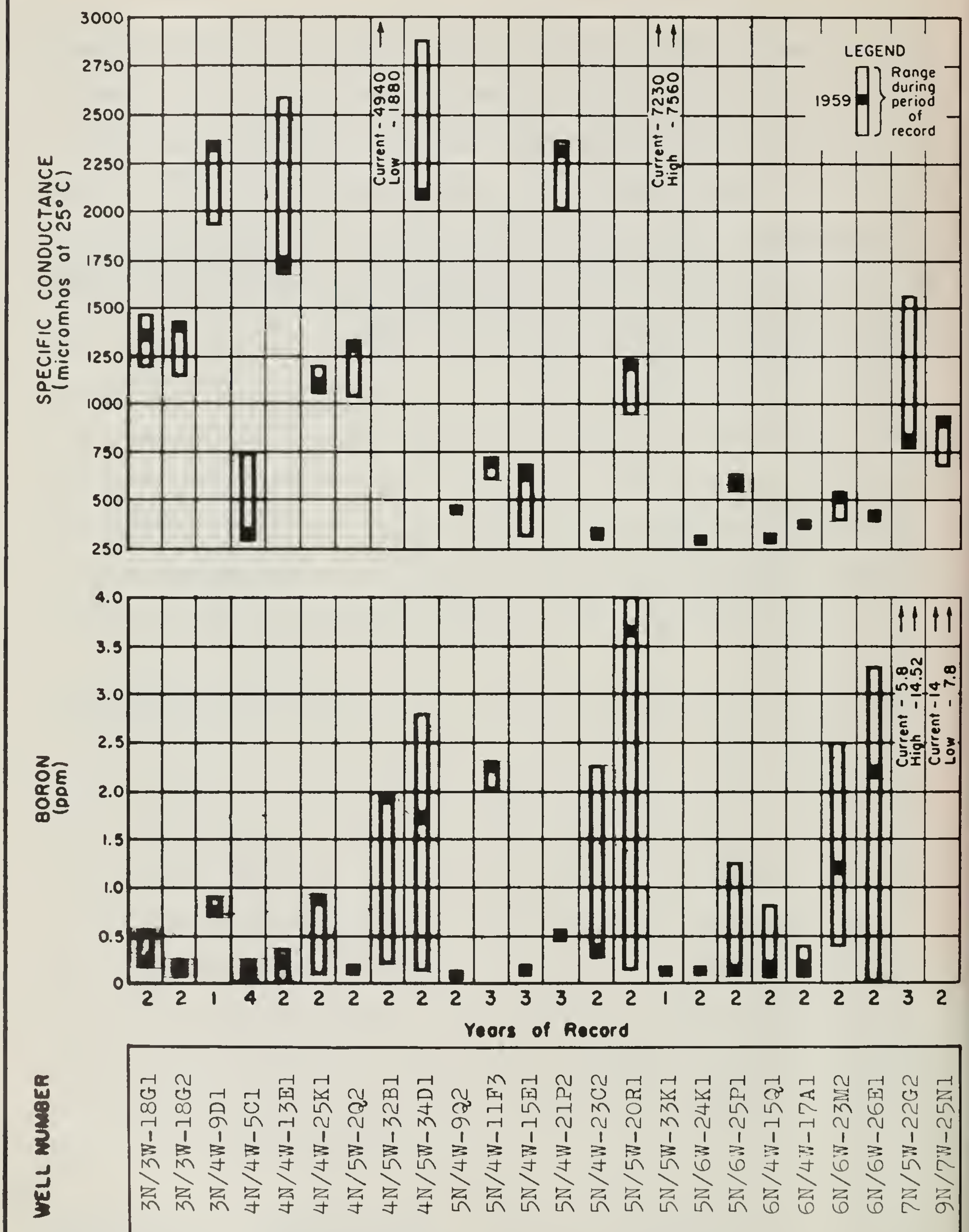
1,320 ppm in September 1959. Chloride concentration in well 5N/5W-33K1 near Schellville was high in March 1958 and remained about the same in September 1959, with 2,600 and 2,540 ppm respectively. Well 9N/7W-25N1 in the upper end of the basin showed excessive boron concentration which varied from 12 ppm in August 1958 to 7.8 ppm in March 1959 and increased to 14 ppm in September 1959. Areas where chloride concentrations in Napa and Sonoma Valleys exceeded 100 ppm during 1959 are shown on the following map.



WATER QUALITY RANGES

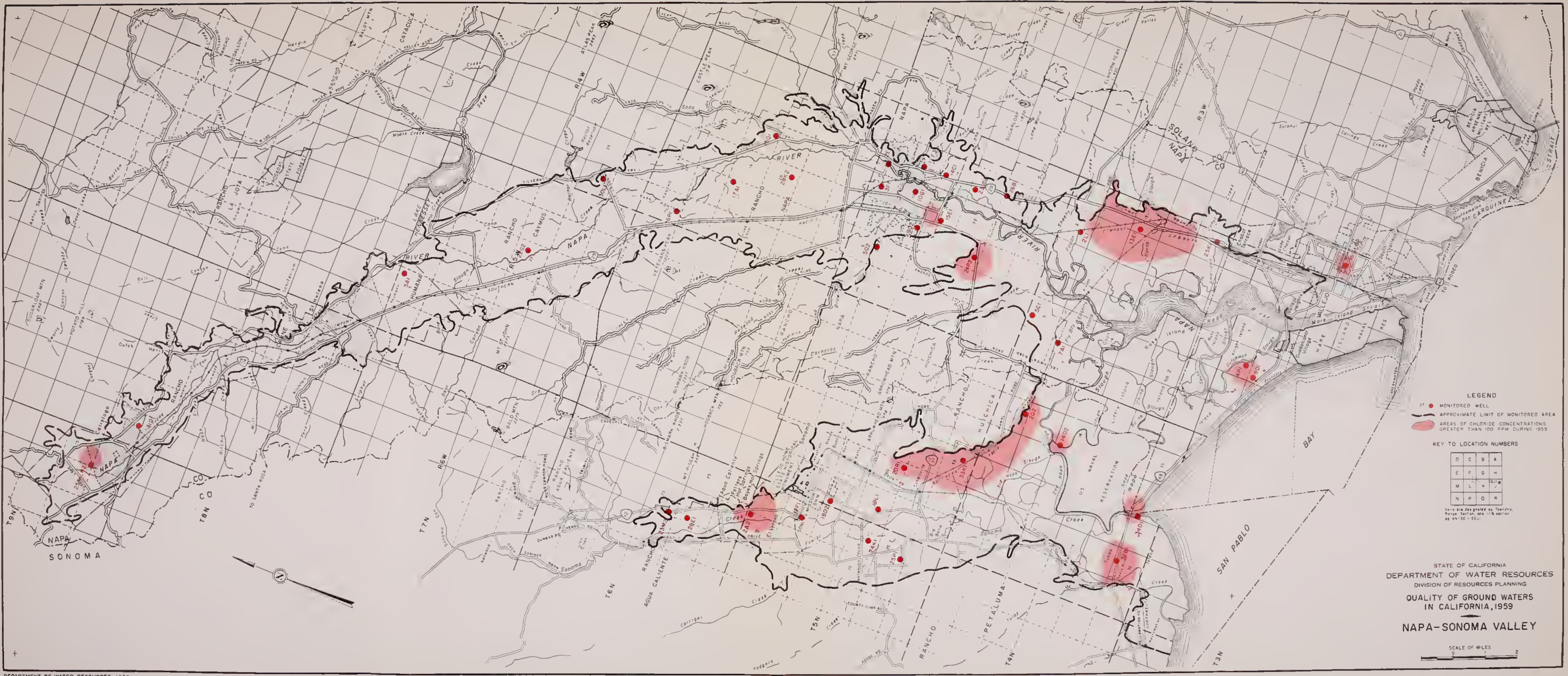
NAPA-SONOMA VALLEY


LEGEND
2F1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
AREAS OF CHLORIDE CONCENTRATIONS GREATER THAN 100 PPM DURING 1959
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg. 4N/3E - 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
NAPA-SONOMA VALLEY
SCALE OF MILES
1 0 1 2
R 3 W
T3N
VALLEJO
BENICIA
BENICIA ARSENAL MILITARY RES
CARQUINEZ STRAIT
Southampton Bay
SAN PABLO BAY
Mare Island Strait
MARE ISLAND NAVAL RES
Napa River
Sulphur Springs Creek
Lake Herman
Paddy Lake
Pine Lake
Army Point
Glen Cove
Morrow Cove
Lake Chabot
Chabot Terrace
Vallejo Heights
Guadalcanal Village
American Canyon Creek
Blue Rock Springs
Rindler Creek
Dutchman Slough
Knight Island
Russ Island Slough
South Slough
BREAKWATER
RODEO
Benicia
Goodyear
SOUTHERN
25K1
18
4P1
9D1
21
40



WATER QUALITY RANGES

NAPA-SONOMA VALLEY



DEPARTMENT OF WATER RESOURCES, 1959

SUISUN-FAIRFIELD VALLEY (2-3)

The monitored area is located in the southwestern portion of Solano County and includes Suisun Valley, Green Valley, and the Birds Landing-Collinsville area. The small valleys widen and merge with the tidal marshes along Suisun Bay. The monitored area is approximately 16 miles long, about 12 miles in width and covers an area of about 125 square miles.

Monitoring Program. A network of 15 monitoring wells was established in Suisun-Fairfield Valley in the fall of 1958 to observe sea-water intrusion and detect significant changes in ground water quality. During 1959, water samples were collected from 11 of the 15 wells in the spring and again in the fall. The remaining four wells were sampled once.

Ground Water Occurrence. The water bearing formations comprise younger alluvium, older alluvium and the Sonoma Volcanics. The thickness of the younger alluvium averages about 20 feet at the northern end of the valley and gradually increases to more than 60 feet at the southern end, the greatest thickness being along Suisun Creek. The valley floor north and northeast of Fairfield is underlain by consolidated rocks at shallow depths and considered as essentially non-water bearing. Most of the water pumped from wells in Suisun-Fairfield Valley is probably obtained from the older alluvium. The thickness of this formation varies from feather edges along the margin of the basin to about 200 feet near Fairfield.

Ground Water Development. Ground water is extensively developed in the area west of Fairfield. Consequently, pumping depressions occurred in 1950 and 1957, centered about 2½ miles southwest of Fairfield. Because of the poor quality water, the low permeability of sediments, and small yields, the area east of Fairfield is only moderately developed. There are only domestic and stock wells in this area. Silt, clay and sand make up the younger Recent alluvium which has a low permeability and generally yields small amounts of water. Well yields range from 20 to 565 gpm and average about 200 gpm for the entire area.

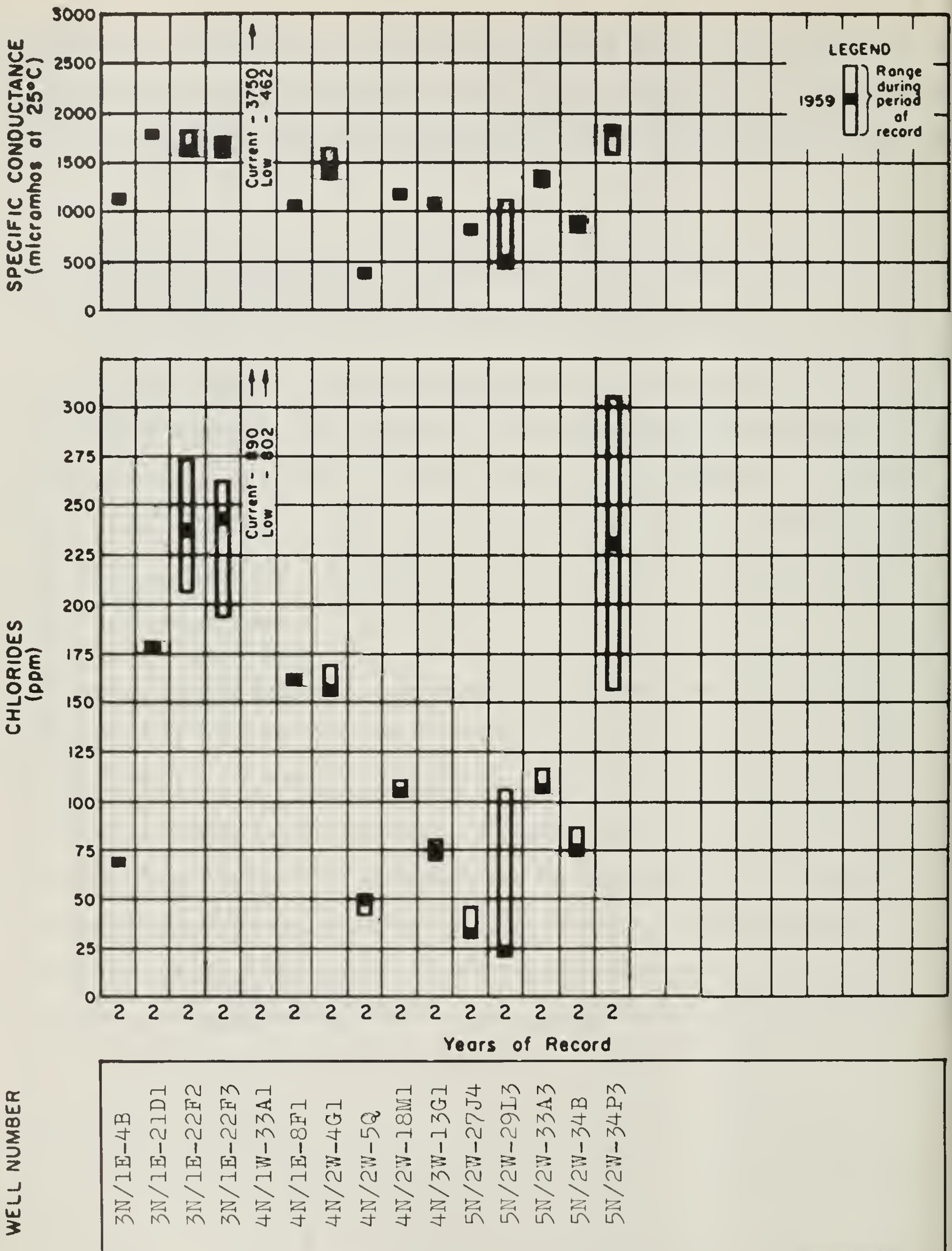
Beneficial Uses of Ground Water. The beneficial uses of ground water are municipal, irrigation, industrial, domestic and stock watering.

Major Waste Discharges. The two major waste discharges located in this area are domestic wastes of about 1.6 mgd from Fairfield-Suisun Sewer District discharged to Suisun Slough after primary treatment, and domestic and industrial wastes of 1.2 mgd from Travis Air Force Base discharged to Union Creek after primary treatment. These discharges are made in the lower end of the basin and to tidal waters.

Evaluation of Water Quality. Under natural conditions, ground water moves southward from the margins of the valley towards the tidal marshes. However, in the vicinity of Fairfield a pumping depression has reversed the gradient of the ground water table. This poses a problem of potential encroachment of sea water from the bay. In addition to the sea water intrusion problem, high concentrations of boron and sodium are found in wells in the southeastern portion of the monitored area. High boron concentrations are also found in wells in the vicinity of Fairfield. Usable ground water is of calcium and sodium bicarbonate type and is generally hard and slightly alkaline.

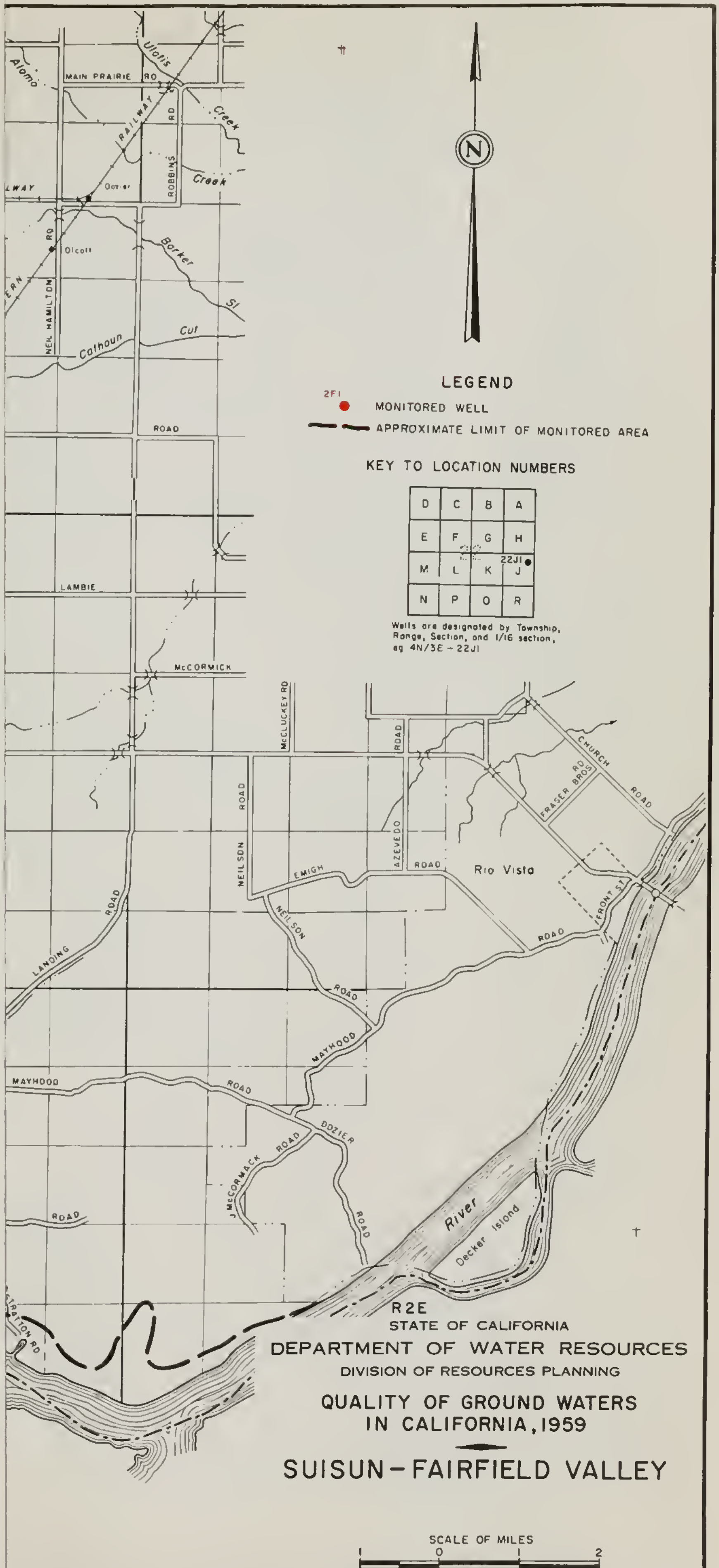
Significant Water Quality Changes. The quality of ground waters has not changed significantly in the two year period of record. Chloride concentration in well 3N/1E-22F2 near Birds Landing decreased from 275 ppm in 1958 to 210 ppm in May 1959 and increased to 240 ppm in September 1959, when it was resampled.

Boron concentration in well 5N/2W-34B near Fairfield remained fairly constant from August 1958 to May 1959 when 3.2 and 3.3 ppm respectively were recorded. The boron concentration in this well decreased to 2.5 ppm in September 1959.



WATER QUALITY RANGES

SUISUN-FAIRFIELD VALLEY

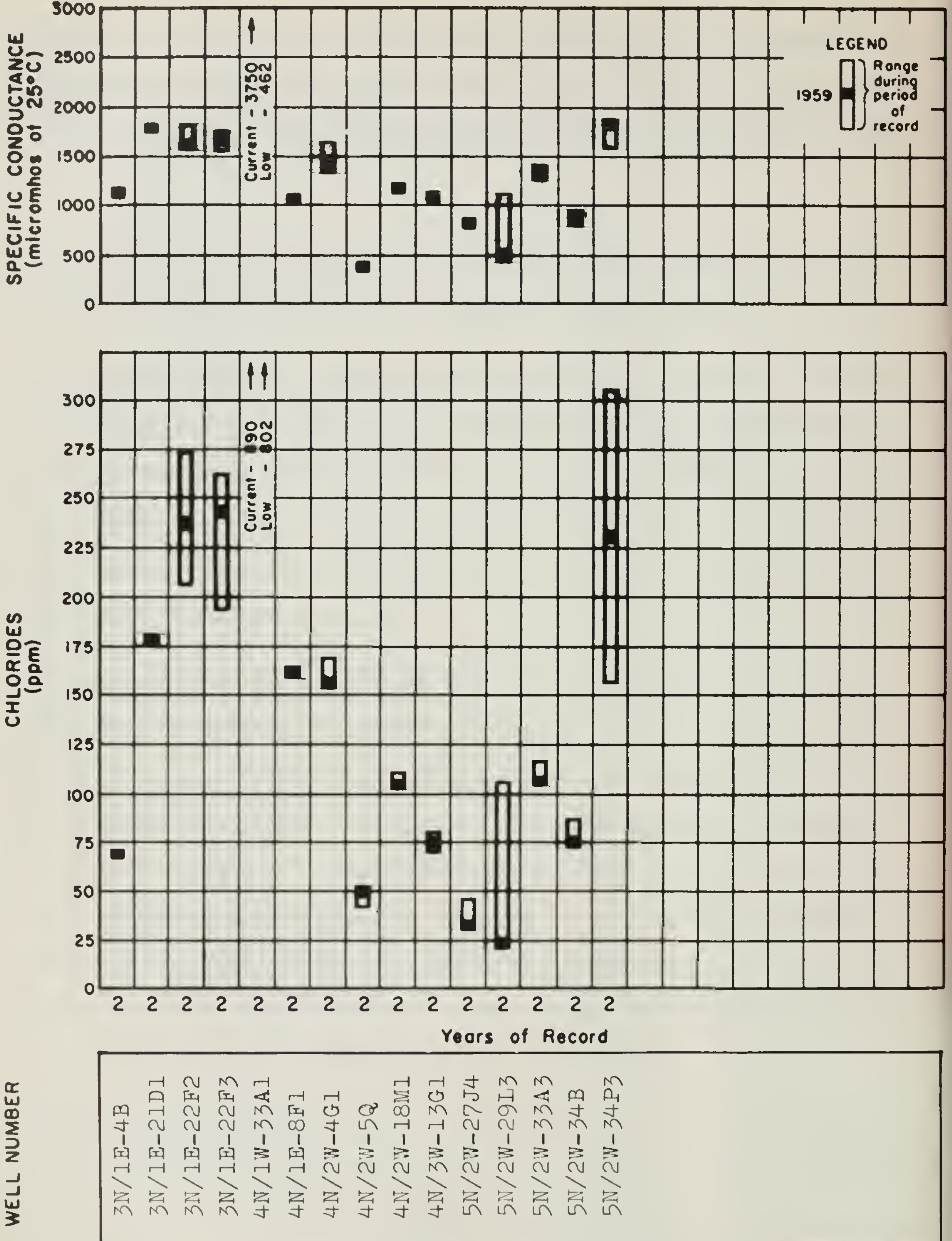


STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959

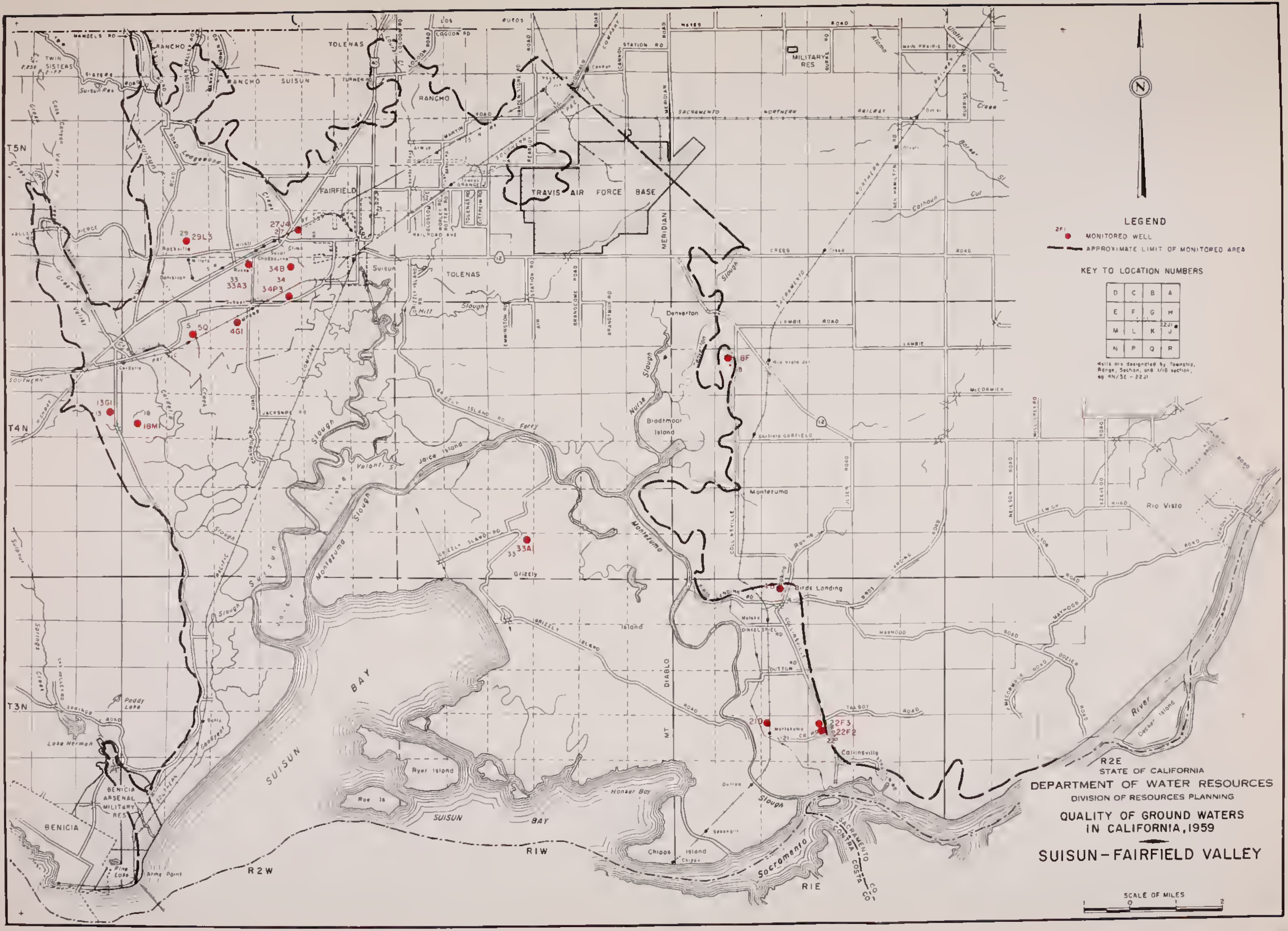
SUISUN-FAIRFIELD VALLEY

SCALE OF MILES
1 0 1 2



WATER QUALITY RANGES

SUISUN-FAIRFIELD VALLEY


STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
SUISUN - FAIRFIELD VALLEY
LEGEND
MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
SCALE OF MILES
T5N
T4N
T3N
R2W
R1W
R1E
R2E
FAIRFIELD
Suisun
TRAVIS AIR FORCE BASE
TOLENAS
RANCHO
MILITARY RES
Denverton
Birds Landing
Montezuma
Rio Vista
Collinsville
Grizzly
BENICIA
BENICIA ARSENAL MILITARY RES
SUISUN BAY
Ryer Island
Chipps Island
Honker Bay
Sacramento River
CONTRA COSTA CO.
29L3
27J4
33A3
34B
34P3
5Q
4G1
13G1
18M
18F
33A1
21D
22F3
22F2

PITTSBURG PLAIN (2-4)

The Pittsburg Plain occupies a narrow terrace fronting on the Sacramento River, New York Slough and the San Joaquin River, between Clayton Valley on the west and the Sacramento-San Joaquin Delta on the east in northeastern Contra Costa County. The monitored area is approximately 5 miles long, 2 miles wide and covers an area of about 10 square miles.

Monitoring Program. A monitoring program was established in Pittsburg Plain in 1957 to provide information on ground water quality in the area and to detect significant changes. Three wells were sampled during July - November 1959.

Ground Water Occurrence. The available ground water occurs in a thin section of alluvium and in the older Pittsburg formation.

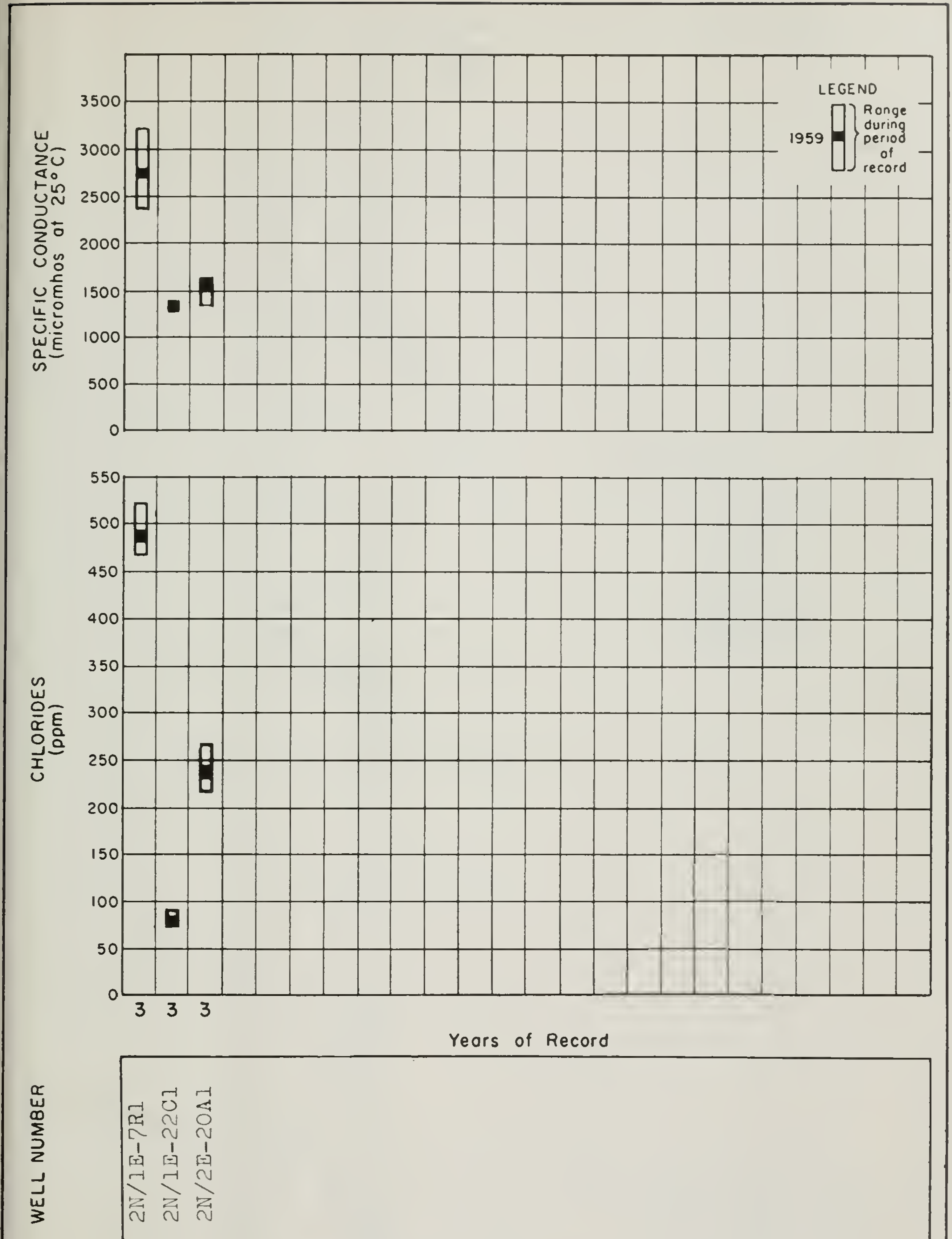
Ground Water Development. There is only limited development of ground water in Pittsburg Plain, due in part to the poor quality water underlying the area and the importation of surface water by Contra Costa Canal. In the 1930's many industries in the Pittsburg area pumped ground water. The heavy pumpage created an overdraft and permitted saline waters to encroach in the ground water reservoirs near the bays. Pumping has since decreased and most of the water now used is surface water. Well yields range from 100 to 150 gpm.

Beneficial Uses of Ground Water. Ground water is presently used to a limited extent for industrial, irrigation and domestic purposes.

Major Waste Discharges. The municipalities and a large number of industries including chemicals, steel, power development, rubber goods, paper products, food processing, gypsum products, asbestos products and roofing materials are located along the waterfront and discharge their wastes into the tidal waters. Disposal of these wastes to tidal waters is not considered detrimental to the underlying ground water in this area at the present time.

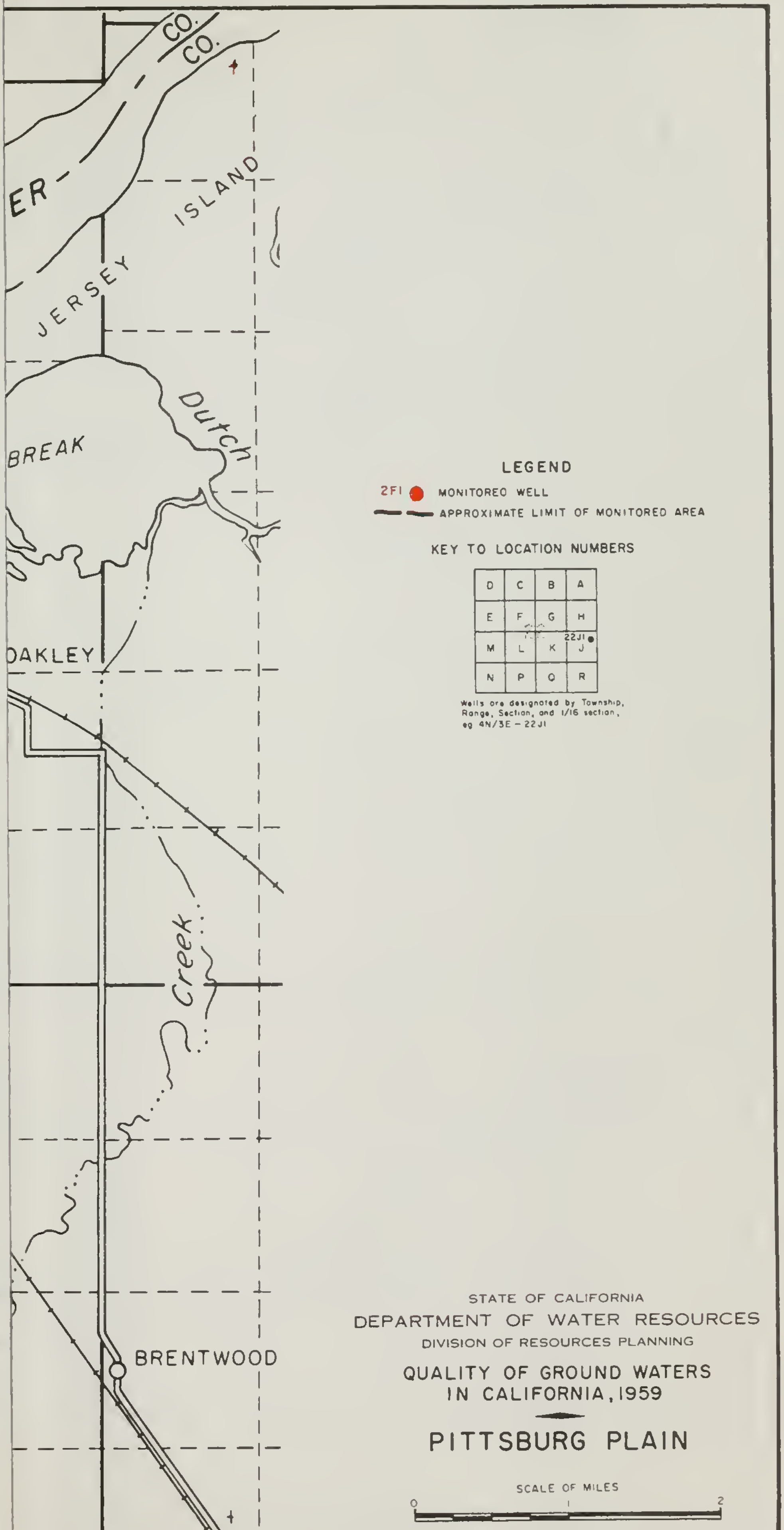
Evaluation of Water Quality. Ground waters underlying Pittsburg Plain are generally of poor quality. They are sodium chloride and sodium sulfate type waters, high in mineral content and are extremely hard. Unless softened, the waters are not suitable for some domestic and industrial uses. Results of radiological assays during 1959 indicate maximum gross radioactivity as 8.91 micromicrocuries per liter ($\mu\mu c/l$).

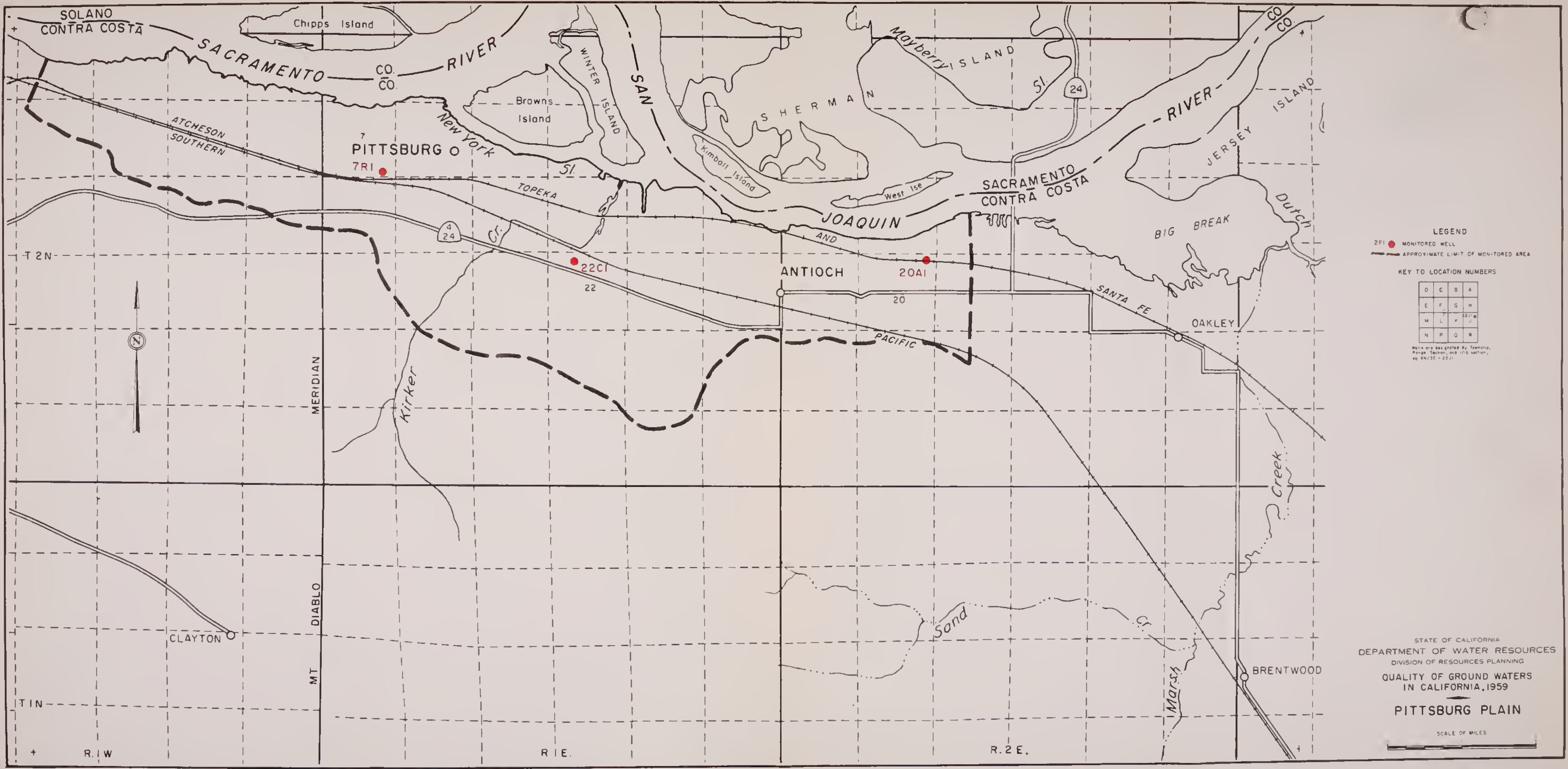
Significant Water Quality Changes. Well 2N/1E-7R1, the most westerly well sampled in this area, showed an increase in total dissolved solids from 1,560 to 1,720 ppm between August 1958 and July 1959. Well 2N/2E-20A1, the most easterly well in the area, showed a small decrease in total dissolved solids from 986 to 907 ppm. Small decreases in chloride, sodium and sulfate ion concentrations also occurred in this well.



WATER QUALITY RANGES

PITTSBURG PLAIN


CO.
CO.
ER
ISLAND
JERSEY
BREAK
Dutch
OAKLEY
Creek
BRENTWOOD
LEGEND
2F1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E – 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
PITTSBURG PLAIN
SCALE OF MILES
0
1
2


SOLANO
CONTRA COSTA
SACRAMENTO
CO.
CO.
RIVER
Chipps Island
Browns Island
WINTER ISLAND
SAN
JOAQUIN
SHERMAN
Mayberry ISLAND
Kimball Island
West Isl
SACRAMENTO
CONTRA COSTA
RIVER
JERSEY ISLAND
BIG BREAK
Dutch
Creek
New York
Sl.
ATCHESON
SOUTHERN
TOPEKA
AND
SANTA FE
PACIFIC
PITTSBURG
7R1
22C1
22
20A1
20
ANTIOCH
OAKLEY
BRENTWOOD
CLAYTON
Kirker
Cr.
Sand
Cr.
Marsh
24
T 2 N
T 1 N
MT DIABLO MERIDIAN
R.1 W
R 1 E.
R.2 E.
LEGEND
2F1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
PITTSBURG PLAIN
SCALE OF MILES

CLAYTON VALLEY (2-5)

Clayton Valley is located in north central Contra Costa County and extends from the foot of Mt. Diablo to Suisun Bay. It has a northwest-southeast trending axial length of about 10 miles, a maximum width of about 3 miles, and includes an area of approximately 20 square miles.

Monitoring Program. To observe the ground water quality and to detect significant changes, a monitoring program was established in Clayton Valley in 1957. Eight wells were sampled either in July or November of 1959.

Ground Water Occurrence. The primary aquifer in this area is the Recent alluvium, composed of clay, gravel and sand. A secondary aquifer consists mainly of the Pleistocene Pittsburg formation composed of continental clay, gravel and sand. The terrace deposits along the south shore of Suisun Bay are considered a part of the secondary aquifer.

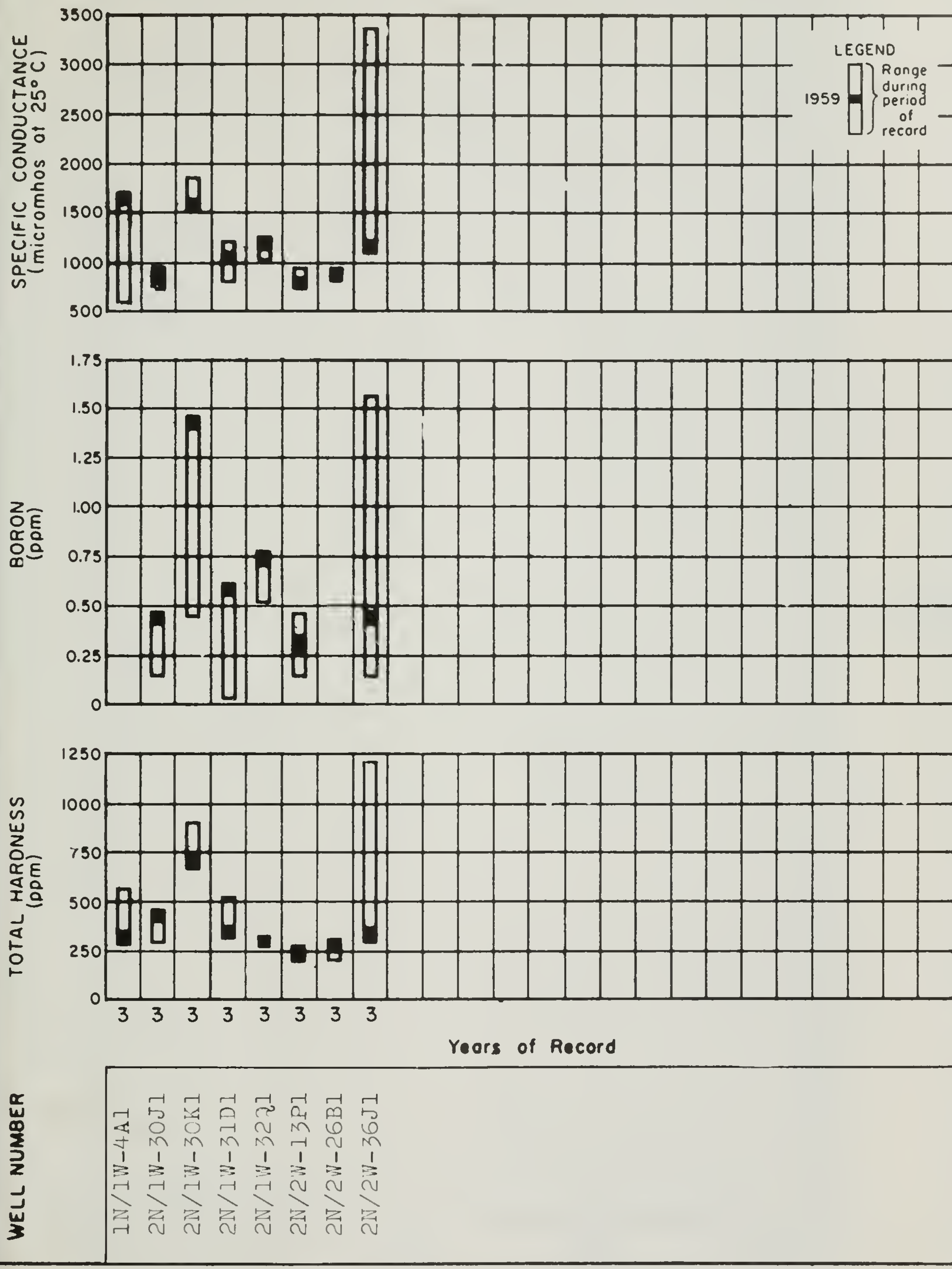
Ground Water Development. There is only limited development of ground water in Clayton Valley. This area is served with surface water by Contra Costa Canal and California Water Service Company. Consequently, the pumpage of ground water has decreased. Well yields range from about 100 to 150 gpm.

Beneficial Uses of Ground Water. The present ground water pumping is limited to industrial use, a small amount of irrigation use and a municipal supply pumped by California Water Service to augment the Sacramento River water.

Major Waste Discharges. An oil refinery located in the northern end of Clayton Valley which discharges its wastes into Suisun Bay is the only significant source of wastes in the area. These wastes are not considered to be a present threat to ground water quality.

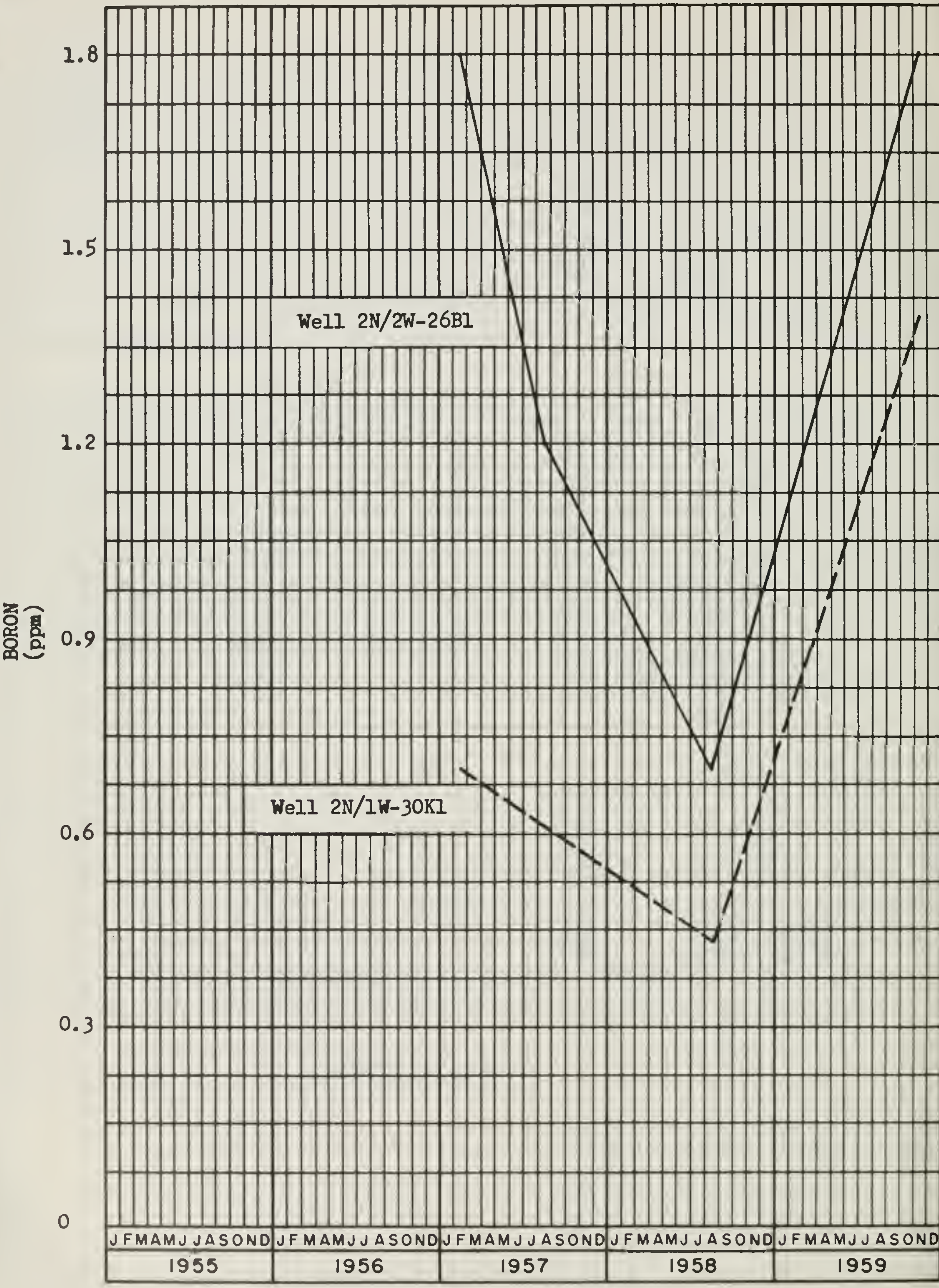
Evaluation of Water Quality. With the exception of high boron content in some of the wells, the ground waters in Clayton Valley are generally of good to excellent mineral quality and are suitable for irrigation purposes. The waters are primarily bicarbonate type with sodium or magnesium the predominant cations. Excessive hardness makes the water undesirable for domestic and some industrial uses, unless softened. Results of radiological assays during 1959 showed the maximum gross radioactivity was 7.35 $\mu\mu c/l$.

Significant Water Quality Changes. Analyses of eight samples collected in 1959 showed only a few changes in mineral quality compared with previous analyse The boron concentration in well 2N/1W-30K1 decreased from 0.7 to 0.43 ppm and increased to 1.4 ppm between 1957 and 1959. Well 2N/2W-26B1 showed a more pronounced fluctuation in boron, from 1.8 ppm down to 0.7 ppm and up to 1.8 ppm during the same period (see quality fluctuation graph).



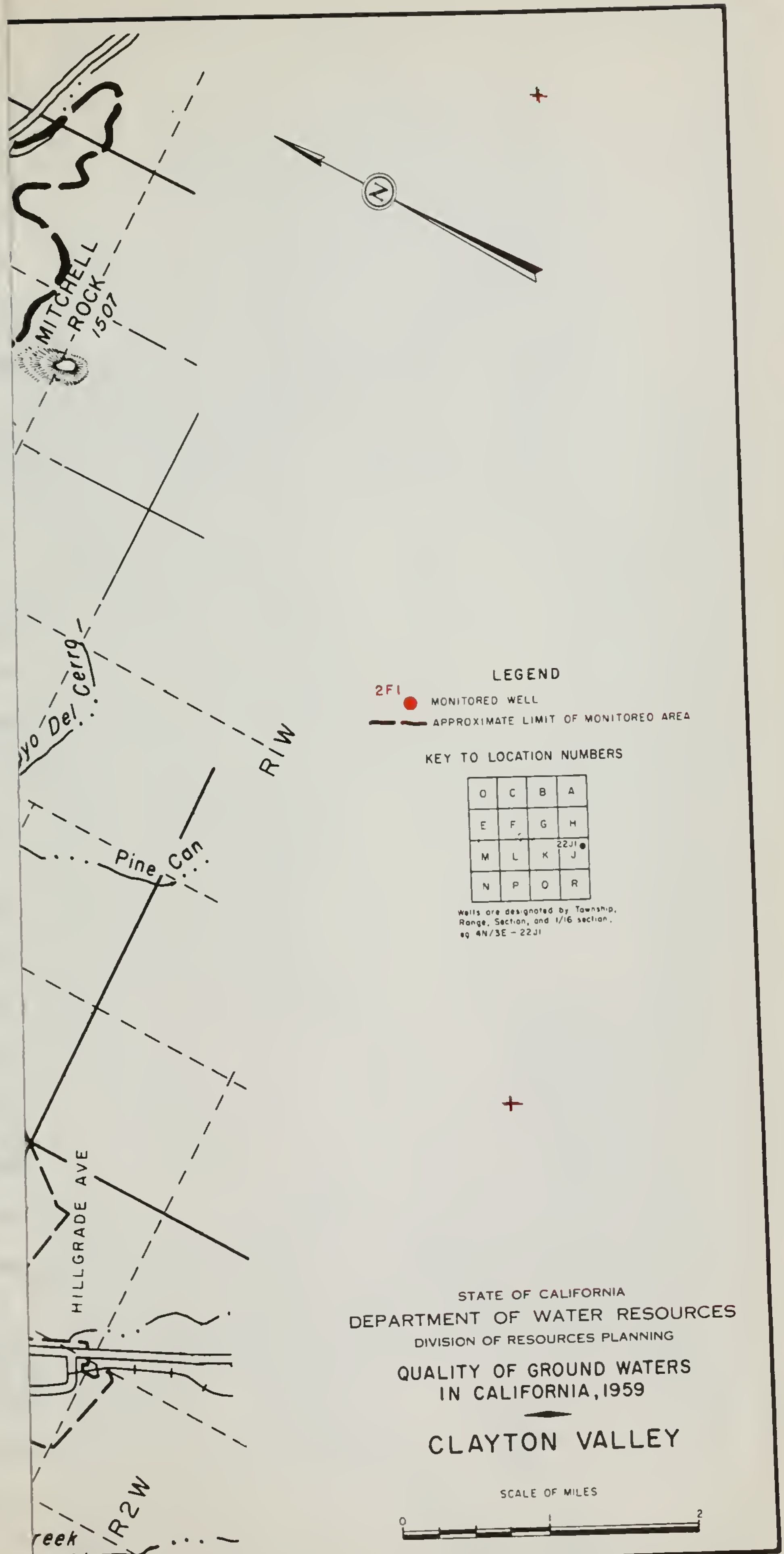
WATER QUALITY RANGES

CLAYTON VALLEY

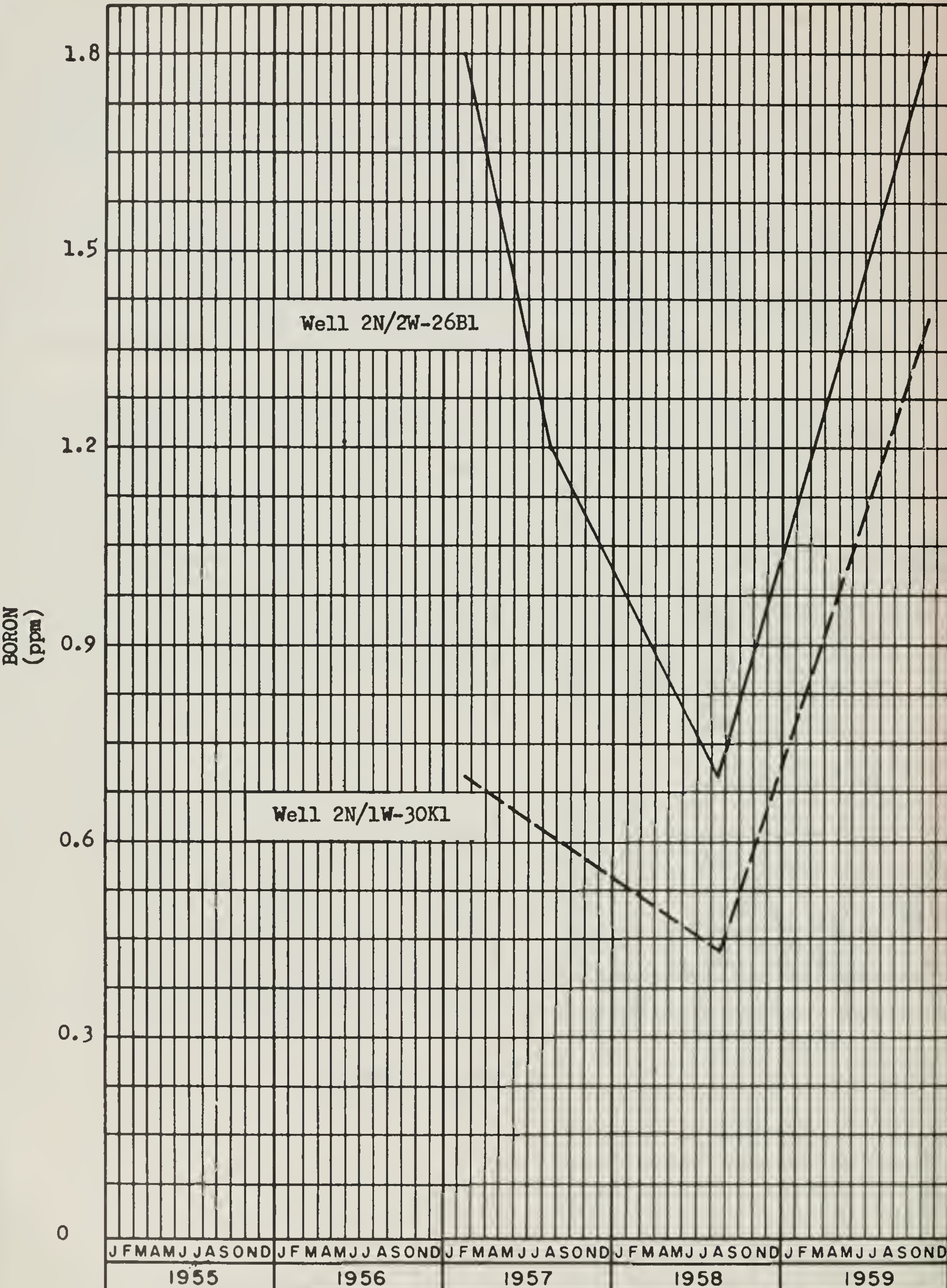


FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

CLAYTON VALLEY



MITCHELL ROCK
1507
yo Del Cerro
R1W
Pine Can
HILLGRADE AVE
reek
R2W
LEGEND
2F1
MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section. eg 4N/3E - 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
CLAYTON VALLEY
SCALE OF MILES
0
1
2



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

CLAYTON VALLEY

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
CLAYTON VALLEY
SCALE OF MILES
0
1
2
LEGEND
2F1
MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
SUISUN BAY
Seal Islands
Edith Pt
Mallard Reservoir
MARTINEZ
CONCORD
Pacheco
Clyde
Avon
Vine Hill
Muir
Franklin Creek
Pacheco Creek
Walnut Cr
Pine Creek
Galindo Creek
Grayson Creek
Contra Costa Canal
Clayton Creek
Diablo Creek
Arroyo Del Cerro
MT ZION 1635
BLACK POINT 1791
MITCHELL ROCK 1507
NAVAL MAGAZINE
PORT CHICAGO NAVAL MAGAZINE
CLAYTON RD
COWELL RD
WILLOW PASS RD
BANCROFT RD
WALNUT AVE
GREGORY LN
PLEASANT HILL RD
SAN MIGUEL DR
TICE VALLEY BLVD
Tice Creek
HILLGRADE AVE
T2N
R1W
R2W
4A1
32Q1
30J1
30K1
31D1
13P1
6B1

BORON

YGNACIO VALLEY (2-6)

Ygnacio Valley is located in northern Contra Costa County and is contiguous with Clayton Valley. The two ground water basins are separated by the Concord fault which acts as a hydrologic barrier between the basins. The monitored area is about 10 miles long, varies in width from 1 to 6 miles and encompasses an area of approximately 20 square miles.

Monitoring Program. The monitoring program in Ygnacio Valley was established in 1957 to maintain a check on the ground water quality and to detect significant changes. Nine wells were sampled during July - November 1959.

Ground Water Occurrence. Chief sources of ground water are the Recent alluvium and the Pittsburg formation underlying Clayton Valley. Several pressure zones probably existed, but deepening of wells and increased pumping draft apparently resulted in pressure relief, causing the ground water reservoir to function as an unconfined aquifer.

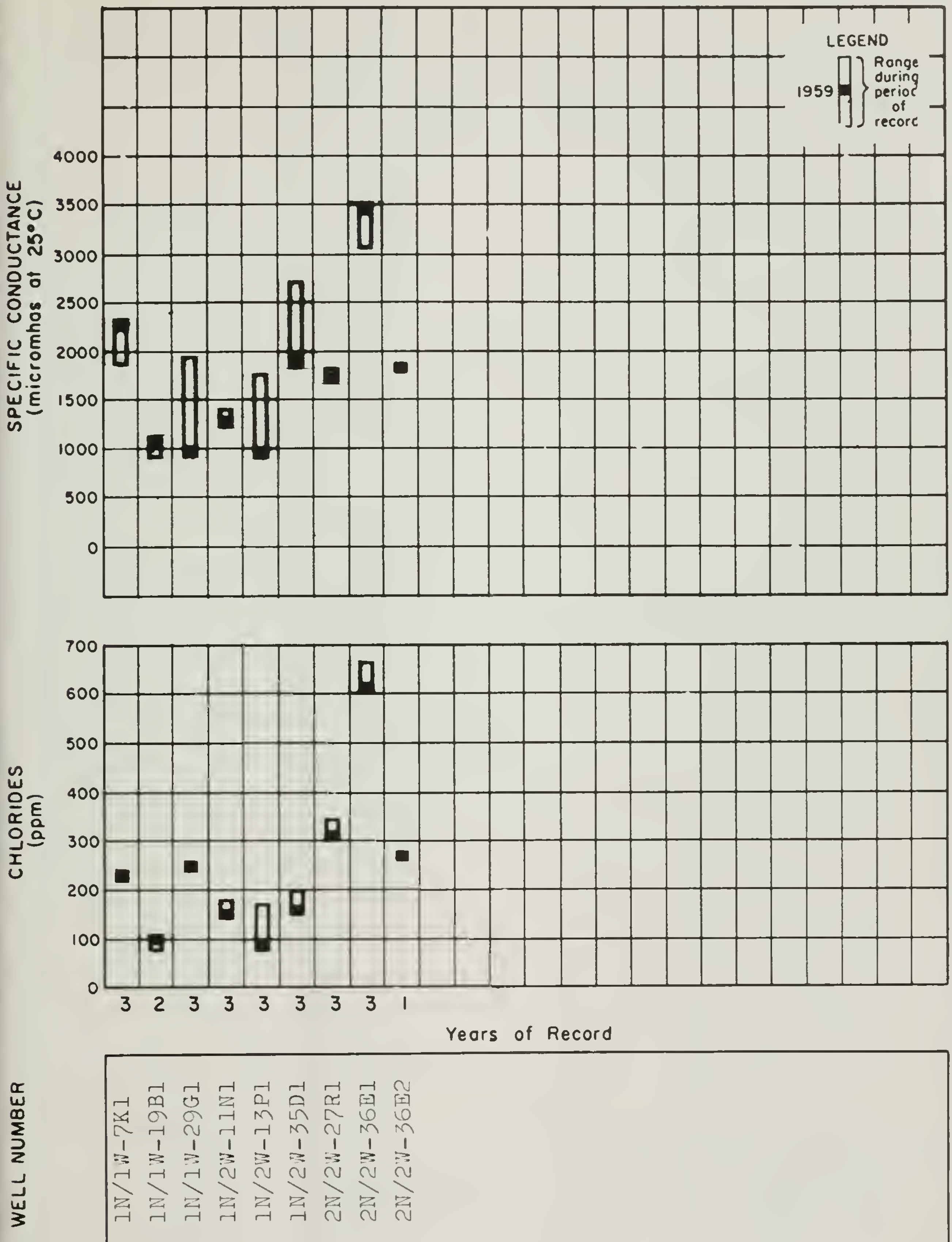
Ground Water Development. There is only moderate development of ground water in Ygnacio Valley. This area is also served with surface water by Contra Costa Canal and California Water Service Company. The many industries located in the Pittsburg area in the 1930's pumped ground water extensively, creating an overdraft which permitted saline water from the bay to intrude into the nearby ground water reservoirs. Pumping has since decreased and the majority of water now used is surface water. The larger wells yield up to 500 gpm, with the average withdrawal capacity being about 200 gpm.

Beneficial Uses of Ground Water. The present ground water pumping is limited to some industrial uses, small irrigation requirements and domestic supplies. The California Water Service Company pumps from 19 wells in 4 well fields to augment the surface water supplies for municipal use.

Major Waste Discharges. Two major waste discharges are located in Ygnacio Valley. The Central Contra Costa Sanitary District discharges 4.9 mgd of domestic and seasonal cannery wastes to Grayson Creek after primary clarification and oxidation pond treatment. The City of Concord discharges approximately 2.3 mgd to Walnut Creek after primary clarification and oxidation pond treatment. Because it is possible for water in these creeks to percolate to ground water, these wastes are considered a potential source of degradation.

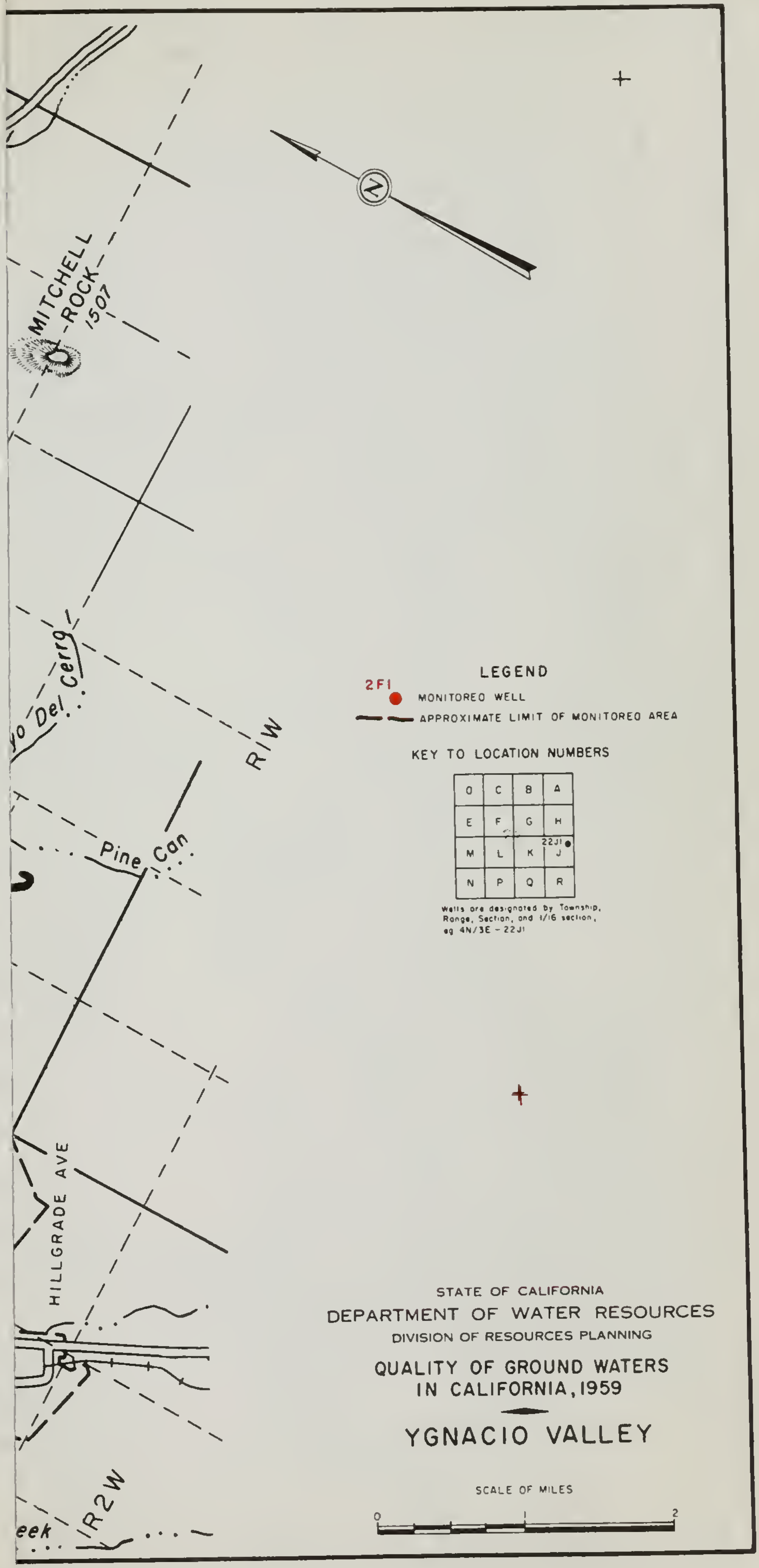
Evaluation of Water Quality. In the vicinity of Pacheco, sodium chloride water is found which may be due to sea-water intrusion. Boron in excess of 0.5 ppm is present throughout the valley. Some wells show concentrations of sulfates and nitrates which are far above the limits recommended in drinking water standards. Ground waters in this basin are also extremely hard. Results of radiological analyses during 1959 indicated the maximum gross radioactivity was 7.57 $\mu\mu c/l$.

Significant Water Quality Changes. The quality of ground waters has not changed significantly since the previous reporting period. The analyses indicate only a slight increase in total dissolved solids between 1957 and 1959, consisting mostly of increases in sulfates, chlorides and calcium.



WATER QUALITY RANGES

YGNACIO VALLEY


MITCHELL ROCK
1507
yo Del Cerro
R1W
Pine Can
HILLGRADE AVE
eek
R2W
LEGEND
2F1
MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E - 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
YGNACIO VALLEY
SCALE OF MILES
0
1
2

LEGENO
2F1
MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUNO WATERS
IN CALIFORNIA, 1959
YGNACIO VALLEY
SCALE OF MILES
0
2
SUISUN BAY
Seal Islands
Edith Pt
Pocheco Creek
Contra Costo Canal
Grayson Creek
Walnut Cr
Mokelumne Aqueduct
Mallard Reservoir
US NAVAL MAGAZINE PORT CHICAGO
Port Chicago
MARTINEZ
CONCORD
Pacheco
Clayton
Creek
Diablo
Pine Creek
Arroyo Del Cerro
MT ZION 1635
MITCHELL ROCK 1507
BLACK POINT 1791
Ygnacio
T2N
T1N
R1W
R2W
CLAYTON RD
CONCORD BLVD
COWELL RD
BAILEY RD
TREAT BLVD
OAK GROVE RD
WALNUT AVE
BANCROFT RD
NORTH GATE RD
SAN MIGUEL RD
RUDGEAR RD
HILLGRADE AVE
TICE VALLEY BLVD
PLEASANT HILL RD
GREGORY LN
RELIEZ VALLEY RD
ALHAMBRA AVE
SOLANO WAY
Tice Creek
Franklin Creek
7K1
36E1
29G1
19B1
27R1
13P1
11N1
35Q1

The East Bay area of Santa Clara Valley is located in Alameda County between the base of the western slope of the Diablo Range and San Francisco Bay. It extends from the City of Albany on the north to the Alameda-Santa Clara county line on the south, and comprises an area of about 140 square miles.

Monitoring Program. A ground water quality monitoring program was established in the East Bay area in 1953, primarily to maintain surveillance on the quality of ground water in the areas subject to sea-water intrusion. Fifty-eight wells were sampled in the spring of 1959 and 31 of these were resampled in the autumn.

Ground Water Occurrence. Water-bearing formations include unconsolidated alluvial deposits of late Quaternary age and older, semi-consolidated sediments of Tertiary-Quaternary age. These consist of layers and lenses of sand and gravel separated by thick layers of silt and clay. This interlayering of the extensive, relatively impermeable clays and the permeable alluvial sands and gravels has resulted in the formation of confined aquifers beneath the greater part of the bay plain area.

The confined ground water portion of the Niles cone contains three fairly well defined aquifers above 400 feet in depth. They are thick, relatively continuous, and separated from one another by blue clay layers. The "upper aquifer", capped by a clay layer approximately 40 feet in thickness, extends to a maximum depth of approximately 175 feet; the "Centerville aquifer" occurs between 190 and 200 feet below the surface; and the "Fremont aquifer" between approximately 250 and 400 feet. All of these aquifers and their confining clay layers extend westward beneath San Francisco Bay. The "upper aquifer" is essentially open to infiltration of salt water from the bay.

Aquifers that are probably equivalent to, but discontinuous with, those in the Niles cone occur beneath the surface of the San Leandro and San Lorenzo cones. However, these aquifers are much thinner and less extensive.

Ground Water Development. The greater portion of the water requirement in the southern part of the area is met by pumping from the alluvial deposits of the Niles cone. Draft on ground water resources within this cone has increased to such an extent that ground water levels remain perennially below sea level throughout a large portion of the area. Yields of wells drawing from the various aquifers are highly variable. Limited data indicate that yields from the "upper aquifer" range from 100 to more than 1,000 gpm, while yields from the deeper aquifers range from 250 to 1,800 gpm.

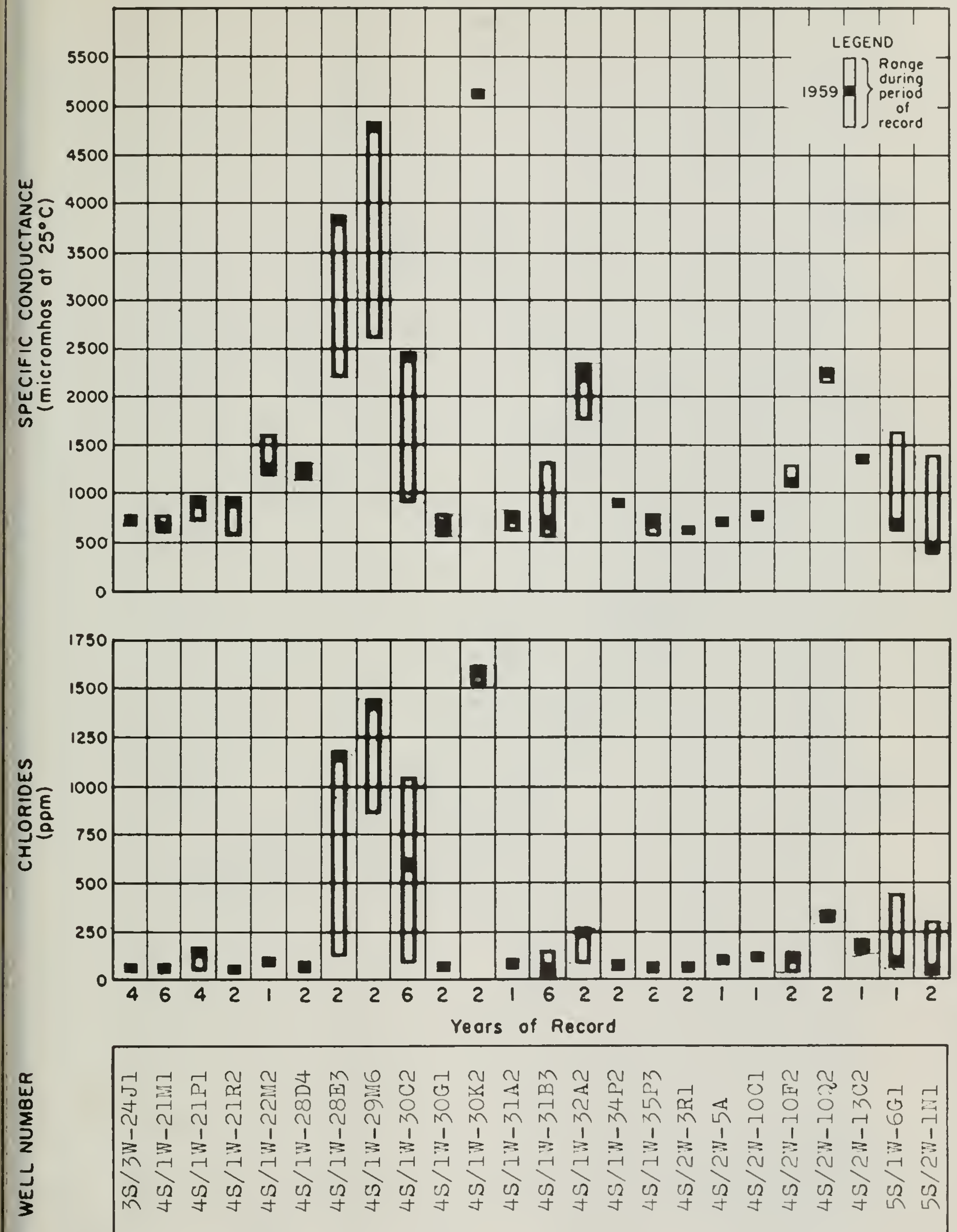
Beneficial Uses of Ground Water. In the northern portion of the East Bay area, ground water is used only in small amounts by private individuals and industries. In the central and southern portion, however, ground water is used extensively for irrigated agriculture and, to a lesser extent, for urban and industrial requirements.

Major Waste Discharges. The major waste discharges are sewage or industrial effluent from the Cities of Hayward and San Leandro, Oro Loma Sanitary District, Union Sanitary District, Holly Sugar Company and West Vaco Chemical Division. The largest of these discharges consists of 6.4 mgd of primary treated wastes from the Oro Loma Sanitary District; the smallest consists of 1.3 mgd of untreated wastes from West Vaco Chemical Division. Disposal is to tidal waters of San Francisco Bay.

Evaluation of Water Quality. Native ground waters of this area are calcium-magnesium bicarbonate in type, generally of good mineral quality, and suitable for most uses. Waters from the forebay area generally contain low to moderate amounts of total dissolved solids, chlorides and boron. High boron concentrations are present in water from wells in the vicinity of Newark and in the proximity of the Hayward and Mission faults. The Hayward fault extends along the base of the hills from north of San Leandro to Niles, and then across alluvial deposits to Irvington. The Mission fault is located east of Niles. These faults probably allow poor quality water that originates at depth to move upward and degrade ground water. Sea-water intrusion in this area was first detected by the presence of high chloride concentrations in the "upper aquifer" of the Niles cone near the bay. The "Centerville aquifer" in the vicinity of Centerville also shows high chloride concentrations.

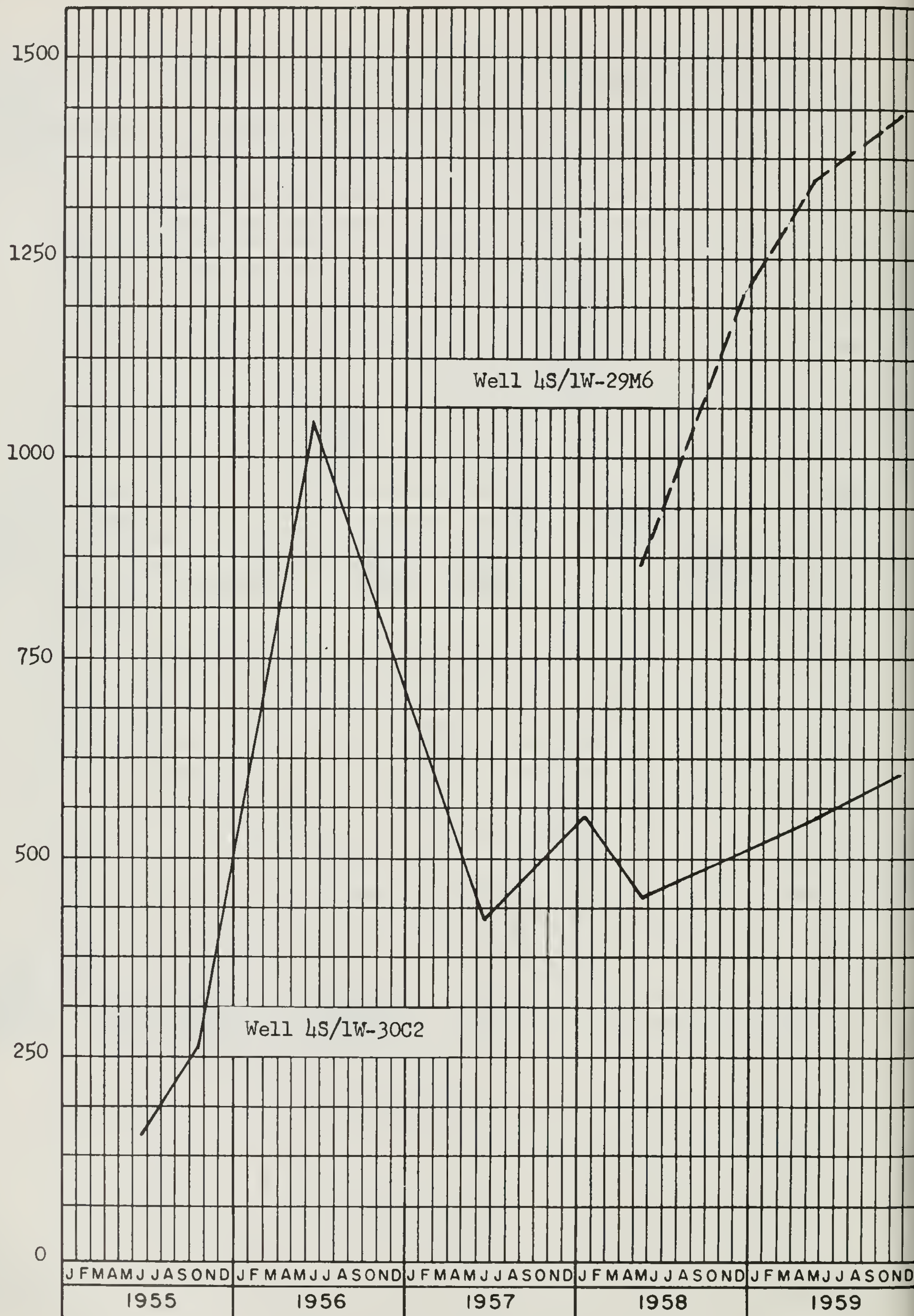
Significant Water Quality Changes. Significant quality changes in the East Bay area of Santa Clara Valley occurred only in the confined ground water area of the Niles cone. Well 4S/1W-29M6, near Centerville, has shown progressive increases in chloride concentrations in successive spring and fall samples from June 1958 to November 1959, at which time it reached 1,430 ppm (see fluctuation graph). Well 4S/1W-28E3, also located near Centerville, showed chloride concentrations of 157, 546, and 1,180 ppm between May 1958 and November 1959. These wells pump from the "upper aquifer" and illustrate the degree of degradation. Salt-water degradation of the "upper aquifer" in 1959 extended one mile east of Centerville, which is one mile farther inland than it was in 1958. The lines of 350 ppm chloride (isochlors) for these periods are shown on the map of the monitored area.

Degradation in the "Fremont aquifer" is shown by high chlorides in well 4S/1W-30C2, located about one-half mile west of Centerville (see fluctuation graph). Because the "Fremont aquifer" is confined, the source of such localized degradation is believed to be a result of leakage of poor quality water from the "upper aquifer" through improperly constructed or abandoned wells or through localized discontinuities or variations in permeability of the confining clay layer.



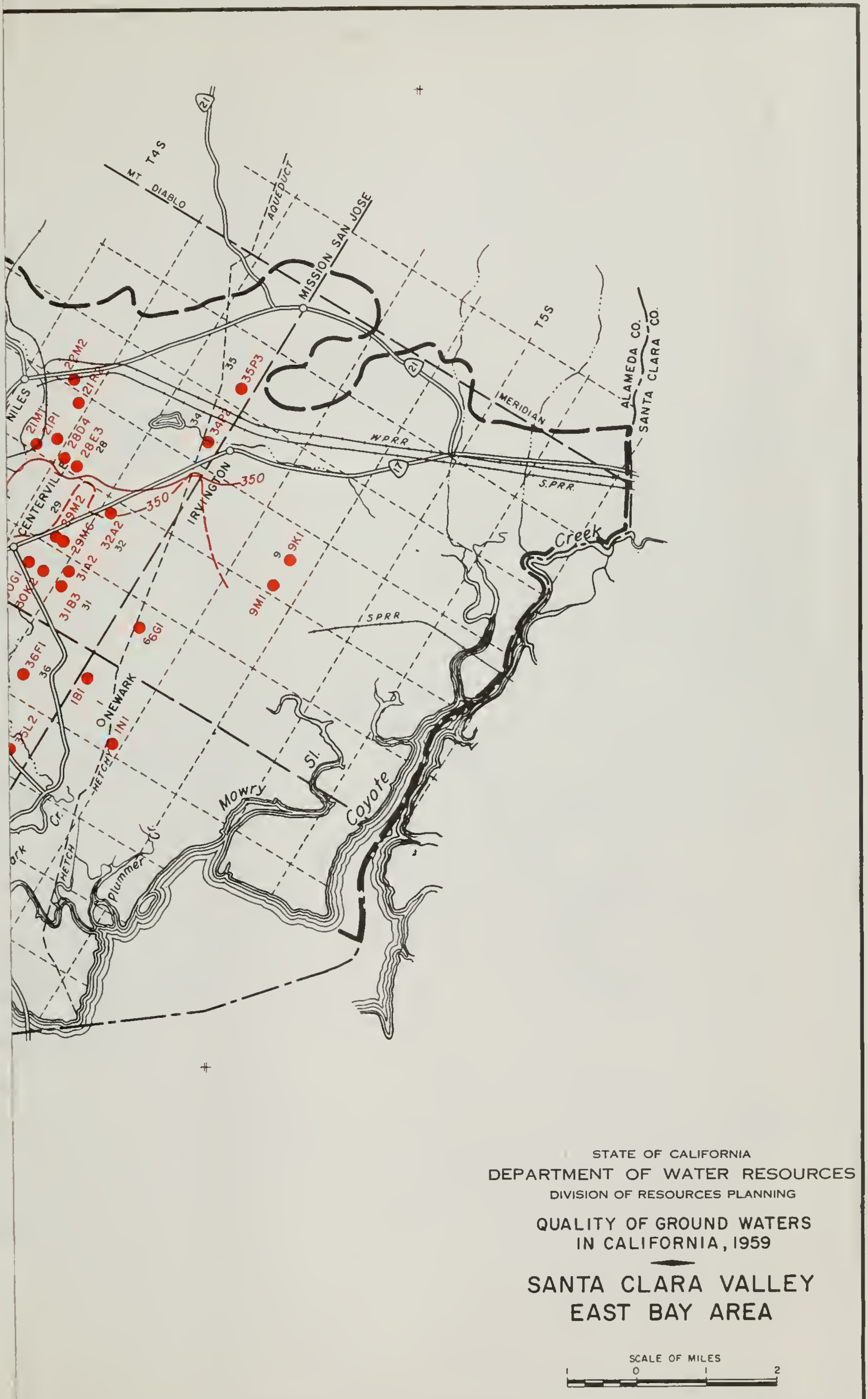
WATER QUALITY RANGES

SANTA CLARA VALLEY, EAST BAY AREA



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

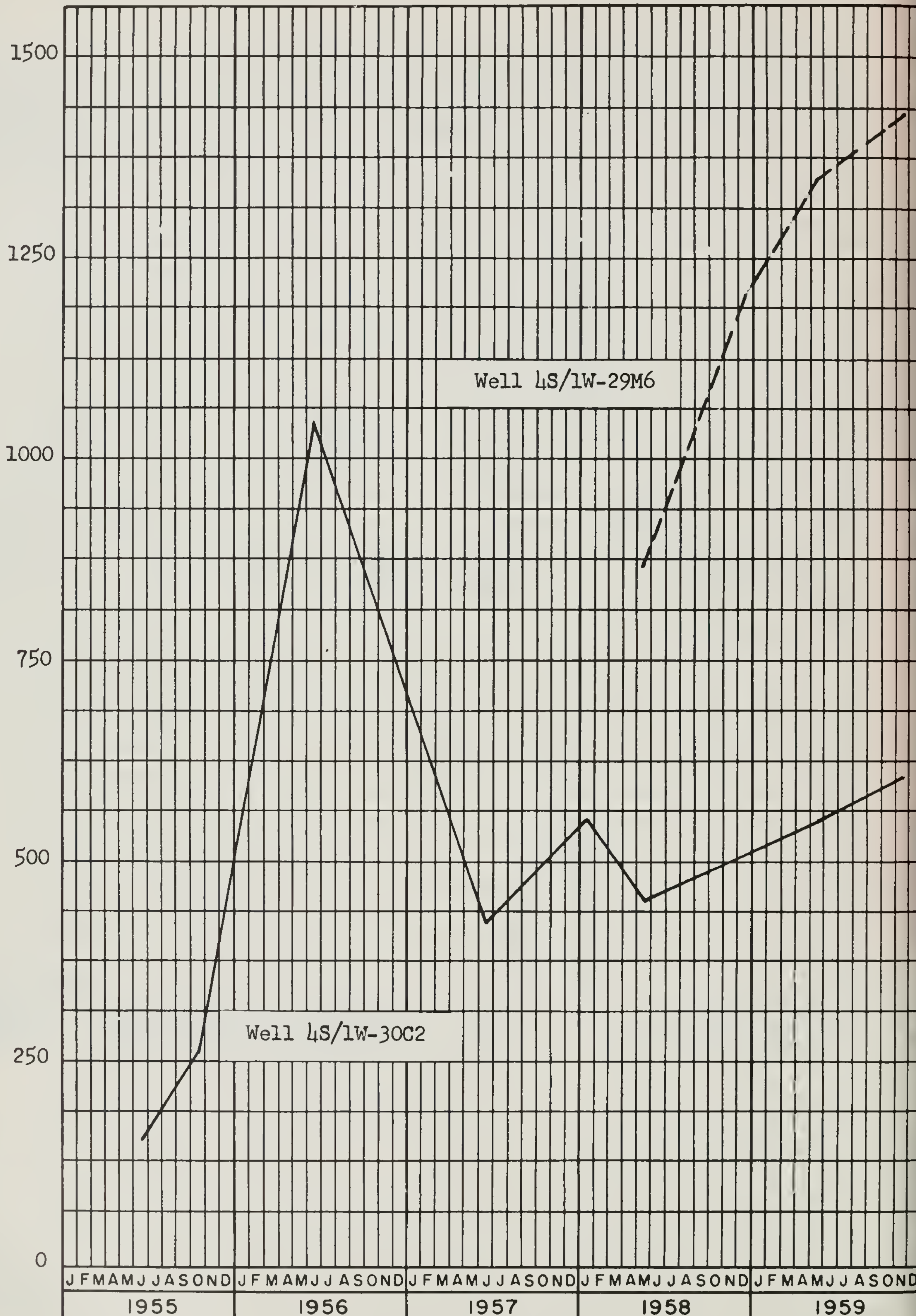
SANTA CLARA VALLEY, EAST BAY AREA



STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

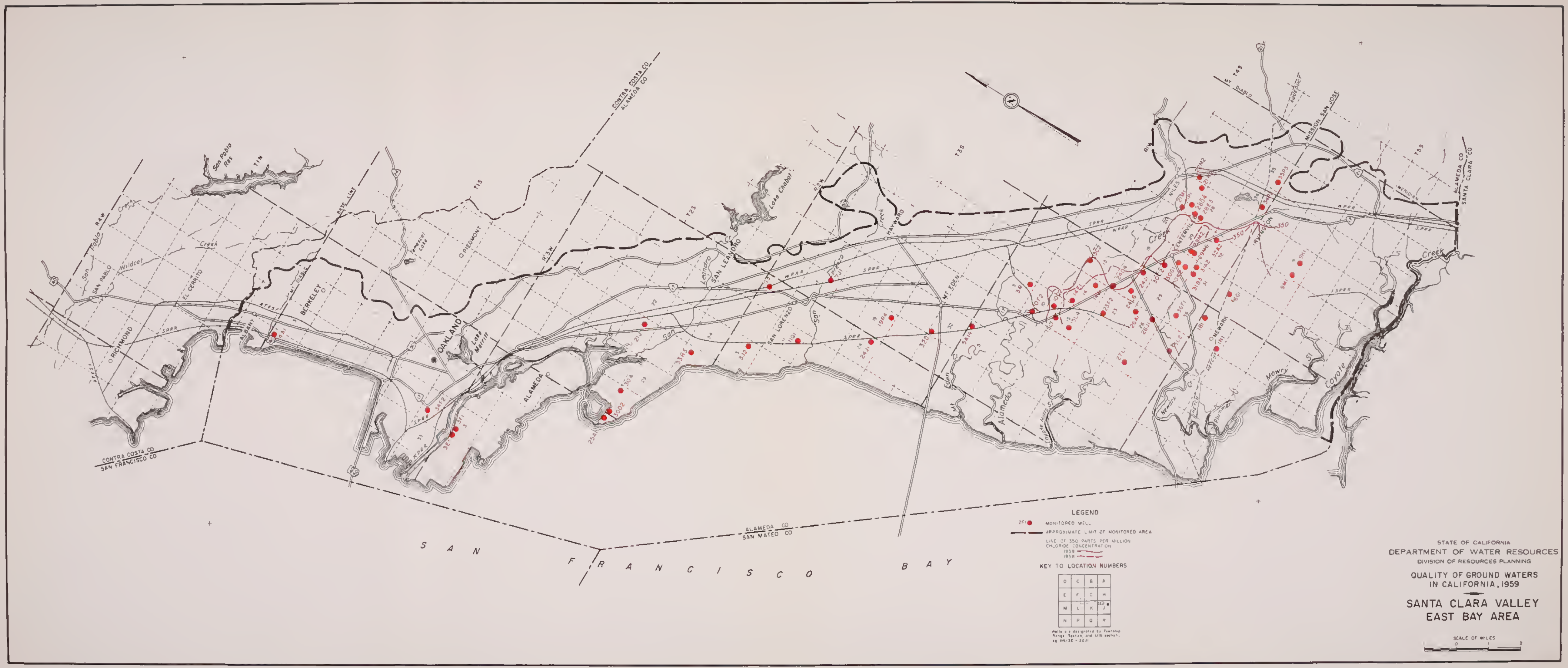
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959

SANTA CLARA VALLEY
EAST BAY AREA



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

SANTA CLARA VALLEY, EAST BAY AREA



STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959

SANTA CLARA VALLEY EAST BAY AREA

SANTA CLARA VALLEY, SOUTH BAY AREA (2-9)

The South Bay Area of Santa Clara Valley consists of that portion of north Santa Clara Valley lying within Santa Clara County and extending from San Francisco Bay southerly to San Jose. The area is bounded on the east by the Diablo Range and on the west by the Santa Cruz Mountains. The monitored area extends about 15 miles east to west, about 16 miles north to south, and comprises about 150 square miles.

Monitoring Program. To detect sea-water intrusion in the South Bay Area of Santa Clara Valley and to observe significant changes, a monitoring program was established in 1953. During July 1959, 24 wells were sampled in this area.

Ground Water Occurrence. The main sources of ground water in Santa Clara Valley are alluvial fan and tideland deposits. The water bearing sediments occupy the valley proper and some adjacent areas. The principal aquifers in the monitored area exhibit pressure characteristics and are separated from the free ground water zone by relatively impervious strata which prevent hydraulic continuity with overlying water bearing deposits. Ground water occurs in both confined and unconfined conditions.

Ground Water Development. Ground water supplies about 95 percent of the water requirements of this area and is extensively developed. Artificial recharge is practiced by the Santa Clara Valley Water Conservation District. Stored surface water is released to permeable stream channels and to percolation ponds on the valley floor to infiltrate and replenish the ground water body. Well yields range from a few gallons per minute to over 1,700 gpm. Most wells produce over 500 gpm.

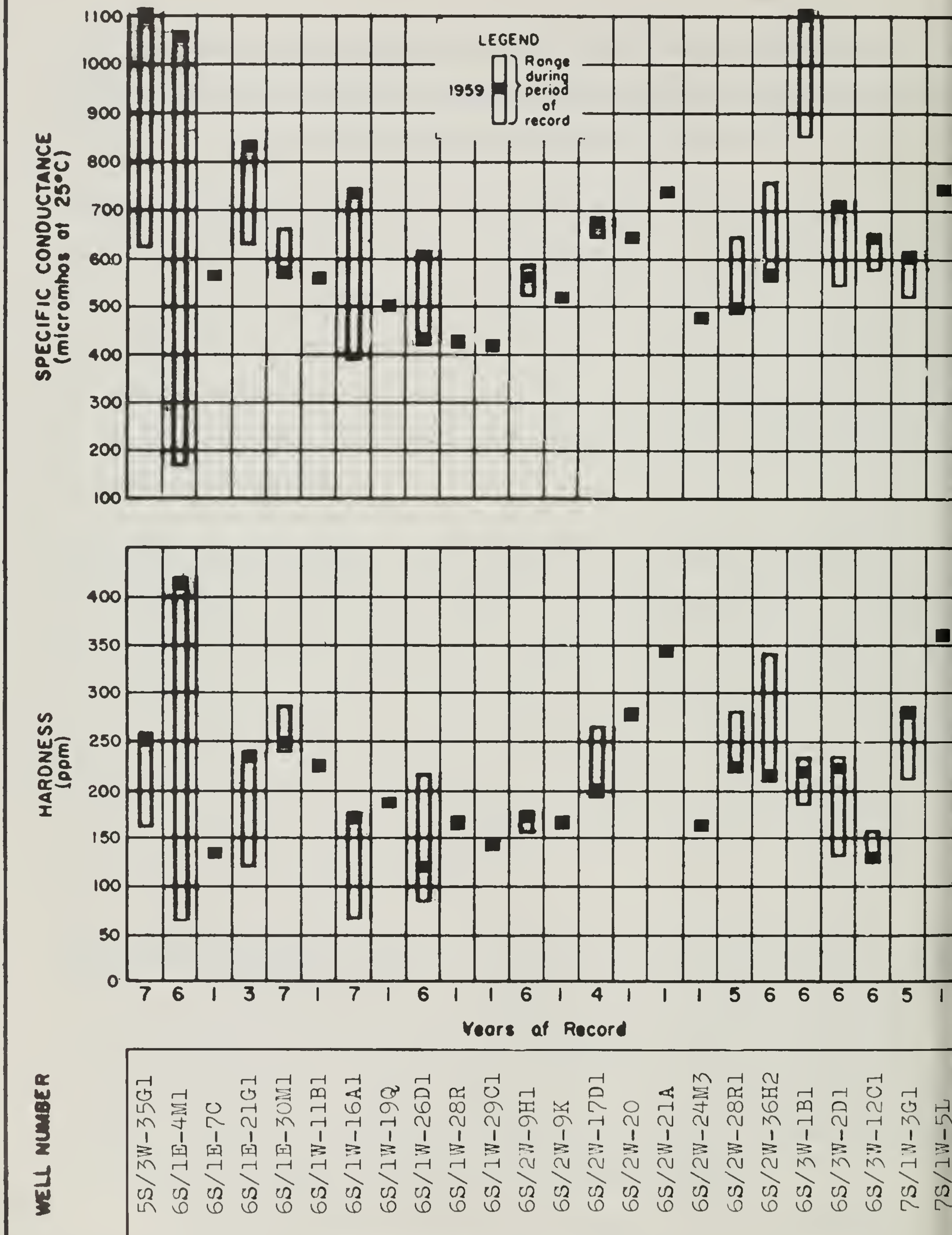
Beneficial Uses of Ground Water. The ground water is used principally for irrigation, public supply and industry. Approximately 75 percent of water developed is for irrigated agriculture.

Major Waste Discharges. There are five major waste discharges in this area consisting of municipal sewage from the Cities of San Jose, Sunnyvale, Mountain View, Palo Alto and the Milpitas Sanitary District. The City of San Jose is the largest discharger, averaging over 20 mgd. Milpitas Sanitary District is the smallest discharger, averaging about 0.8 mgd. The wastes are discharged to water courses adjacent to San Francisco Bay and pose no immediate threat to ground water quality.

Evaluation of Water Quality. Ground waters in this area are generally of bicarbonate type with sodium and calcium the predominant cations. Although moderately to very hard, the waters are otherwise of good to excellent quality and suitable for most uses. In local areas, in the eastern portion of this basin, the ground water is of questionable quality for irrigation due to high concentrations of boron, particularly in the Penitencia Creek cone area. Prolonged overdraft of the ground water basin poses a threat of sea-water intrusion to the area adjacent to the bay.

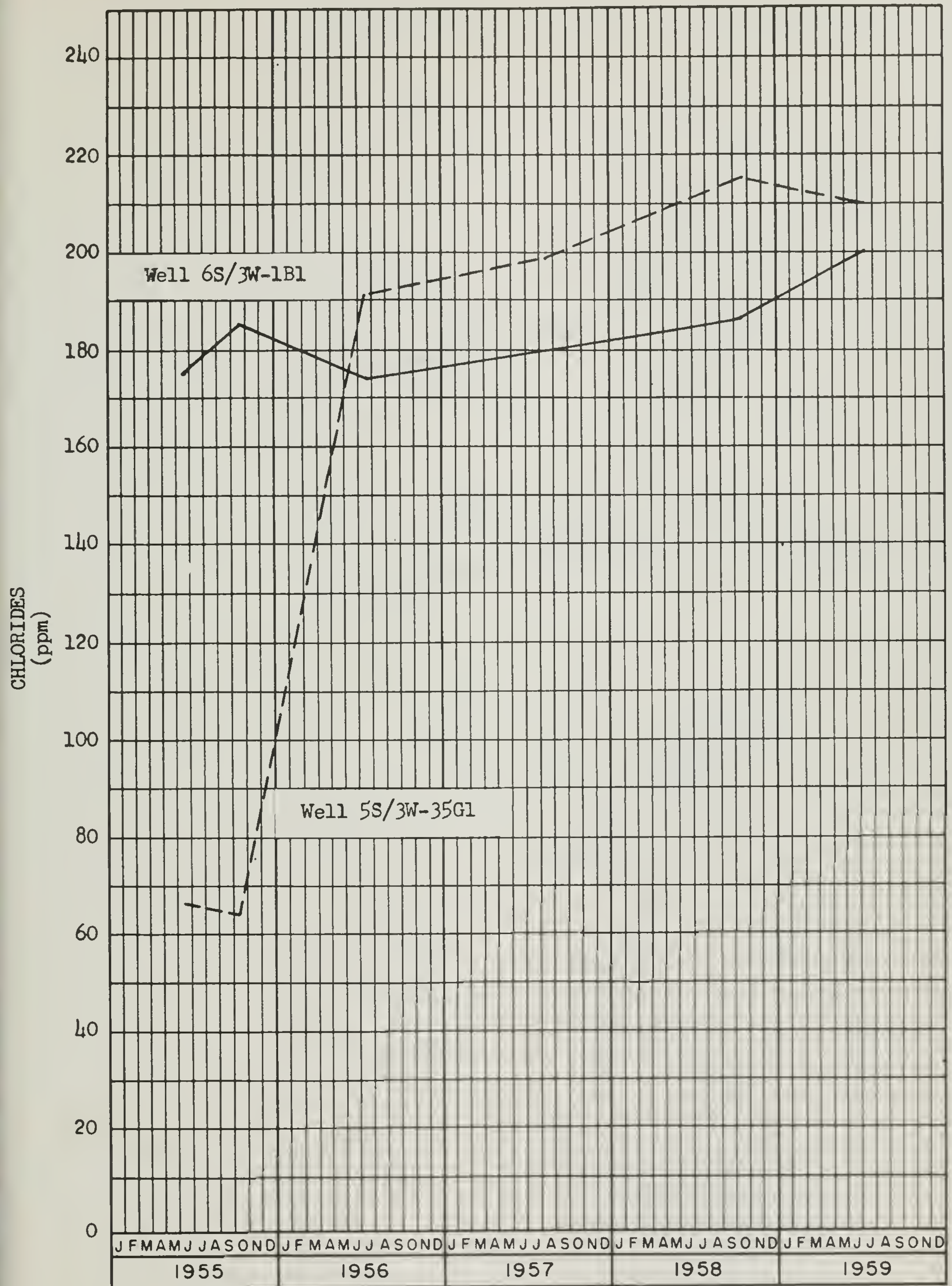
Significant Water Quality Changes. Wells 5S/3W-35G1 and 6S/3W-1B1, both located in the Palo Alto area, contained the highest chloride concentrations found in this area during 1959. The chloride concentrations in these wells were 210 and 200 ppm respectively. These values are 100 to 150 ppm greater than those reported in 1953 when the monitoring program was initiated. Chloride fluctuations in these two wells are shown on the fluctuation graphs.

Sea-water intrusion near Palo Alto appears to be of a less serious nature than that which occurred in the vicinity of Centerville in 1959. The chloride concentration has remained fairly constant in recent years. Intrusion into the upper aquifer has progressed inland at a rate varying with the ground water draft and recharge from surface streams.



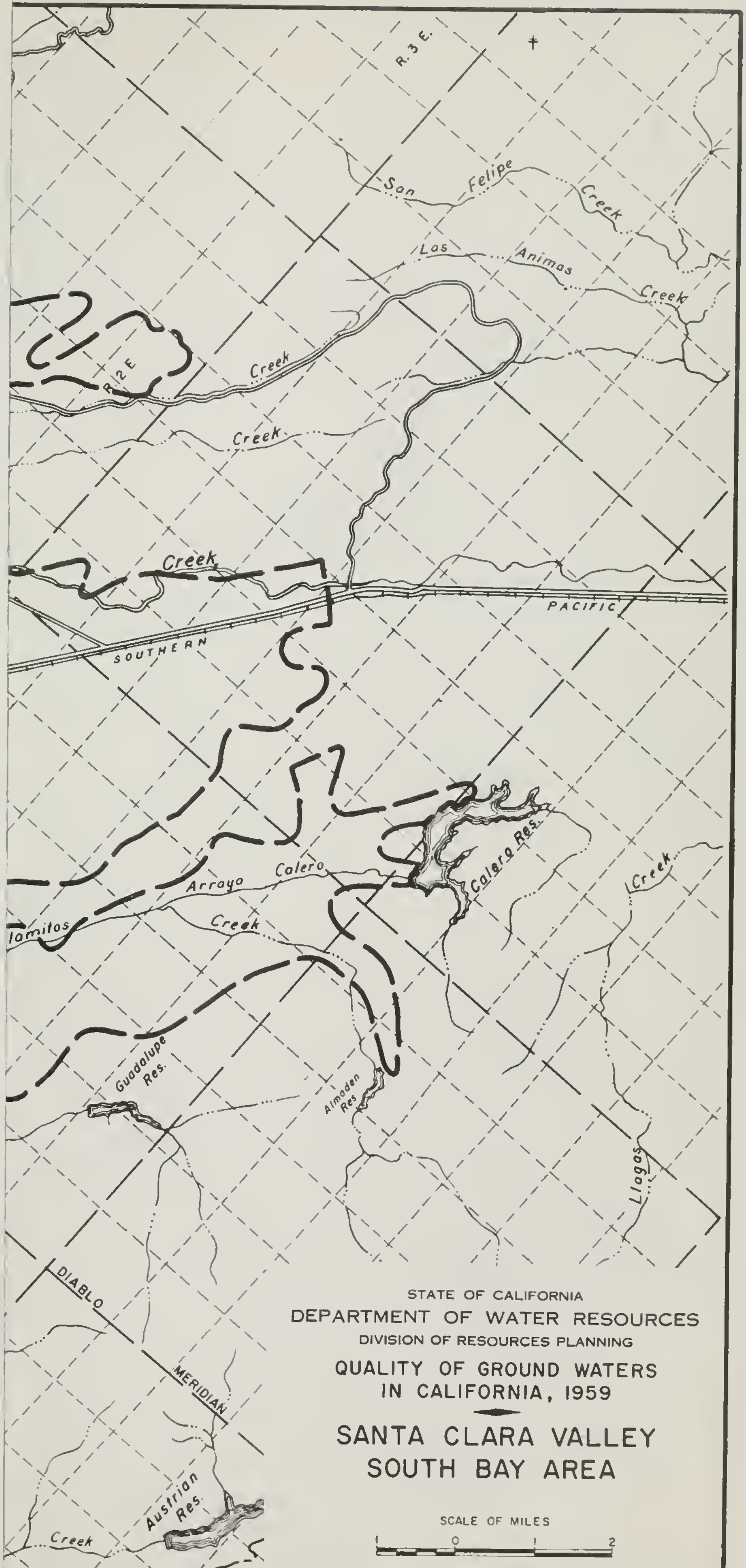
WATER QUALITY RANGES

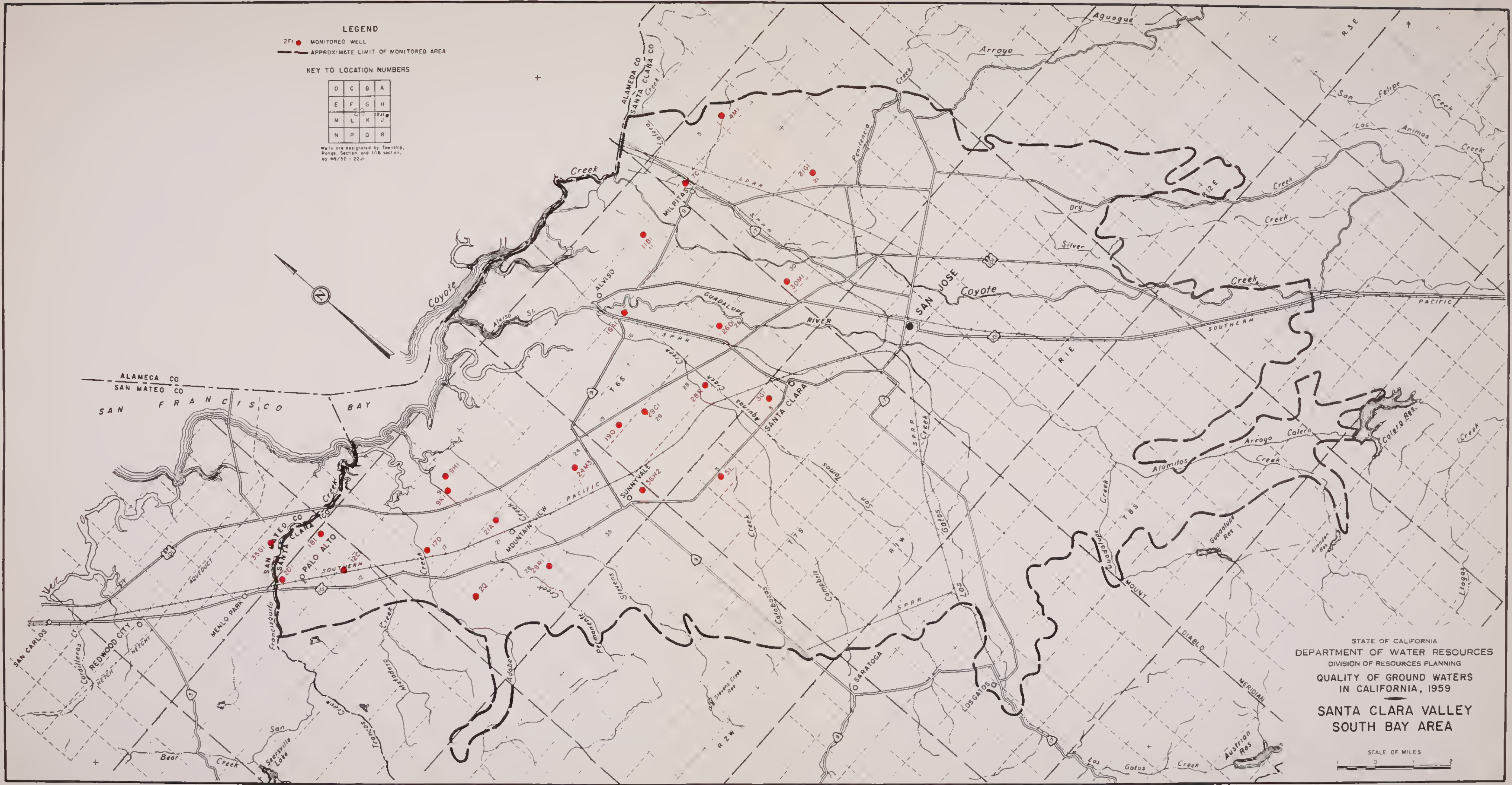
SANTA CLARA VALLEY, SOUTH BAY AREA



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

SANTA CLARA VALLEY, SOUTH BAY AREA


R.3 E.
San Felipe Creek
Las Animas Creek
Creek
R.2 E.
Creek
Creek
PACIFIC
SOUTHERN
Calero Res.
Arroyo Calero
Creek
lamitos
Creek
Guadalupe Res.
Almaden Res.
Llagas
DIABLO MERIDIAN
Austrian Res.
Creek
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
SANTA CLARA VALLEY
SOUTH BAY AREA
SCALE OF MILES
1 0 1 2



STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959

SANTA CLARA VALLEY
SOUTH BAY AREA

SCALE OF MILES
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LIVERMORE VALLEY (2-10)

Livermore Valley is located in the eastern portion of Alameda County, with a minor portion of the area extending into Contra Costa County. The valley has an east-west length of about 14 miles, varies from 3 to 6 miles in width, and includes an area of about 50 square miles.

Monitoring Program. Due to the dependence of the area on ground water supplies and the presence in the ground water of excessive quantities of boron and nitrates, a monitoring program was established in Livermore Valley in 1953. Nineteen wells were sampled in 1959 during the period June - July, at the height of the irrigation season.

Ground Water Occurrence. Sources of ground water include stream, flood-plain, and shallow lake deposits of Recent age, as well as the Livermore formation which is composed of older, semi-consolidated alluvial deposits. Recent alluvial deposits comprise the chief aquifer and contain unconfined ground water, except in the vicinity of Pleasanton where lake bed clays confine permeable beds. The Livermore formation exhibits both confined and unconfined ground water characteristics.

Ground Water Development. Ground water is moderately to extensively developed in Livermore Valley and supplies almost all of the water requirements. Well yields are low near the perimeter of the valley, increase toward the center, and range from less than 10 to about 2,000 gpm.

Beneficial Uses of Ground Water. Ground water is used primarily for irrigation and domestic purposes.

Major Waste Discharges. The largest waste discharge in this area consists of effluent from the City of Livermore sewage treatment plant. This effluent is mainly disposed of by percolation and evaporation from ponds, although some overflow reaches Los Positos Creek during periods of heavy rainfall. Smaller waste discharges emanate from the City of Pleasanton, and from various military and industrial installations. These wastes are disposed of by ponding and by discharge into streams, which in some cases percolate to ground water.

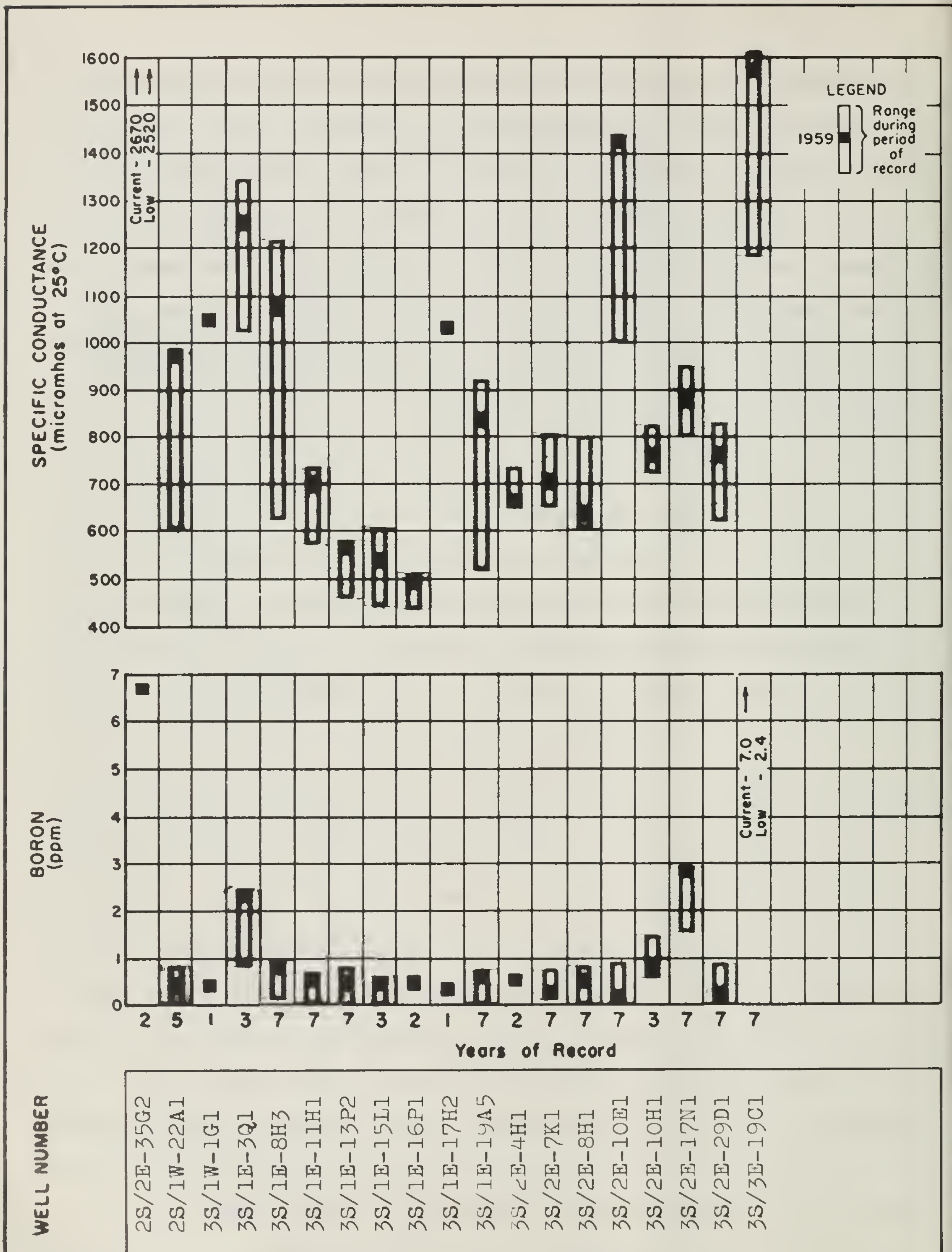
Evaluation of Water Quality. Although ground waters of Livermore Valley are generally of good mineral quality and are suitable for irrigation purposes, they are excessively hard for domestic use. Waters high in boron are found in the northern and eastern portion of the valley and waters high in nitrates occur in localized areas. These problems appear to be related to waters derived from underlying and adjacent marine formations, the presence of geologic faults allowing the upward migration of poor quality water, and the limited amounts of recharge afforded by a small catchment area with meager rainfall. The high nitrate content may result from infiltrating waters which have been deteriorated by waste discharges or fertilizers.

Significant Water Quality Changes. Analyses of samples collected in Livermore Valley during 1959 show few significant changes in concentrations of mineral constituents. The most notable increase in chloride concentration occurred in well 3S/1E-8H3, located approximately 2 miles north of the City of Pleasanton, in which chlorides increased from 38 ppm in June 1957, to 137 ppm in June 1959, as shown on the fluctuation graph. Chloride concentrations in this well have shown similar fluctuations during the period of record, but the reason for this is not known. Total dissolved solids in this well increased from 375 to 654 ppm during the same period.

The highest nitrate concentration found in Livermore Valley during 1959 occurred in well 3S/2E-10E1, located about one-half mile east of the

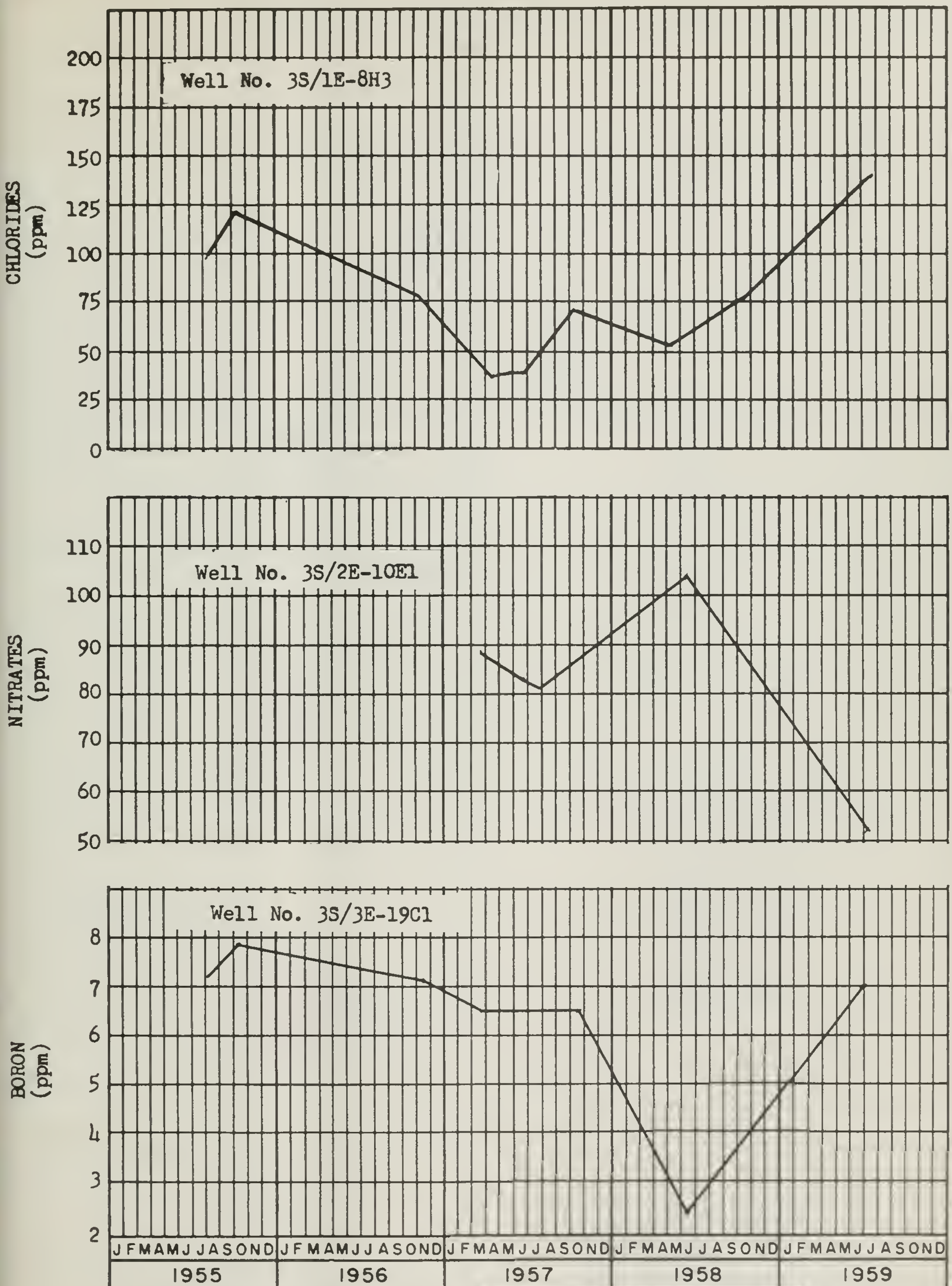
City of Livermore, where nitrates in a sample taken during July 1959 were 52 ppm. However, as shown on the fluctuation graph, this was a marked decrease from the nitrate concentration of 104 ppm found in this well during June 1958.

The boron concentration in well 3S/3E-19C1 increased from 2.4 to 7.0 ppm between June 1958 and July 1959 (see fluctuation graph). The reason for the wide fluctuation in boron concentration in this well has not been ascertained. Areas where boron concentrations in ground water generally exceed 0.5 ppm are shown on the Livermore Valley map.



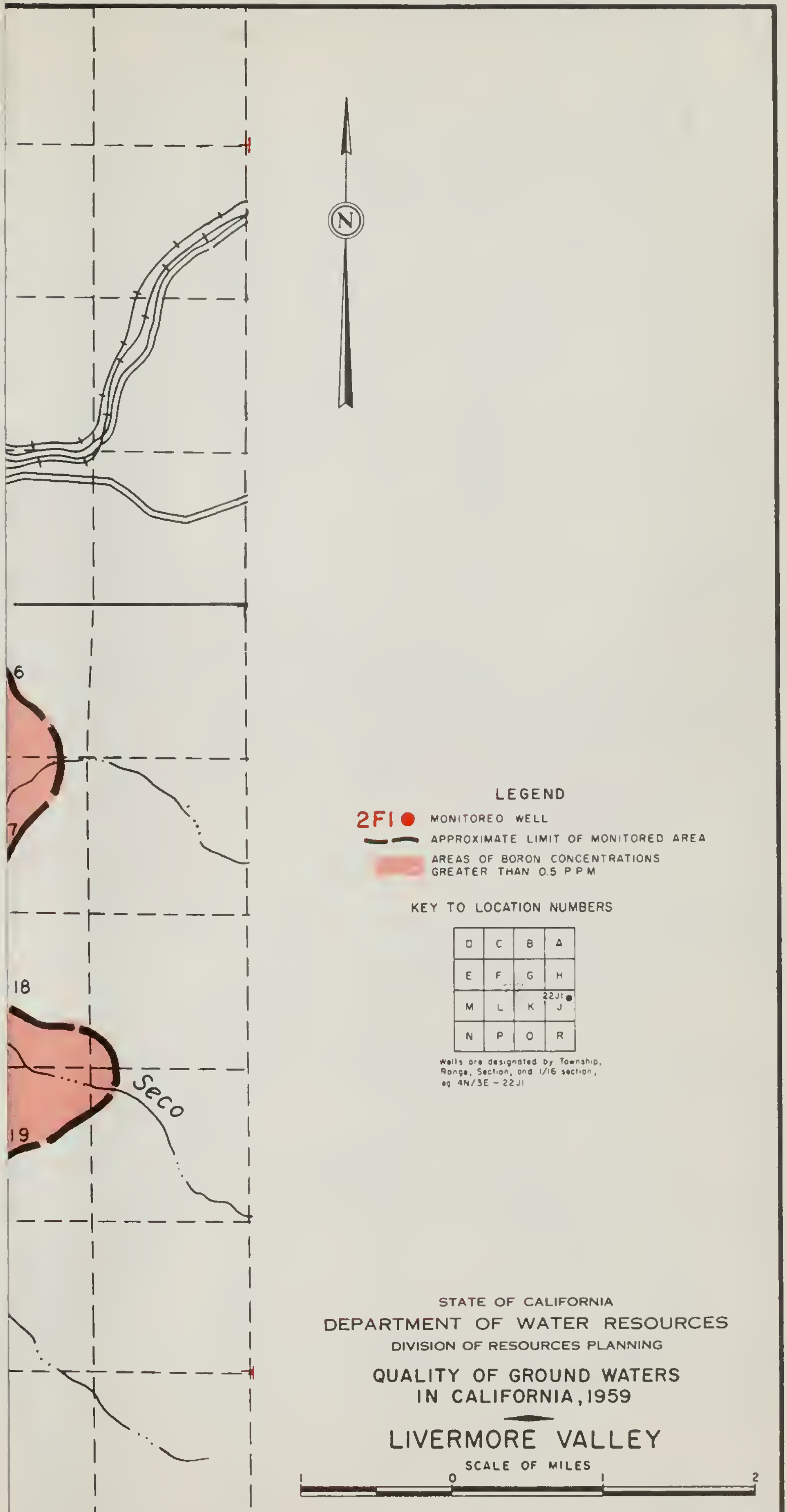
WATER QUALITY RANGES

LIVERMORE VALLEY

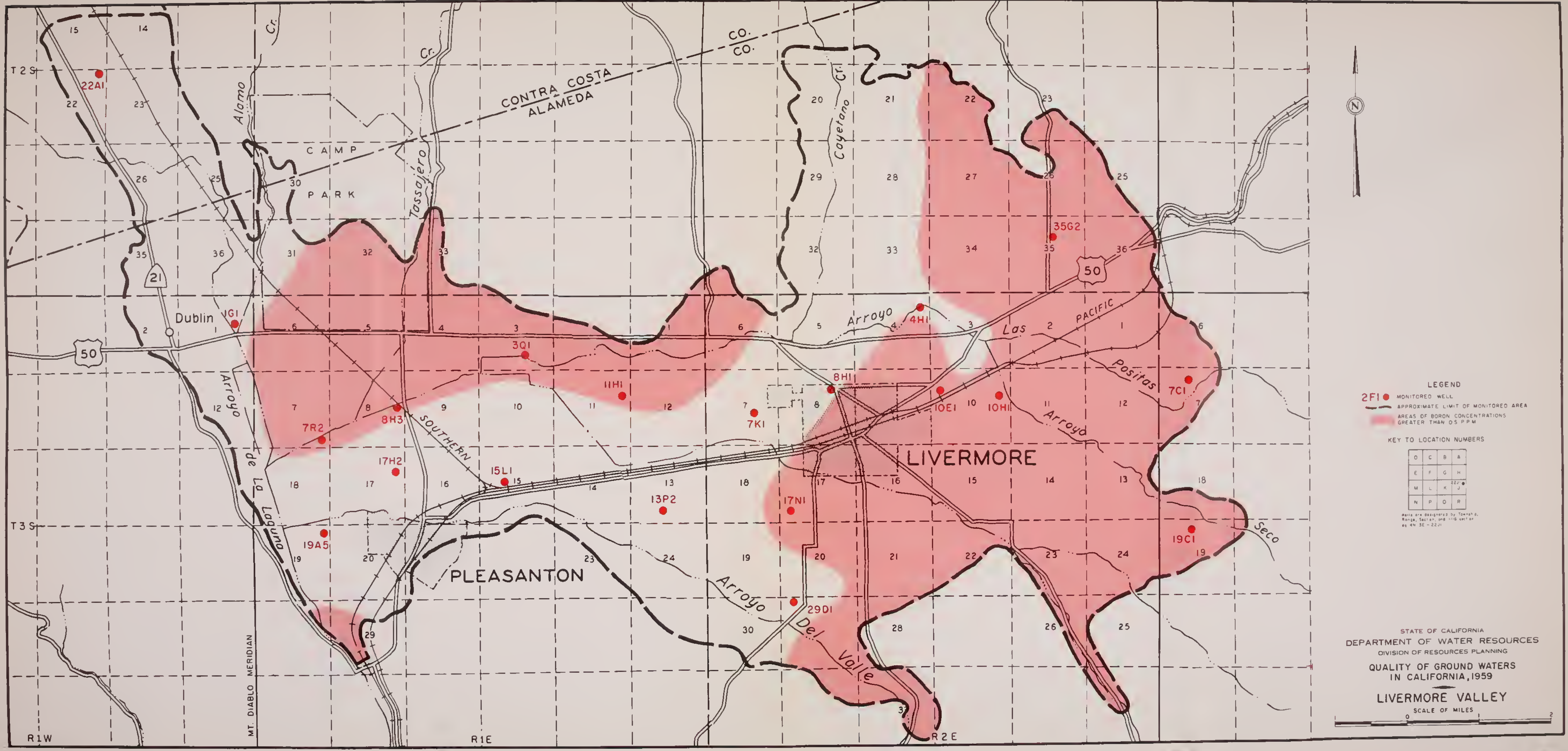


FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

LIVERMORE VALLEY



N
6
7
18
19
Seco
LEGEND
2F1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
AREAS OF BORON CONCENTRATIONS GREATER THAN 0.5 P.P.M.
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E - 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
LIVERMORE VALLEY
SCALE OF MILES
1 0 1 2



LEGEND
2F1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
AREAS OF BORON CONCENTRATIONS GREATER THAN 0.5 P.P.M.
KEY TO LOCATION NUMBERS
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
LIVERMORE VALLEY
SCALE OF MILES
CONTRA COSTA
ALAMEDA
CO.
CO.
CAMP PARK
Dublin
LIVERMORE
PLEASANTON
Alamo Cr.
Tassajero Cr.
Cayetano Cr.
Arroyo de La Laguna
Arroyo Las Positas
Arroyo Seco
Arroyo Del Valle
SOUTHERN PACIFIC
MT. DIABLO MERIDIAN
T2S
T3S
R1W
R1E
R2E
22A1
1G1
3Q1
11H1
7R2
8H3
17H2
15L1
13P2
19A5
7K1
8H1
4H1
10E1
10H1
35G2
7C1
17N1
19C1
29D1

CENTRAL COASTAL REGION (NO. 3)

The Central Coastal Region includes all of the coastal drainage areas from the southern boundary of Pescadero Creek Basin in San Mateo County to the northeastern boundary of Rincon Creek Basin in Ventura County. The region is characterized by narrow coastal strips and coastal valleys with moderate slopes toward the ocean, backed by mountain ranges paralleling the coast. It extends inland an average of about 50 miles to the crest of the coastal mountain ranges, and encompasses an area of approximately 11,000 square miles.

Valley areas in this region depend largely on ground water as a source of supply and approximately 90 percent of the water requirements are met by ground water pumping. Nineteen ground water basins have been identified in this region, of which eighteen are utilized intensively to supply irrigation water. Six ground water basins in this region have been included in the statewide ground water monitoring program. These areas, the number of monitor wells in each and the sampling times are listed in the following tabulation.

Monitored Area	Number of Wells	Sampling Time
Pajaro Valley (3-2)	21	May & October
Gilroy-Hollister Basin (3-3)	24	July - August
Salinas Valley (3-4)	45	June
Carmel Valley (3-7)	5	July
Santa Maria River Valley (3-12)*	-	-
Cuyama Valley (3-13)*	-	-

* Ground water basins are located in Southern California and will be discussed in Part II of this bulletin.

Ground water quality in the Central Coastal Region, in most of the monitored areas reported herein, did not change significantly during 1959. There was, however, a general increase in chlorides in wells located in the coastal segment of Salinas Valley. In Pajaro Valley one well in the area of sea-water intrusion showed a gradual increase in chlorides. Slight increases in total dissolved solids and boron also were noted in most of the wells in Gilroy-Hollister Basin.

Pajaro Valley comprises an irregularly shaped area of about 50 square miles in the Pajaro River drainage area below Pajaro Gap. It extends from Elkhorn Slough on the south to the Santa Cruz Mountains on the north and east. The area occupies the northern extremity of Monterey County, a small part of the northwestern corner of San Benito County, and the southern portion of Santa Cruz County.

Monitoring Program. Sea-water intrusion into ground water adjacent to Monterey Bay prompted the inclusion of Pajaro Valley in the monitoring program in 1953. During May and October 1959, samples were collected from 21 wells in the sea-water intrusion area.

Ground Water Occurrence. In the valley floor area, ground water occurs in three distinct zones, designated the shallow, intermediate and deep zones. The shallow zone is unconfined and extends from land surface to a depth of about 100 feet. The intermediate zone, which is largely confined, lies below the shallow zone, extending to a depth of about 200 to 300 feet. The deep zone underlies this intermediate zone and extends to a depth of about 800 feet below land surface. The three aquifers merge into a forebay in the vicinity of the City of Watsonville. The forebay area is underlain by permeable deposits and is the principal source of ground water replenishment to the intermediate and deep zones. Under natural conditions, the general direction of ground water movement in the deeper zones was from the uplands to Monterey Bay.

Ground Water Development. There is extensive development of ground water in the valley for domestic and irrigation needs and moderate development for stock watering and industrial uses. Nearly all water for irrigation, and a portion of the municipal supply for the City of Watsonville is pumped from the confined ground water bodies. The yield of wells in Pajaro Valley ranges from small capacity domestic wells to large irrigation wells yielding more than 500 gpm.

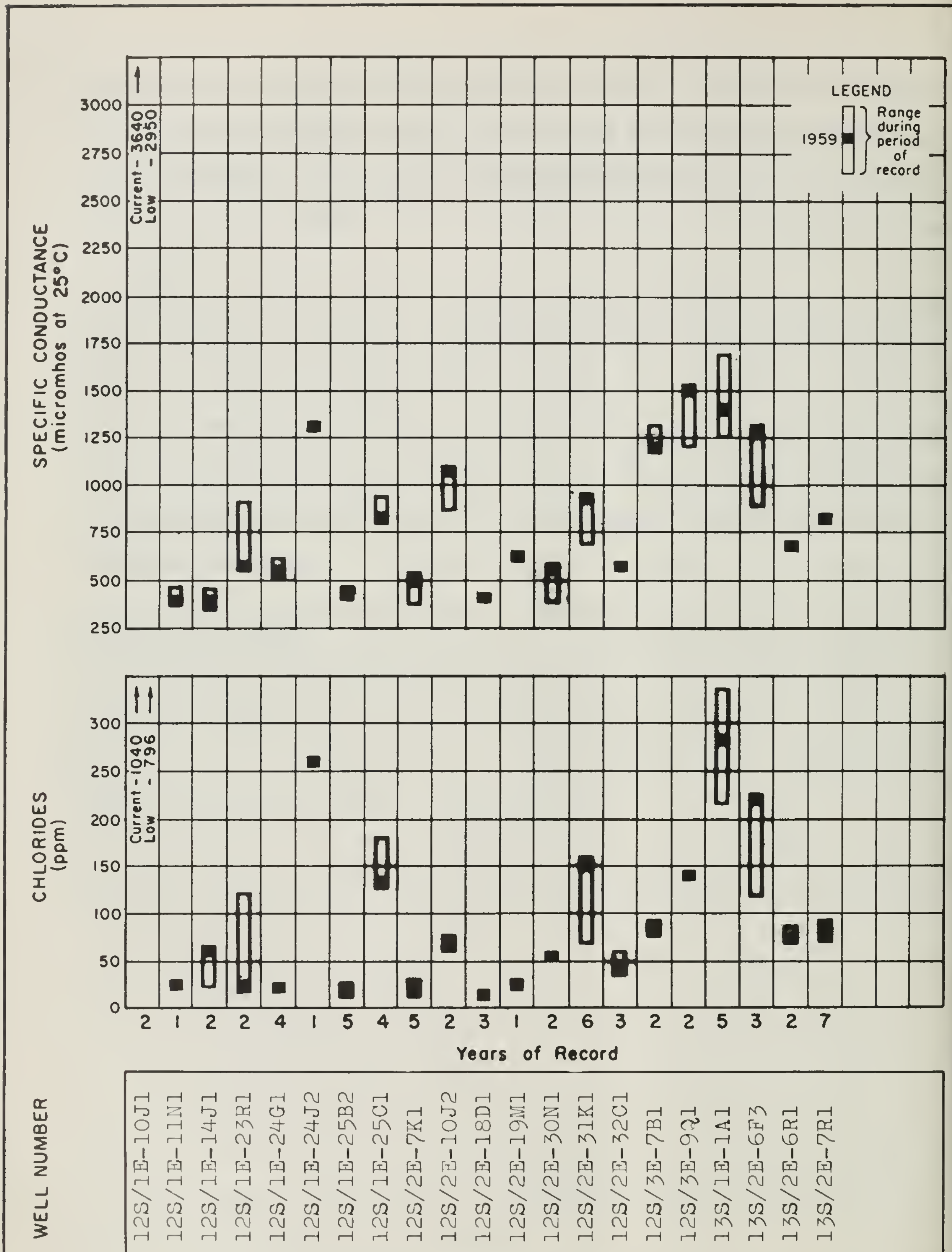
<u>Beneficial Uses of Ground Water</u>. Ground water is the source of more than 95 percent of irrigation supplies in Pajaro Valley. A few industries concerned with the processing and packing of agricultural products also depend on ground water as do domestic users in outlying areas. Most urban domestic supplies are obtained from surface waters but supplemental supplies are obtained from ground water.

<u>Major Waste Discharges</u>. The principal waste discharge in Pajaro Valley comprises sewage and industrial waste effluent from the City of Watsonville. Included are sanitary wastes from Freedom Sewer Maintenance District and Pajaro Sanitation District. The wastes are discharged to Monterey Bay by a submarine outfall after primary treatment and chlorination.

<u>Evaluation of Water Quality</u>. The ground water in the shallow zone is often of poor mineral quality and is used only in isolated cases. In the intermediate zone, ground water is generally of good to excellent mineral quality and suitable for most purposes. Intermediate zone ground water is predominantly of calcium-magnesium bicarbonate type with low to moderate total dissolved solids, chlorides and boron. The water is moderately to very hard, which limits its use for domestic and industrial purposes. Only limited data are available on ground water quality of the deep zone. These data indicate the water to be of excellent mineral quality.

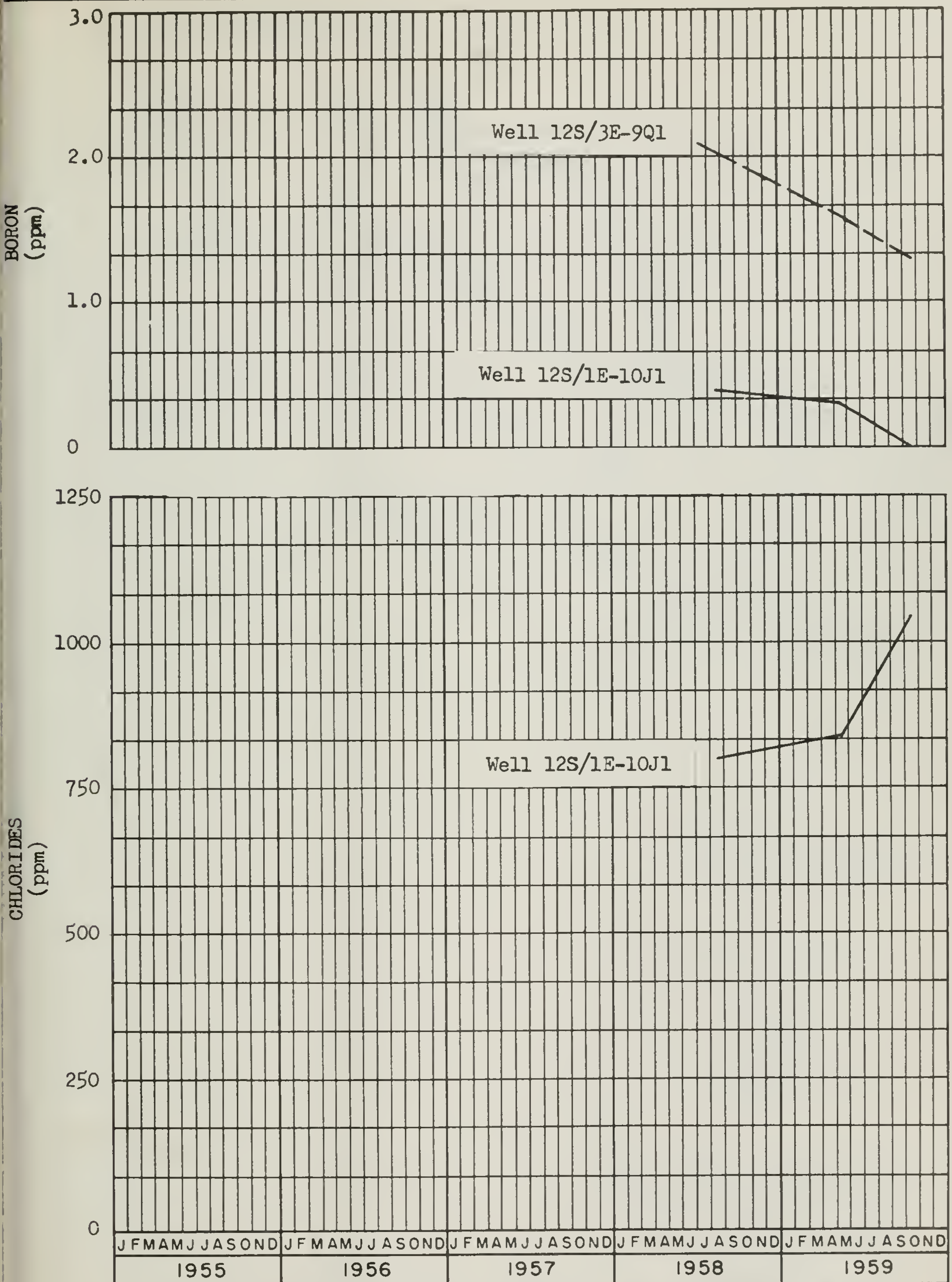
Sea-water intrusion has occurred along the bay where the aquifers are open to the ocean. This is due to reversal of the normal seaward hydraulic gradient by overdraft on the ground water supply. Wells pumping from the intermediate zone near Monterey Bay produce high chloride waters due to sea-water intrusion.

Significant Water Quality Changes. Analyses of samples collected in Pajaro Valley in 1959 show few significant changes in mineral concentrations. Well 12S/1E-10J1, located in the sea-water intrusion area near the bay and pumping water from the intermediate zone, showed an increase in chlorides from 796 ppm in August 1958 to 837 ppm in May 1959 and to 1,040 ppm in October 1959. During the same period, however, boron in the well decreased noticeably (see fluctuation graph). Shallow zone well 12S/3E-9Q1, located in the upper portion of the valley, showed a decrease in boron concentration from 2.1 ppm in July 1958 to 1.6 ppm in May 1959 to 1.3 ppm in September 1959. Boron in two other wells, 12S/2E-31K1 and 12S/2E-32C1, near the bay and pumping water from the intermediate zone, decreased from 1.4 to 0.30 ppm and from 1.4 to 0.2 ppm, respectively, between July 1958 and July 1959. The cause of these decreases in boron concentration has not been determined. Sea-water intrusion in this area has shown no significant advance since 1957.



WATER QUALITY RANGES

PAJARO VALLEY



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

PAJARO VALLEY

LEGEND

2F1 ● MONITORED WELL

APPROXIMATE LIMIT OF MONITORED AREA

LINE OF 100 PARTS PER MILLION CHLORIDE CONCENTRATION (INTERMEDIATE ZONE)

1959

1957

KEY TO LOCATION NUMBERS

D	C	B	A
E	F	G	H
M	L	K	J 22J1
N	P	Q	R

Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E – 22J1

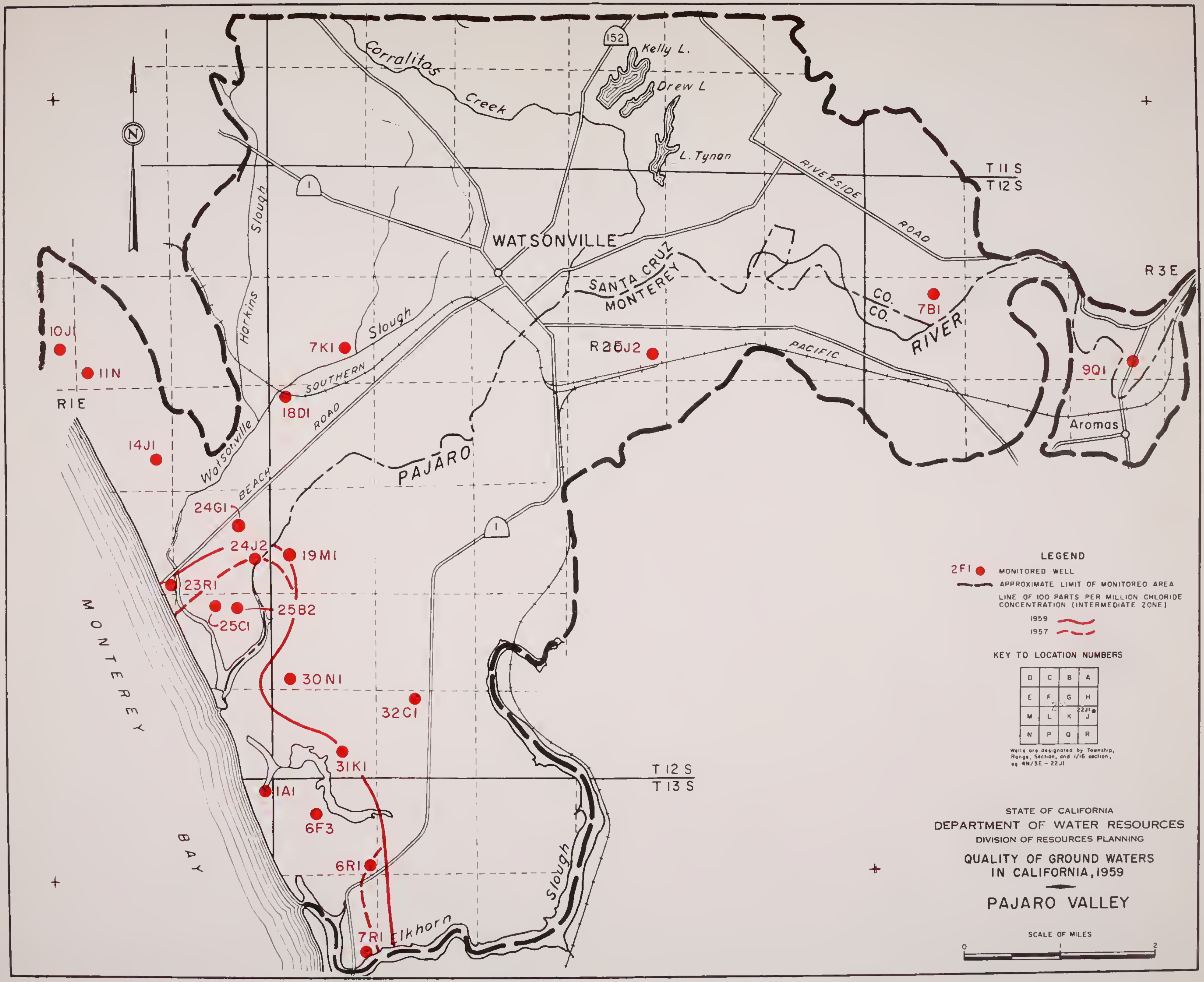
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959

PAJARO VALLEY

SCALE OF MILES

0 1 2



152
Kelly L.
Drew L
L. Tynan
Corralitos
Creek
T 11 S
T 12 S
RIVERSIDE
ROAD
WATSONVILLE
SANTA CRUZ
MONTEREY
CO.
CO.
RIVER
R 3 E
7B1
Slough
Harkins
Slough
7K1
10J1
11N
R 2 E
26J2
PACIFIC
9Q1
SOUTHERN
ROAD
18D1
R 1 E
Aromas
14J1
Watsonville
BEACH
PAJARO
24G1
24J2
19M1
23R1
25B2
25C1
30N1
32C1
31K1
1A1
6F3
6R1
7R1
Elkhorn
Slough
T 12 S
T 13 S
MONTEREY
BAY
LEGEND
2F1
MONITORED WELL
APPROXIMATE LIMIT OF MONITOREO AREA
LINE OF 100 PARTS PER MILLION CHLORIDE CONCENTRATION (INTERMEDIATE ZONE)
1959
1957
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E – 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
PAJARO VALLEY
SCALE OF MILES
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GILROY-HOLLISTER BASIN (3-3)

Seven small valleys make up the Gilroy-Hollister Basin, which includes South Santa Clara Valley, Hollister Valley, San Benito Valley and four other small, contiguous valleys. The monitored area extends a distance of about 25 miles from the ground water divide near Morgan Hill, Santa Clara County, southeasterly to Tres Pinos at the head of Hollister Valley in San Benito County. The area varies from 3 to 10 miles in width and comprises about 150 square miles. Drainage from the area is to the Pajaro Valley.

Monitoring Program. An annual monitoring program was established in this basin in 1958 to maintain a check on any adverse changes in water quality due to ground water overdraft. During 1959, 24 wells in the basin were sampled during July and August.

Ground Water Occurrence. The water-bearing units are the alluvial sediments of Quaternary age, the San Benito gravels of Pliocene-Pleistocene age and the Purisima formation of Pliocene age. The alluvial sediments include stream channel, stream terrace, flood plain, swamp and alluvial deposits. The alluvium in the Hollister area attains a maximum thickness of approximately 250 feet. In South Santa Clara Valley the thickness of the alluvium ranges from 50 to 1,000 feet. Confined ground water conditions exist throughout much of the area but free or partially confined ground water occurs in limited areas in the upper portions of the valley.

Ground Water Development. There is extensive development of ground water for irrigation and domestic needs, and moderate development for industrial and stock watering uses. The yield of wells is about 350 gpm in South Santa Clara

Valley and averages about 500 gpm in the Hollister area. Some wells in the Hollister area are reported to yield up to 1,700 gpm.

Beneficial Uses of Ground Water. This area is largely agricultural and the major water use is for irrigation and domestic purposes. Smaller amounts are used for stock watering, and for the processing of agricultural products. Pumping for irrigation constitutes about 75 percent of the total ground water withdrawal.

Major Waste Discharges. Waste discharges in the area include those of domestic sewage and food processing plants. The largest discharge comprises 2.75 mgd of domestic sewage from the City of Gilroy, which is discharged to Llagas Creek after primary treatment. Smaller amounts are discharged by the Cities of Hollister and San Juan Bautista, and by food processing plants in the vicinity. The majority of liquid wastes can percolate and reach the underlying ground waters. No evidence is available, as yet, to indicate whether or not these wastes are degrading the ground water supply.

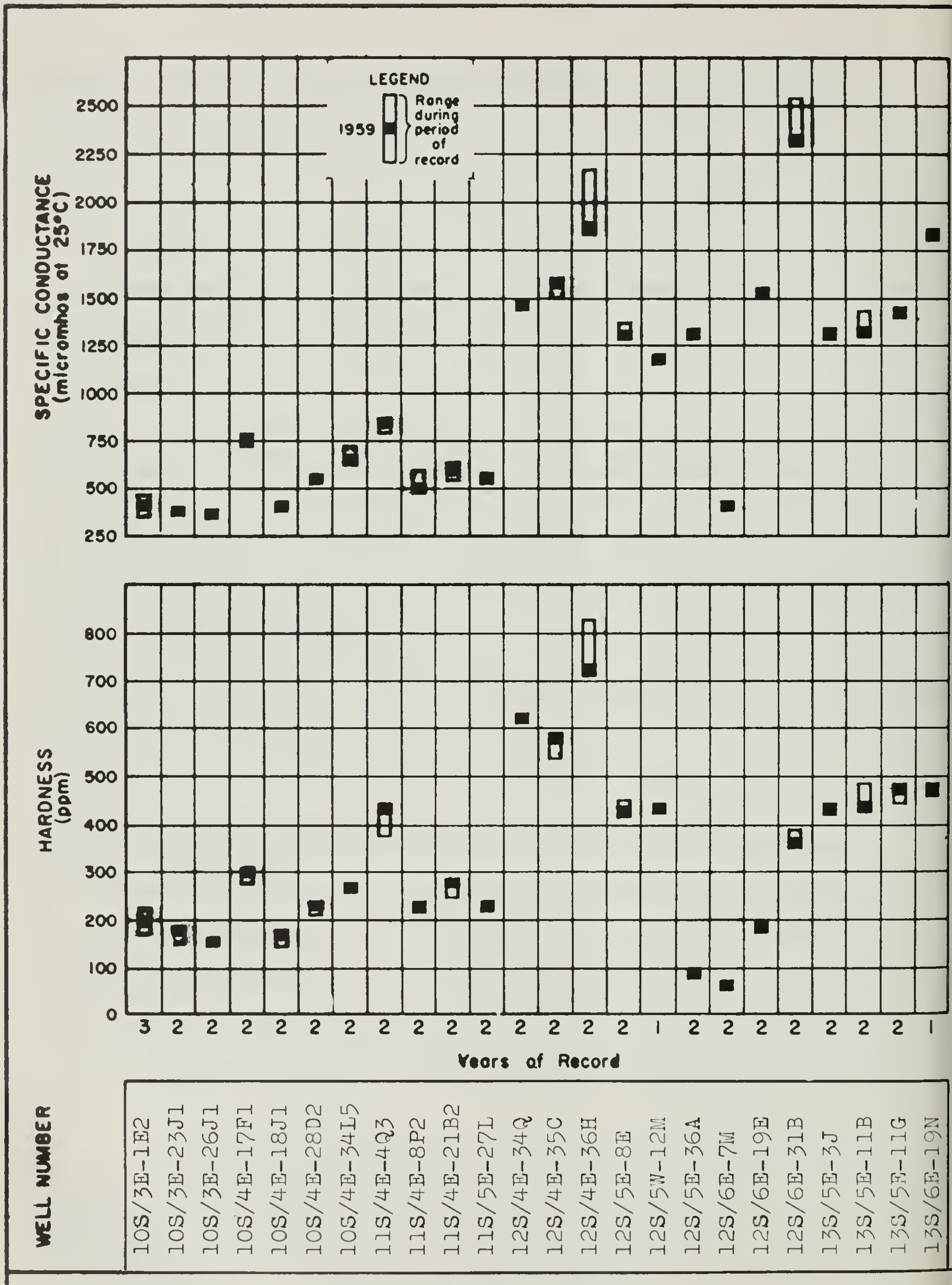
Evaluation of Water Quality. Ground waters of South Santa Clara Valley, while moderately to very hard, are generally of good mineral quality and suitable for most beneficial uses. The waters are typically calcium-magnesium or magnesium-calcium bicarbonate type and contain 250 to 550 ppm total dissolved solids. Chlorides range from 14 to 48 ppm, sulfates range from 19 to 76 ppm, nitrates range from 3.5 to 84 ppm and boron ranges from 0.0 to 0.14 ppm.

Ground waters in the Hollister area are of poor quality, are high in total dissolved solids content and contain excessive boron. These waters also contain high concentrations of chlorides, sulfates and nitrates.

At least six faults which restrict ground water movement are reported to occur in this monitored area. In additon, these faults may act as conduits for upward migration of poor quality water.

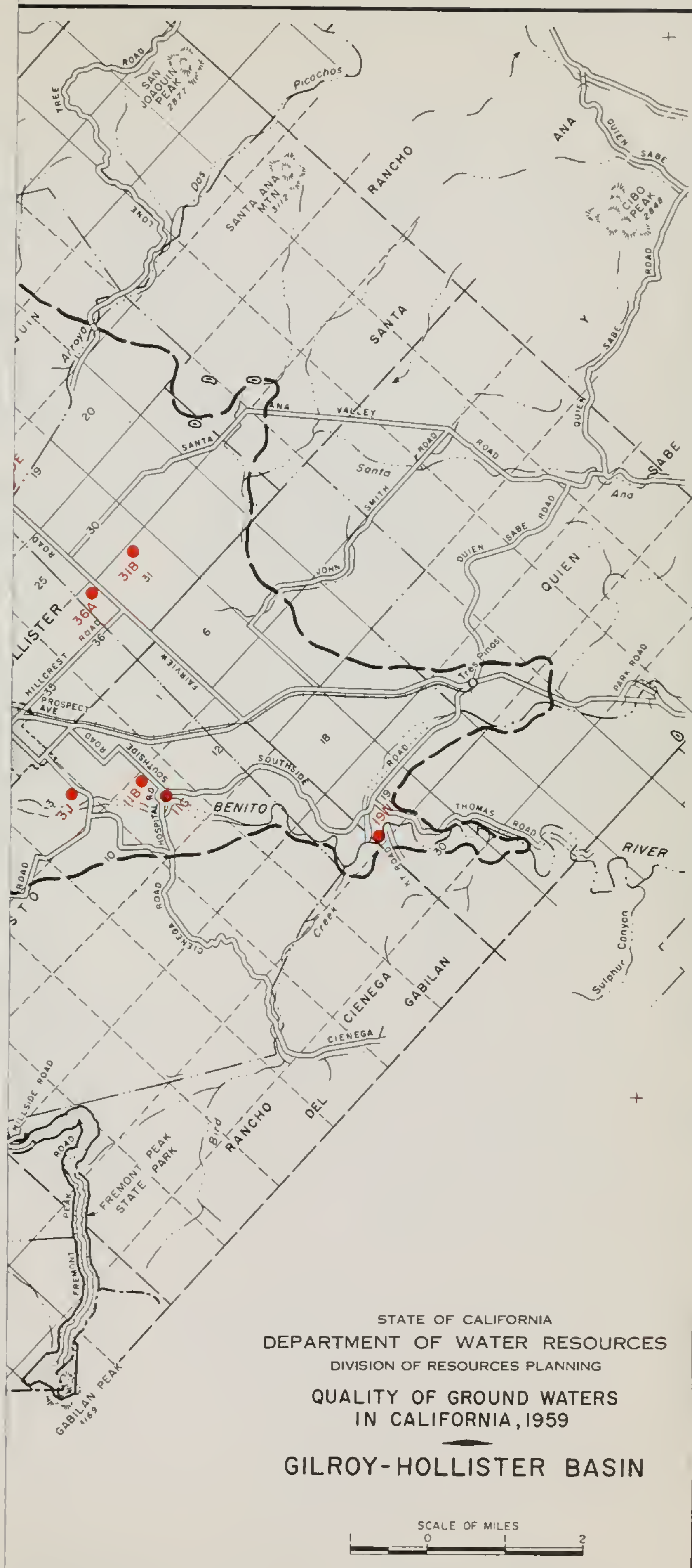
Significant Water Quality Changes. All wells sampled in South Santa Clara Valley showed small increases in total dissolved solids, with well 11S/4E-4Q3, located about 2 miles east of Gilroy, showing the largest increase, from 487 ppm in 1958 to 552 ppm in 1959. The same well also showed a large increase in nitrate concentration, from 59 ppm in 1958 to 84 ppm in 1959.

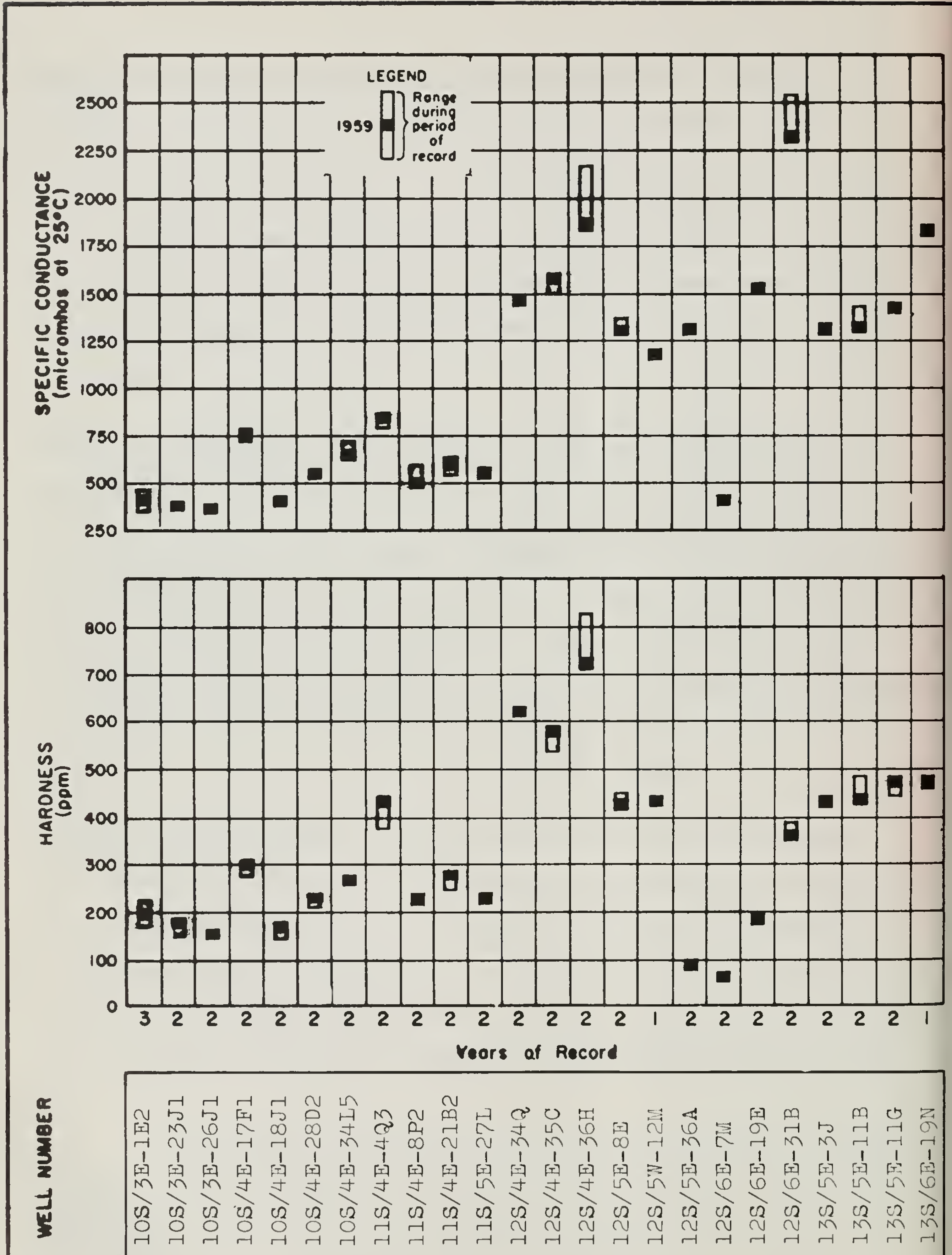
In the southern portion of the basin near Hollister, the majority of wells sampled in 1959 showed increases in boron concentration from the previous year's analyses. Well 12S/6E-19E, located about 5.5 miles northeast of Hollister in the Fairview district, showed the largest increase in boron concentration, from 7.2 ppm in 1958 to 19 ppm in 1959. The source of the boron is probably poor quality water migrating upward along the Hayward fault.



WATER QUALITY RANGES

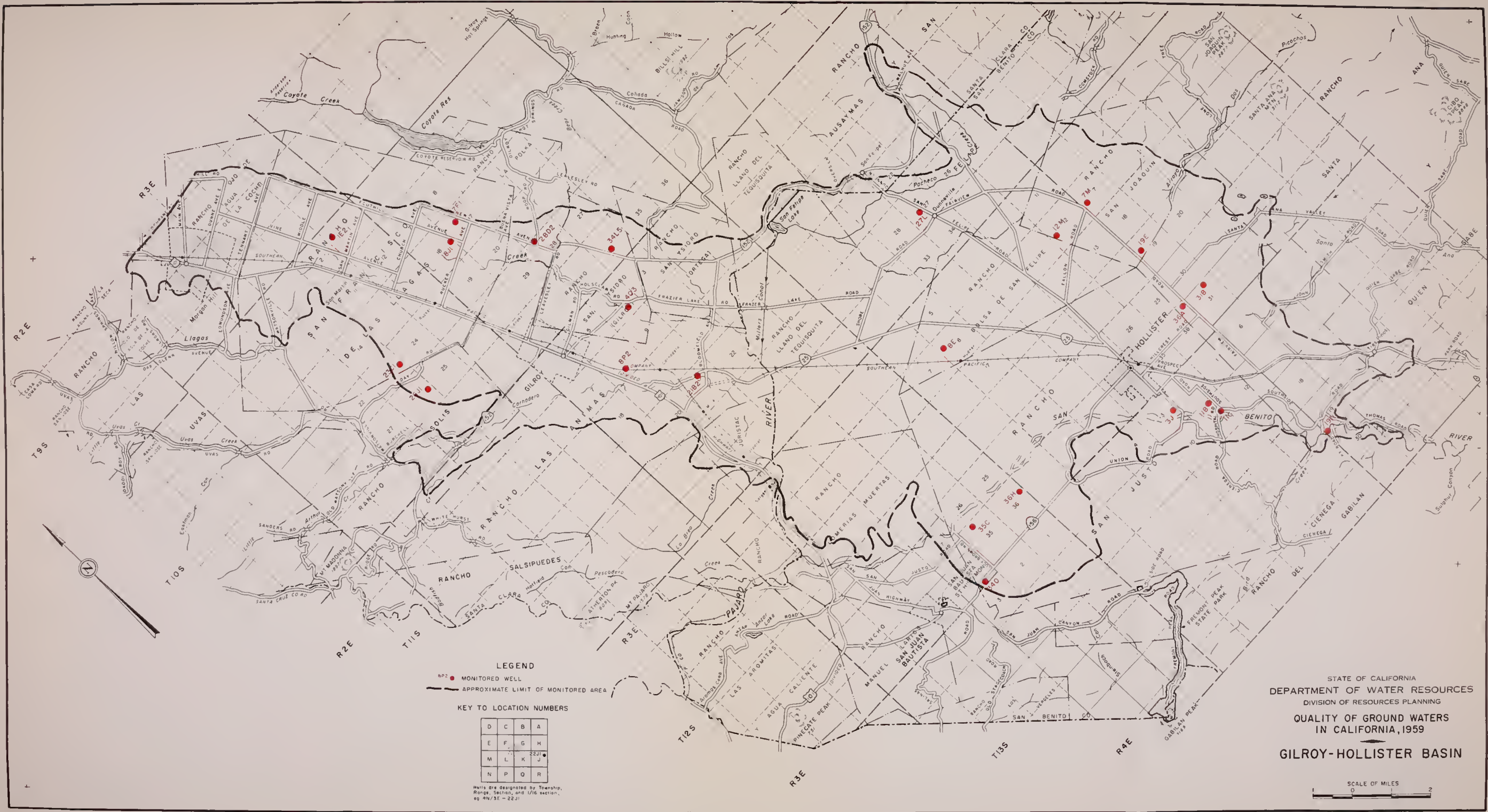
GILROY-HOLLISTER BASIN


STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
GILROY-HOLLISTER BASIN
SCALE OF MILES
SAN JOAQUIN PEAK 2877
SANTA ANA MTN 3112
CIBO PEAK 2848
RANCHO
SANTA
QUIEN SABE
FREMONT PEAK STATE PARK
GABILAN PEAK
CIENEGA
GABILAN
RANCHO DEL
BENITO
RIVER
Tres Pinos
31B
36A
3J
11B
11G
19N



WATER QUALITY RANGES

GILROY-HOLLISTER BASIN


LEGEND
8P2 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 9N/3E - 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
GILROY-HOLLISTER BASIN
SCALE OF MILES
0
2
HOLLISTER
GILROY
SAN JUAN BAUTISTA
San Felipe Lake
Coyote Res
Coyote Creek
PAJARO
RIVER
Llagas
Uvas
FREMONT PEAK STATE PARK
R2E
R3E
R4E
T9S
T10S
T11S
T12S
T13S

SALINAS VALLEY (3-4)

Salinas Valley is a narrow, elongated, northwest-southeast trending valley located mostly in Monterey County. The monitored portion of the valley varies from 2 to 10 miles in width, is approximately 40 miles in length, and comprises about 300 square miles of highly productive irrigated and dry farmed land. The valley is bordered on the northeast by the Gabilan Range and on the southwest by the Santa Lucia Range and the Sierra de Salinas.

Monitoring Program. A monitoring program was established in this valley in 1953 to observe and report the status of sea-water intrusion. During June 1959, 44 wells were sampled in Salinas Valley.

Ground Water Occurrence. Ground waters in Salinas Valley occur principally in three aquifers. These consist of an upper, unconfined aquifer and two lower, confined aquifers. Water from the upper zone is not used in any significant amounts due to its poor mineral quality. In lower Salinas Valley, the principal aquifers in the pressure area are designated as the 180-foot and 400-foot aquifers, due to the average depth of the water-bearing materials below ground surface. The pressure aquifers are recharged by subsurface inflow from a forebay area south of Salinas. Recharge to the forebay area is supplemented by controlled releases of stored surface waters from Nacimiento Dam.

Ground Water Development. Lower Salinas Valley is devoted to the production of irrigated crops. Ground water is the only source of irrigation water supply. Consequently, ground water is extensively developed for this purpose and for rural domestic uses. Yield of wells ranges from low capacity domestic wells to irrigation wells yielding from 200 gpm to more than 3,000 gpm.

Beneficial Uses of Ground Water. Ground water is principally used for irrigation. Other uses are municipal, industrial and stock watering.

Major Waste Discharges. There are three major waste discharges in lower Salinas Valley. They comprise treated sewage and industrial wastes from the City of Salinas and Alisal Sanitary District, which are disposed to Salinas River near Spreckles. A third discharge consists of untreated industrial wastes from Spreckels Sugar Company, which are disposed to percolation ponds located on lands adjacent to the Salinas River.

Evaluation of Water Quality. The ground waters of Salinas Valley are quite variable in mineral quality.

In the coastal segment, between the bay and a line approximately 2 miles inland, the water in the upper perched zone is not used in any significant amounts due to its poor quality. Ground water in the 180-foot aquifer in the coastal segment is degraded by sea water and is sodium chloride or sodium bicarbonate in type. In this same area ground water in the 400-foot aquifer is similar in type, but apparently degraded by sea water to a limited extent.

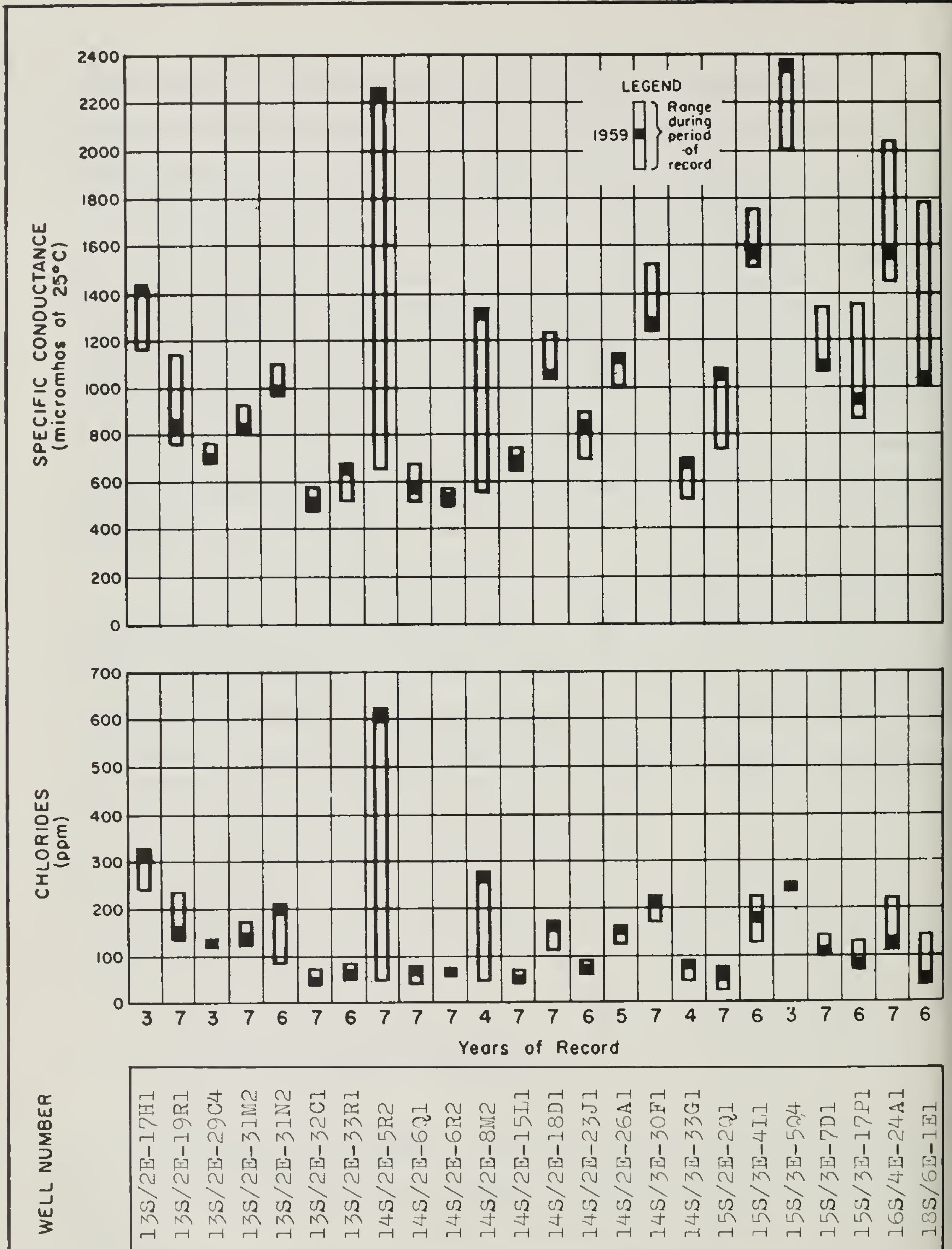
About 1 mile west of Salinas, poor quality ground waters occur in the 180-foot aquifer. These poor quality waters are sodium chloride in type. The waters in the 400-foot aquifer in this area are generally of good mineral quality.

Analyses of ground water from the area near Greenfield showed a mixed calcium-magnesium-sodium sulfate type.

Significant Water Quality Changes. Analyses of samples collected in Salinas Valley in 1959 showed significant changes and trends in mineral concentrations in ground water. In well 13S/2E-17H1, located about 1 mile east of Moss Landing, chlorides increased from 279 ppm in 1958 to 316 ppm in 1959. Chlorides in well 13S/2E-30L1, located adjacent to the bay about 1.5 miles west of Castroville, increased from 232 ppm in 1958 to 406 ppm in 1959. Well 14S/2E-5R2, located about 2 miles south of Castroville and pumping from the 180-foot aquifer, showed an increase from 264 ppm in 1958 to 608 ppm in chlorides in 1959 (see quality fluctuation graphs).

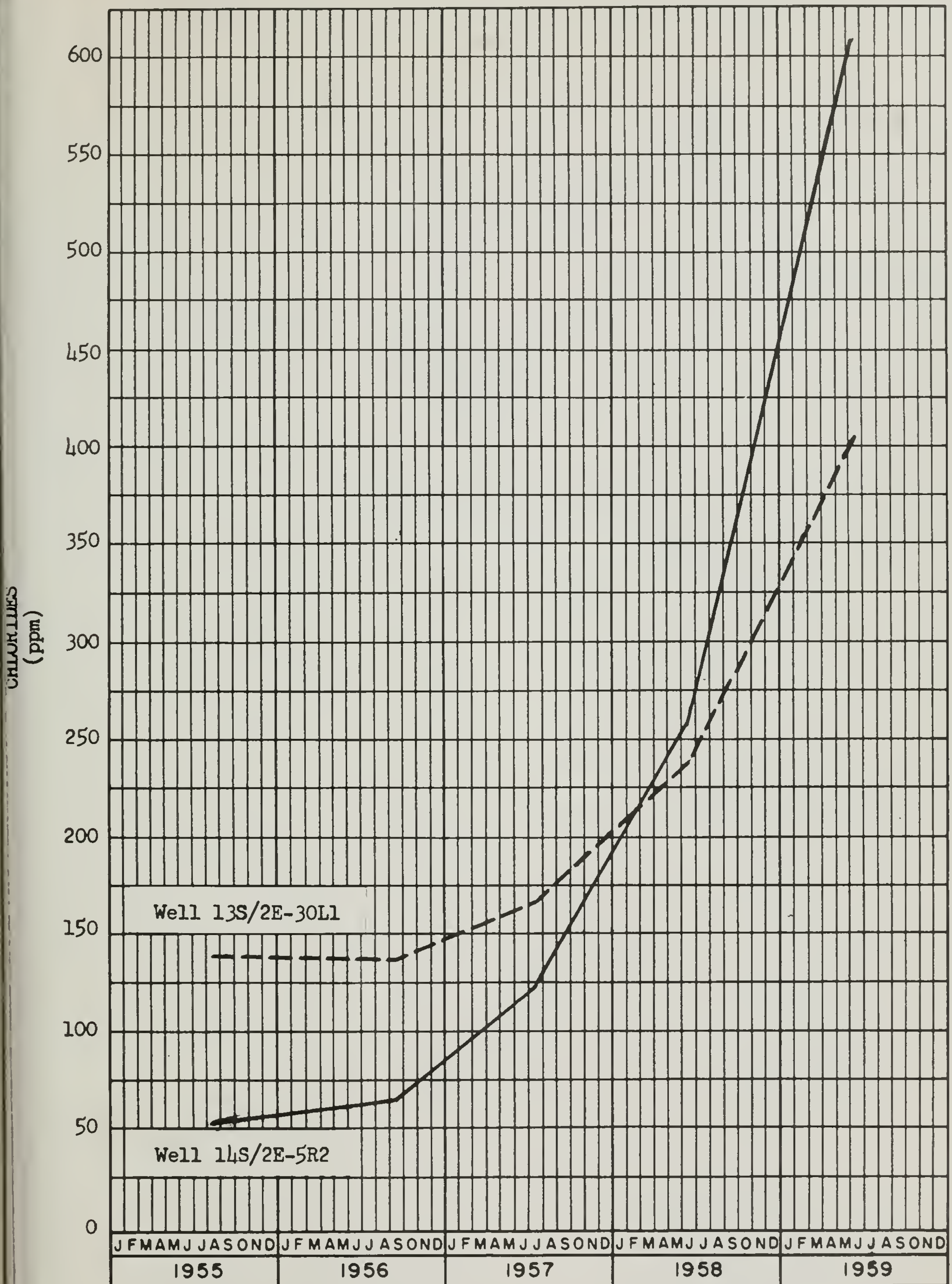
Ground water in the 400-foot aquifer near the bay was of better quality, being affected by sea-water intrusion in only a small area adjacent to Monterey Bay. Well 14S/3E-30F1, located about 1 mile west of Salinas, showed chloride concentrations ranging from 188 ppm in 1953 to 220 ppm in 1959. Better quality water was found in wells to the east and west of well 14S/3E-30F1, indicating a possible local source of degradation resulting from industrial waste discharge in the northern part of Salinas.

Between 1958 and 1959, sea-water intrusion in the 180-foot aquifer advanced approximately 0.5 mile farther inland and reached a maximum distance of about 3 miles from the shore line. There was also evidence of additional salt-water degradation in the 400-foot aquifer (see map of monitored area).

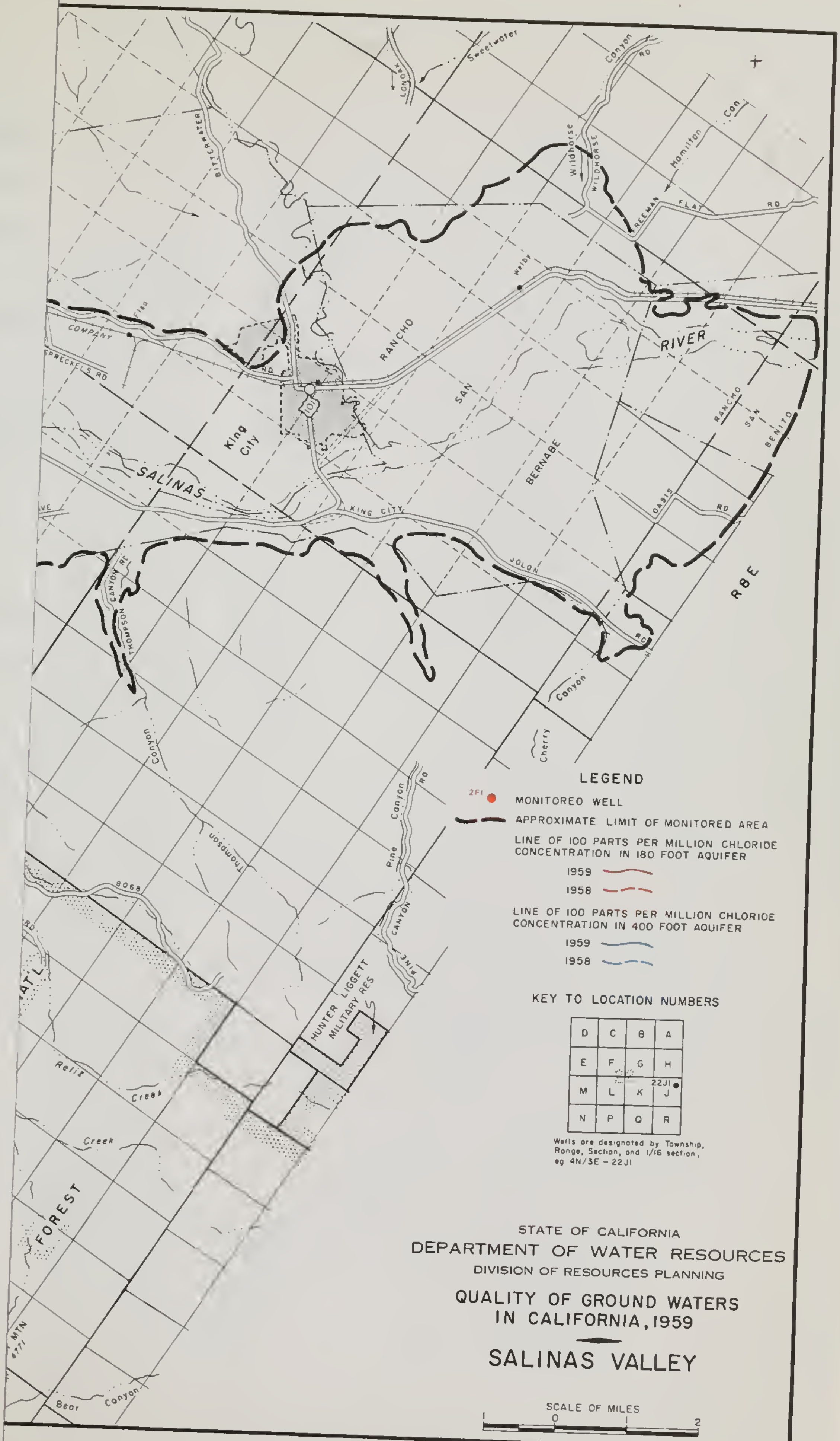


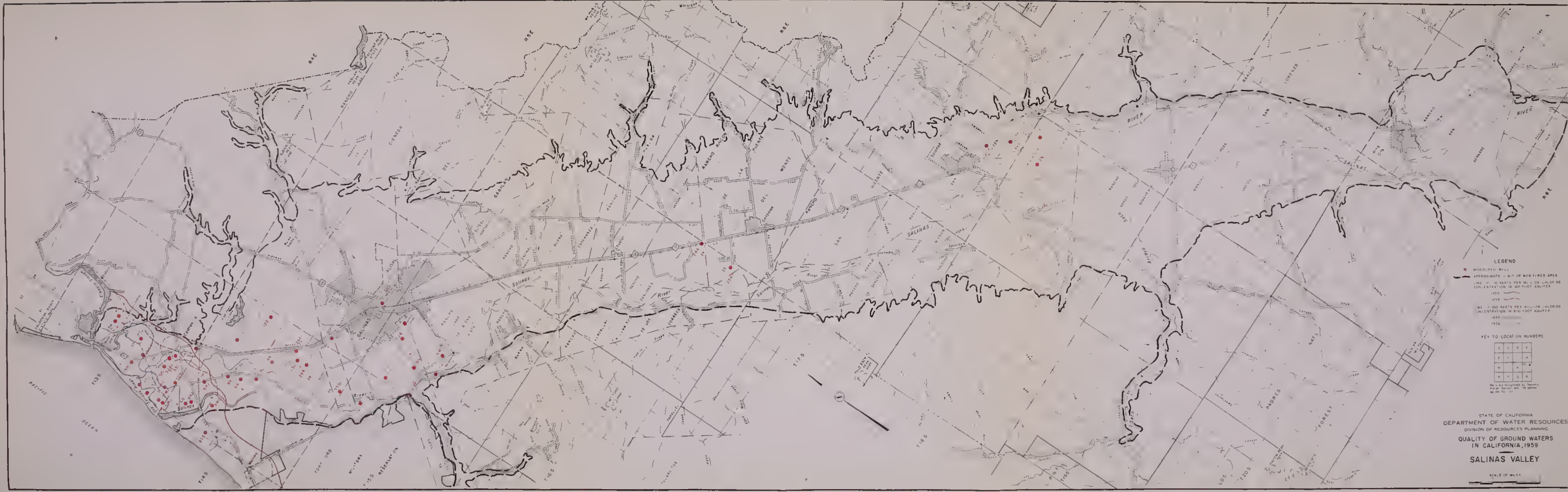
WATER QUALITY RANGES

SALINAS VALLEY



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS
SALINAS VALLEY


LEGEND
2F1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
LINE OF 100 PARTS PER MILLION CHLORIDE CONCENTRATION IN 180 FOOT AQUIFER
1959
1958
LINE OF 100 PARTS PER MILLION CHLORIDE CONCENTRATION IN 400 FOOT AQUIFER
1959
1958
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E – 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
SALINAS VALLEY
SCALE OF MILES
1 0 1 2
King City
SALINAS
RIVER
RANCHO SAN BERNABE
RANCHO SAN BENITO
SPRECKELS RD
COMPANY RD
KING CITY JOLON RD
OASIS RD
FREEMAN FLAT RD
Hamilton
Wildhorse
WILDHORSE CANYON RD
Sweetwater
LONOAK
BITTERWATER
Welby
Coburn
101
THOMPSON CANYON RD
Thompson Canyon
Cherry Canyon
Pine Canyon
PINE CANYON RD
HUNTER LIGGETT MILITARY RES
Reliz Creek
Creek
FOREST
Bear Canyon
MTN
R 8 E
8068


LEGEND
PACIFIC
OCEAN
Salinas
River
SALINAS
RIVER
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
SALINAS VALLEY

CARMEL VALLEY (3-7)

Carmel Valley, located in northern Monterey County, is a long, alluvium-filled valley extending easterly from the coast a distance of 23 miles. However, only the coastal portion which is susceptible to sea-water intrusion is included in the monitoring program. The area monitored is about 1 mile in width and extends from the coast about 3 miles inland. The valley is drained by the Carmel River which flows to the ocean.

Monitoring Program. An annual monitoring program was established in this area in 1953 to detect evidence of sea-water intrusion. Five wells located near the coast were sampled in July 1959.

Ground Water Occurrence. Ground water occurs in the unconsolidated Recent alluvium underlying the valley. The alluvium is comprised mainly of sand and gravel with small amounts of silt and clay; it is about 135 feet thick near the coast and feathers out along the valley margin. The seaward extension of the aquifer is open to the ocean. Ground water in the valley is unconfined.

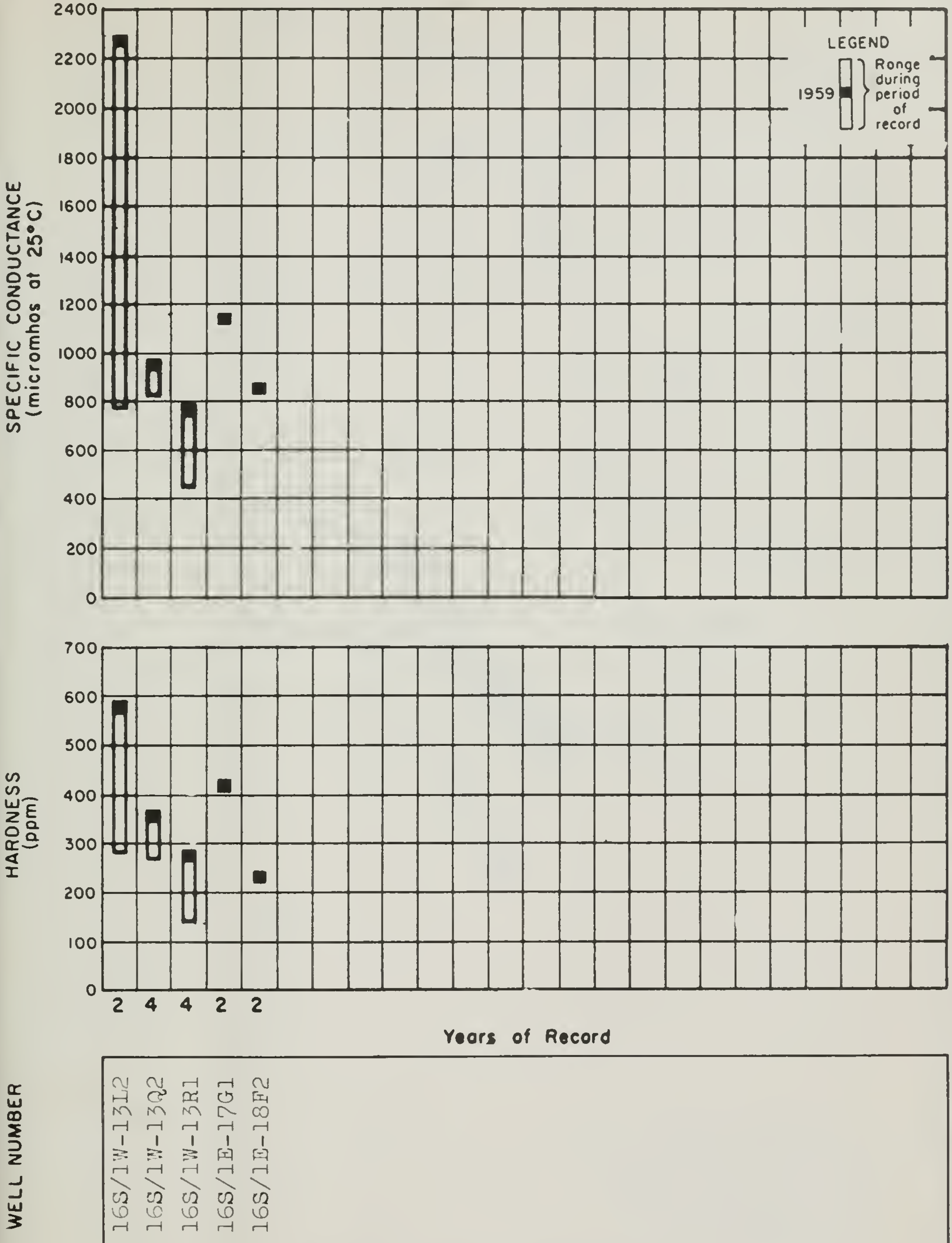
Ground Water Development. Practically all of the valley is utilized for truck crops and pastures. Local domestic and irrigation requirements are supplied by numerous wells in the valley. Home construction is increasing and in the near future it is expected that the monitored area will become completely residential, and agricultural use of ground water will decrease accordingly. Well yields range from small amounts for domestic use up to 600 gpm for irrigation needs.

Beneficial Uses of Ground Water. Ground water is used for irrigation and local domestic needs.

Major Waste Discharges. The major waste discharge comprises sewage effluent from Carmel Sanitary District amounting to 1.5 mgd which is disposed to Carmel Bay in a submarine outfall after primary treatment. Some of this effluent is used as irrigation water in an artichoke field adjacent to the sewage treatment plant between the months of June and October.

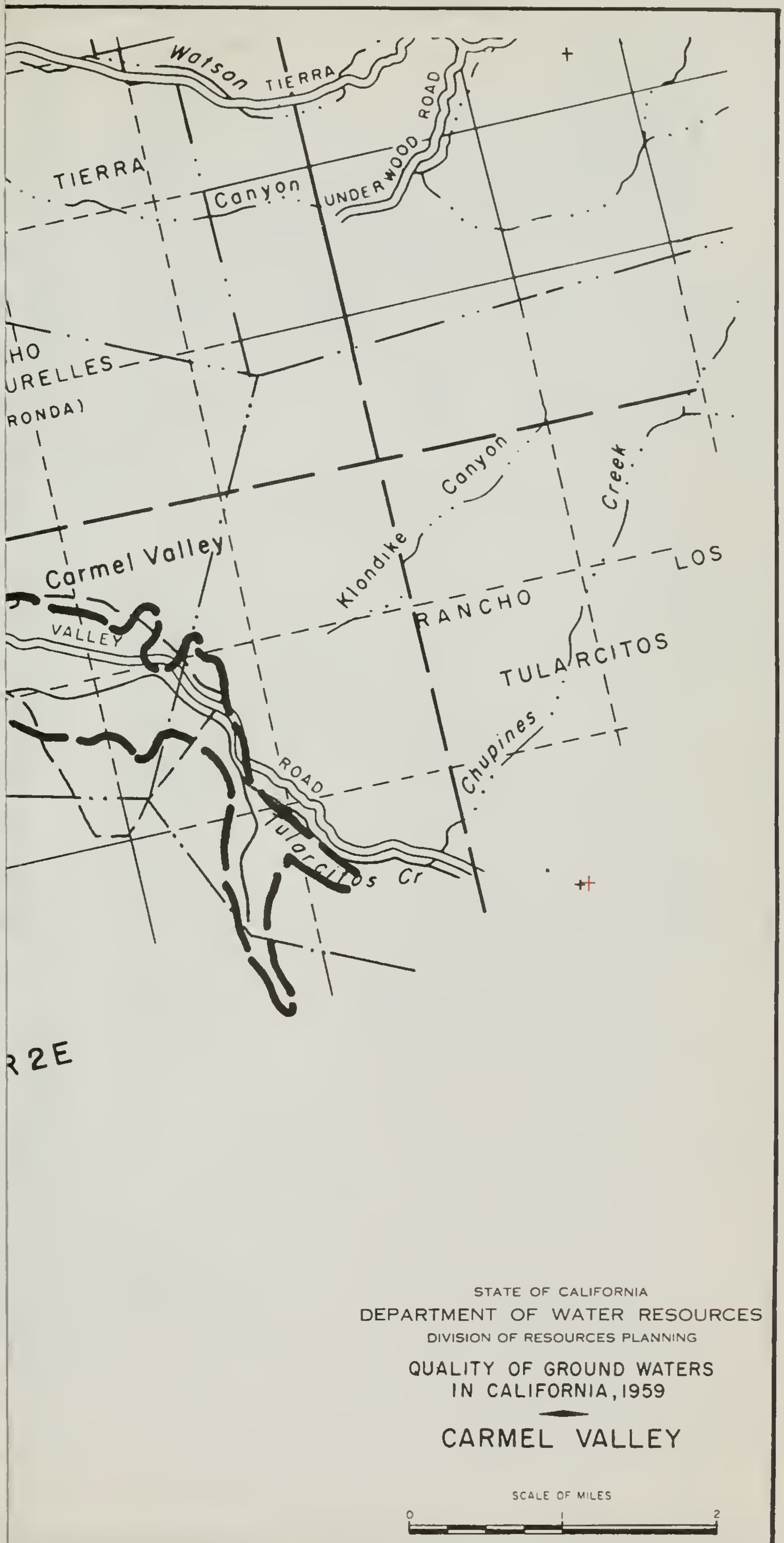
Evaluation of Water Quality. Ground waters in the monitored portion of Carmel Valley are generally of excellent mineral quality and contain moderate total dissolved solids, although the waters are usually of calcium-sodium bicarbonate type and are very hard.

Significant Water Quality Changes. In general, the analyses of samples collected from five wells in Carmel Valley during 1959 showed only minor variations in mineral quality. However, well 16S/1W-13L2, located about 1 mile inland from the bay and along the Carmel River, showed a large increase in sodium and chloride ions, and small increases in other constituents. Sea-water intrusion is believed to be the source of this degradation.



WATER QUALITY RANGES

CARMEL VALLEY



STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959

CARMEL VALLEY

Point Cypress
Sunset Pt
CARMEL BAY
Carmel By The-Sea
RANCHO CAÑADA DE LA SEGUNDA
CARMEL VALLEY ROAD
RANCHO LOS LAURELLES
JAMES LAURELLES (CRANSOM)
MEADOWS Canyon
Buckeye Canyon
Coyote Gulch
GRADE
RANCHO CORRAL DE TIERRA
CALERA
Colero Canyon
Watson Canyon
TIERRA
UNDERWOOD ROAD
Los Ranchitos Del Carmelo
RANCHO LOS LAURELLES (BERONDA)
LAURELES GRADE
13L2
13
18
18F2
17
17G1
13Q2
Carmel River
Holt Valley Ranch No
CARMEL RIVER BEACH STATE PARK
T16S
RANCHO SAN JOSE Y SUR CHIQUITO
19
North Fork
San Jose
Potrero Canyon
RANCHO EL POTRERO DE SAN CARLOS
ROBINSON CANYON ROAD
PINYON PEAK 2237
Carmel Valley
VALLEY
Klondike Canyon
Creek
RANCHO LOS TULARCITOS
Chupines
Tularcitos Cr
ROAD
Carmel Point
POINT LOBOS RESERVE STATE PARK
HUCKLEBERRY HILL 932
Gibson Cr
Bird Island
Wildcat Cr
Carmel Highlands
Seneca Creek
Von Winkleys Con
Williams Canyon
RANCHO SAN FRANCISQUITO
Las Gazas Creek
VASQUEZ KNOB 2136
Yankee Point
Malpaso Creek
RANCHO SAN JOSE Y SUR CHIQUITO
Soberones Creek
Canyon
THE CALIFORNIA SEA OTTER STATE GAME REFUGE
T17S
R1W
R1E
R2E
LEGEND
2F1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, as 4N/3E - 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
CARMEL VALLEY
SCALE OF MILES
0
2

CENTRAL VALLEY REGION (NO. 5)

The Central Valley Region extends from the California-Oregon state line southward to the Tehachapi Mountains, and from the Coast Range on the west to the Sierra Nevada on the east as shown on Plate 1. It averages about 120 miles in width and is more than 500 miles long. The region comprises a drainage area of approximately 59,000 square miles, and includes nearly 44 percent of the valley and mesa lands of the State.

Ground water has been an important source of water supply in the development of the Central Valley Region. Ground water is used principally for irrigation purposes but also supplies many communities and is used for domestic and industrial purposes. Some of the most extensive irrigated areas in the region derive their present water supplies entirely from ground water sources.

Twenty-nine ground water basins have been identified in this region, five of which have thus far been included in the monitoring program. These areas, as well as the number of monitored wells in each and the sampling times, are listed in the following tabulation. For convenience, the discussions and data for the Sacramento and San Joaquin Valleys are presented in this report by counties.

Monitored Area	Number of Wells	Sampling Time
Redding Basin (5-6)	26	July
Upper Lake Valley (5-13)	12	June
Kelseyville Valley (5-15)	9	June
Sacramento Valley (5-21)		
Tehama County	25	July - August
Glenn County	24	June
Butte County	19	August

Monitored Area	Number of Wells	Sampling Time
Colusa County	28	June - July
Sutter County	29	July to September
Yuba County	12	August
Placer County	20	August
Yolo County	43	August
Sacramento County	33	May - July
Solano County	15	May - October
San Joaquin Valley (5-22)		
San Joaquin County	24	April - September
Stanislaus County	59	August - October
Merced County	50	June - August
Madera County	30	July
Fresno County	72	July - August
Tulare County	19	June - September
Kings County	16	August
Kern County	59	June

There were no extensive changes in quality of ground waters in the Central Valley Region during 1959. There were, however, significant changes in specific constituents in individual wells and in groups of wells in certain areas. A substantial increase in chlorides was observed in two wells in Redding Basin. Boron increased substantially in one well in Tehama County, while most of the monitoring wells in Glenn County showed slight increases in boron. There were also notable boron increases in wells in Colusa and Yolo Counties.

With a few notable exceptions, ground water quality in the San Joaqui Valley remained essentially the same as that of the previous year. Boron in individual wells in San Joaquin and Stanislaus Counties showed increases ranging up to 3.6 ppm. Slight increases in total dissolved solids were found in most wells in Madera County. A general but slight increase in chlorides and total dissolved solids occurred in wells in Kern County.

REDDING BASIN (5-6)

Redding Basin is located in the south central portion of Shasta County. The monitored area includes primarily the Cow Creek, Stillwater, Anderson, and Cottonwood Valleys. The area is approximately 21 miles north to south and has a maximum east-west dimension of about 22 miles. It comprises an area of about 280 square miles.

Monitoring Program. An annual monitoring program was established in Redding Basin in 1957 to maintain a check on ground water quality and to detect significant changes. During July 1959, samples were collected from 26 wells.

Ground Water Occurrence. Ground water occurs chiefly in formations of alluvial and/or volcanic origin, ranging from Pliocene to Recent in age. The water-bearing formations, in order of decreasing age, are the Tuscan and Tehama formations, the Red Bluff gravels, and the Quaternary alluvium. Unconfined ground water occurs in the Quaternary alluvium. Confined to partially confined conditions occur in the Tuscan and Tehama formations.

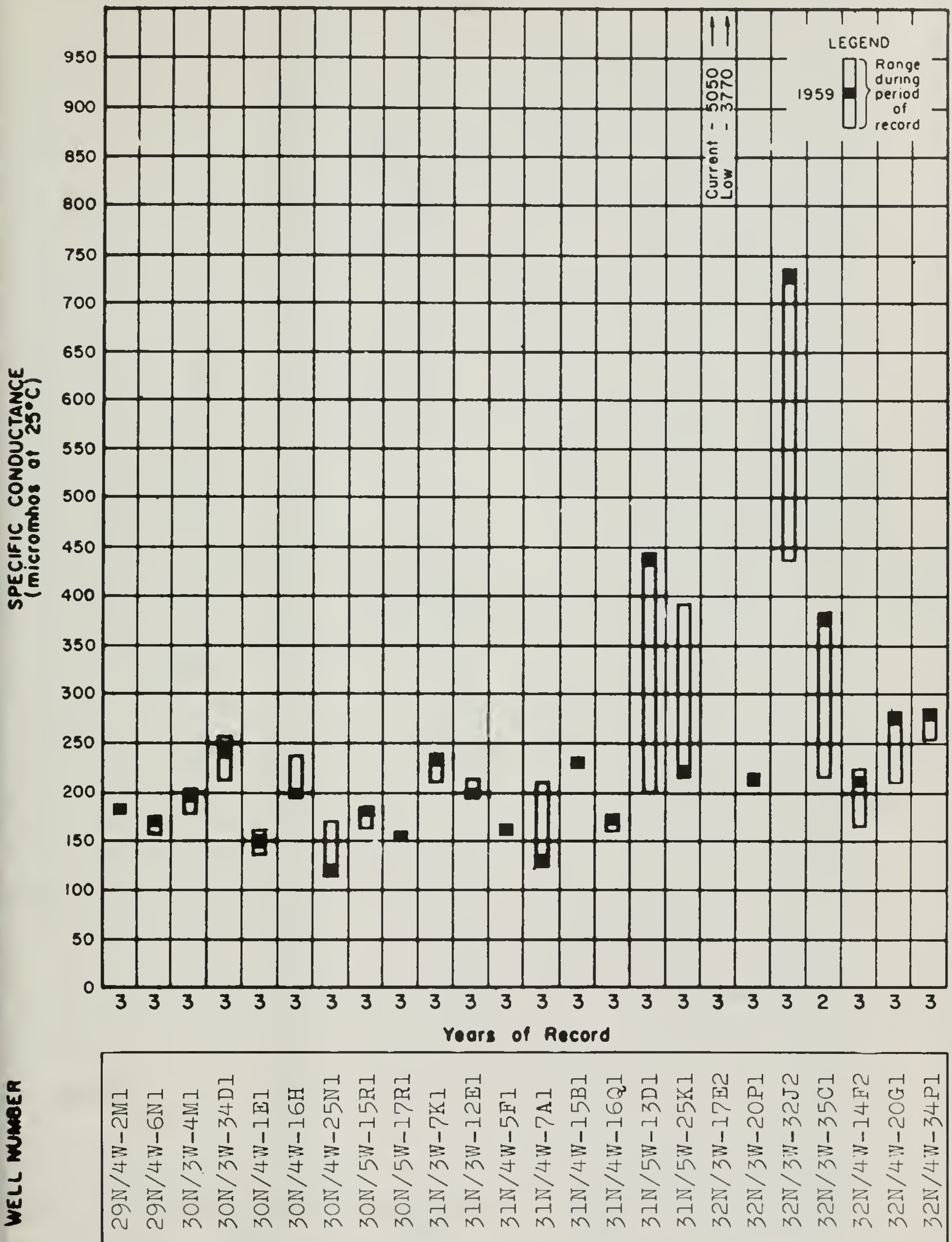
Ground Water Development. Ground water is moderately developed. Wells west of Cottonwood yield 500 to 800 gpm; those in the southeastern portion of the basin yield 1,000 to 2,000 gpm.

Beneficial Uses of Ground Water. Ground water is used primarily for domestic, municipal and industrial requirements. Irrigation water is supplied mainly from surface sources.

Major Waste Discharges. The only large waste discharge in Redding Basin consists of sewage effluent from the City of Redding, discharged into the Sacramento River.

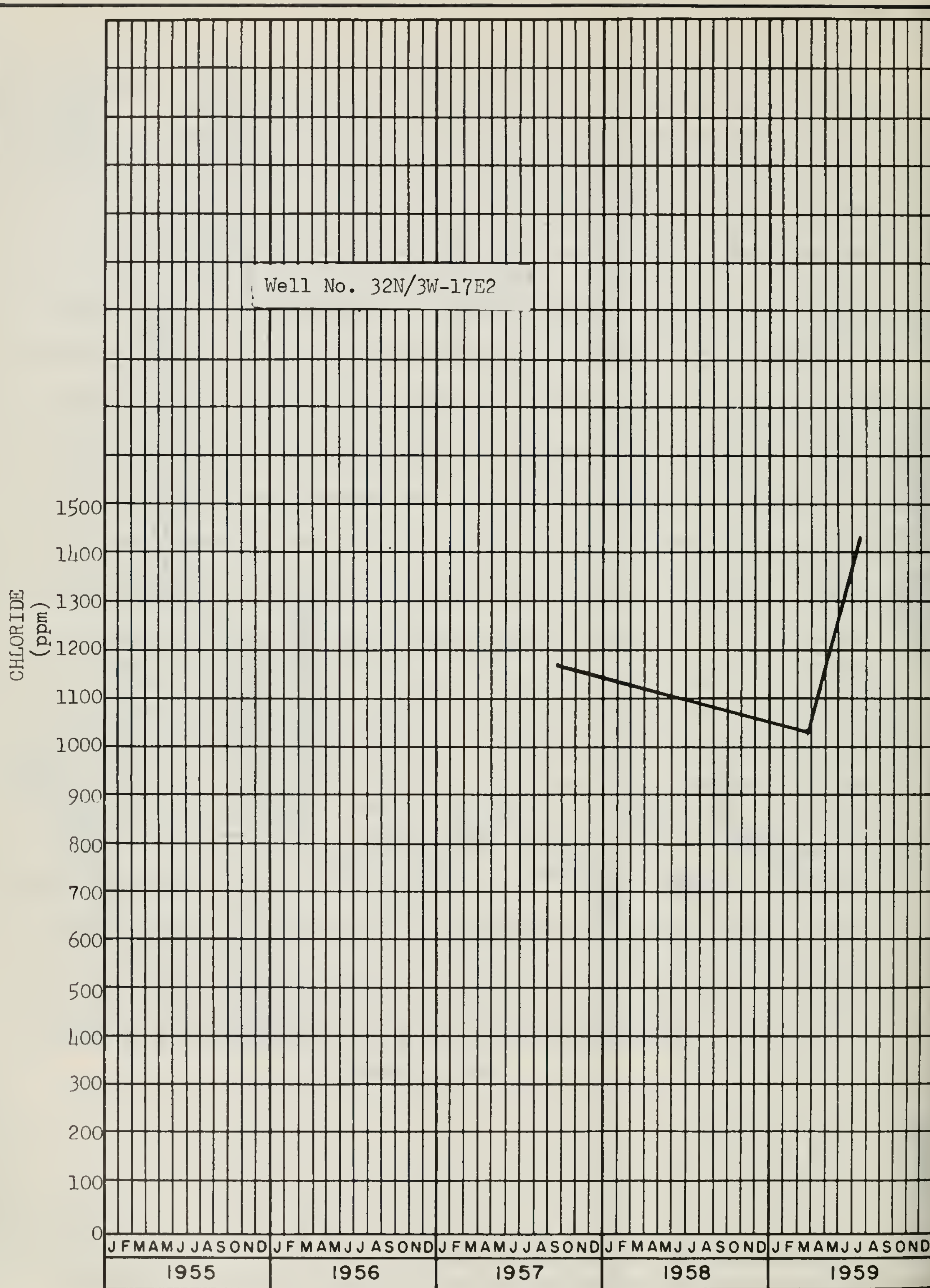
Evaluation of Water Quality. Ground waters of Redding Basin are magnesium-calcium or magnesium-sodium bicarbonate in type and are generallv of excellent mineral quality. Total dissolved solids seldom exceed 200 ppm and sodium is generally below 60 percent. However, highly mineralized ground waters are found in individual wells at a few locations. Approximately 1 mile south of Redding, water from a recently drilled well contains about 17,000 ppm chlorides. This well flows at the rate of 10 to 50 gpm into Oregon Gulch and is a potential source of water quality degradation through infiltration into the fresh water aquifer. This salt water is derived from a geologic formation (Chico formation) which underlies the fresh water aquifer throughout the basin. The formation was deposited in an ancient sea which trapped highly concentrated saline water in the sediments. Results of radiological analyses of the monitoring wells showed a maximum of 10.35 μμc/l in 1959.

Significant Water Quality Changes. Analyses of samples collected from monitored wells in 1959 showed only a few changes in mineral concentrations from those of previous years. In well 32N/3W-32J2, located in the northeastern portion of the monitored area, chlorides increased from 48 to 136 ppm between September 1957 and July 1959. Chlorides in well 32N/3W-17E2, located near Bella Vista, increased from 1,160 to 1,420 ppm during the same period, as shown on the fluctuation graph. The latter well penetrates the Chico formation, which is known to produce highly mineralized waters.



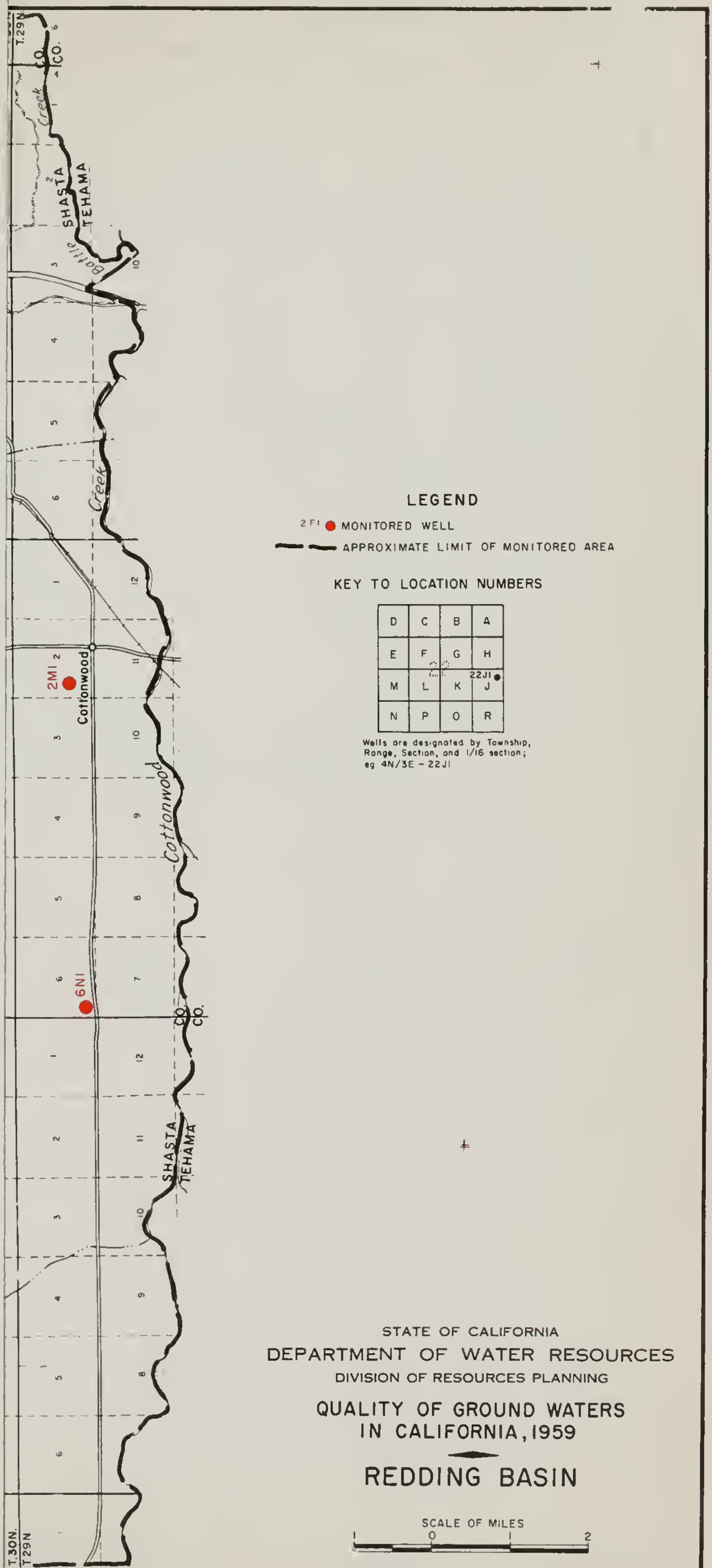
WATER QUALITY RANGES

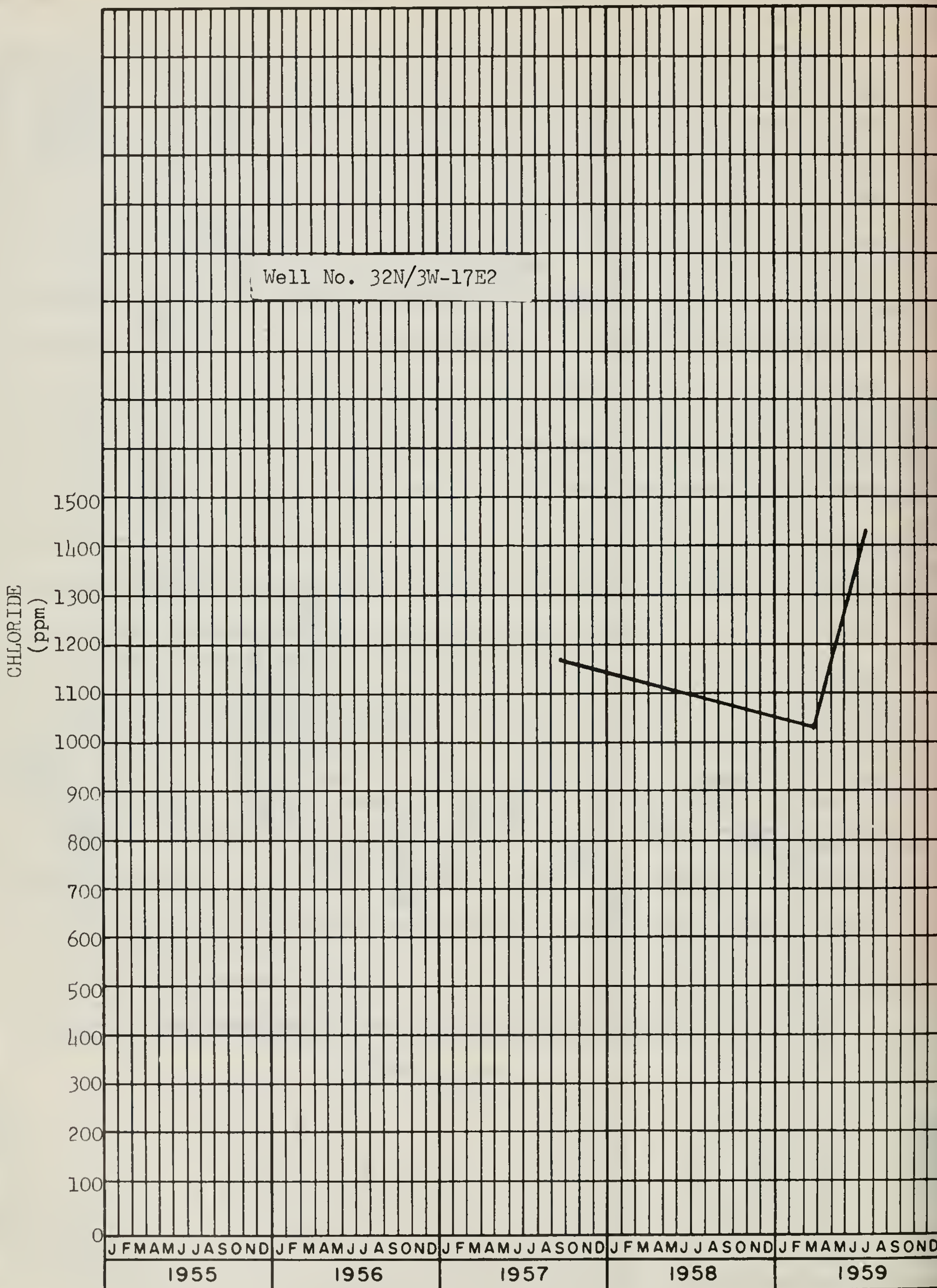
REDDING BASIN



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

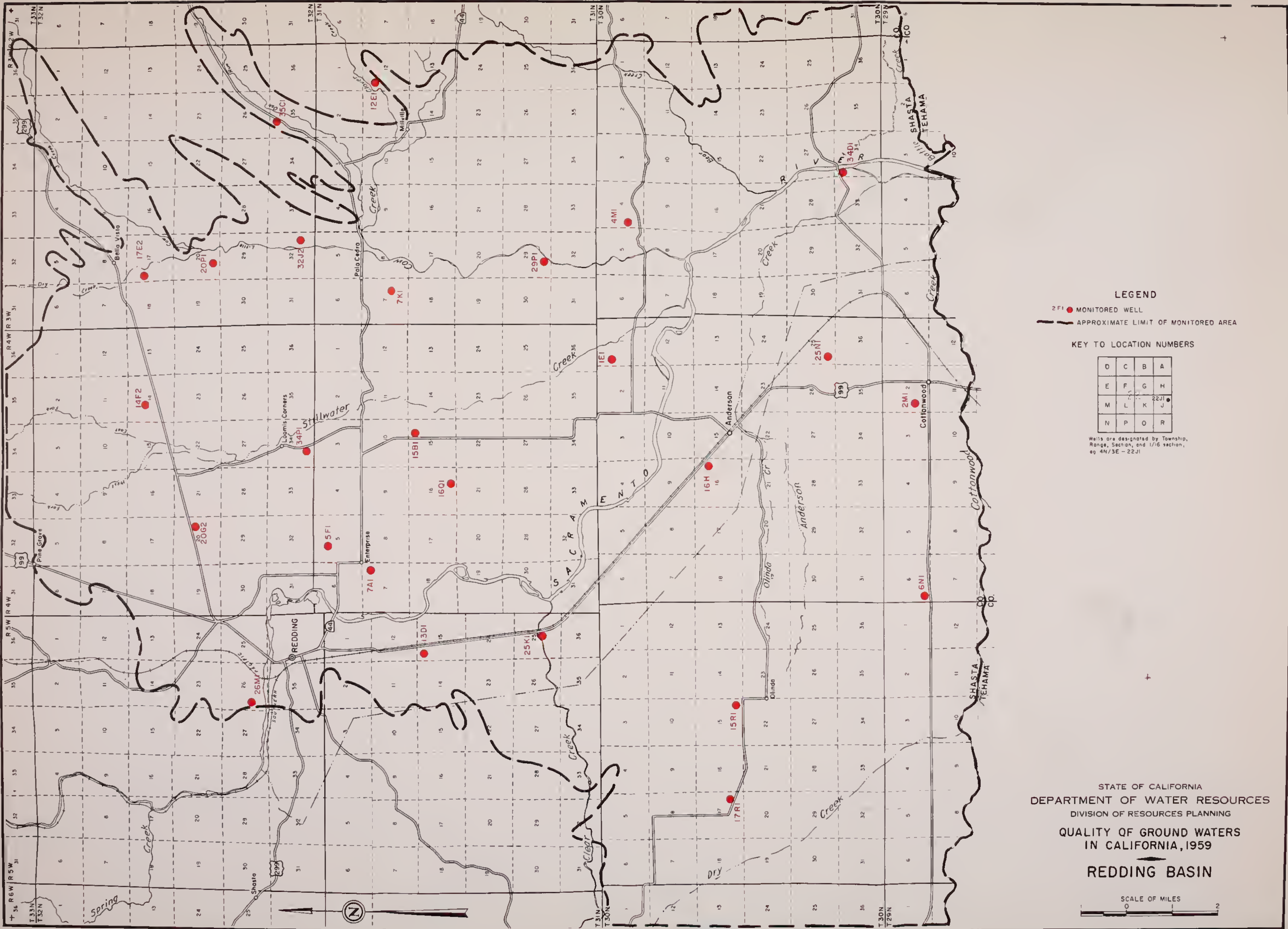
REDDING BASIN


LEGEND
2F1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section; eg 4N/3E - 22J1
2M1
6N1
Cottonwood
Cottonwood Creek
Battle Creek
Creek
SHASTA
TEHAMA
SHASTA CO.
TEHAMA CO.
T.30N.
T.29N.
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
REDDING BASIN
SCALE OF MILES
0
2



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

REDDING BASIN


LEGEND
2F1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E - 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
REDDING BASIN
SCALE OF MILES
1 0 1 2
REDDING
Anderson
Cottonwood
Palo Cedro
Millville
Bella Vista
Enterprise
Olinda
Shasta
Loomis Corners
Pine Grove
SACRAMENTO
RIVER
Cow
Stillwater
Creek
Clear
Anderson
Cottonwood
Dry
Spring
Bear
SHASTA
TEHAMA
35C1
12E1
34D1
4M1
17E2
20P1
32J2
29P1
7K1
1E1
25N1
14F2
34P1
15B1
16Q1
16H
2M1
20G2
5F1
7A1
6N1
13D1
25K1
26M1
15R1
17R1

Upper Lake Valley borders on the north shore of Clear Lake in Lake County. It extends about 7 miles north from the shore line and includes an area of about 16 square miles.

Monitoring Program. Excessive quantities of boron known to occur in ground waters in the western and southern portions of the valley prompted the establishment of a monitoring program in the area in 1953. Samples were collected from 12 wells during June 1959.

Ground Water Occurrence. The principal aquifers in the area consist of alluvium and unconsolidated to poorly consolidated sediments deposited in the lake as it existed during Quaternary time. Ground water occurs in strata and lenticular beds of sand and gravel. Fine-grained lake sediments confine the aquifers in the lower portion of the valley.

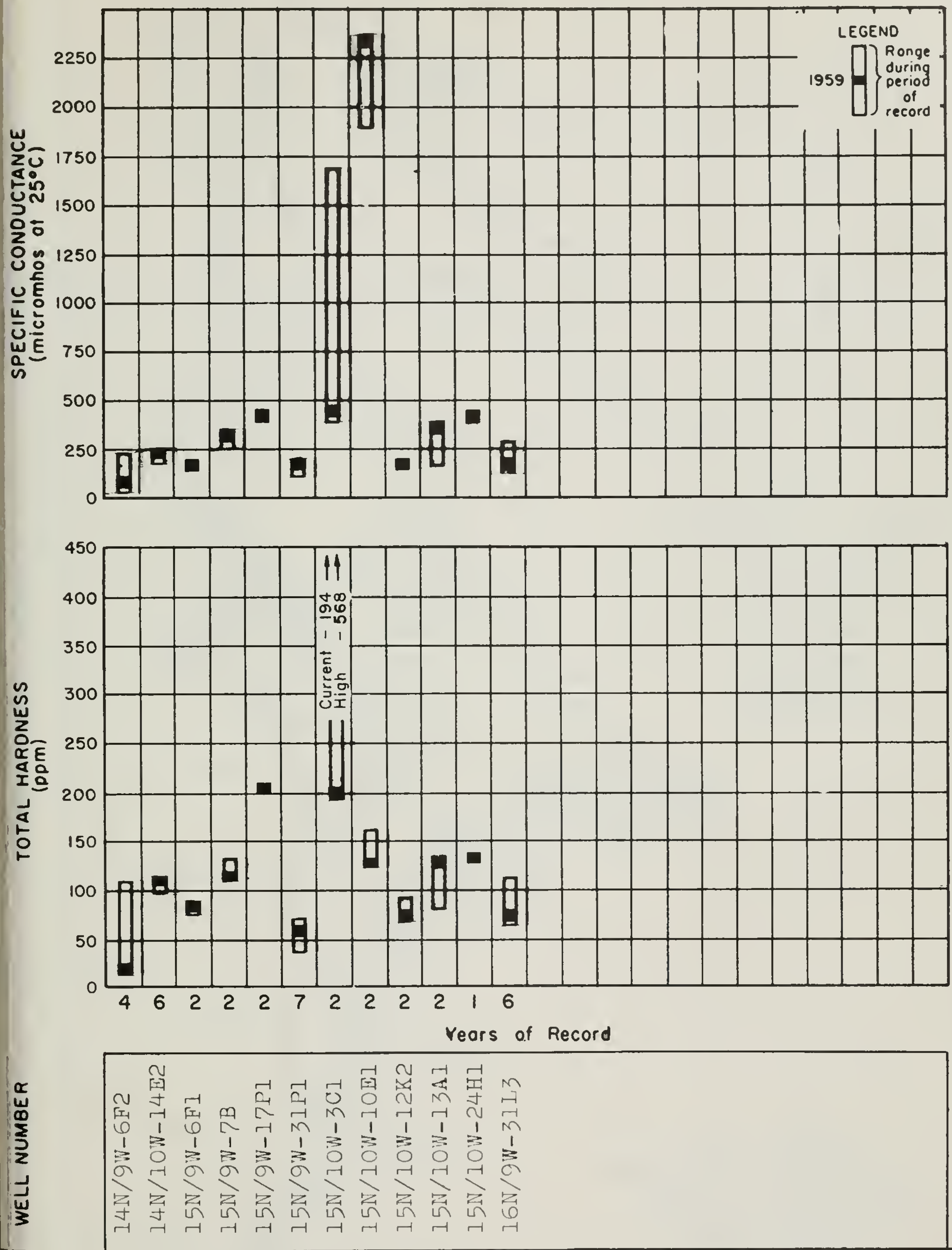
Ground Water Development. Ground water is moderately to extensively developed. Wells in areas of unconfined ground water have an average yield of about 350 gpm while those in the confined area yield about 230 gpm.

Beneficial Uses of Ground Water. Ground water is used primarily for irrigation, domestic and stock watering purposes.

Major Waste Discharges. There are no large waste discharges in the area. Several small domestic and industrial wastes near the town of Upper Lake are discharged into Scotts Creek or Middle Creek and then carried into Clear Lake.

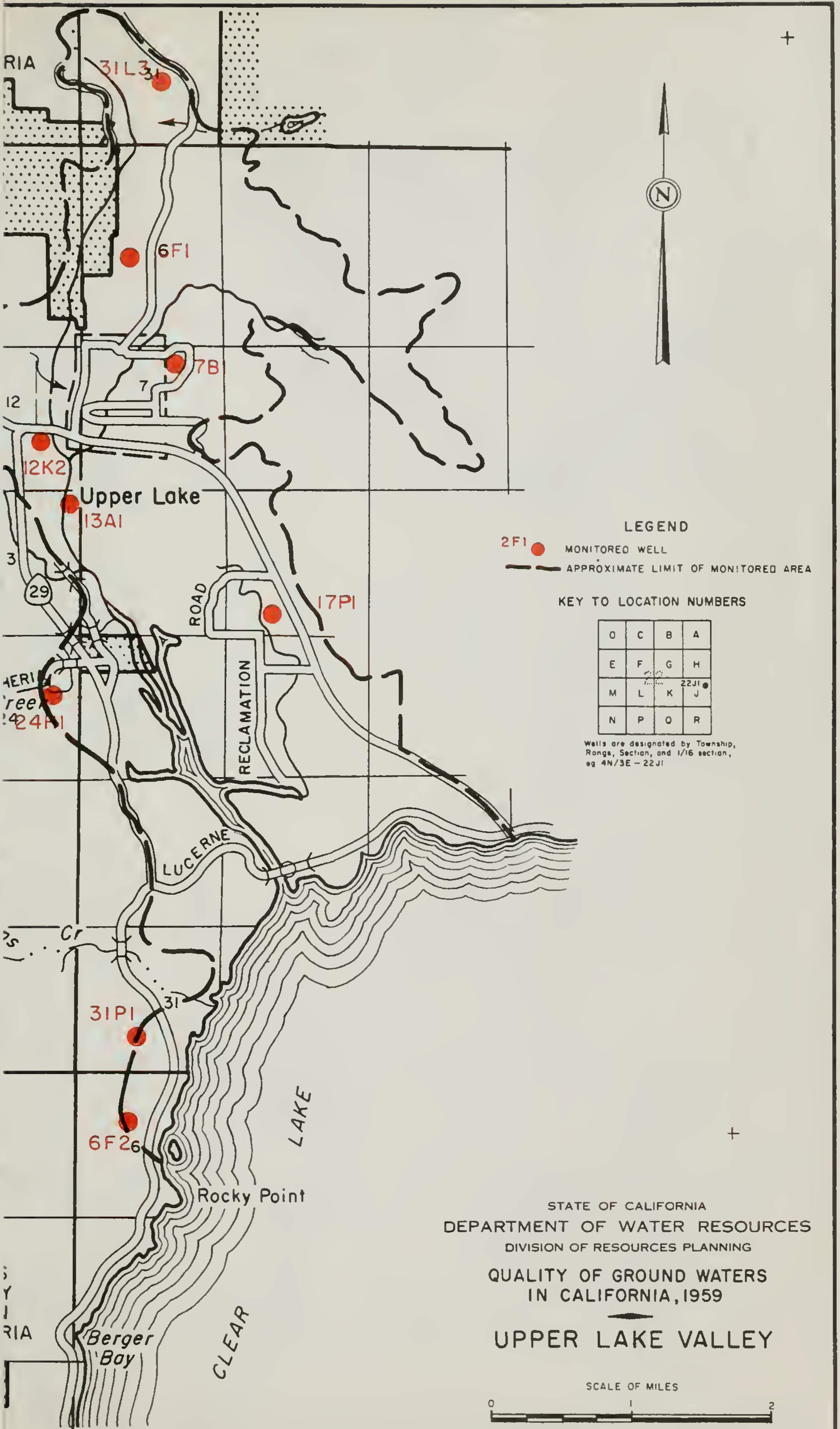
Evaluation of Water Quality. Ground waters in Upper Lake Valley are generally calcium or magnesium bicarbonate in type and, with the exception of some waters being moderately to very hard and the local occurrence of high boron concentrations, are of excellent mineral quality. Possible migration of ground waters containing high boron concentrations into areas of good quality water constitutes a threat to ground water quality in this area.

Significant Water Quality Changes. Water from well 15N/10W-13A1, located about 0.5 mile south of Upper Lake, showed an increase in total dissolved solids from 107 to 239 ppm and in boron from 0.06 to 0.73 ppm between July 1958 and June 1959. Since there are only two years of record on this well, it is not known whether these increases represent normal fluctuations or indicate a trend toward ground water degradation in this location. During 1959, well 15N/10W-10E1, located approximately 3 miles west of Upper Lake, contained 68 ppm boron.

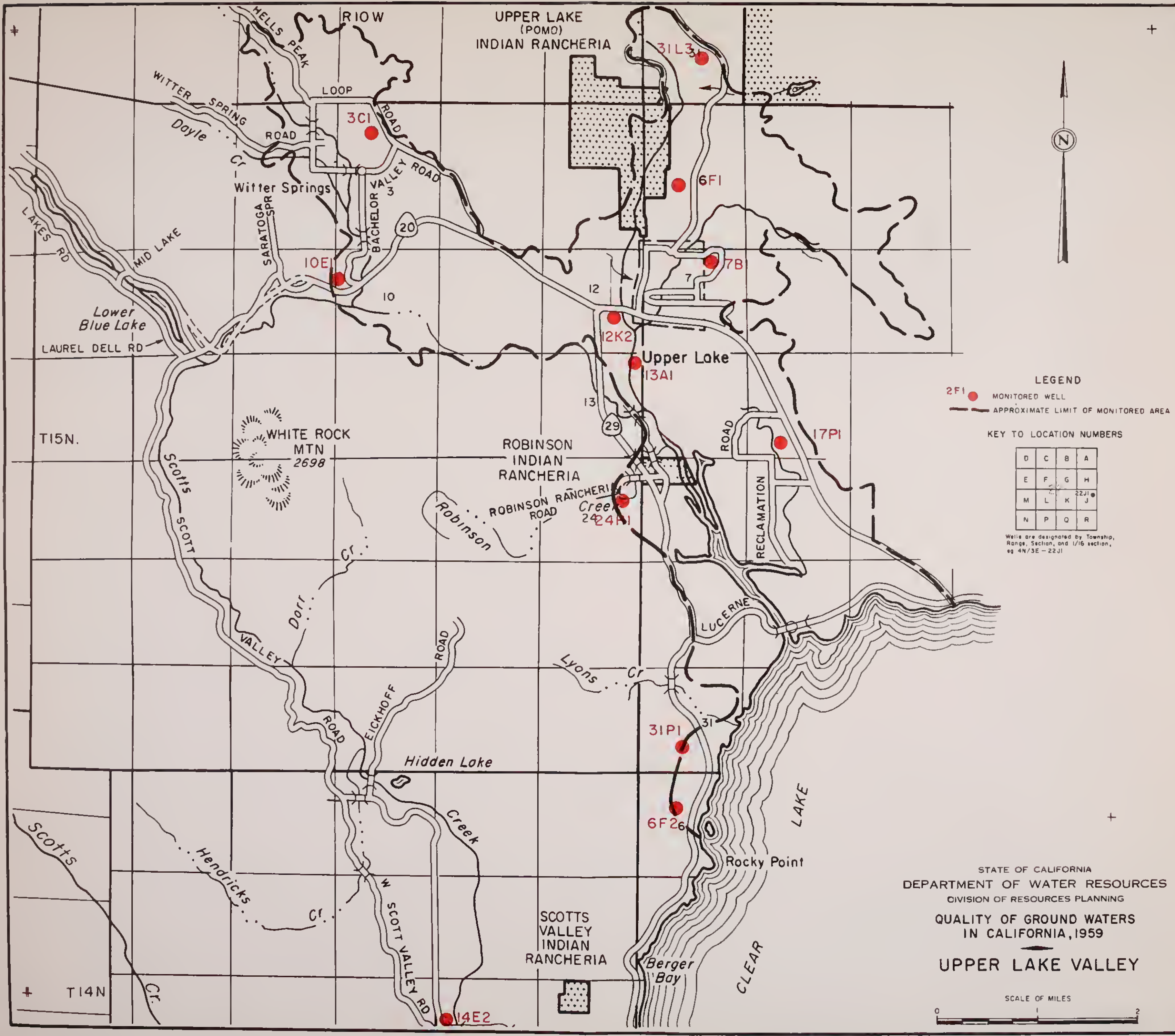


WATER QUALITY RANGES

UPPER LAKE VALLEY



31L3
6F1
7B1
12K2
Upper Lake
13A1
17P1
24P1
31P1
6F2
ROAD
RECLAMATION
LUCERNE
Cr
Rocky Point
Berger Bay
CLEAR
LAKE
29
LEGEND
2F1
MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E – 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
UPPER LAKE VALLEY
SCALE OF MILES
0
1
2



R10W
UPPER LAKE
(POMO)
INDIAN RANCHERIA
HELLS PEAK
WITTER SPRING ROAD
LOOP ROAD
Dayle Cr
Witter Springs
VALLEY ROAD
BACHELOR
SARATOGA SPR
LAKES RD
MID LAKE
Lower Blue Lake
LAUREL DELL RD
WHITE ROCK MTN 2698
T15N.
ROBINSON INDIAN RANCHERIA
ROBINSON RANCHERIA ROAD
Robinson Creek
Upper Lake
RECLAMATION ROAD
Scotts
SCOTT VALLEY ROAD
Dorr Cr
EICKHOFF ROAD
Lyons Cr
LUCERNE
Hidden Lake
Creek
Hendricks Cr
W SCOTT VALLEY RD
SCOTTS VALLEY INDIAN RANCHERIA
Scotts Cr
T14N
Berger Bay
Rocky Point
CLEAR LAKE
3C1
10E1
6F1
31L3
7B1
12K2
13A1
17P1
24P1
31P1
6F2
14E2
LEGEND
2F1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E – 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
UPPER LAKE VALLEY
SCALE OF MILES
0 1 2

Kelseyville Valley is a gently rolling plain in Lake County. It is bordered by Clear Lake on the north, extends about 7 miles south from the shore line, and encompasses an area of approximately 30 square miles.

Monitoring Program. In order to detect any degradation of ground water by migration of waters containing excessive boron concentrations which are known to occur in the area, a monitoring program was established in Kelseyville Valley in 1953. Samples were collected from nine wells during the month of June 1959.

Ground Water Occurrence. The principal aquifers are alluvium and unconsolidated to poorly consolidated lake sediments which were deposited during Quaternary time. Volcanic detritus also comprises a notable portion of the water-bearing sediments. Confinement which occurs in aquifers beneath Clear Lake extends about 1 mile beneath Kelseyville Valley.

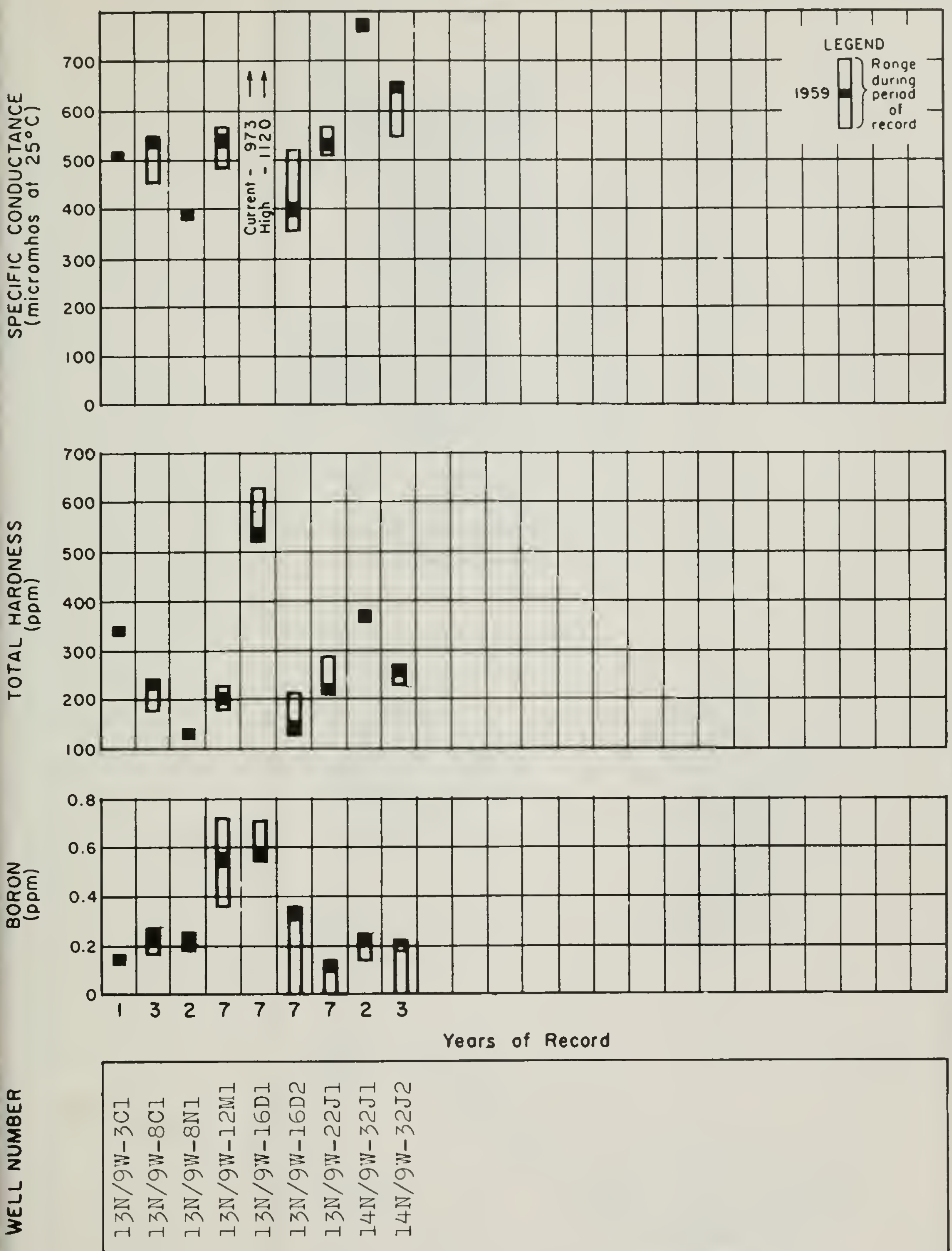
Ground Water Development. Ground water is extensively developed in the area. Well yields average approximately 450 gpm. Yields in the confined area are slightly higher than those in the unconfined area.

Beneficial Uses of Ground Water. Ground water is used extensively for irrigation, domestic and stock watering purposes.

Major Waste Discharges. There are no large waste discharges in Kelseyville Valley. Communities are small and individual sewage disposal systems are used.

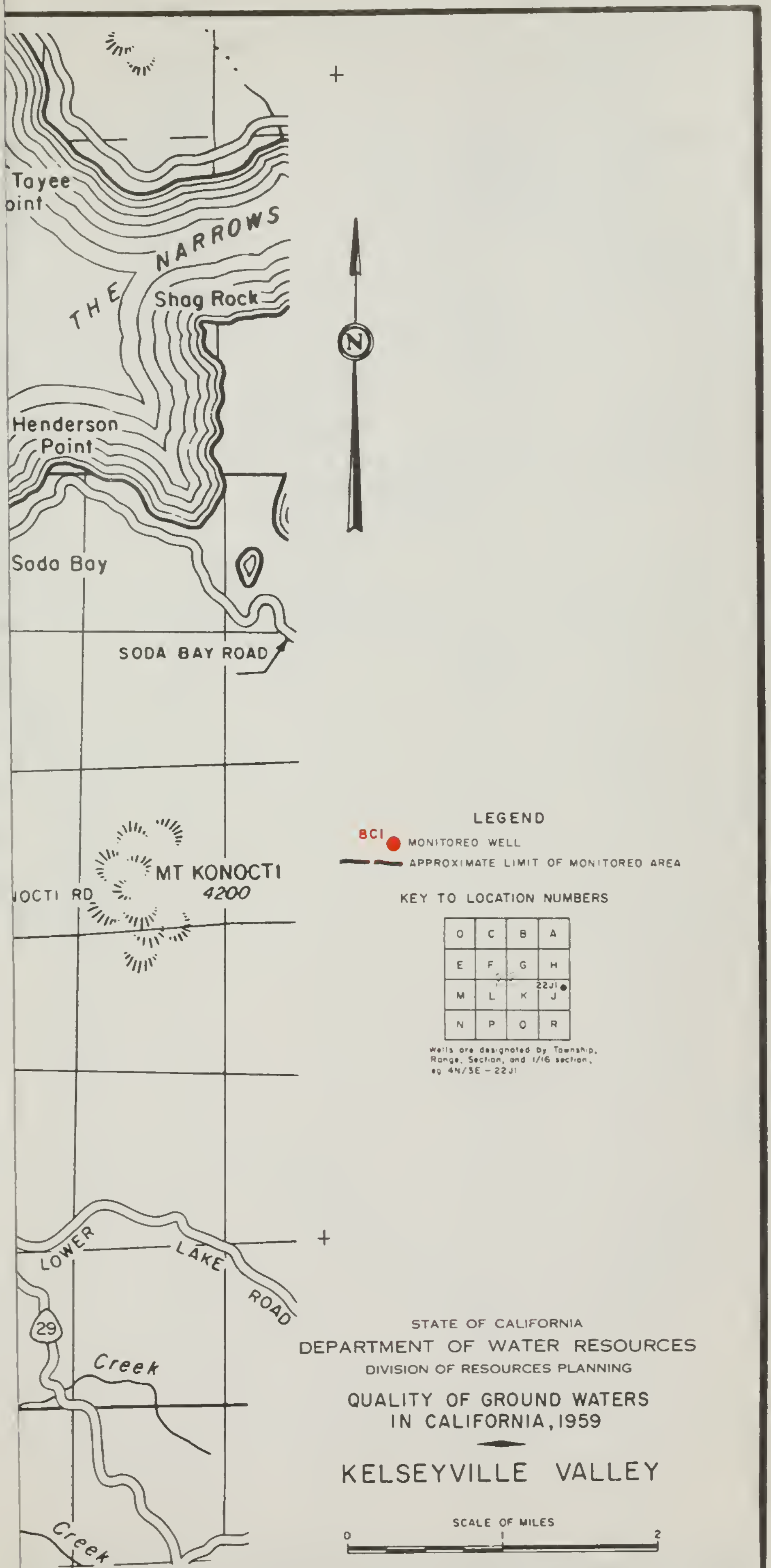
Evaluation of Water Quality. Ground waters in Kelseyville Valley are magnesium bicarbonate in type and, with the exception of high boron concentrations at some locations, are of good to excellent mineral quality. Waters from most of the monitoring wells range from moderately to very hard.

Significant Water Quality Changes. None.

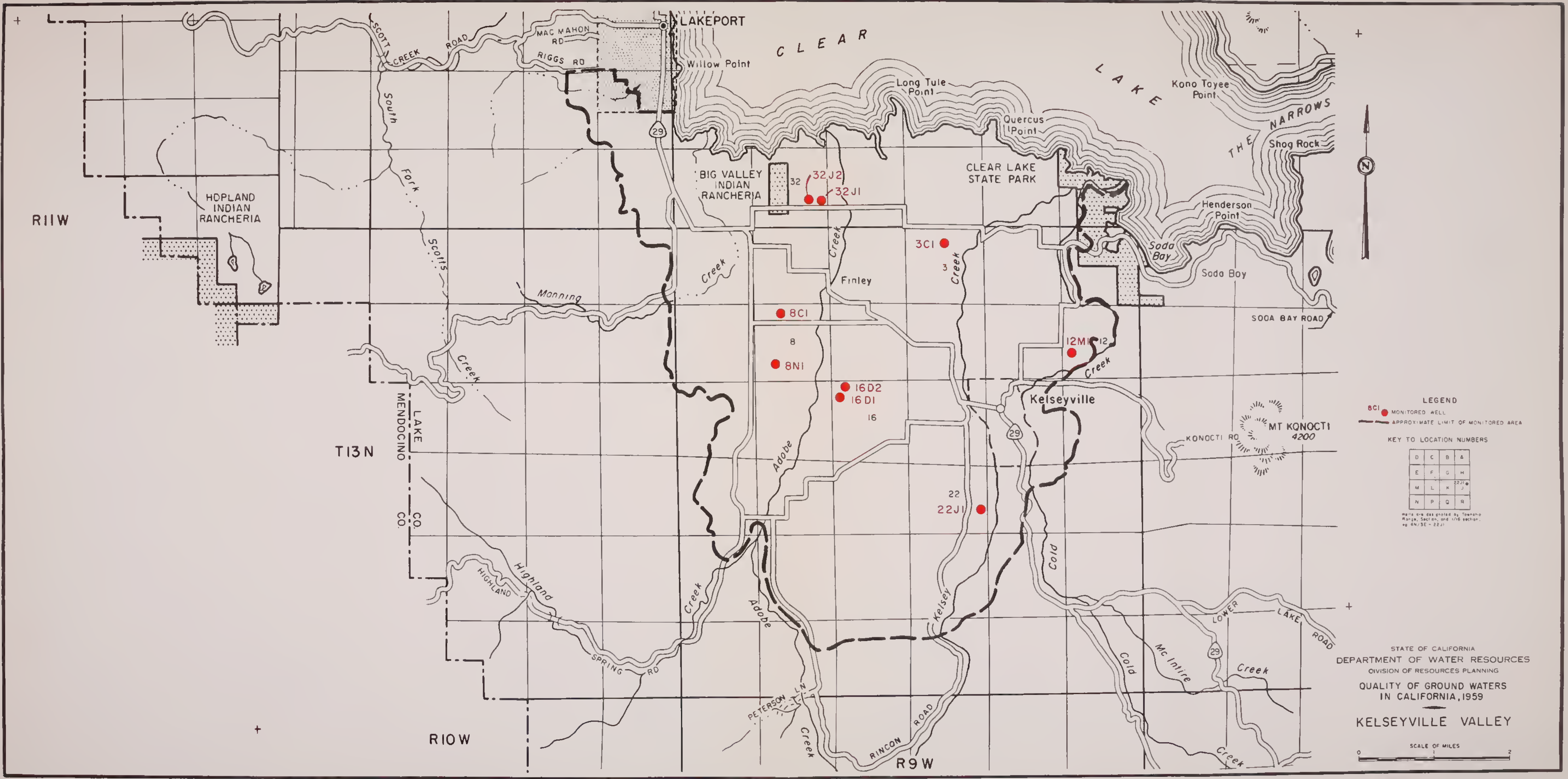


WATER QUALITY RANGES

KELSEYVILLE VALLEY



Tayee
oint
THE NARROWS
Shag Rock
Henderson
Point
Soda Bay
SODA BAY ROAD
MT KONOCTI
4200
NOCTI RD
LOWER LAKE ROAD
29
Creek
Creek
LEGEND
8C1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E – 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
KELSEYVILLE VALLEY
SCALE OF MILES
0
1
2



STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959

KELSEYVILLE VALLEY

SACRAMENTO VALLEY (5-21)

The Sacramento Valley area comprises about 5,000 square miles of valley floor land which extends generally northward from the Cosumnes River to the vicinity of the City of Red Bluff. It is bordered on the east by the Sierra Nevada and on the west by the Coast Range. Its ground water storage capacity, between the depths of 20 and 200 feet, is approximately 30,000,000 acre-feet.

Almost all of the Sacramento Valley is included in the ground water quality monitoring program. During 1959, samples were collected from 250 wells in the area, primarily during the summer irrigation season. Ground waters are generally of excellent mineral quality and suitable for a large number of beneficial uses. Quality problems are primarily local. High concentrations of boron are found in Tehama, Colusa, Placer and Yolo Counties. Excessive concentrations of chlorides occur in southern Sutter County and in a few individual wells in Yuba and Placer Counties. The following is a discussion of the Sacramento Valley by counties.

TEHAMA COUNTY

The monitored area in Tehama County extends from the Glenn and Butte county lines on the south to the vicinity of Red Bluff on the north. It is approximately 30 miles long, north to south, and varies in width from about 6 to 18 miles.

Monitoring Program. Tehama County was included in the monitoring program in 1957 to provide essential ground water quality data and to detect any migration of waters containing high boron which are known to be present in the area. Samples were collected from 25 wells in the area during the period July - August 1959.

Ground Water Occurrence. Ground water occurs chiefly in formations of alluvial and/or volcanic origin, ranging from Pliocene to Recent age. The water-bearing formations, in order of decreasing age, are the Tuscan and Tehama formations, the Red Bluff gravels, and the Quaternary alluvium. Ground water is unconfined in the Quaternary alluvium; confined to partially confined in the Tehama and Tuscan formations.

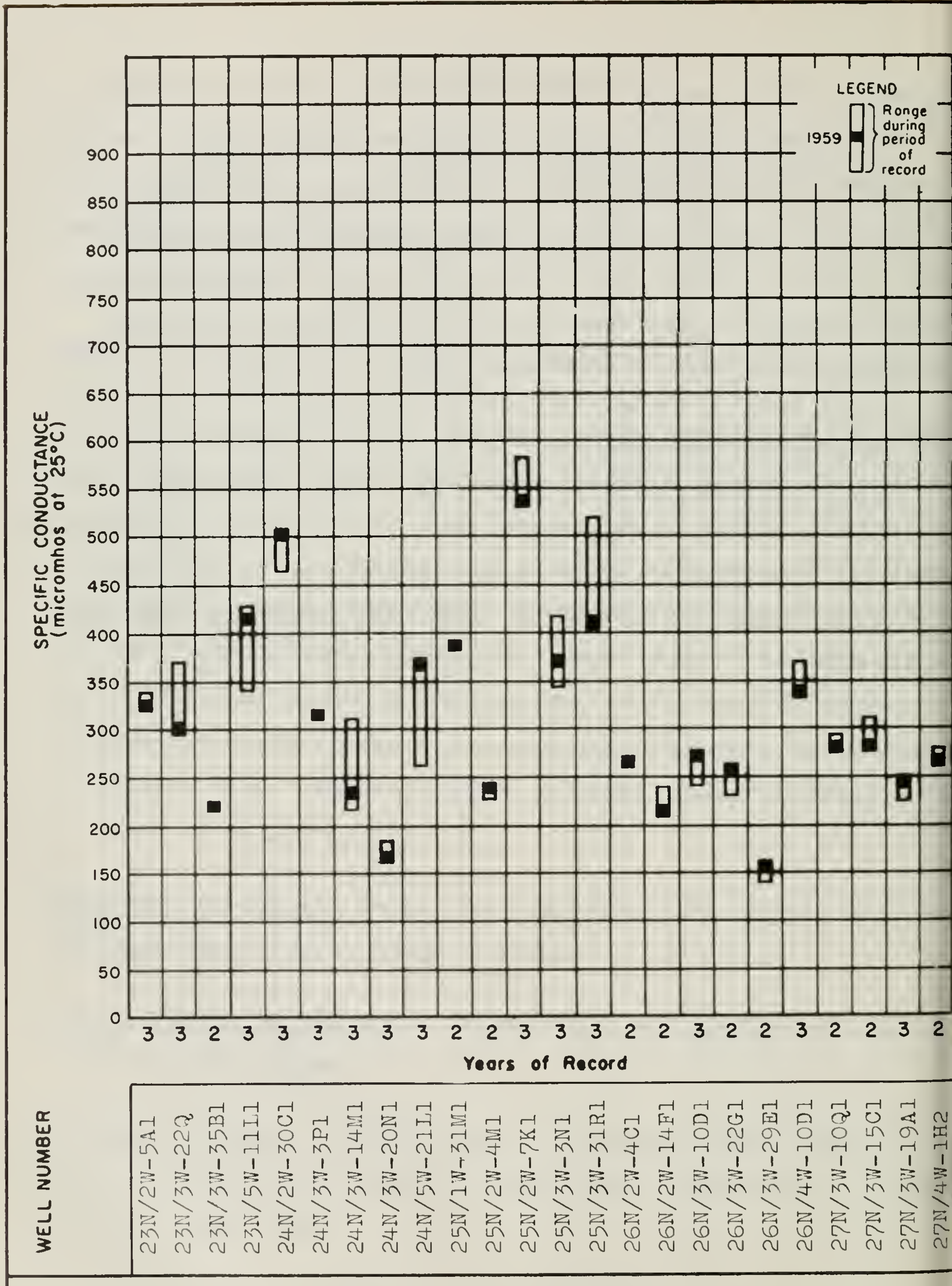
Ground Water Development. Ground water is moderately to extensively developed. Irrigation wells produce an average of 470 gpm.

Beneficial Uses of Ground Water. Ground water is used primarily for irrigation and domestic purposes.

Major Waste Discharges. The only large waste discharge in Tehama County consists of effluent from the City of Red Bluff sewage treatment plant discharged into the Sacramento River.

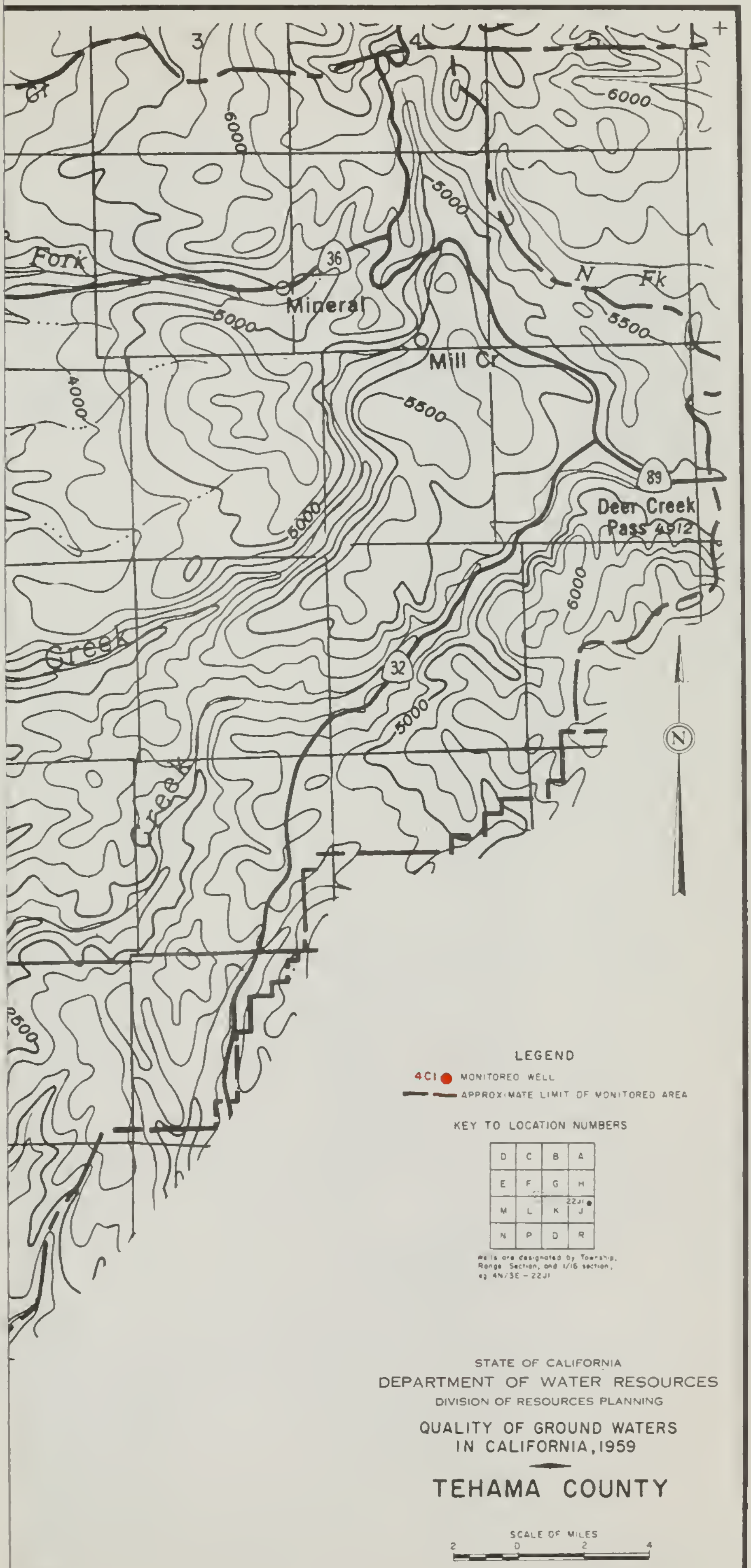
Evaluation of Water Quality. Ground waters in Tehama County are generally of excellent mineral quality. They are bicarbonate in type, with calcium the predominant cation, although calcium is rarely present in concentrations greater than 50 percent of the total cations. There is evidence of high boron concentrations in ground waters to the north and east of the monitored area. Possible migration of these waters into areas of good water quality poses the most important threat to ground water quality in this area.

Significant Water Quality Changes. Analyses of samples collected in 1959 compared with those of 1958 showed significant changes in mineral constituents in two wells. Percent sodium decreased from 84 to 31 percent in well 26N/2W-14F1, located in the northeastern portion of the monitored area. Boron increased from 0.0 to 1.4 ppm in well 27N/4W-1H2, located approximately 2.5 miles north of Red Bluff.

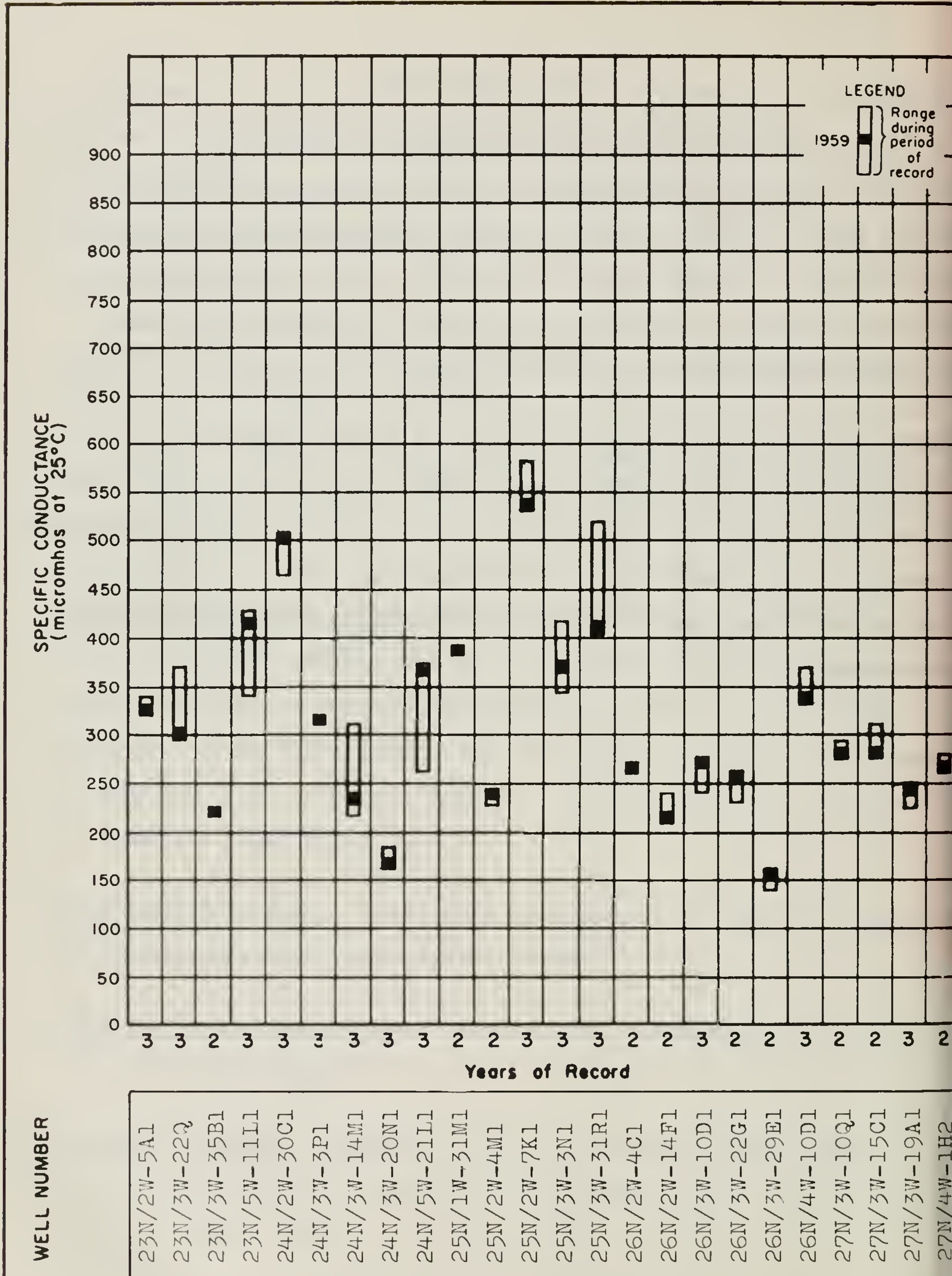


WATER QUALITY RANGES

TEHEMA COUNTY

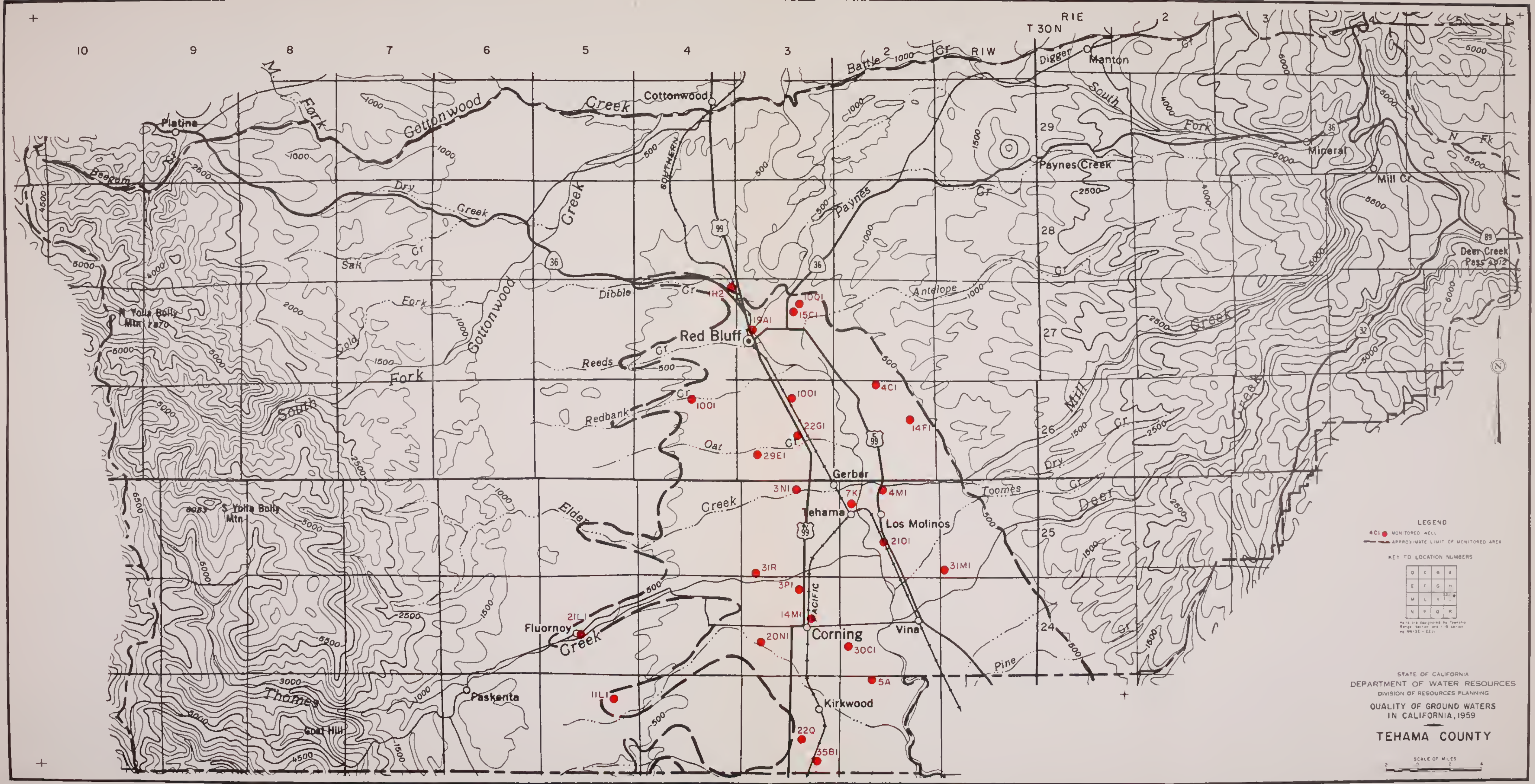


3
4
5
6000
5000
Fork
36
Mineral
N Fk
5500
Mill Cr
4000
89
Deer Creek Pass 4912
Creek
32
Creek
LEGEND
4C1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E-22J1
N
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
TEHAMA COUNTY
SCALE OF MILES
2 0 2 4



WATER QUALITY RANGES

TEHEMA COUNTY



LEGEND
4C1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
TEHAMA COUNTY
SCALE OF MILES
T 30 N
R 1 E
R 1 W
Red Bluff
Cottonwood
Platina
Manton
Paynes Creek
Mineral
Mill Cr
Deer Creek Pass
Gerber
Tehama
Los Molinos
Corning
Vina
Kirkwood
Paskenta
Fluornoy
Goat Hill
S Yolla Bolly Mtn
N Yolla Bolly Mtn
Cottonwood Creek
South Fork
Battle Cr
Digger Cr
Paynes Cr
Antelope Cr
Dibble Cr
Reeds Cr
Redbank Cr
Oat Cr
Elder Creek
Thomes Creek
Toomes Cr
Deer Cr
Mill Cr
Pine Cr
Dry Cr
Salt Cr
Beegum Cr
SOUTHERN PACIFIC
1H2
19A1
10Q1
15C1
4C1
10Q1
10Q1
14F1
22G1
29E1
3N1
7K
4M1
21Q1
31R
31M1
3P1
14M1
21L1
20N1
30C1
5A
11L1
22Q
35B1

GLENN COUNTY

The monitored portion of Glenn County includes the valley floor area which lies generally between the Sacramento River on the east and the nonwater-bearing rocks of the Coast Range on the west. It is bounded on the north by Tehama County and on the south by Colusa County. It extends about 25 miles north to south and 15 miles east to west.

Monitoring Program. Because of the importance of ground water to the economy of Glenn County together with the lack of water quality data, a monitoring program was established in this area in 1957. The program consisted of 24 wells in 1959, which were sampled in June.

Ground Water Occurrence. The chief aquifers in this area are Quaternary alluvium and, in the northern portion, the Tehama formation. Recent alluvium overlies older alluvium to a depth of 40 to 125 feet; older alluvium in turn overlies the Tehama formation. The Stony Creek-Willow Creek alluvial plain and fan produces the largest quantities of ground water in the area. For the most part, ground water is unconfined, although some confinement occurs in the Willows area.

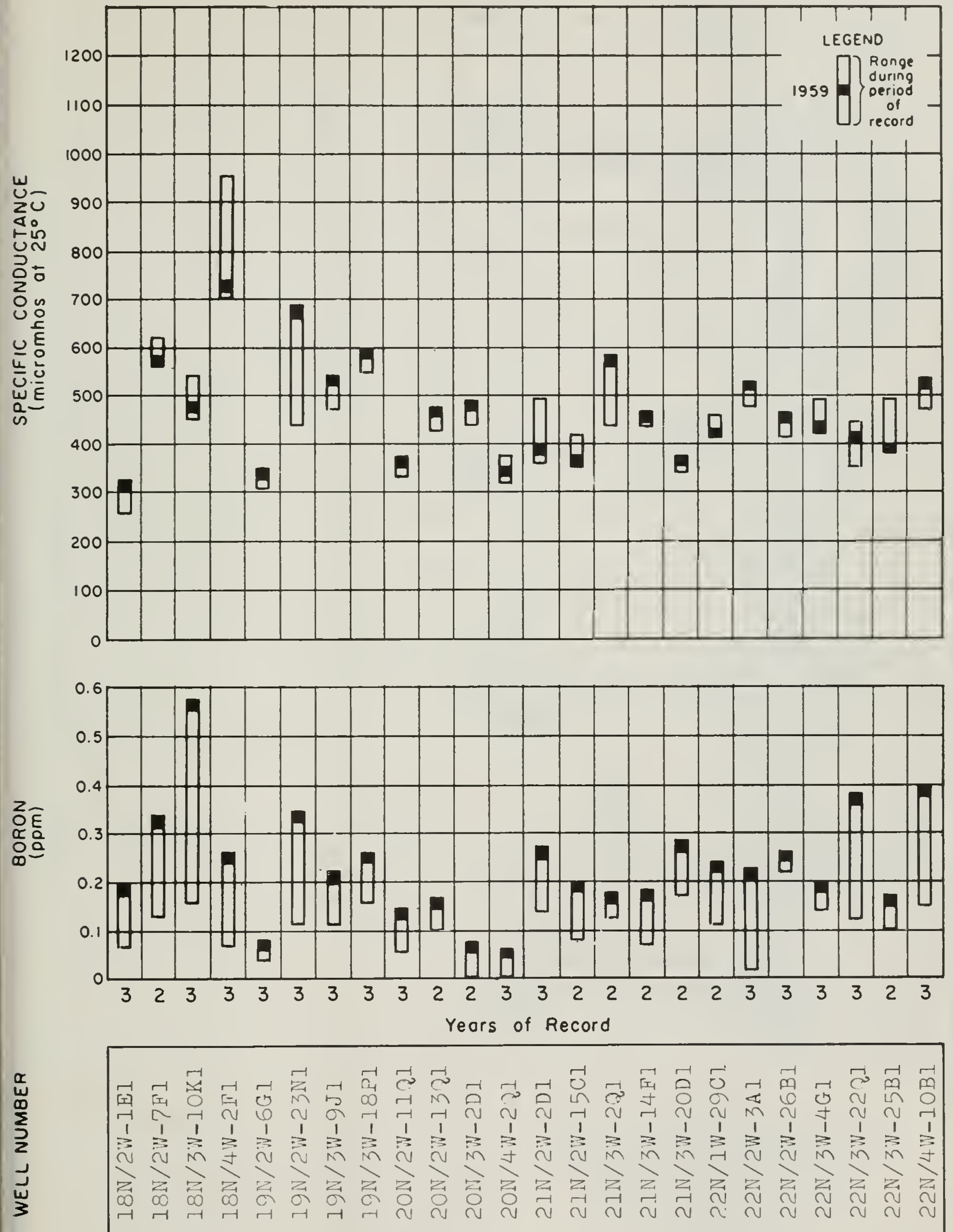
Ground Water Development. Approximately 60 percent of the irrigation and virtually all of the municipal, industrial and domestic water needs are met by ground water. Well yields range from only a few gpm in shallow domestic wells to 750 gpm in deep irrigation wells.

Beneficial Uses of Ground Water. Ground water is used for irrigation, municipal, industrial and domestic purposes.

Major Waste Discharges. The largest waste discharges in Glenn County consist of effluent from sewage treatment plants serving the Cities of Orland and Willows. Other waste discharges emanate from various industrial establishments in the county. Final disposal is accomplished by discharge into streams, percolation ponds or, in some instances, by reuse for irrigation purposes. Ord Bend gas field discharges about 2 gpm of highly saline water (13,700 to 15,400 ppm total dissolved solids) directly to land surface.

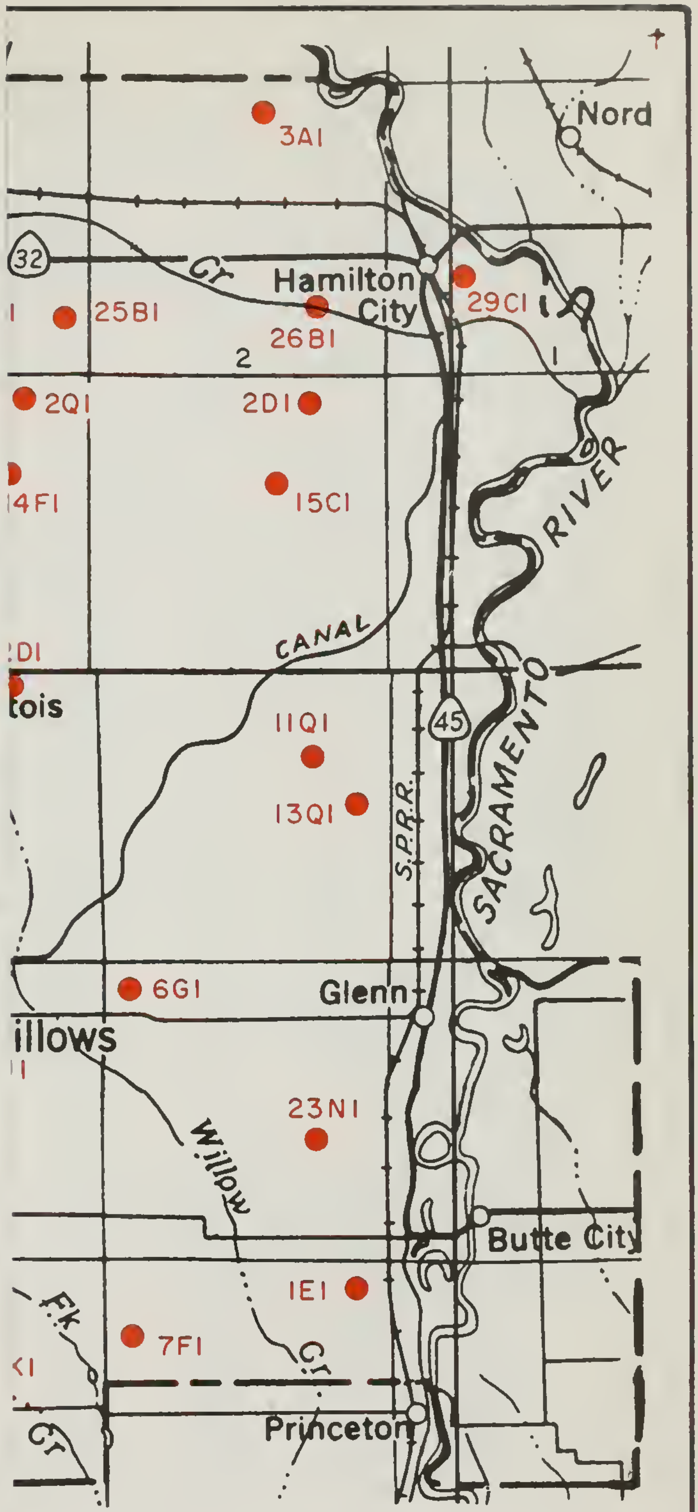
Evaluation of Water Quality. Ground waters of Glenn County are generally of excellent mineral quality. They are bicarbonate in type with calcium the predominant cation, although calcium is rarely in excess of 50 percent of the total cations. These waters contain small to moderate concentrations of boron.

Significant Water Quality Changes. Comparisons of the 1959 analyses with those of 1958 showed a slight increase in boron in all of the monitoring wells. The greatest increase, from 0.35 to 0.58 ppm, occurred in well 18N/3W-10K1, located about 5 miles east of Biggs. There are not enough historical water quality data available to determine whether there is a trend toward higher boron concentrations in this area.



WATER QUALITY RANGES

GLENN COUNTY

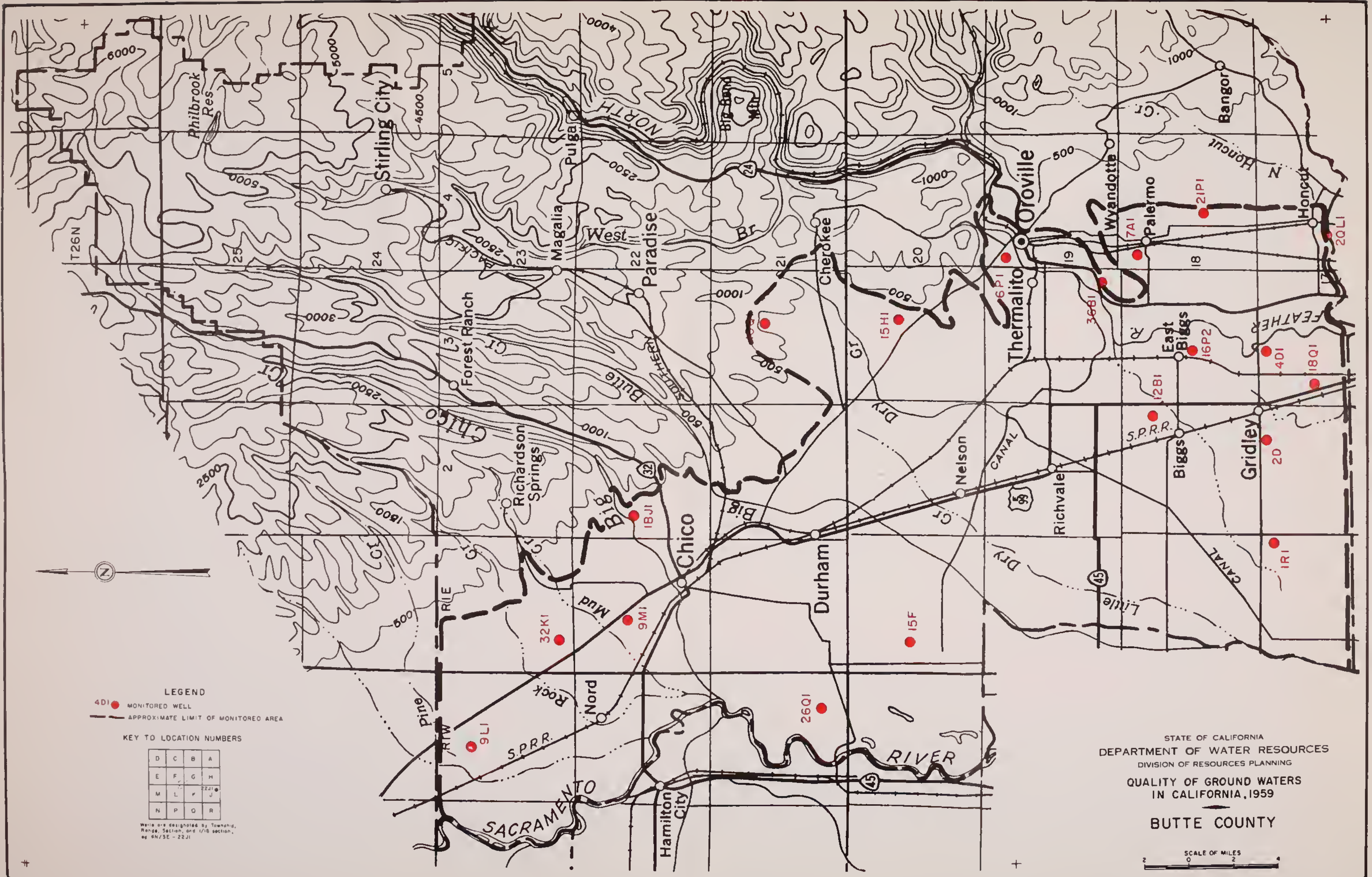


STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959

GLENN COUNTY

SCALE OF MILES
2 0 2 4



LEGEND
MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
BUTTE COUNTY
SCALE OF MILES
Chico
Oroville
Paradise
Durham
Gridley
Biggs
Thermalito
Palermo
Wyandotte
Honcut
Bangor
Nelson
Richvale
East Biggs
Hamilton City
Nord
Magalia
Pulga
Stirling City
Forest Ranch
Richardson Springs
Cherokee
Philbrook Res
SACRAMENTO RIVER
FEATHER
S.P.R.R.

BUTTE COUNTY

The monitored portion of Butte County extends from Tehama County on the north to Sutter County on the south, and from the Sacramento River and Butte Creek on the west to the foothills of the Sierra Nevada on the east. The area is approximately 40 miles in length north to south and varies in width from about 10 to 20 miles.

Monitoring Program. Due to the importance of ground water to the economy of Butte County, a monitoring program was established in the area in 1957. Samples were collected from 19 wells during August 1959.

Ground Water Occurrence. Ground water occurs chiefly in Quaternary alluvium and in the Tuscan formation. The alluvium is composed of Recent and Pleistocene gravels, sands and clays in variable mixtures. The Tuscan formation is of volcanic origin and dips westerly beneath the alluvium at a low angle. Although generally considered to be unconfined, there is evidence of partial confinement locally in the area.

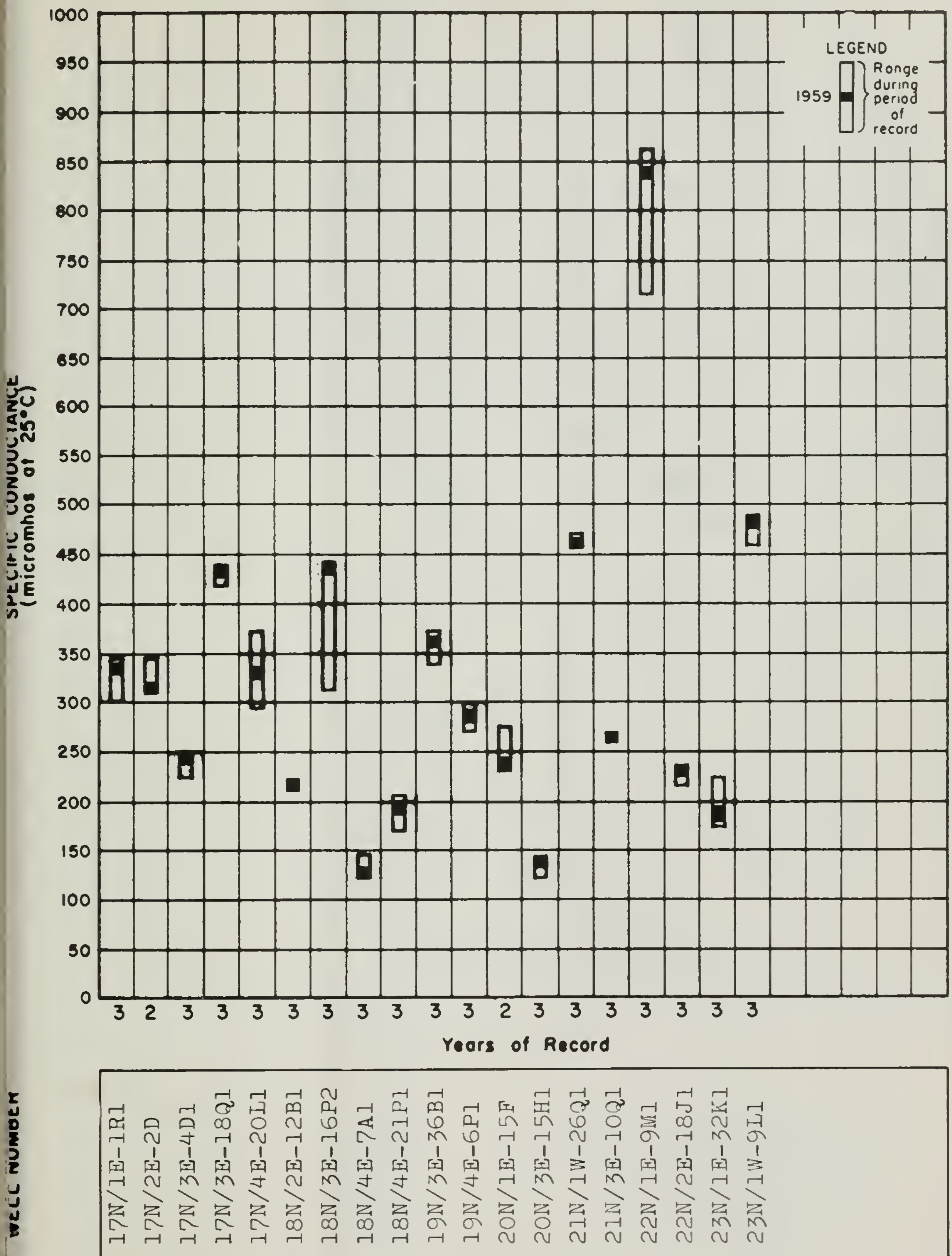
Ground Water Development. Ground water is moderately developed in Butte County. Large irrigation wells located in the central portion of the monitored area produce up to 1,000 gpm. Wells located along the Sacramento River produce about 400 gpm.

Beneficial Uses of Ground Water. The ground waters of Butte County are used for most beneficial purposes, of which irrigation is the largest.

Major Waste Discharges. The major waste water discharges in Butte County consist of effluent from sewage treatment plants located near the Cities of Oroville, Chico and Gridley. The plants located in the Oroville and Gridley areas discharge the treated waste waters to the Feather River. The waste water from the plant in Chico is reused for irrigation or disposed to percolation ponds.

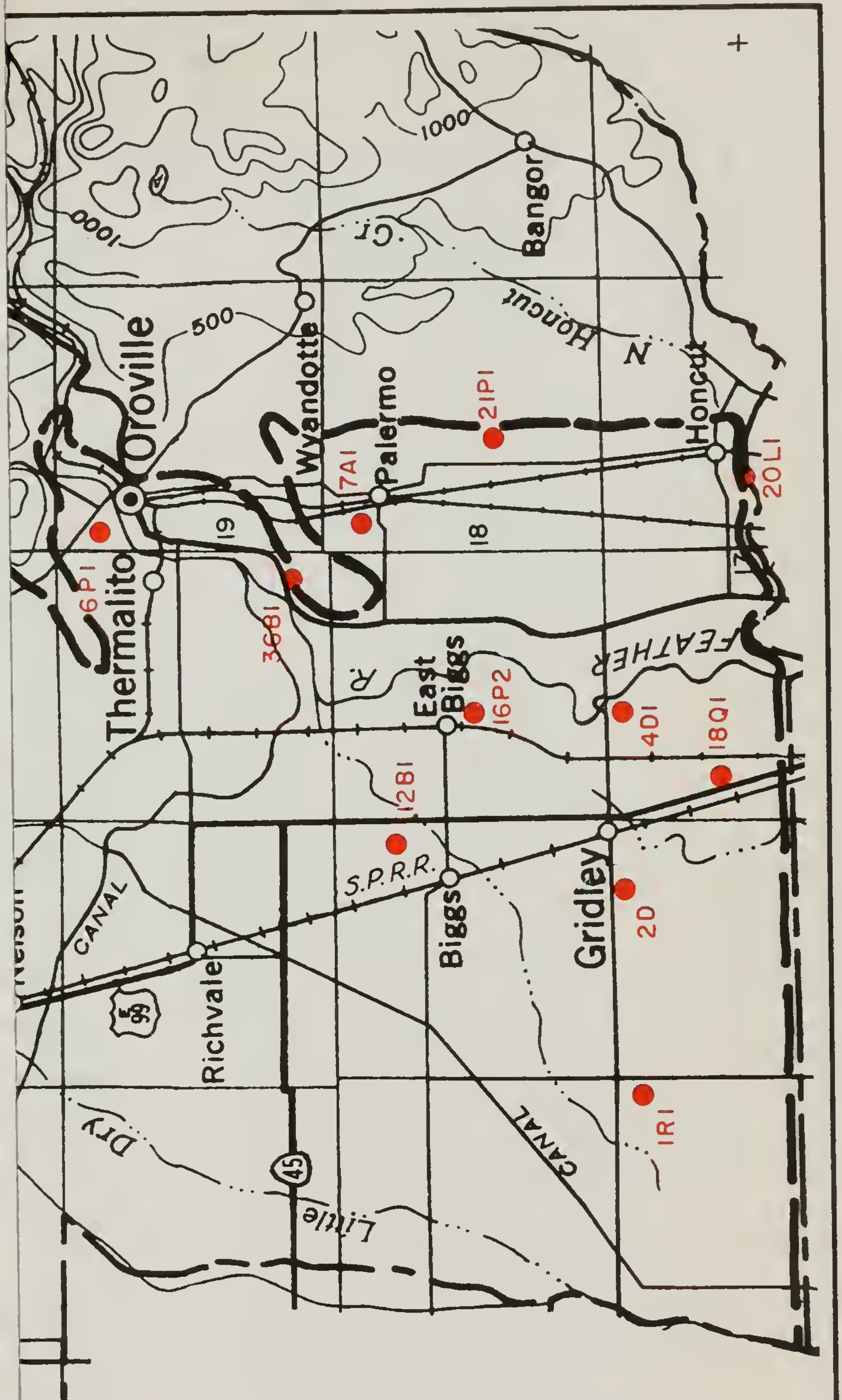
Evaluation of Water Quality. Ground waters of Butte County are bicarbonate in type with the predominant cation being magnesium or a combination of magnesium and calcium in nearly equal proportions. In general, the mineral quality is excellent throughout the monitored area. The sodium percentage is uniformly low, generally less than 25 percent. Total dissolved solids are consistently below 400 ppm. The waters are generally slightly to moderately hard. Results of heavy metal analyses made of all samples collected in 1959 were well within the recommended and mandatory limits for drinking water.

Significant Water Quality Changes. None.



WATER QUALITY RANGES

BUTTE COUNTY

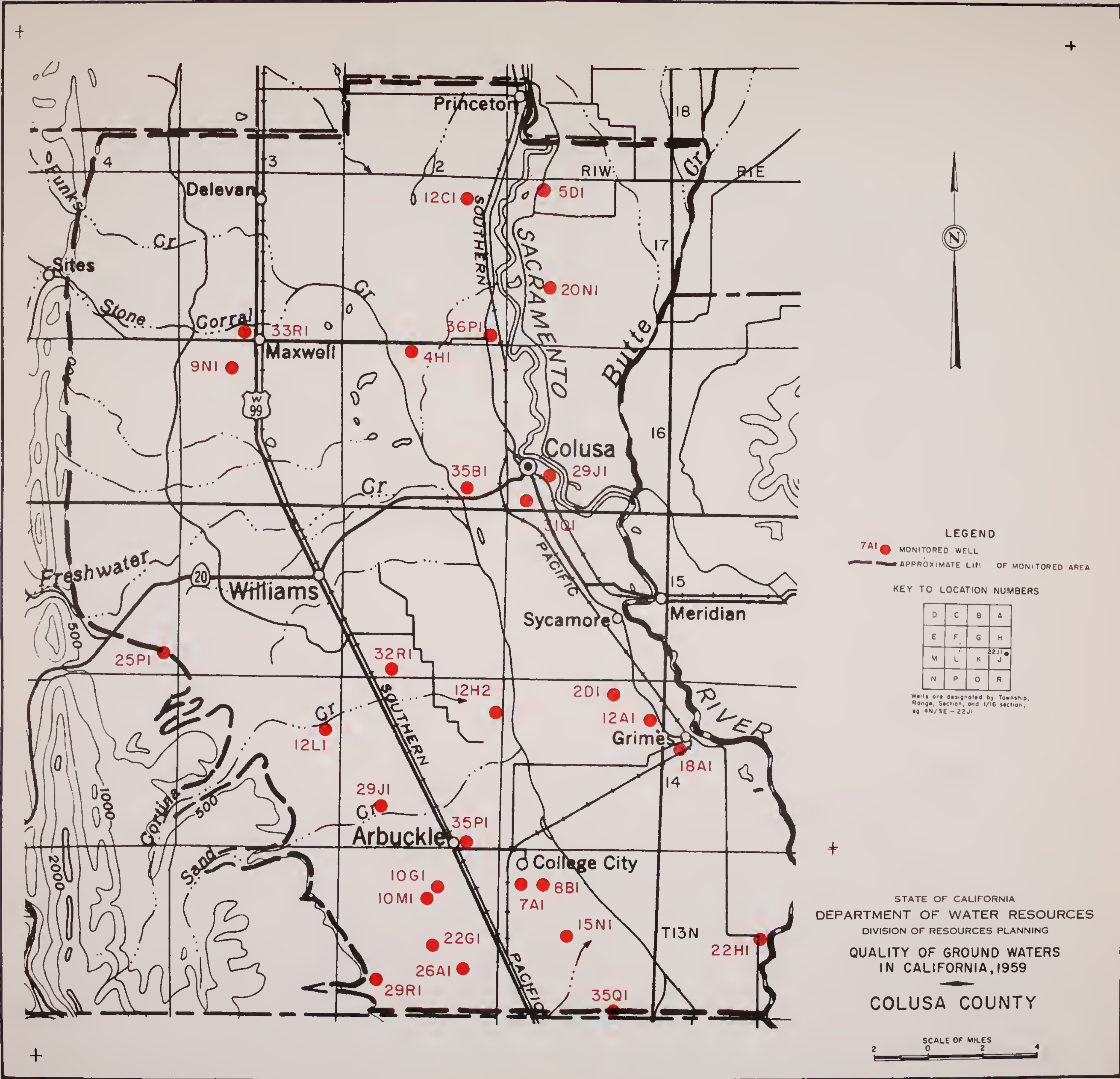


STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959

BUTTE COUNTY

SCALE OF MILES
2 0 2 4


Princeton
Delevan
Sites
Maxwell
Colusa
Williams
Sycamore
Meridian
Grimes
Arbuckle
College City
Funks
Cr
Stone
Corral
Freshwater
Cortina
Sand
Butte
SACRAMENTO
RIVER
SOUTHERN
PACIFIC
RIW
RIE
T13N
4
3
2
18
17
16
15
14
500
1000
2000
12C1
5D1
20N1
33R1
36P1
4H1
9N1
35B1
29J1
31Q1
25P1
32R1
12H2
2D1
12A1
12L1
18A1
29J1
35P1
10G1
10M1
7A1
8B1
15N1
22G1
26A1
29R1
35Q1
22H1
N
LEGEND
7A1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E - 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
COLUSA COUNTY
SCALE OF MILES
2 0 2 4

COLUSA COUNTY

The monitored portion of Colusa County includes most of the valley floor area. It is bounded on the east by Butte Creek and the Sacramento River and on the west by the Coast Range. The area extends from Glenn County on the north to Yolo County on the south, a distance of about 32 miles, and varies in width from 15 to 20 miles.

Monitoring Program. Due to the increasing utilization of ground water in Colusa County, a monitoring program was established in 1957. During 1959, samples were collected from 29 wells during the period June - July.

Ground Water Occurrence. The principal water-bearing formations in Colusa County are the Quaternary alluvium and the underlying Plio-Pleistocene Tehama formation. The Quaternary alluvium consists of Recent alluvium to a depth of 100 feet underlain by Pleistocene alluvium to a depth of 200 feet. Ground water in this area is generally unconfined or partially confined.

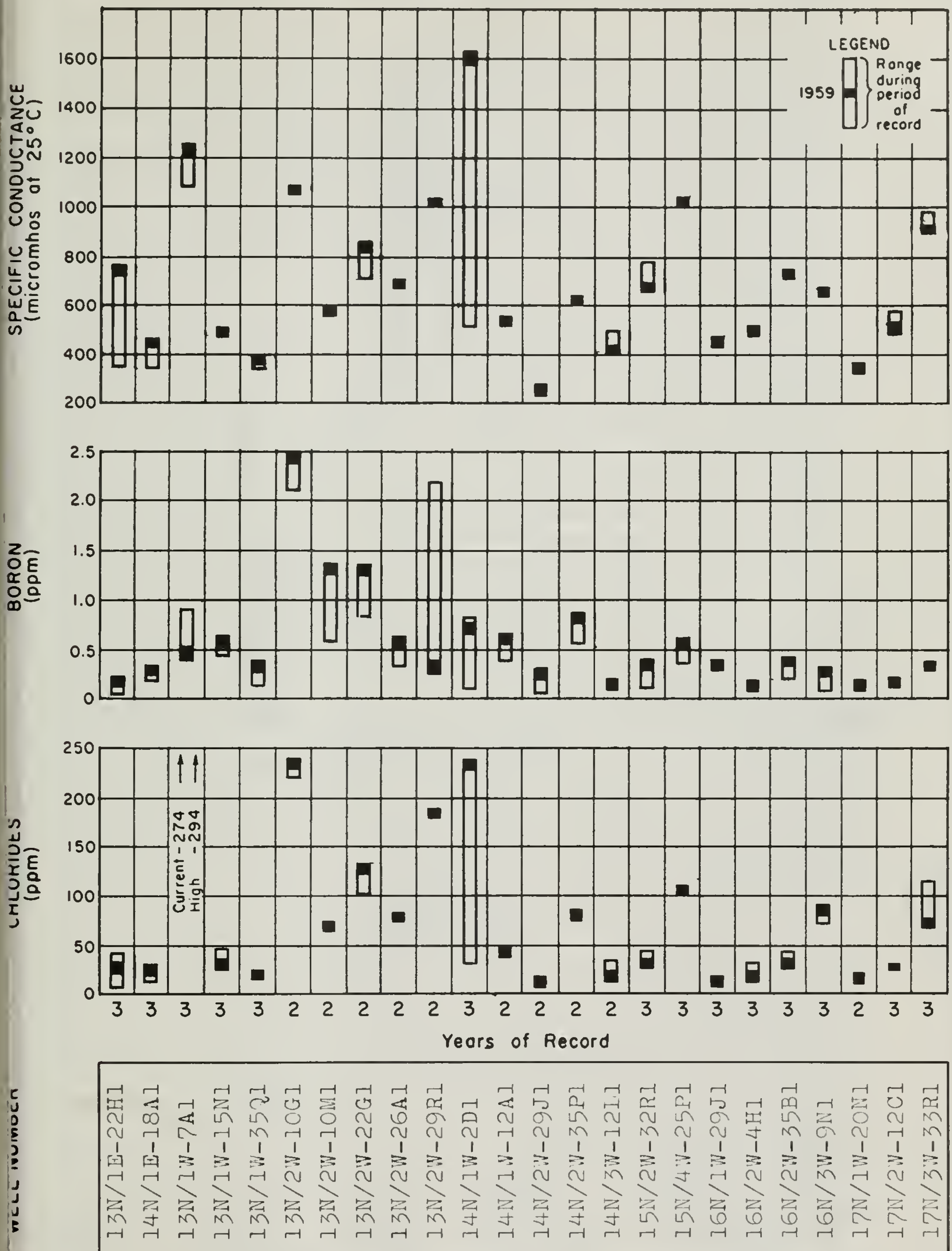
Ground Water Development. Ground water is extensively developed, supplying nearly all water requirements. Large irrigation wells produce over 500 gpm.

Beneficial Uses of Ground Water. Ground water is used for domestic, municipal and irrigation supplies.

Major Waste Discharges. The primary waste discharges in Colusa County are effluent from sewage treatment plants serving the cities or communities of Colusa, Maxwell, Williams and Arbuckle. Minor waste discharges emanate from small industries such as dairies and slaughter houses. Final disposal of these wastes is accomplished by discharge into canals or creeks and thence into the Sacramento River.

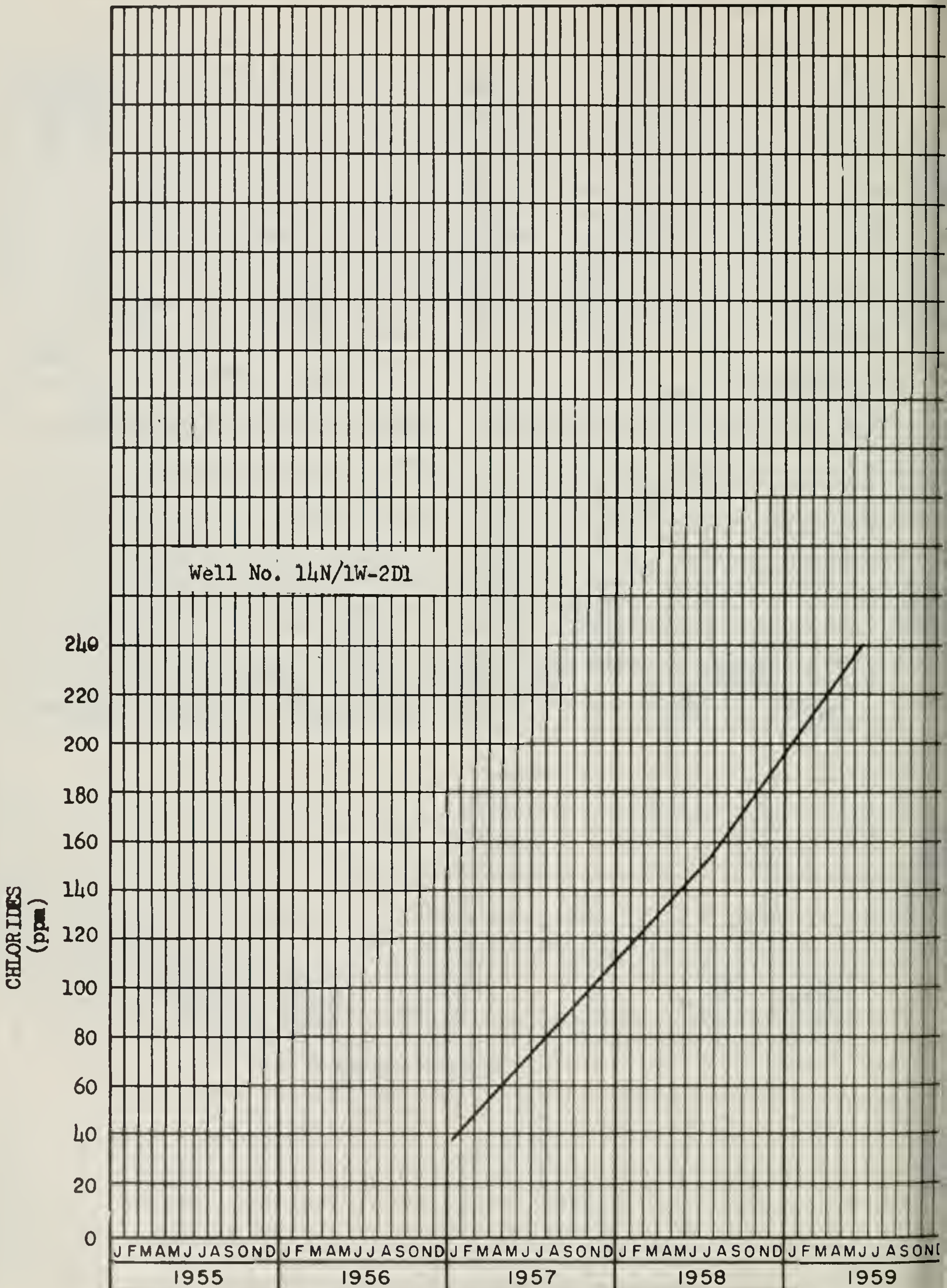
Evaluation of Water Quality. Ground waters of Colusa County vary in mineral quality from excellent to poor. High chlorides and high percent sodium are found at scattered locations. Moderately high boron concentrations occur in the southern portion of the monitored area. The ground waters are generally slightly to moderately hard, although a few wells yield very hard water. Radiological analyses made in 1959 showed a maximum radioactivity of 11.72 $\mu\mu$ c/l.

Significant Water Quality Changes. Analyses of samples collected in 1959 showed substantial increases in boron concentrations in two wells. In these wells, 13N/2W-10M1 and 22G1, located south of Arbuckle, boron increased from 0.58 to 1.4 ppm and from 0.84 to 1.4 ppm, respectively, between July 1958 and June 1959. Boron increased slightly in several other wells. Chlorides increased from 155 to 240 ppm in well 14N/1W-2D1, located about 8 miles south of Colusa, during the same period (see fluctuation graph).



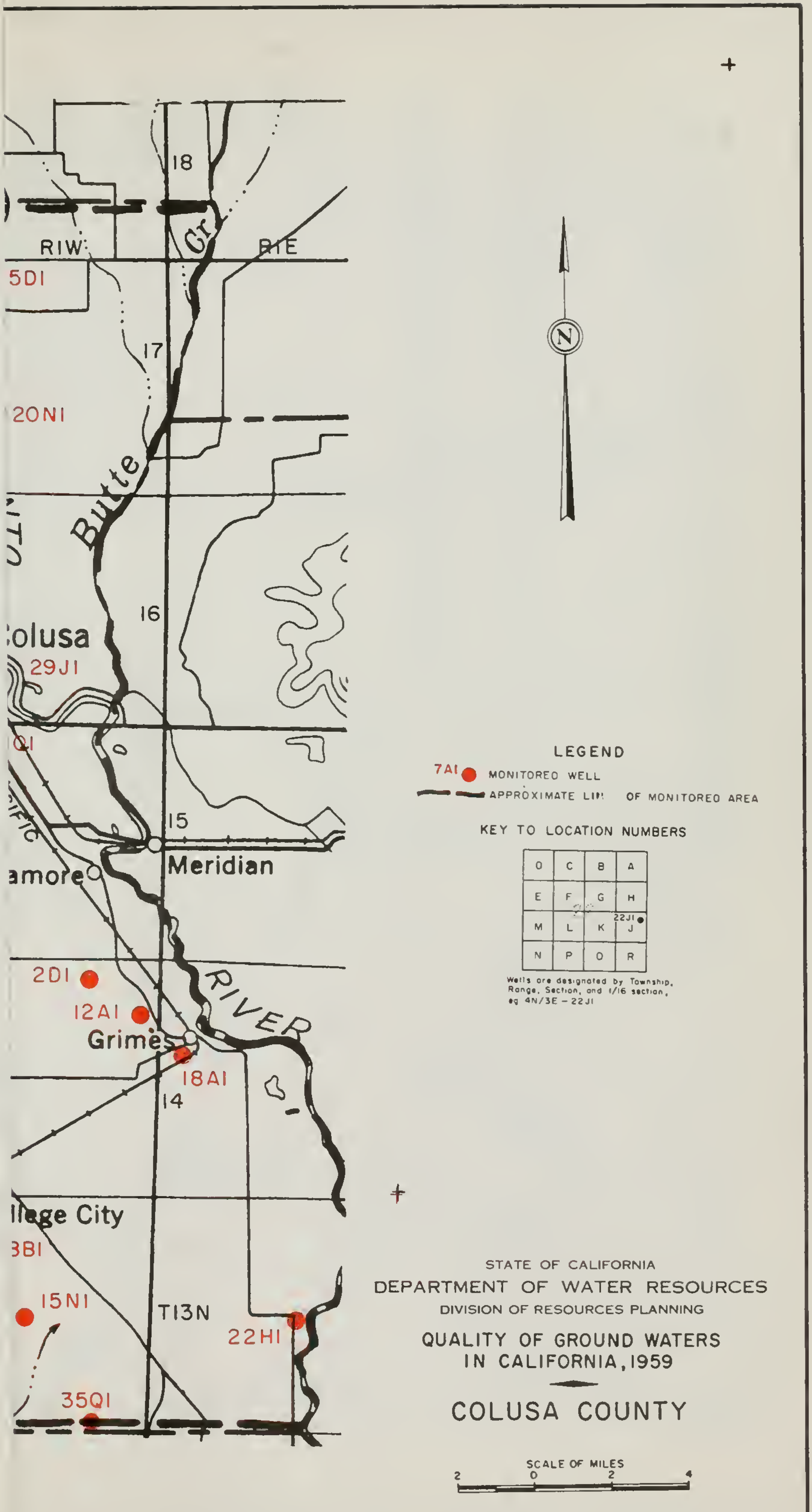
WATER QUALITY RANGES

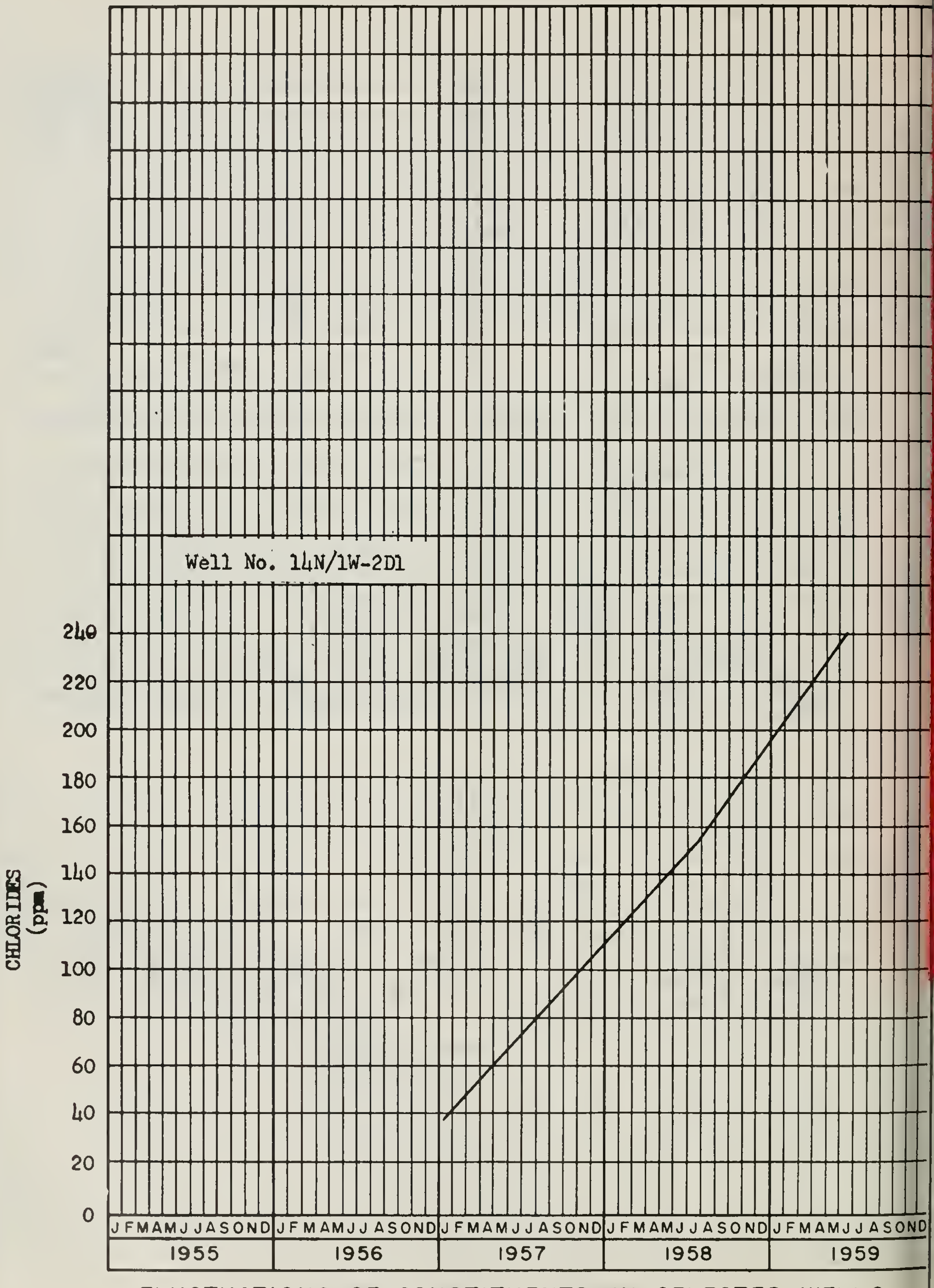
COLUSA COUNTY



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

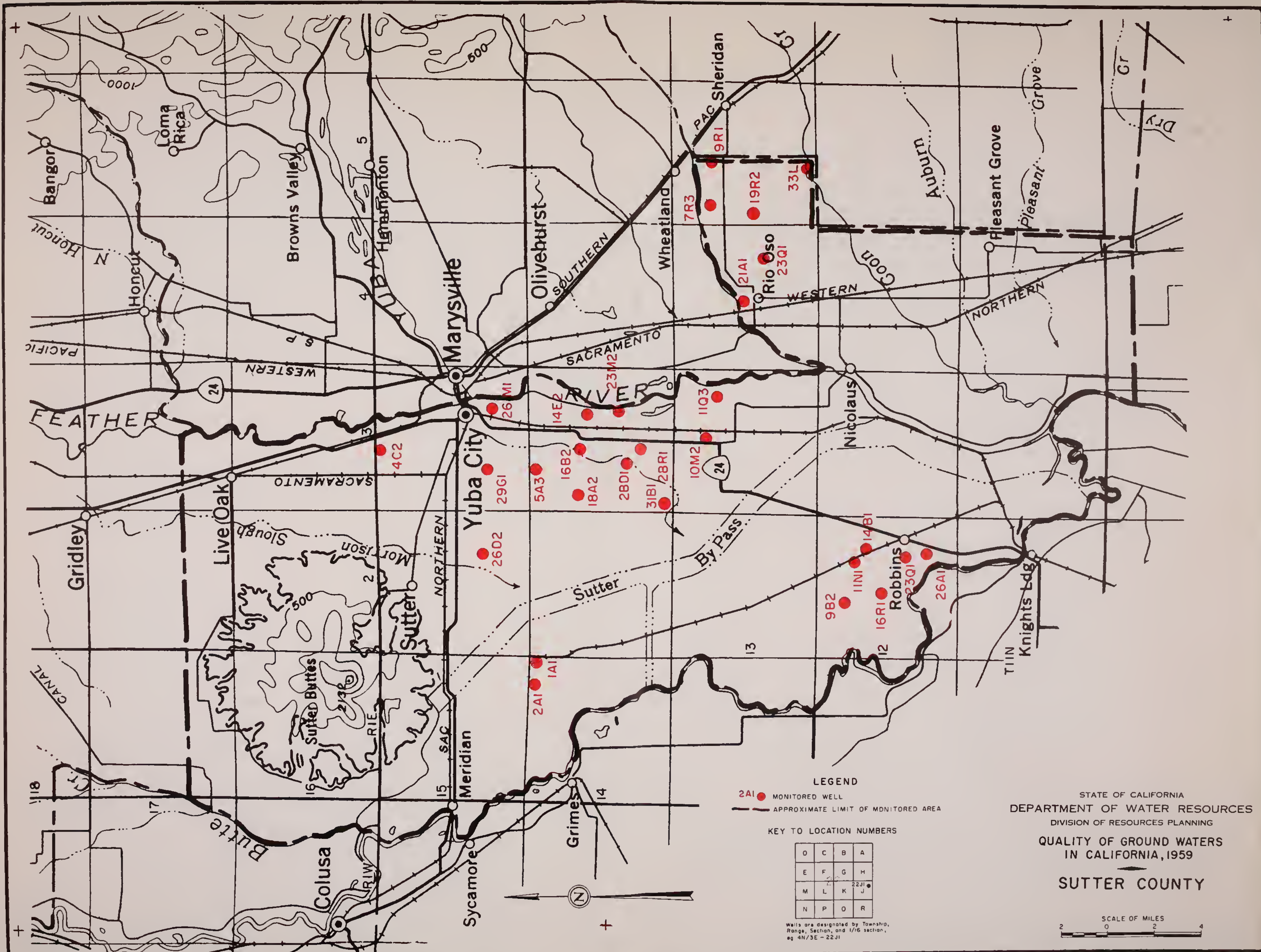
COLUSA COUNTY


18
RIW
Cr
RIE
5DI
17
20NI
Butte
Colusa
29JI
16
15
Meridian
2DI
12AI
Grimes
18AI
RIVER
14
15NI
T13N
22HI
35QI
LEGEND
7AI MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22JI
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E – 22JI
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
COLUSA COUNTY
SCALE OF MILES
2 0 2 4



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

COLUSA COUNTY


STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
SUTTER COUNTY
LEGEND
2A1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E - 22J1
SCALE OF MILES
2 0 2 4
Marysville
Yuba City
Sheridan
Wheatland
Olivehurst
Rio Oso
Nicolaus
Robbins
Knights Ldg
Meridian
Grimes
Sycamore
Colusa
Sutter
Live Oak
Gridley
Honcut
Bangor
Loma Rica
Browns Valley
Hammonton
Pleasant Grove
Sutter Buttes
FEATHER
RIVER
SACRAMENTO
WESTERN
PACIFIC
NORTHERN
SOUTHERN
Sutter By Pass
Butte
Morrison Slough
Auburn
Coon
Dry
9R1
7R3
19R2
33L
21A1
23Q1
23M2
14E2
26M1
11Q3
10M2
4C2
29G1
5A3
16B2
18A2
28D1
28R1
31B1
26D2
14B1
11N1
9B2
16R1
26A1
1A1
2A1

SUTTER COUNTY

Almost all of Sutter County is included in the ground water quality monitoring program. The county, bounded generally by the Feather River on the east and the Sacramento River on the west, is situated in the Sacramento Valley proper and is, for the most part, underlain by water-bearing deposits.

Monitoring Program. High chloride concentrations in local areas prompted the inclusion of Sutter County in the monitoring program in 1953. During 1959, samples were collected from 28 wells during the period July - September.

Ground Water Occurrence. The principal source of ground water is alluvium which was deposited during Pleistocene to Recent times. In the eastern portion of the area Pliocene volcanic sands and gravels comprise the main producing aquifer for deep wells. In general, the aquifers are unconfined although partial confinement occurs in some areas.

Ground Water Development. Ground water is extensively developed, resulting in overdraft of the ground water supply. Wells west of the Feather River yield an average of about 800 gpm. South of the Bear River wells yield about '50 gpm.

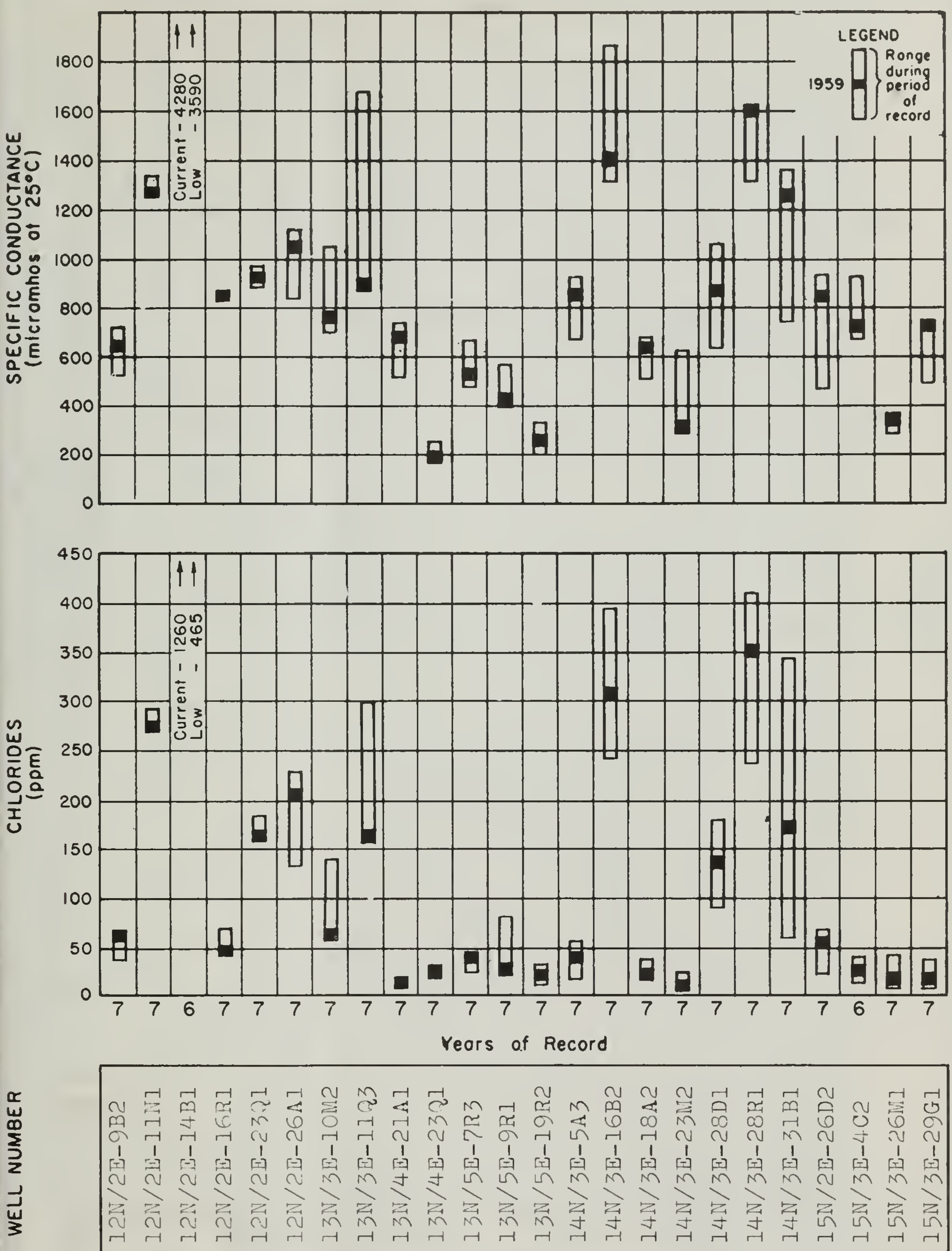
Beneficial Uses of Ground Water. Ground water is used primarily for irrigation and domestic purposes.

Major Waste Discharges. The principal waste discharge in Sutter County consists of effluent from the Yuba City sewage treatment plant. This waste is discharged into the Feather River during the winter, when the river is at high stage, and into percolation-evaporation ponds during the summer.

Evaluation of Water Quality. Ground waters in Sutter County are generally bicarbonate in type with magnesium the predominant cation. High concentrations of sodium and chloride are found in an area south of Yuba City and also in the vicinity of Robbins. The source of this mineralization is probably entrapped evaporatives or rising connate brines. Ground waters in the remainder of the monitored area are of good to excellent mineral quality, althou

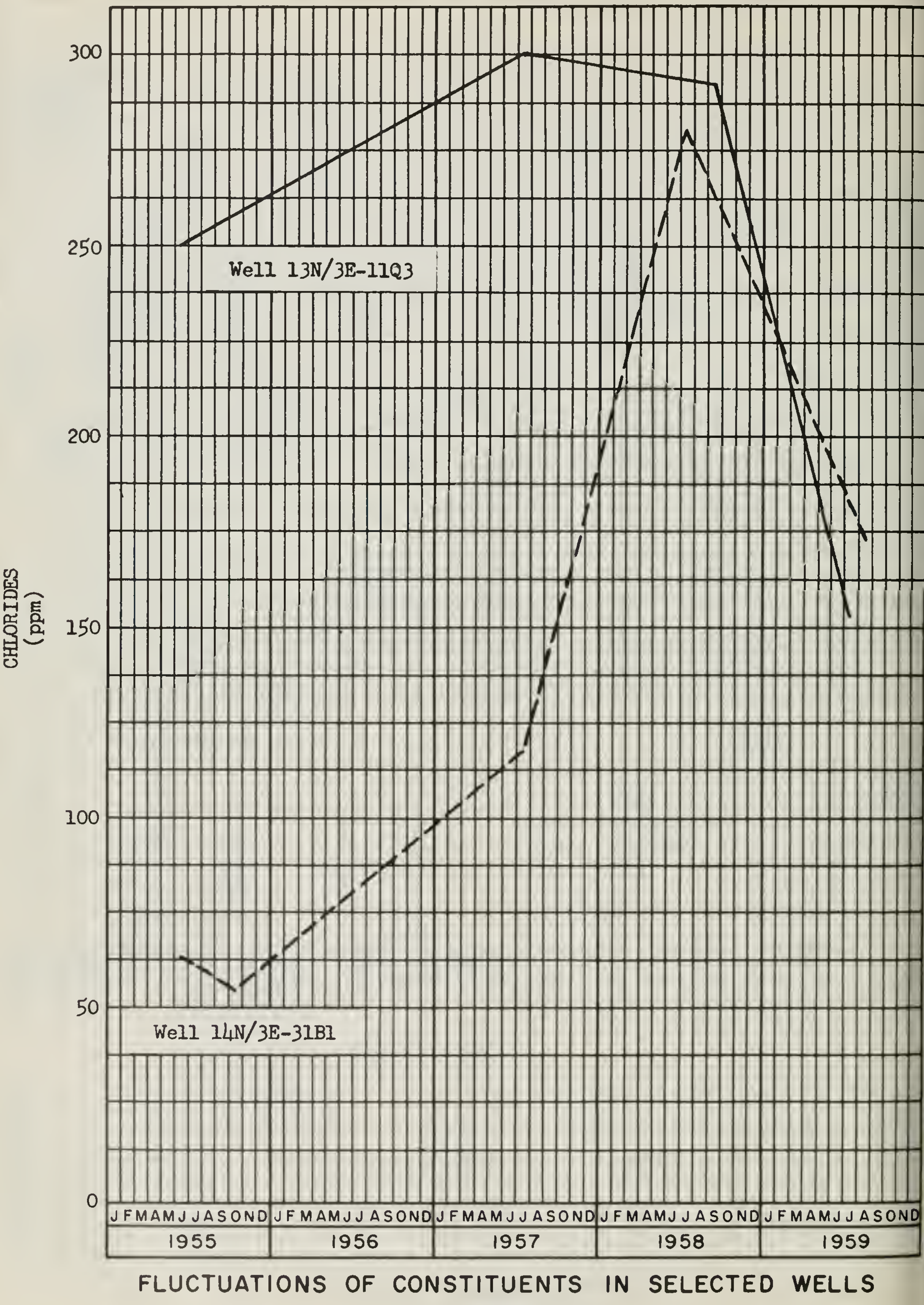
moderately hard.

Significant Water Quality Changes. Comparison of analyses of samples collecte in 1959 with those of 1958 or earlier showed decreases in chlorides in two wells. Between July 1958 and September 1959, chlorides in well 13N/3E-11Q3 decreased from 291 to 153 ppm and in well 14N/3E-31B1 from 281 to 173 ppm, as shown in the fluctuation graph. Chlorides either increased or decreased by lesser amounts in several other wells in the same general area. Chlorides in this area are generally high, however, and fluctuations in chloride content are not uncommon.



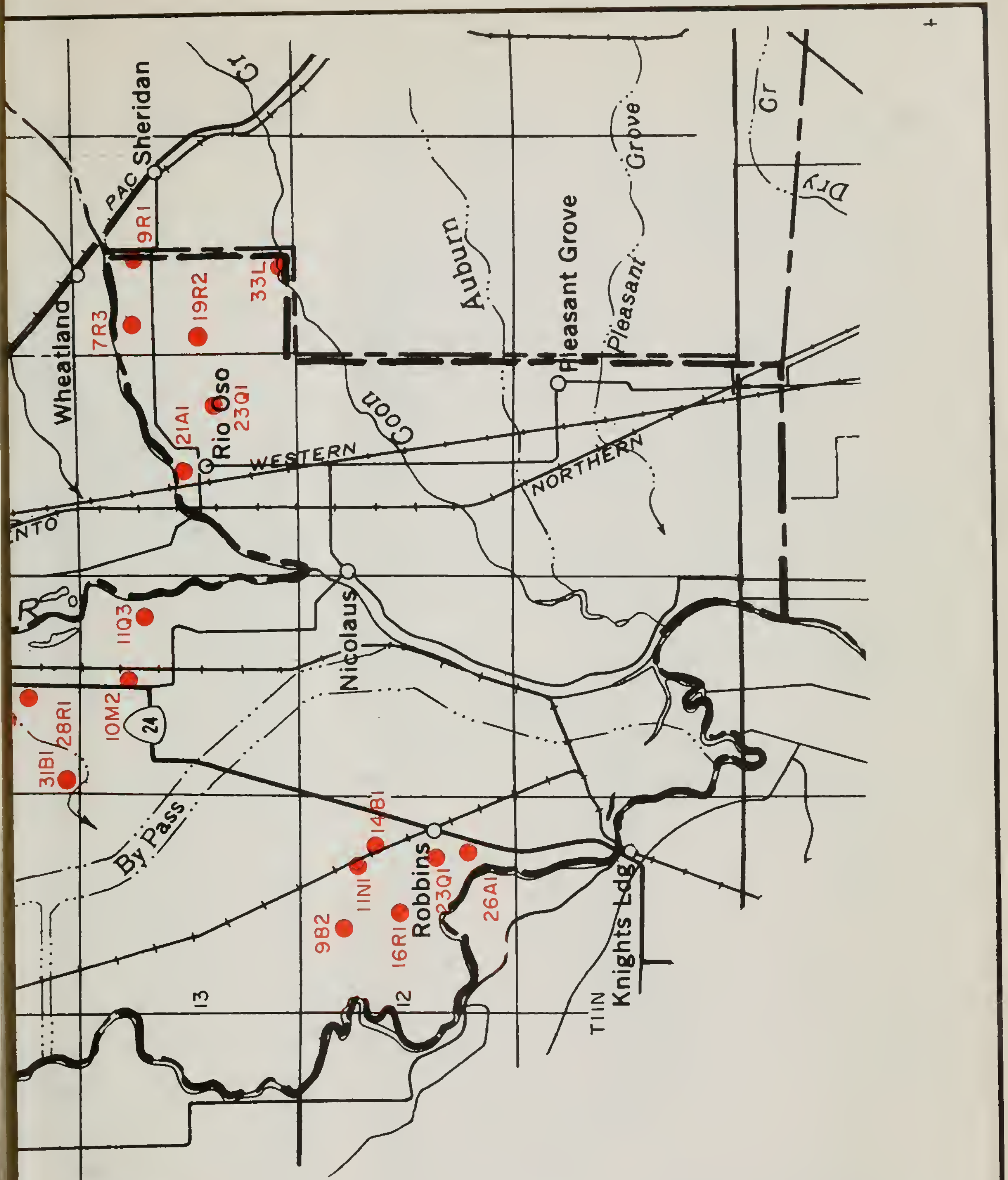
WATER QUALITY RANGES

SUTTER COUNTY



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

SUTTER COUNTY



LEGEND

2A1 ● MONITORED WELL

APPROXIMATE LIMIT OF MONITORED AREA

KEY TO LOCATION NUMBERS

D	C	B	A
E	F	G	H
M	L	K	J 22J1 ●
N	P	Q	R

Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E – 22J1

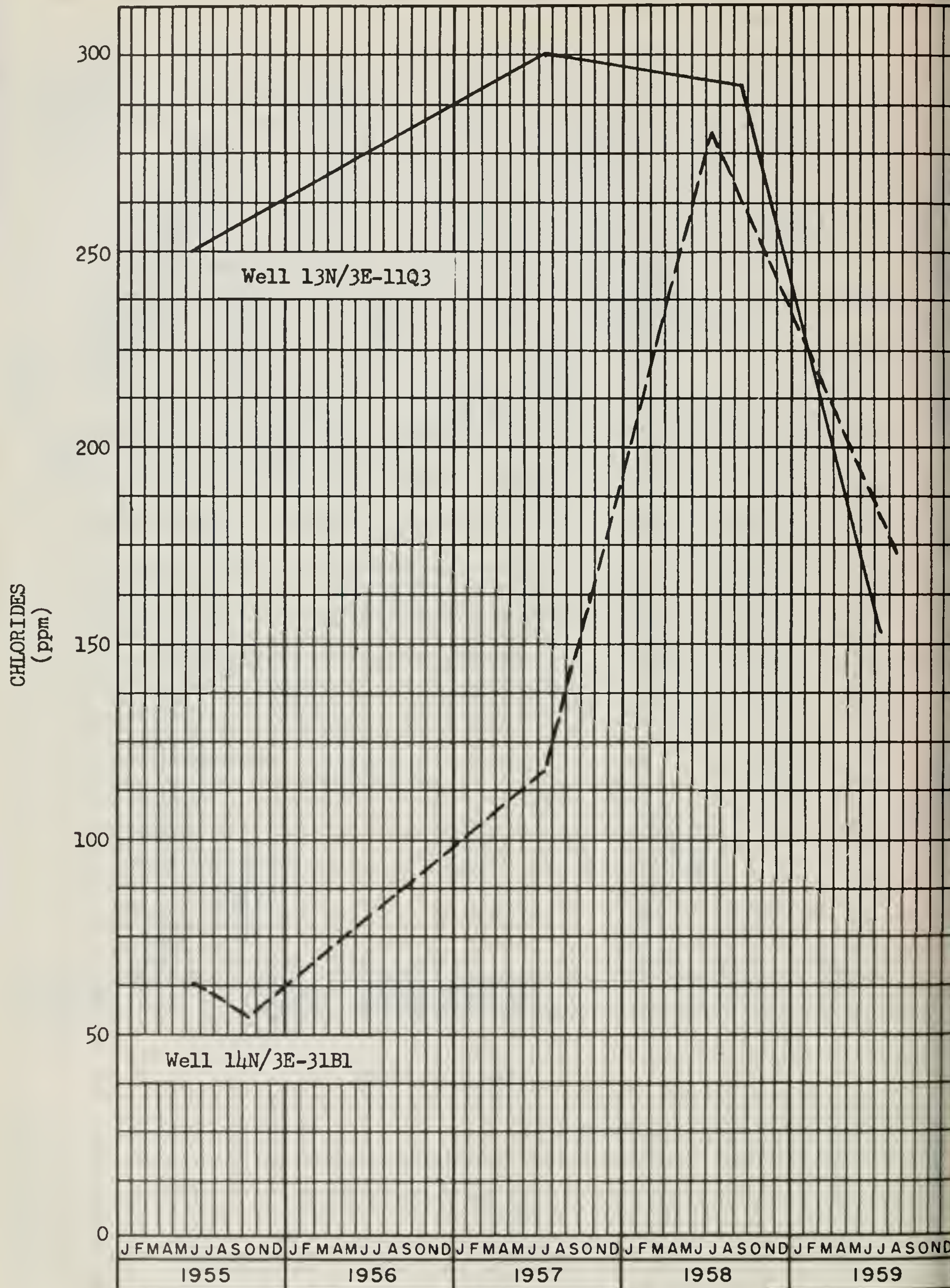
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959

SUTTER COUNTY

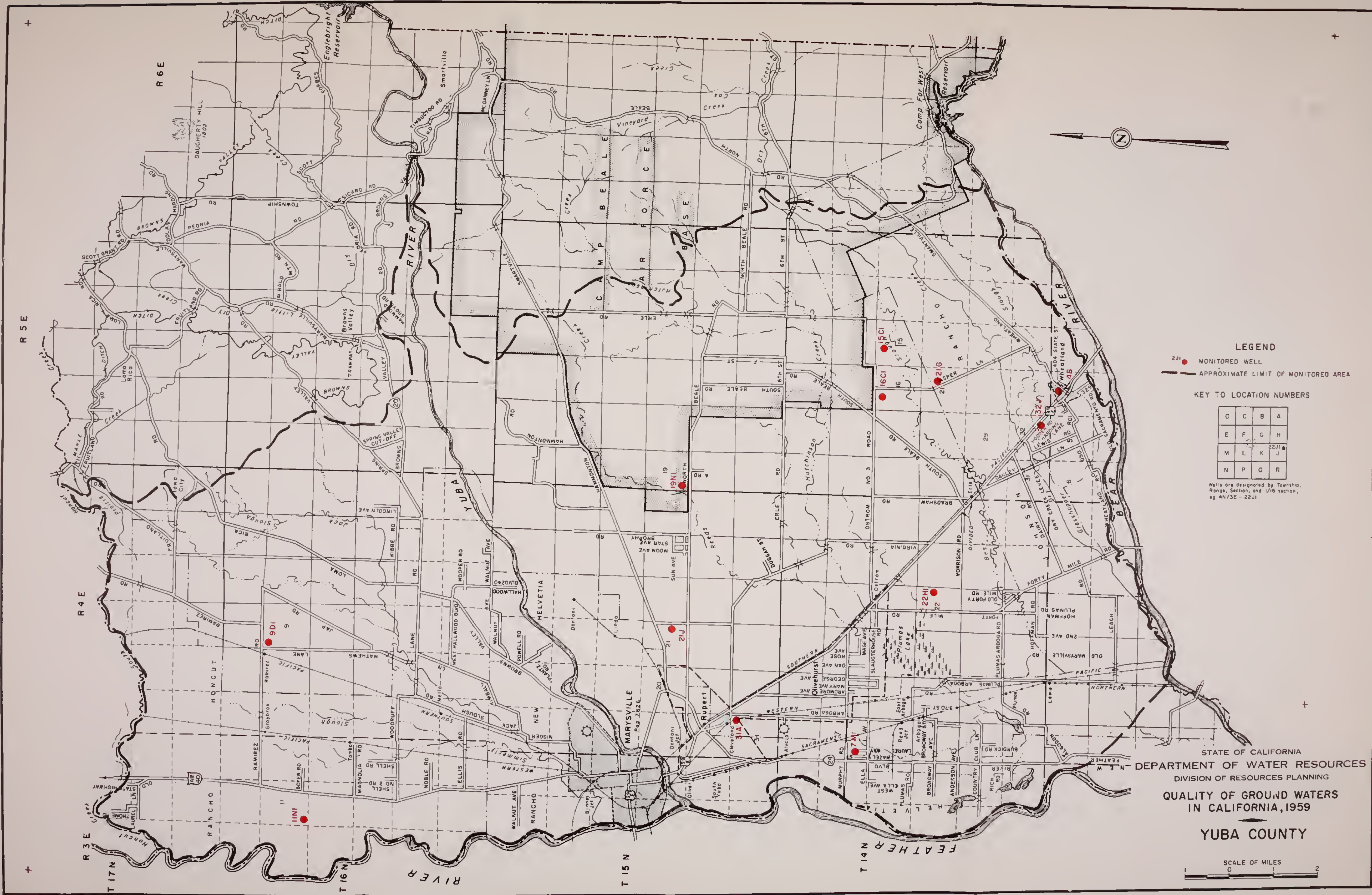
SCALE OF MILES

2 0 2 4



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

SUTTER COUNTY


STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
YUBA COUNTY
LEGEND
MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E - 22J1
SCALE OF MILES
MARYSVILLE
CAMP BEALE AIR FORCE BASE
YUBA RIVER
FEATHER RIVER
BEAR RIVER
Englebright Reservoir
Camp Far West Reservoir
Wheatland
Olivehurst
Plumas Lake
T 17 N
T 16 N
T 15 N
T 14 N
R 3 E
R 4 E
R 5 E
R 6 E

YUBA COUNTY

The portion of Yuba County which is included in the monitoring program is located in the east central portion of the Sacramento Valley. It is bounded by Sutter County on the west and the foothills of the Sierra Nevada on the east. This valley floor portion of the county varies between 8 and 12 miles in width and has a maximum length of about 25 miles.

Monitoring Program. The monitoring program in Yuba County was begun in 1953 to maintain a check on ground water quality and detect significant changes in quality which might result from migration of saline waters known to underlie the area at depth. Samples were collected from 12 wells in this area during August 1959.

Ground Water Occurrence. The principal sources of ground water include unconsolidated Quaternary alluvium underlain by a late Tertiary formation composed of volcanic ash and water-laid volcanics. Pleistocene alluvium, exposed toward the foothills, is an important local source of ground water. The larger and deeper wells of the area derive water from both the alluvium and the volcanics. Saline waters occur beneath the fresh waters. Ground water is confined only in the deeper zones and in local areas.

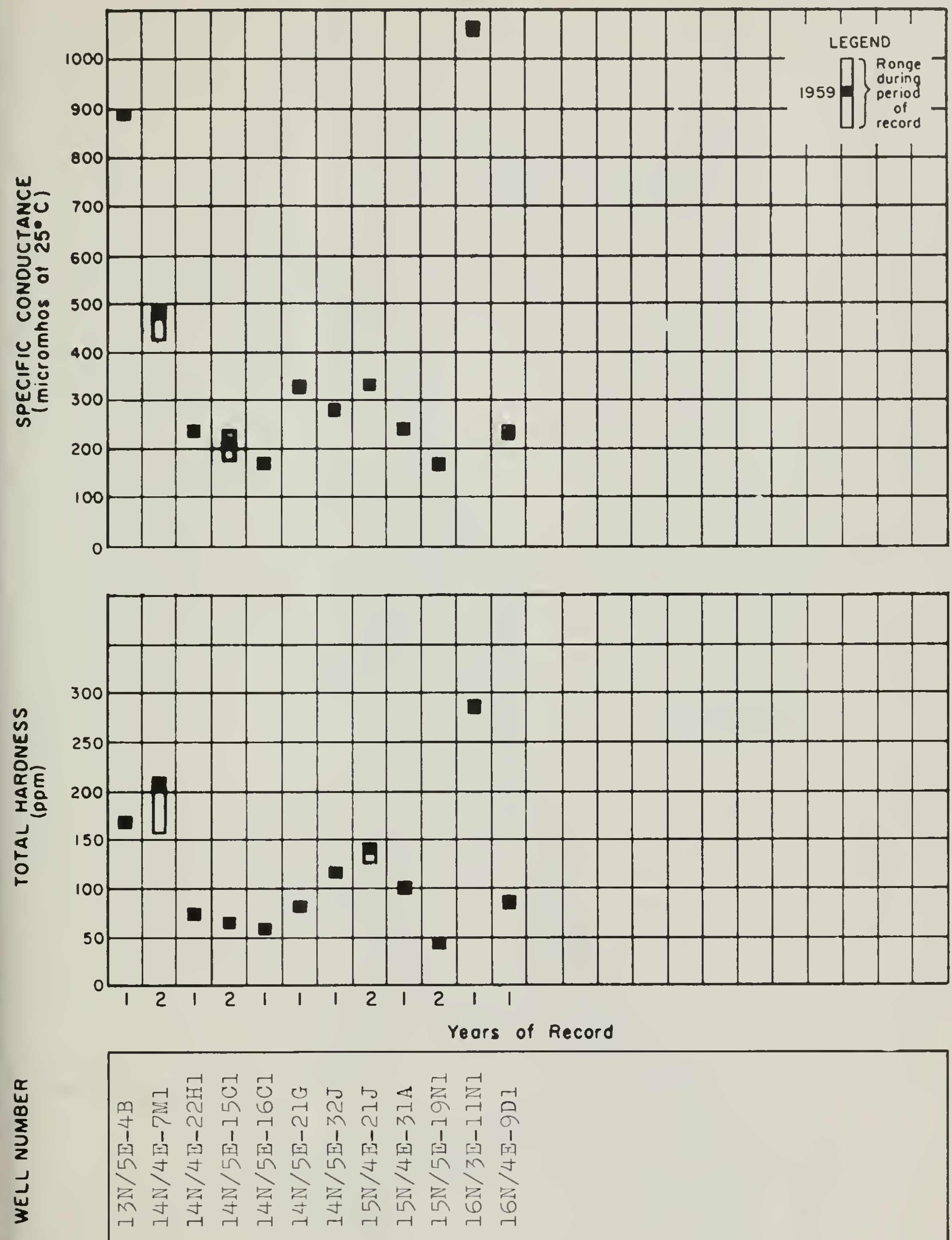
Ground Water Development. Ground water in Yuba County is extensively developed. The average yield of wells is about 850 gpm, with a few wells producing up to 2,000 gpm.

Beneficial Uses of Ground Water. Ground water is used primarily for irrigation, domestic and municipal supplies.

Major Waste Discharges. The principal waste discharges in Yuba County consist of effluent from sewage treatment plants serving Marysville and Linden. The waste from the Marysville plant is discharged into evaporation-percolation ponds; that from the Linden plant is discharged into the Feather River.

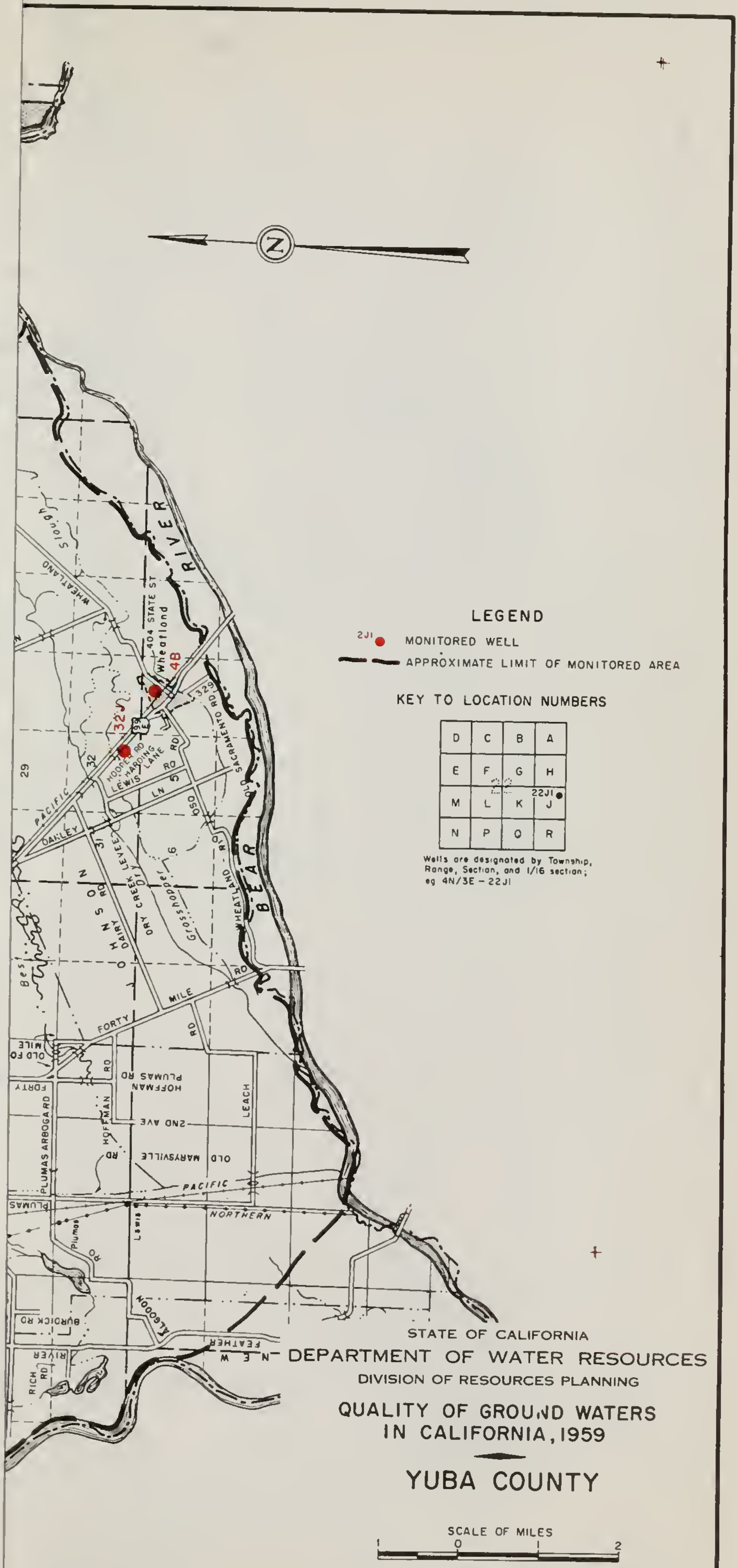
Evaluation of Water Quality. Ground waters in Yuba County are generally of good to excellent mineral quality, although high chlorides and moderately hard waters are found at scattered locations. A possible source of the chlorides is the saline water body which underlies the fresh water at depth. Radiological analyses made in 1959 showed a maximum radioactivity of 10.10 $\mu\mu c/l$.

Significant Water Quality Changes. None.



WATER QUALITY RANGES

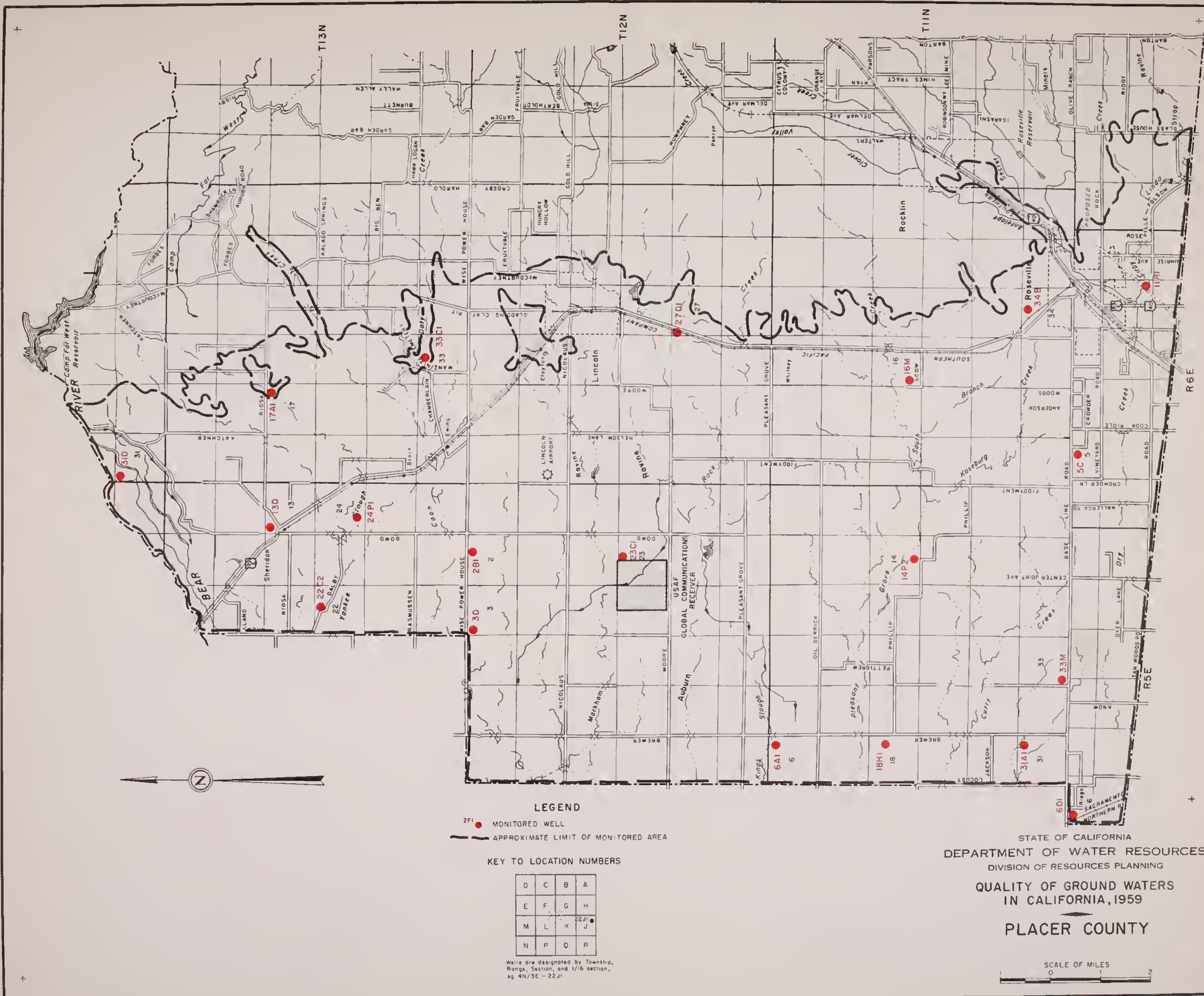
YUBA COUNTY



STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959

YUBA COUNTY



T13N
T12N
T11N
R7E
R6E
R5E
Lincoln
Rocklin
Roseville
Sheridan
USAF GLOBAL COMMUNICATIONS RECEIVER
LINCOLN AIRPORT
Camp Far West Reservoir
BEAR RIVER
31D
17A1
33C1
27D1
34B
11R1
16M
5C
13D
24P1
28B1
23C1
14P2
22C2
3D
33M
6A1
18H1
31A1
6D1
LEGEND
2F1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E – 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
PLACER COUNTY
SCALE OF MILES
0
1
2

PLACER COUNTY

The monitoring program in Placer County comprises most of the valley floor portion of the county. The area is about 13 miles in width and extends approximately 20 miles north to south.

Monitoring Program. Because of the importance of ground water to Placer County and due to the presence in the area of highly mineralized waters, a monitoring program was initiated there in 1957. Samples were collected from 20 wells in August 1959.

Ground Water Occurrence. The main water-bearing formation in Placer County is the old alluvium, composed mostly of silt, clay, sand, sandstone and smaller amounts of gravel. Alluvium of slightly younger age but of similar composition overlies the old alluvium to a maximum thickness of about 50 feet. Volcanic detritus as well as breccias and tuffs underlies the alluvium. A few wells southwest of Lincoln obtain water from the Ione formation, a marine deposit of Eocene age.

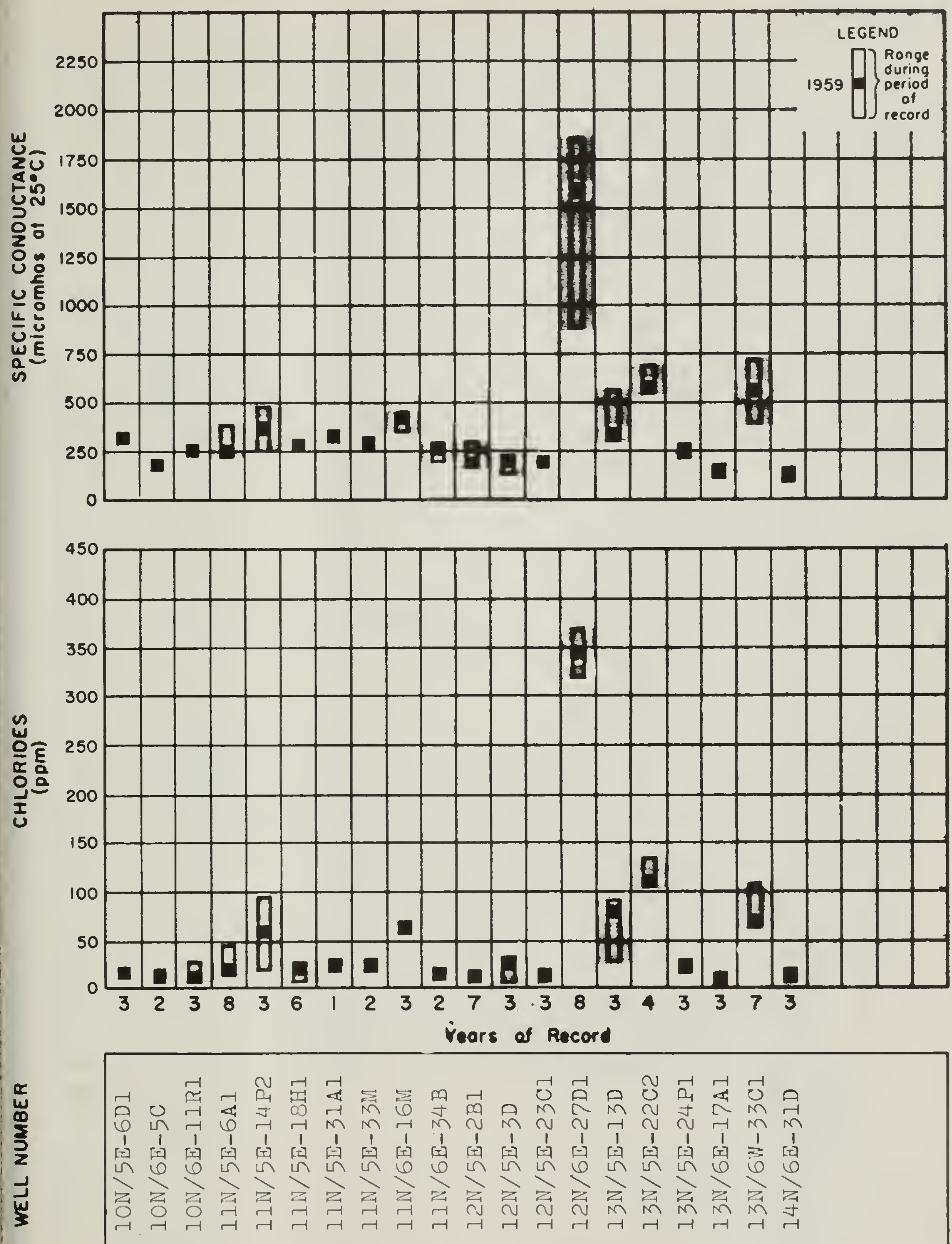
Ground Water Development. Ground water is extensively developed in Placer County. Wells located near the western boundary of the county which are drilled in the old alluvium yield up to 1,800 gpm. Wells penetrating the volcanic rock yield up to 1,200 gpm, and those in the Ione formation produce about 100 gpm.

Beneficial Uses of Ground Water. Ground water in Placer County is used primarily for irrigation. Other uses are domestic and industrial.

Major Waste Discharges. The principal waste discharges consist of effluent from sewage treatment plants serving the Cities of Roseville and Auburn. Minor wastes emanate from various mining operations. All large wastes are discharged into streams and do not presently threaten ground water quality.

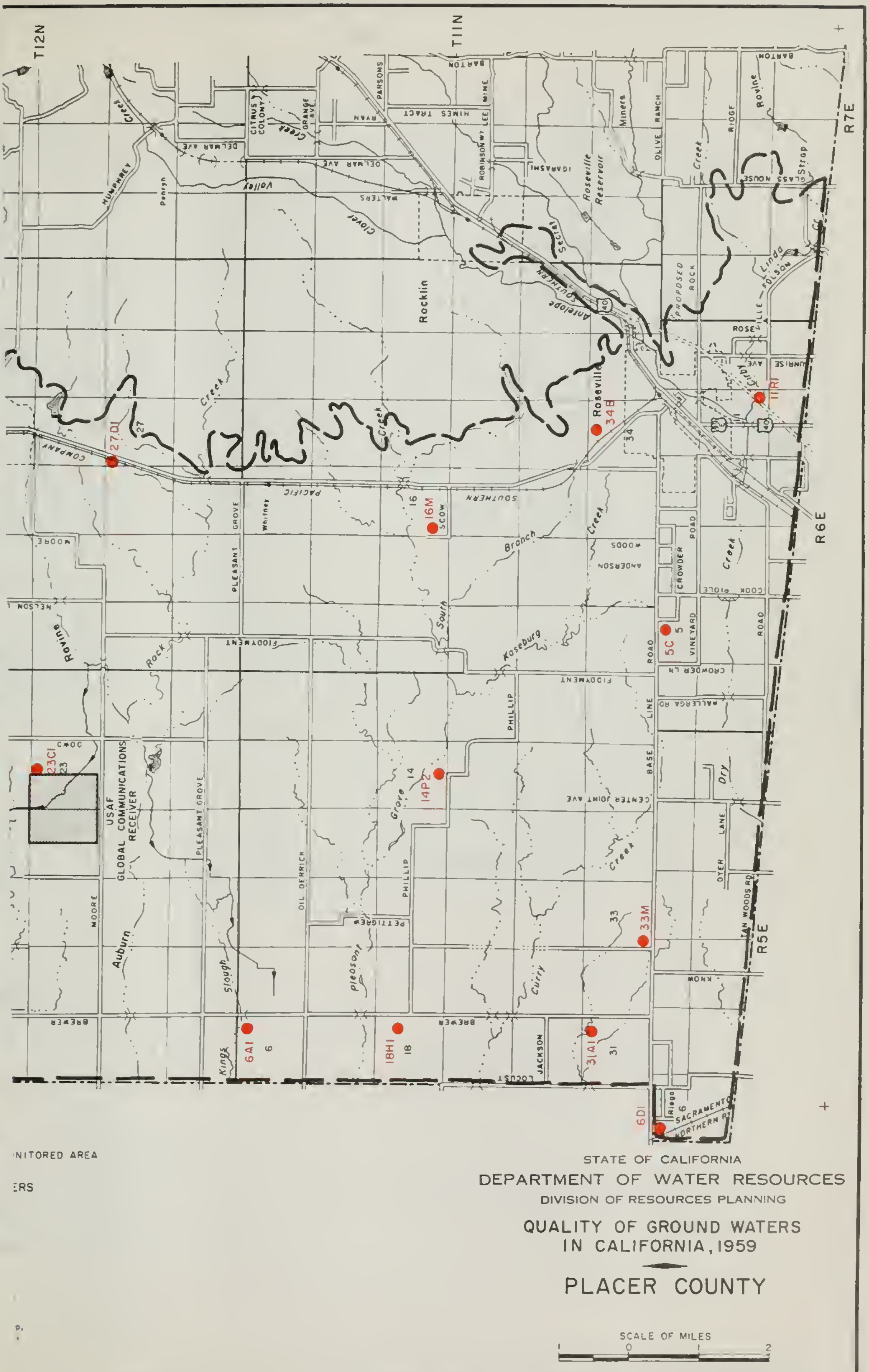
Evaluation of Water Quality. Ground waters in Placer County are generally bicarbonate in type with sodium the predominant cation. With the exception of local areas in the vicinity of Lincoln and Sheridan, the water is of excellent mineral quality, slightly hard, with generally less than 300 ppm total dissolved solids. Waters in the Lincoln and Sheridan areas are derived from connate waters of the Ione formation and as a result contain up to 2,000 ppm total dissolved solids, including high concentrations of chlorides, boron, sulfates and sodium.

Significant Water Quality Changes. None.



WATER QUALITY RANGES

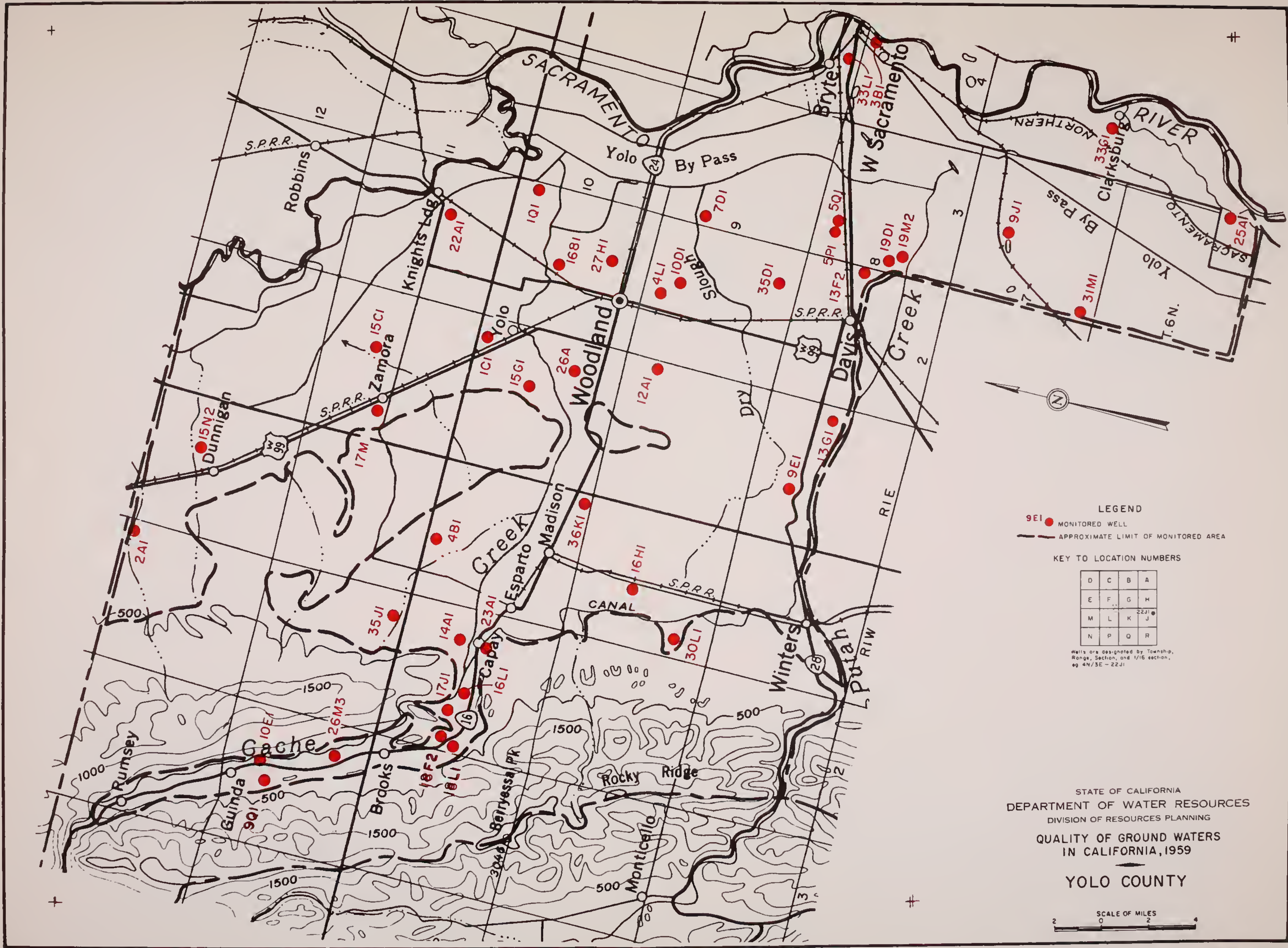
PLACER COUNTY



STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959

PLACER COUNTY


SACRAMENTO RIVER
Yolo By Pass
NORTHERN
S.P.R.R.
Robbins
Knights Ldg.
Bryte
W Sacramento
Clarksburg
Woodland
Yolo
Zamora
Dunnigan
Davis
Creek
Slough
Dry Slough
Putah Creek
Winters
CANAL
Madison
Esparto
Capay
Cache Creek
Brooks
Guinda
Rumsey
Rocky Ridge
Monticello
Berryessa Pk
3046
T. 6 N.
R1E
R1W
24
99
W 99
28
16
500
1000
1500
22A1
1Q1
16B1
27H1
7D1
4L1
10D1
35D1
5Q1
5P1
13F2
19D1
19M2
33L1
3B1
33G1
9J1
25A1
31M1
15C1
1C1
15G1
26A
12A1
17M
15N2
2A1
4B1
36K1
16H1
9E1
13G1
35J1
14A1
23A1
30L1
17J1
16L1
26M3
10E1
18F2
18L1
9Q1
LEGEND
9E1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E – 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
YOLO COUNTY
SCALE OF MILES
2 0 2 4

YOLO COUNTY

The monitored area in Yolo County includes, in addition to that portion of the Sacramento Valley floor area in Yolo County, the Capay Valley which extends along Cache Creek from the town of Capay northwesterly to Rumsey in the western portion of the county. The area covers mainly the eastern half of Yolo County and is situated in the southwestern portion of the Sacramento Valley. The total monitored area comprises about 650 square miles.

Monitoring Program. Due to the presence of excessive boron in the area, a monitoring program was established in Capay Valley in 1953. During 1957, the program was expanded to include the present monitored area. During August 1959, samples were collected from 43 wells.

Ground Water Occurrence. The principal sources of ground water are the stream channel and terrace deposits composed of unconsolidated silt, sand and gravel of Recent age. The Tehama formation, of Plio-Pleistocene age and continental origin, is a secondary aquifer. Ground water in the alluvial deposits is unconfined and the Tehama formation is locally confined. In Capay Valley only the Recent stream channel and terrace deposits are important as ground water sources.

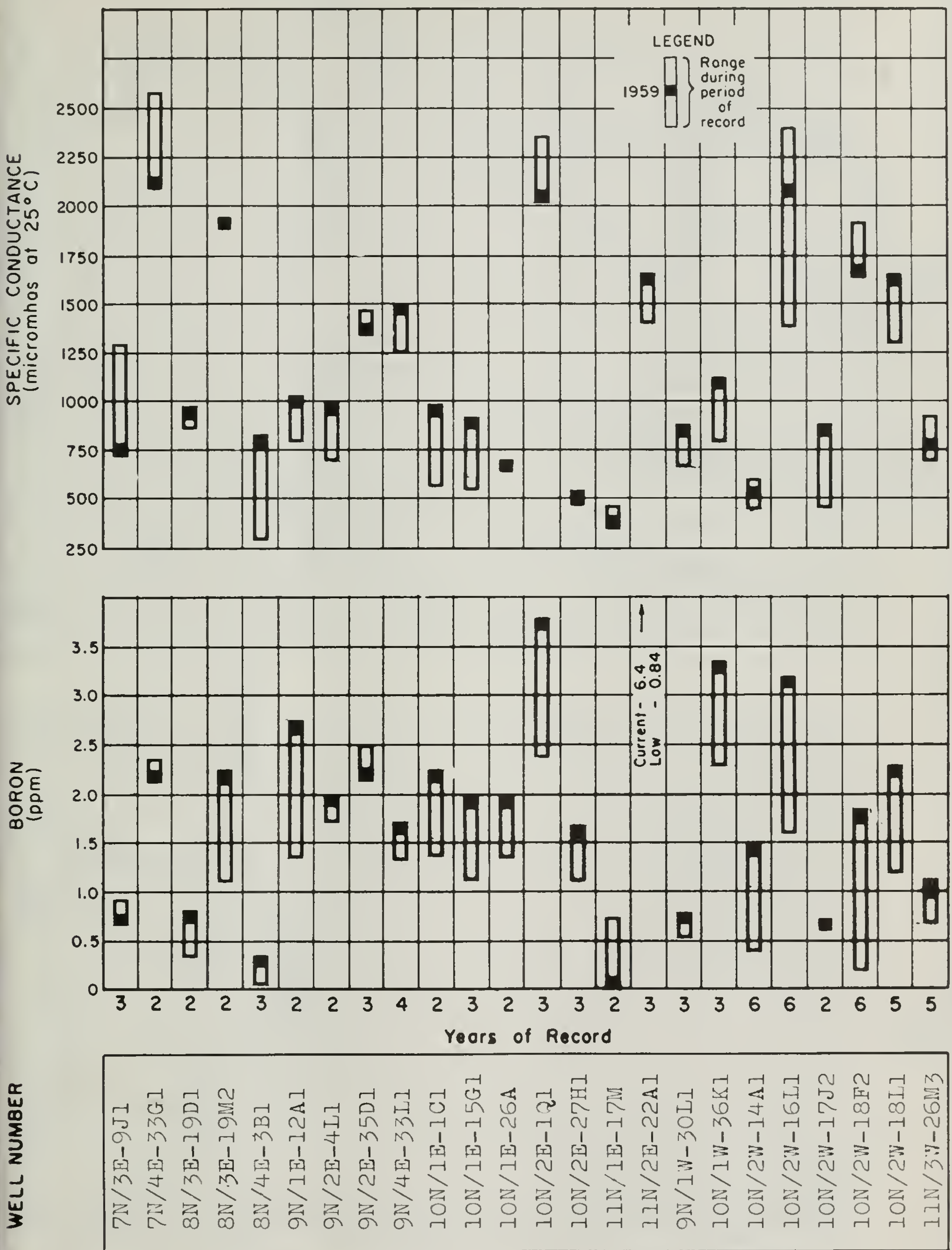
Ground Water Development. Ground water in Yolo County is moderately developed. Wells in the Sacramento Valley portion of the area yield up to 3,000 gpm. In Capay Valley the wells are primarily shallow, domestic wells producing up to 60 gpm.

Beneficial Uses of Ground Water. Ground water is used for irrigation, domestic and stock watering purposes.

Major Waste Discharges. The principal waste discharges in Yolo County consist of effluent from sewage treatment plants at Woodland, Davis and West Sacramento These wastes are disposed of by discharge to surface water.

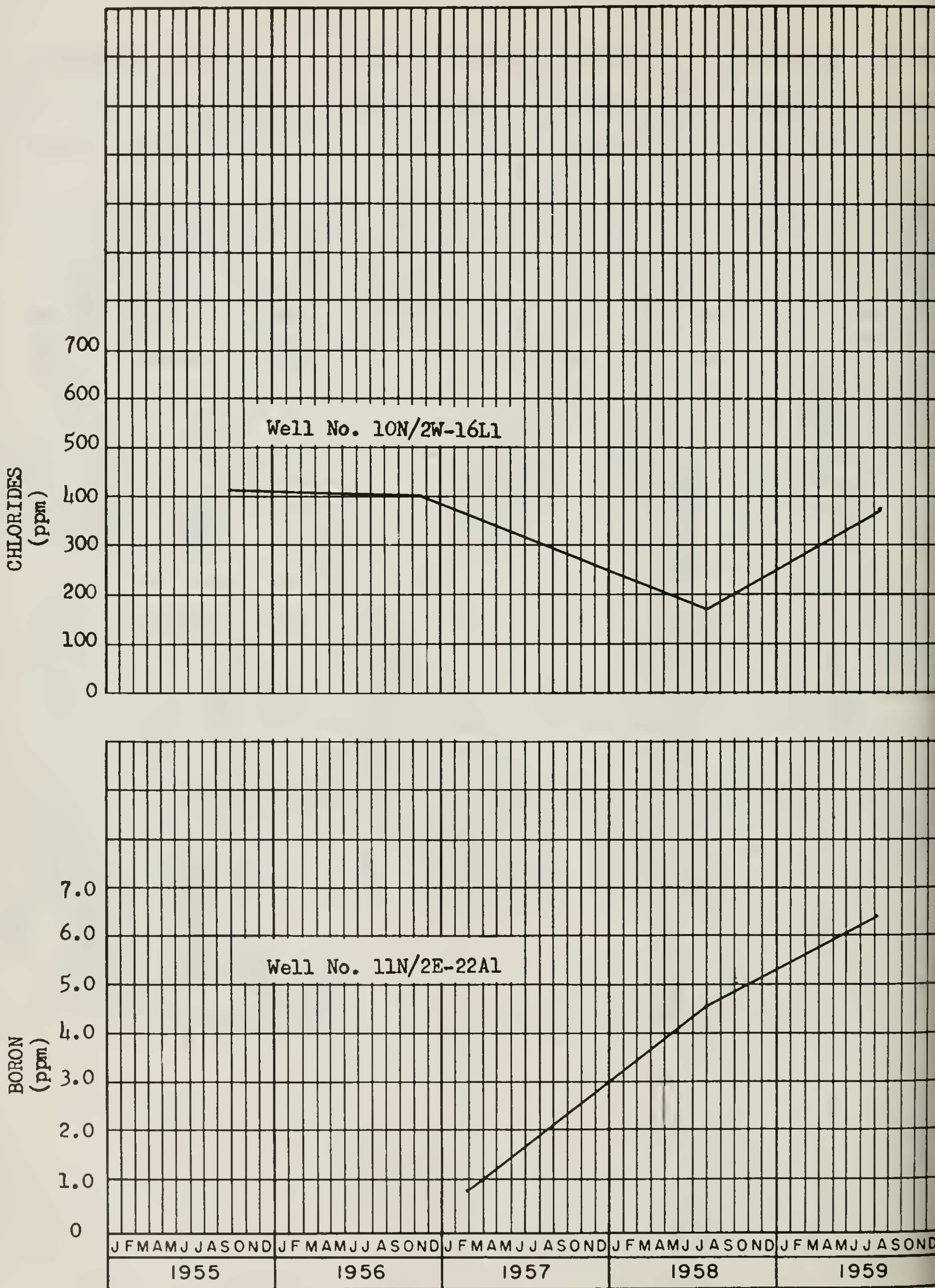
Evaluation of Water Quality. Ground waters of Yolo County are generally bicarbonate in type with magnesium and/or sodium the predominant cations. They are typically class 2 or 3 irrigation water and, in addition, are very hard. The most serious quality problem is the presence, throughout the county, of boron in concentrations generally considered injurious to crops. These high boron concentrations are believed to be derived from Cache Creek, which is known to contain high boron. High concentrations of chloride also occur adjacent to the Sacramento River and in other local areas.

Significant Water Quality Changes. Comparison of 1959 analyses with those of 1958 showed increases in boron in the majority of the monitored wells. The greatest of these was an increase from 4.6 to 6.4 ppm in well 11N/2E-22A1, located about 18 miles northwest of Woodland (see fluctuation graph). Boron in this well was 0.84 ppm in 1957. Chlorides in well 10N/2W-16L1, in Capay Valley, increased from 168 to 378 ppm between July 1958 and August 1959. Chlorides in this well have fluctuated between 168 and 430 ppm since 1953.



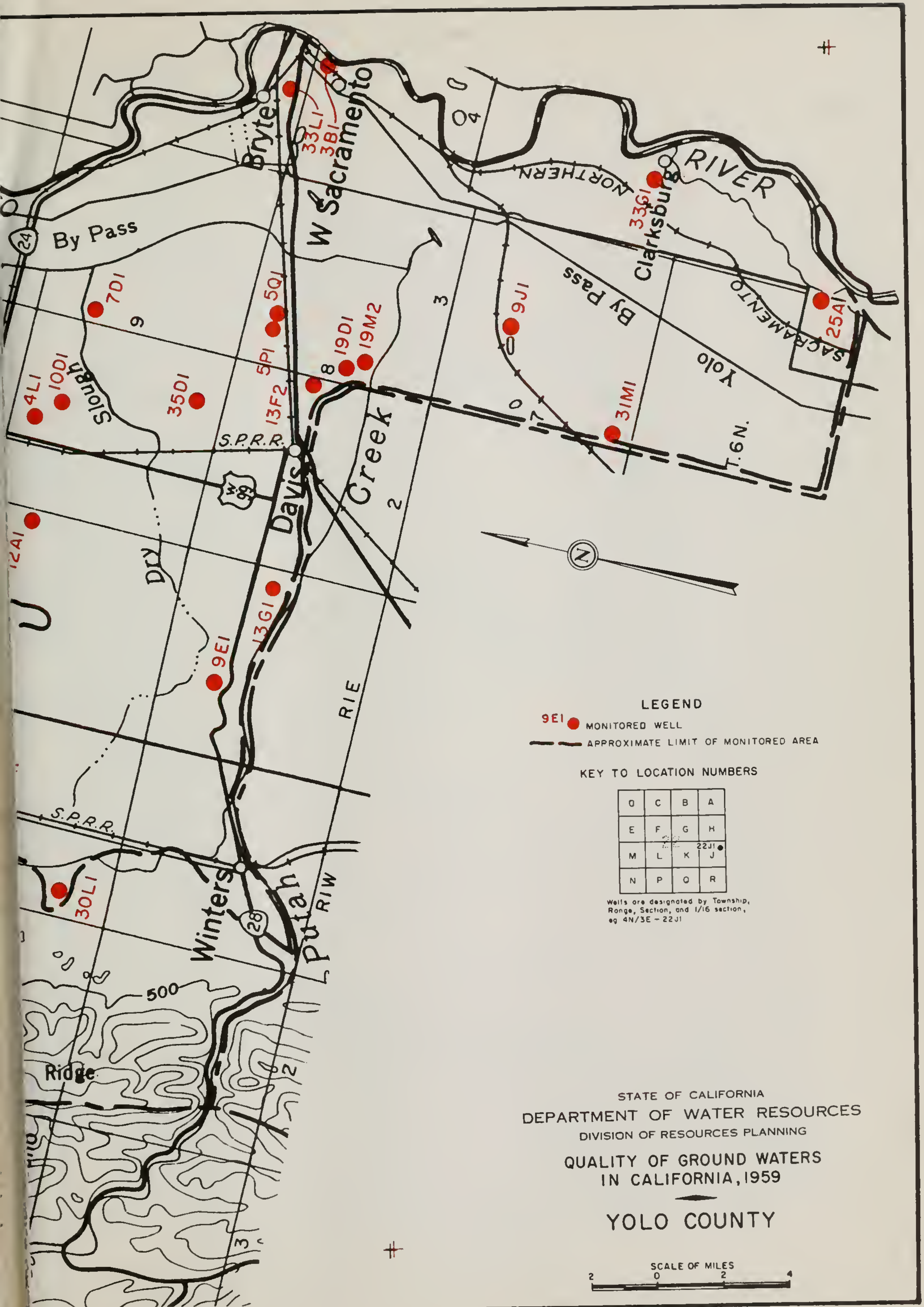
WATER QUALITY RANGES

YOLO COUNTY

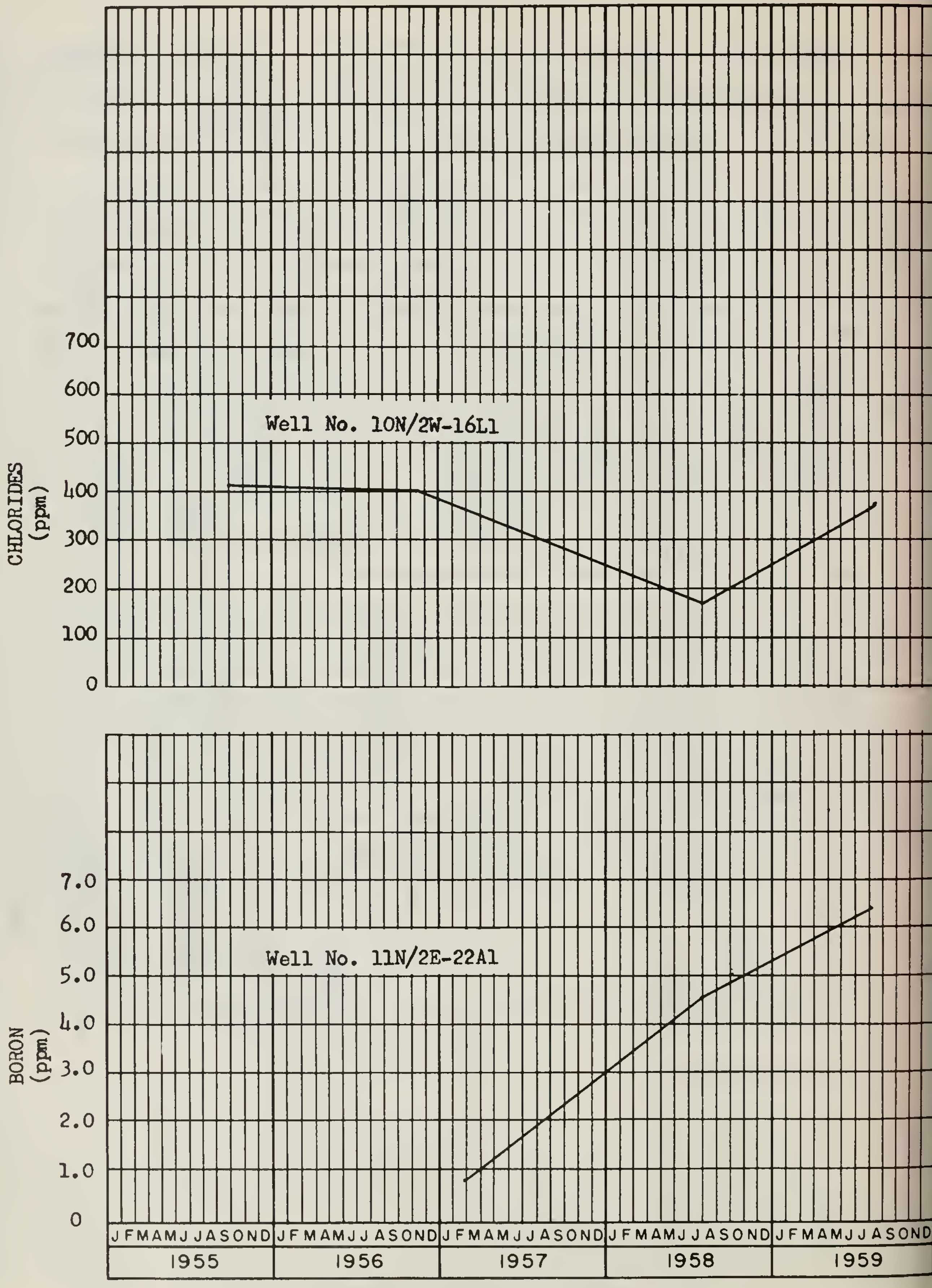


FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

YOLO COUNTY

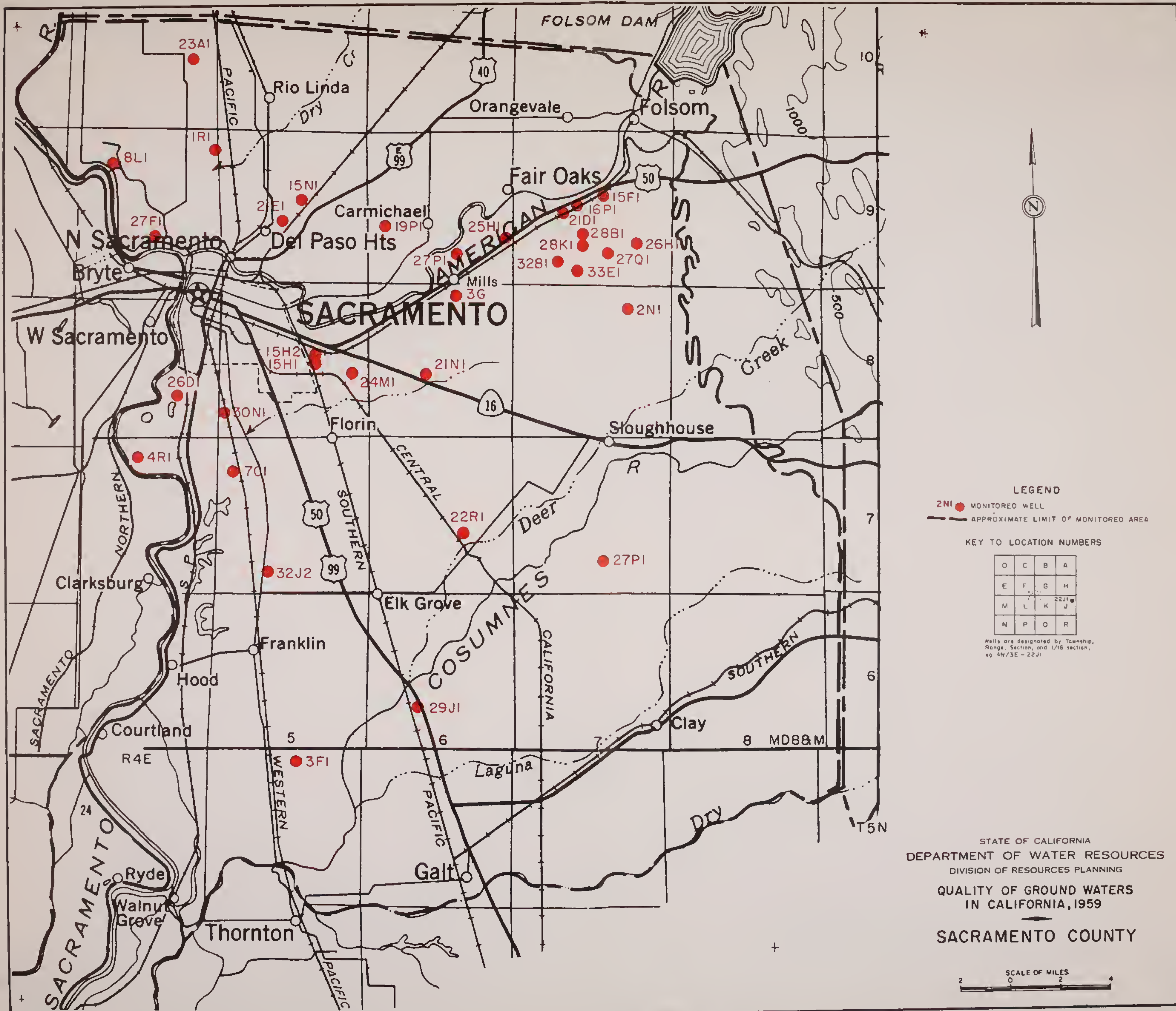


LEGEND
9E1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E - 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
YOLO COUNTY
SCALE OF MILES
2 0 2 4
Bryte
W Sacramento
33L1
3B1
SACRAMENTO RIVER
NORTHERN
Clarksburg
33G1
25A1
By Pass
Yolo By Pass
7D1
5Q1
5P1
19D1
19M2
13F2
9J1
4L1
10D1
35D1
31M1
Slough
S.P.R.R.
T.6N.
Davis
Creek
Dry
12A1
13G1
9E1
R1E
R1W
Winters
Putah
30L1
500
Ridge



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

YOLO COUNTY


STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
SACRAMENTO COUNTY
LEGEND
2N1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E - 22J1
SCALE OF MILES
2 0 2 4
FOLSOM DAM
Rio Linda
Orangevale
Folsom
Fair Oaks
Carmichael
Del Paso Hts
N Sacramento
Bryte
SACRAMENTO
W Sacramento
Mills
Florin
Sloughhouse
Elk Grove
Clarksburg
Franklin
Hood
Courtland
Clay
Galt
Ryde
Walnut Grove
Thornton
AMERICAN
COSUMNES
Deer
Creek
Dry
Laguna
SACRAMENTO
PACIFIC
SOUTHERN
CENTRAL
NORTHERN
WESTERN
CALIFORNIA
23A1
1R1
8L1
15N1
21E1
27F1
19P1
25H1
15F1
16P1
21D1
28B1
28K1
26H1
27Q1
32B1
33E1
27P1
3G
2N1
15H2
15H1
24M1
21N1
26D1
30N1
4R1
7Q1
22R1
27P1
32J2
29J1
3F1
40
99
50
16
R4E
T5N
MD B&M
1000
500

SACRAMENTO COUNTY

Most of Sacramento County is included in the monitoring program. A small area in the Sacramento-San Joaquin Delta, where little ground water is used, and an area along the eastern boundary which is underlain by geologic formations that yield negligible quantities of ground water are not included. The total monitored area includes approximately 450 square miles.

Monitoring Program. A monitoring program was established in Sacramento County in 1955 to record ground water quality and to detect changes in quality that might result from ground water overdraft or from industrial wastes which occur in the eastern portion of the county. Samples were taken from 33 wells in the area during July 1959.

Ground Water Occurrence. Recent alluvium and semi-consolidated Plio-Pleistocene continental sediments comprise the principal aquifers. Tertiary volcanics are of local importance in the eastern portion of the county. The aquifers generally are unconfined, although perched water bodies occur locally.

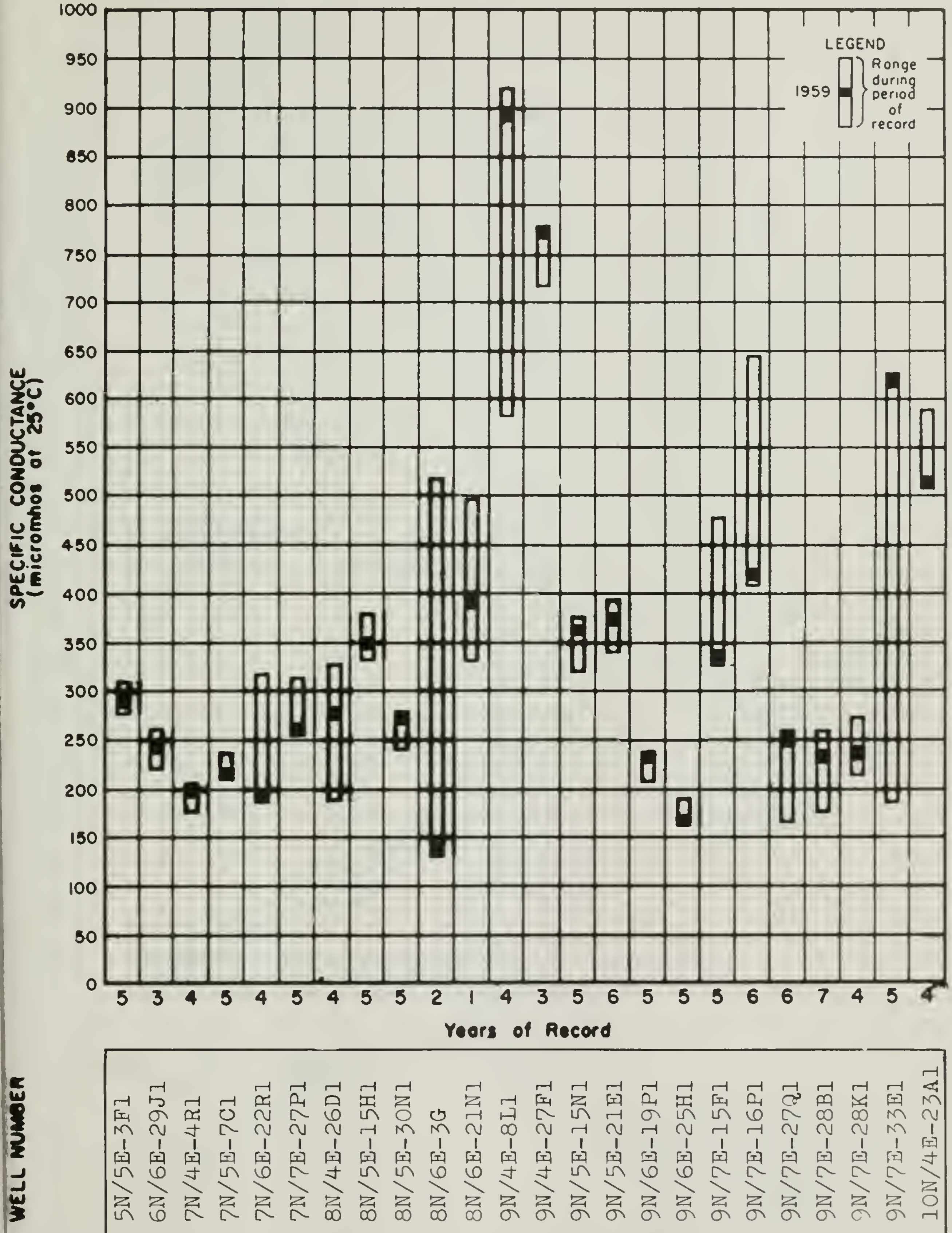
Ground Water Development. Ground waters in Sacramento County are moderately developed except in areas adjacent to the Sacramento River where ground water development is minimized by the availability of inexpensive surface water. The average well yield in Sacramento County is approximately 400 gpm.

Beneficial Uses of Ground Water. Ground waters in Sacramento County are used primarily for irrigation, domestic, municipal and industrial purposes.

Major Waste Discharges. The principal waste discharges consist of effluent from the City of Sacramento, from Mather and McClellan Air Force Bases, from Aerojet-General Corporation, and Libby, McNeill & Libby plants. The wastes from the City of Sacramento and the Air Force Bases are discharged to surface waters while the wastes from Aerojet-General and Libby plants are discharged to dredger tailings in the eastern portions of the county. Wastes from Aerojet-General plant contain potassium perchlorate ($KClO_4$) and ammonium perchlorate (NH_4ClO_4) in solution. These constituents are reported to be toxic to plant life to approximately the same extent as boron. Accordingly, analyses of ground water samples near this waste discharge include tests for perchlorate and ammonium in addition to the usual mineral analyses.

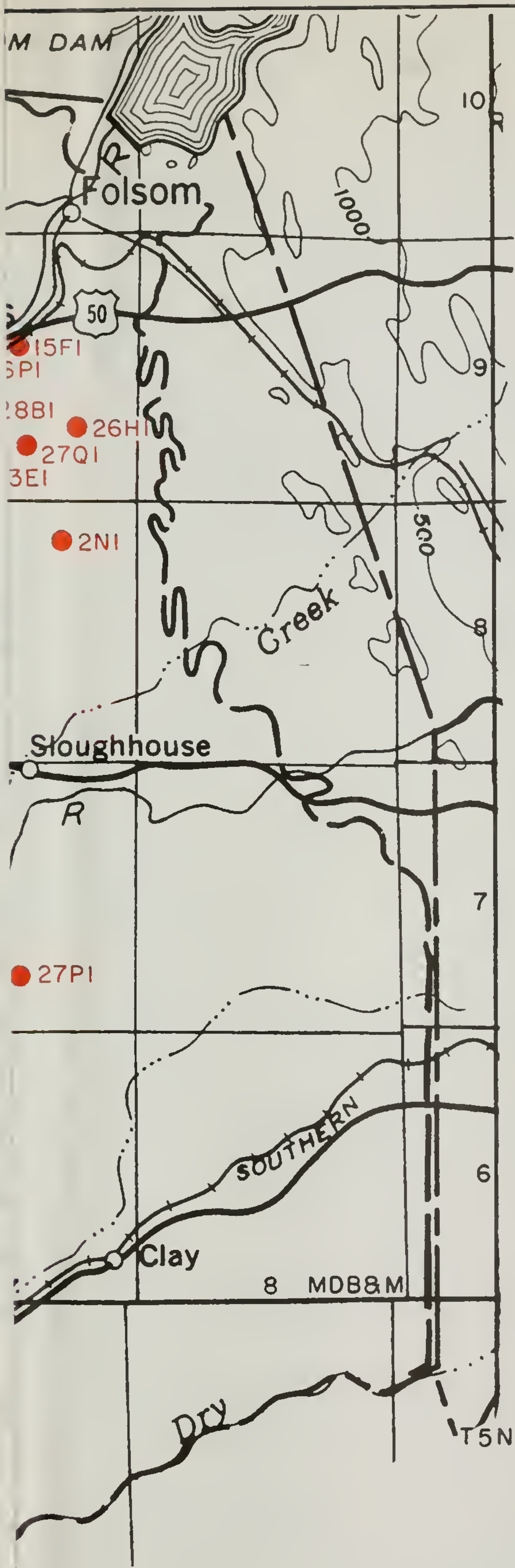
Evaluation of Water Quality. Ground waters in Sacramento County are primarily calcium-magnesium bicarbonate in type and, although slightly to moderately hard, are of excellent mineral quality. Total dissolved solids are relatively low, seldom exceeding 350 ppm. Boron, chlorides and nitrates are uniformly low and well within recommended limits.

Significant Water Quality Changes. None.



WATER QUALITY RANGES

SACRAMENTO COUNTY



LEGEND

2N1 ● MONITORED WELL

APPROXIMATE LIMIT OF MONITORED AREA

KEY TO LOCATION NUMBERS

D	C	B	A
E	F	G	H
M	L	K	22J1 ● J
N	P	Q	R

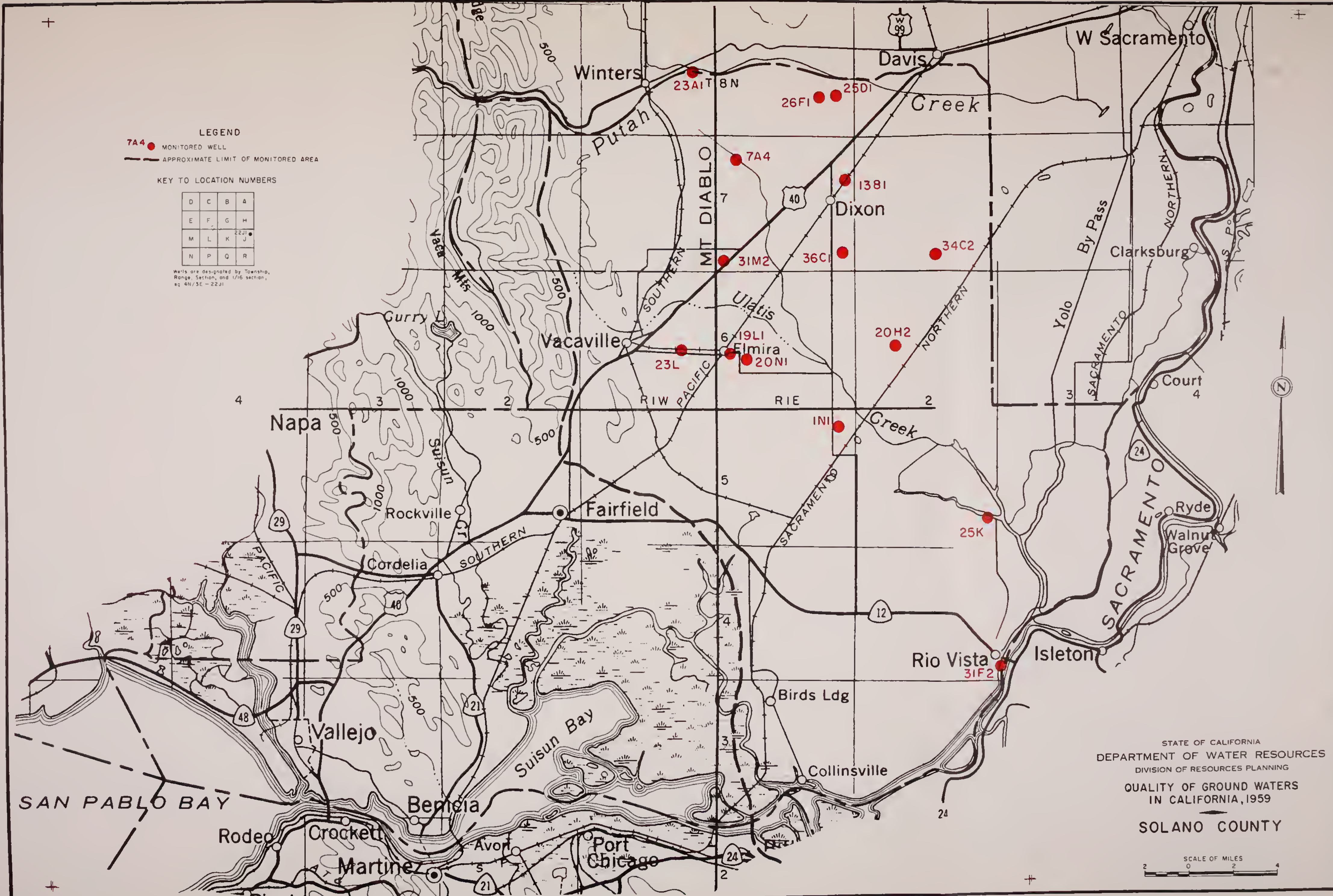
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E - 22J1

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959

SACRAMENTO COUNTY

SCALE OF MILES
2 0 2 4


LEGEND
7A4 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
SOLANO COUNTY
SCALE OF MILES
Winters
Davis
W Sacramento
Dixon
Vacaville
Elmira
Fairfield
Napa
Rockville
Cordelia
Vallejo
Benicia
Crockett
Rodeo
Martinez
Port Chicago
Birds Ldg
Collinsville
Rio Vista
Isleton
Clarksburg
Court
Ryde
Walnut Grove
SAN PABLO BAY
Suisun Bay
Putah Creek
Ulatis Creek
23A1
26F1
25D1
7A4
13B1
31M2
36C1
34C2
19L1
23L
20N1
20H2
1N1
25K
31F2

SOLANO COUNTY

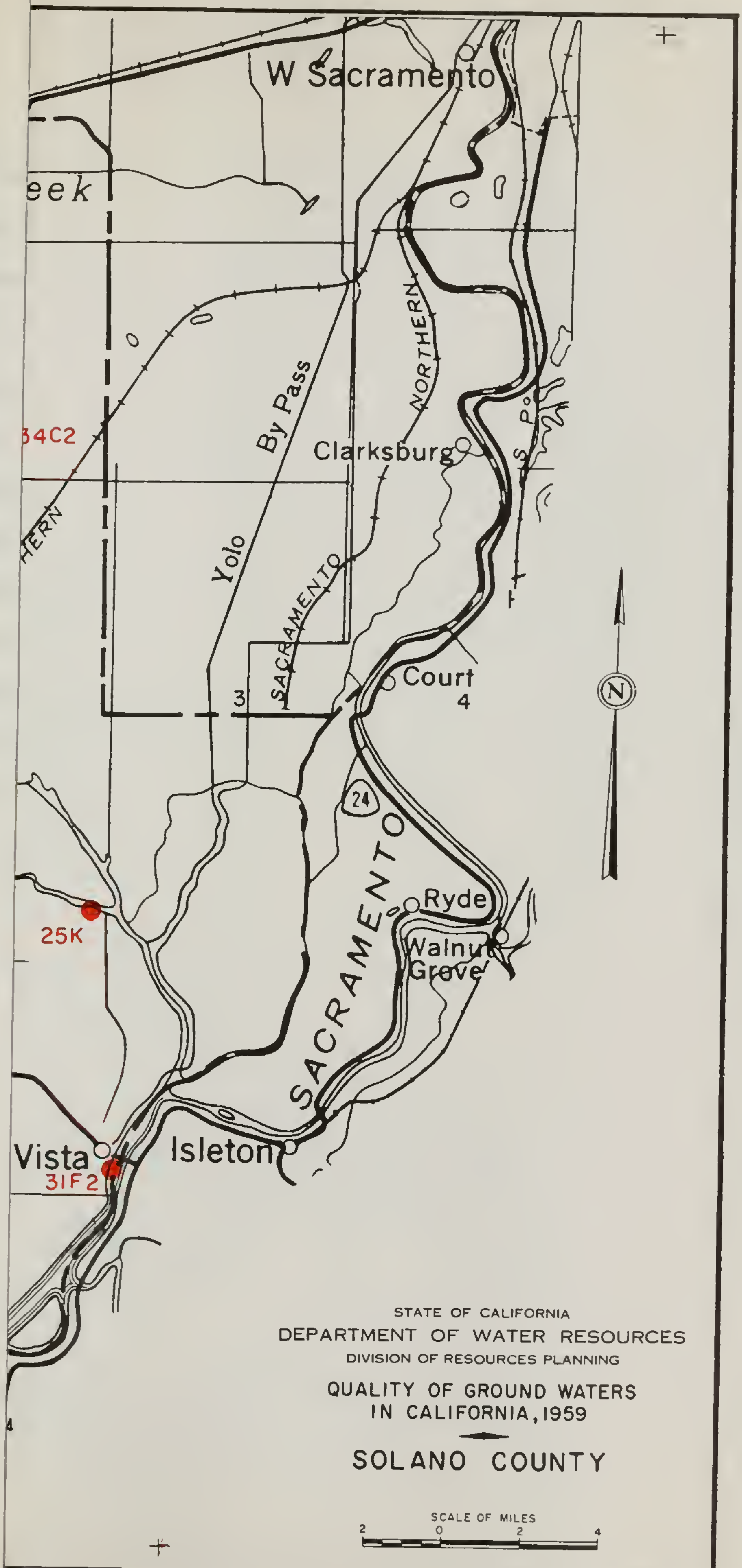
This area comprises all of the northern and eastern portions of Solano County which lie in the Sacramento Valley. It extends from Putah Creek on the north to the Sacramento River on the south, and includes an area of approximately 400 square miles. The remainder of Solano County lies in Region 2 and was discussed previously in this report as Suisun-Fairfield Valley.

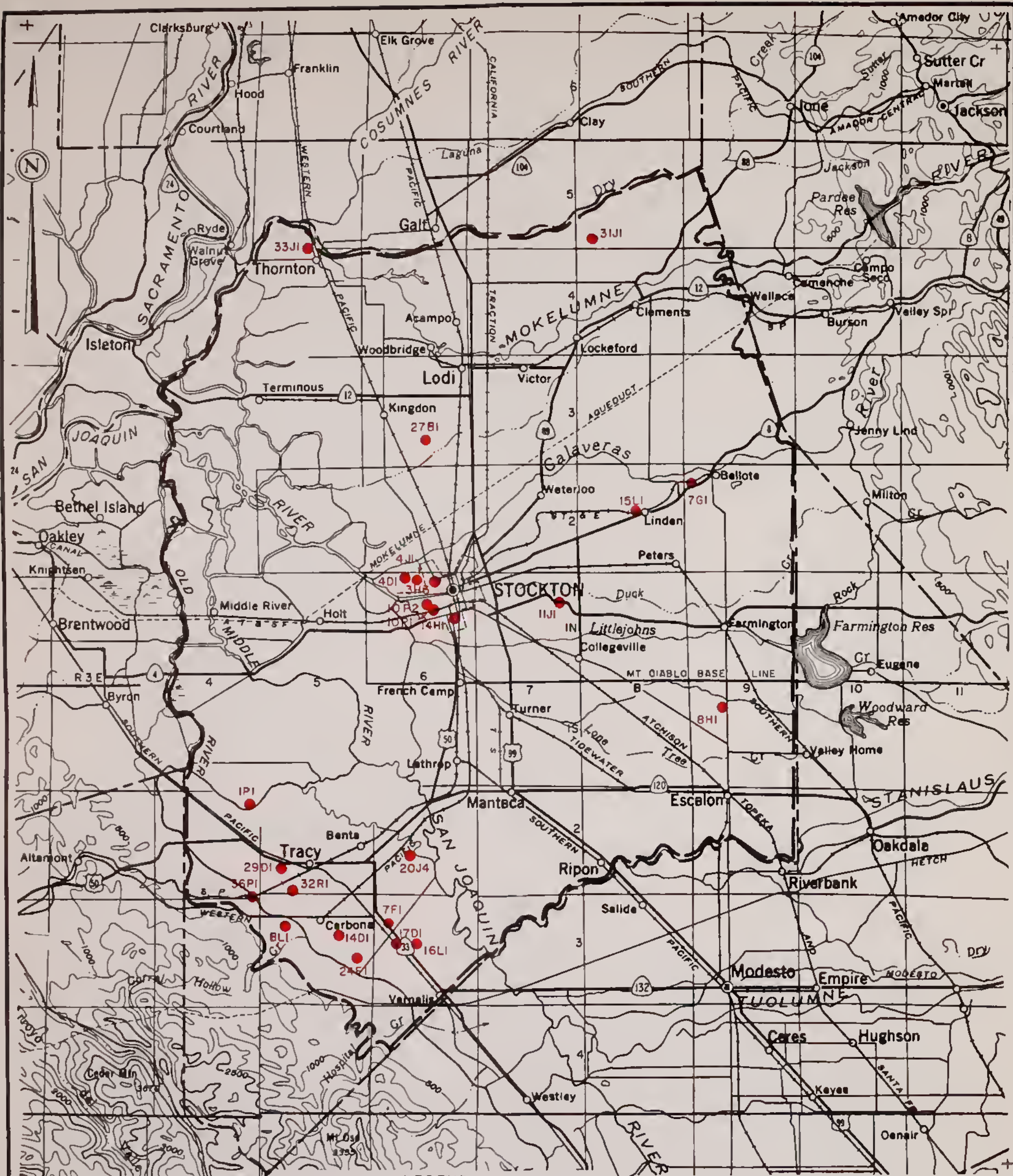
Monitoring Program. The monitoring program in Solano County was begun in 1958 to observe the ground water quality and to detect changes in quality which might result from migration of poor quality waters known to be present in the area. Samples were collected from 15 wells in 1959 during the period May - June. Three of the wells were sampled again in October.

Ground Water Occurrence. Water-bearing formations in this area include younger alluvium, consisting of stream channel and flood plain deposits; older alluvium, comprised of fine-grained sediments enclosing lenses and bodies of coarse materials; the Tehama formation; and Tertiary volcanic sedimentary rocks. The Tehama formation extends to a depth of 1,500 to 2,500 feet. The volcanics, comprised of a sequence of shale, sandstone and conglomerate, underlie the Tehama formation. Ground water is partially confined, the degree of confinement increasing with depth.

Ground Water Development. Ground waters in Solano County are moderately to extensively developed. Well yields range from less than 100 to approximately 1,000 gpm.

Beneficial Uses of Ground Water. Ground water is used for irrigation, domestic and other purposes.


W Sacramento
eek
34C2
HERN
Yolo
By Pass
NORTHERN
SACRAMENTO
Clarksburg
Court
4
3
24
SACRAMENTO
Ryde
Walnut
Grove
25K
Vista
31F2
Isleton
N
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
SOLANO COUNTY
SCALE OF MILES
2
0
2
4



LEGEND

401 ● MONITORED WELL

▬ ▬ APPROXIMATE LIMIT OF MONITORED AREA

KEY TO LOCATION NUMBERS

D	C	B	A
E	F	G	H
M	L	K	J 22J1
N	P	Q	R

Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E – 22J1

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959

SAN JOAQUIN COUNTY

SCALE OF MILES

4 0 4 8

SAN JOAQUIN VALLEY (5-22)

The San Joaquin Valley floor comprises about 10,000 square miles of irrigable lands and extends from the Tehachapi Mountains northward to the vicinity of the Cosumnes River. Underlying this valley is the largest ground water reservoir in the State. The storage capacity of this great reservoir, to a depth of 200 feet below land surface, has been estimated to be 100,000,000 acre-feet. A bed of diatomaceous earth, generally known as the Corcoran clay, continuous throughout most of the San Joaquin Valley, separates this reservoir into upper and lower ground water zones. This clay bed is about 40 to 50 feet thick and lies generally between 300 and 350 feet below the land surface. Wells in the western portion of the valley draw water principally from the lower zone, by-passing the poor quality of most upper zone waters in that area. Wells in the remainder of the valley produce good quality waters from both zones. Most of the San Joaquin Valley has been included in the monitoring program and is reported herein by counties.

SAN JOAQUIN COUNTY

The area of San Joaquin County included in the monitoring program comprises most of the valley floor portion of the county. The monitored area extends from the Sacramento county line on the north to the Stanislaus county line on the south, and varies in width from about 14 to 30 miles.

Monitoring Program. In 1953, a monitoring program was established in San Joaquin County to detect degradation of ground waters by migration of poor quality waters, which are located primarily in the western part of the county. During 1959, from April to September, water samples were collected from 24 wells.

Ground Water Occurrence. The principal sources of ground water are unconsolidated Recent alluvium and semi-consolidated Tertiary and Quaternary continental sediments. In the eastern portion of the county the Mehrten formation is also an important aquifer. Ground water is generally unconfined, except in the vicinity of Tracy, where a deep zone is confined by the Corcoran clay. The general movement of ground water is from east to west, except across the delta, where it is impeded by fine-grained deposits.

Ground Water Development. Ground water is moderately to extensively developed. Wells in the Mehrten formation are reported to produce up to 1,300 gpm while those in the alluvial sediments produce about 3,000 gpm.

Beneficial Uses of Ground Water. Approximately 70 percent of the water pumped is used for irrigation. The remaining portion is used mainly for industrial and domestic purposes.

Major Waste Discharges. The principal waste discharges in San Joaquin County consist of effluent from sewage treatment plants at or near the Cities of

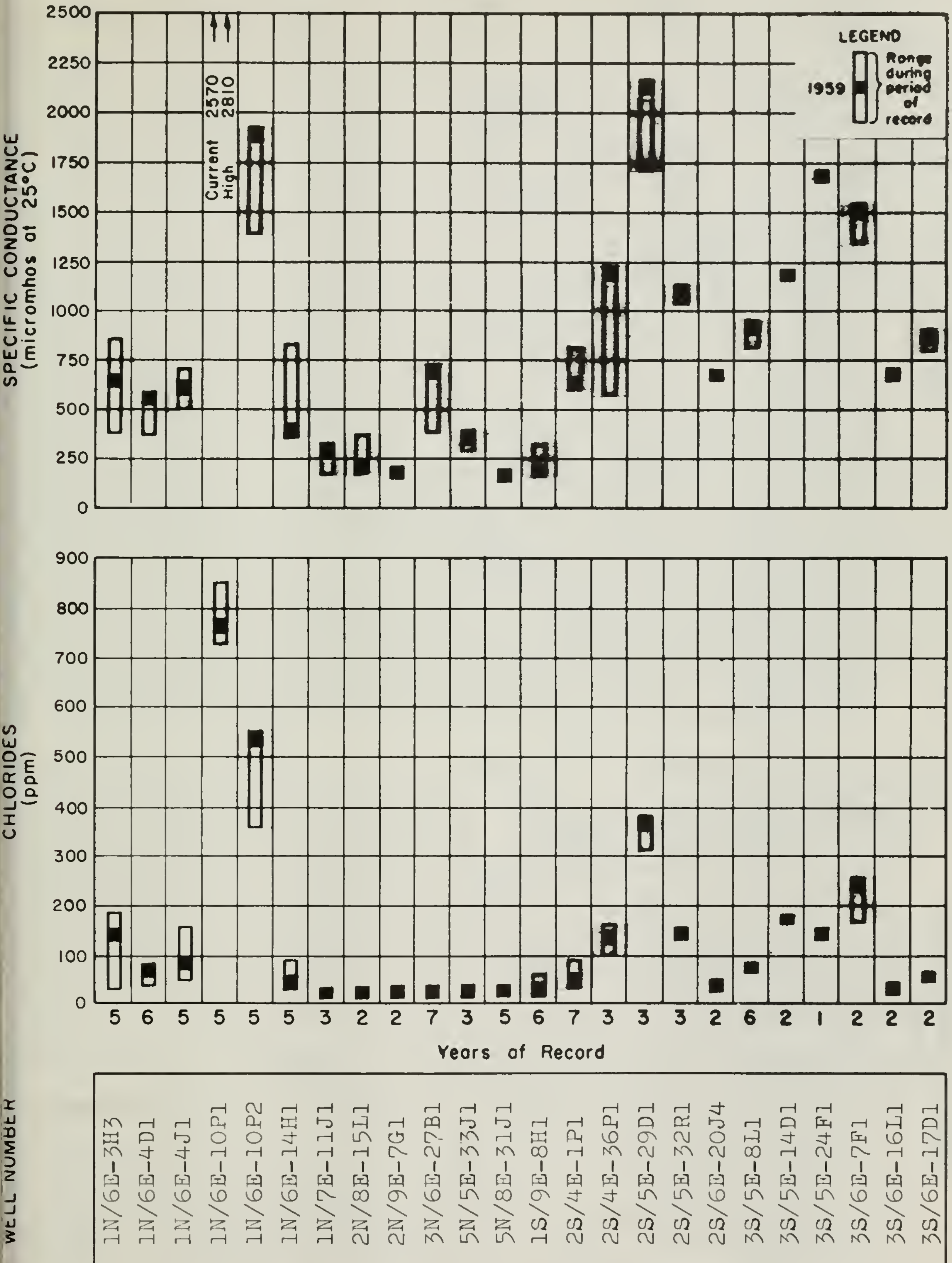
Escalon, Stockton, Manteca, Tracy and Lincoln Village. All of the sewage treatment plants dispose of their waste waters to nearby surface waters except for the plant at Escalon which uses percolation ponds for disposal.

Evaluation of Water Quality. Ground water in San Joaquin County varies in type and mineral quality depending upon location and depth from which the water is extracted. Wells less than 1,000 feet deep, located east of Stockton, generally yield water suitable for both domestic and agricultural purposes. The water is bicarbonate in type with calcium the predominant cation. Total dissolved solids range between 115 and 645 ppm but seldom exceed 250 ppm. Chloride and boron are usually well within the limits for class 1 irrigation waters. Analyses of 1959 showed nitrates in excess of 44 ppm in two wells located south of Tracy.

Saline water apparently underlies most of the county at varying epths. The saline water body is very deep along the eastern edge of the area, bout 2,000 feet beneath the ground surface in the vicinity of Linden, becoming hallower toward the west, reaching a depth of about 1,000 feet in the Stockon area. Poor quality water underlies the central delta portion of the county t a depth of less than 100 feet. The impediment to ground water movement esulting from the fine-grained delta deposits appears to have effectively revented significant movement of the poor quality water, which underlies the elta area at shallower depths, into the fresh water underlying the eastern ortion of the county.

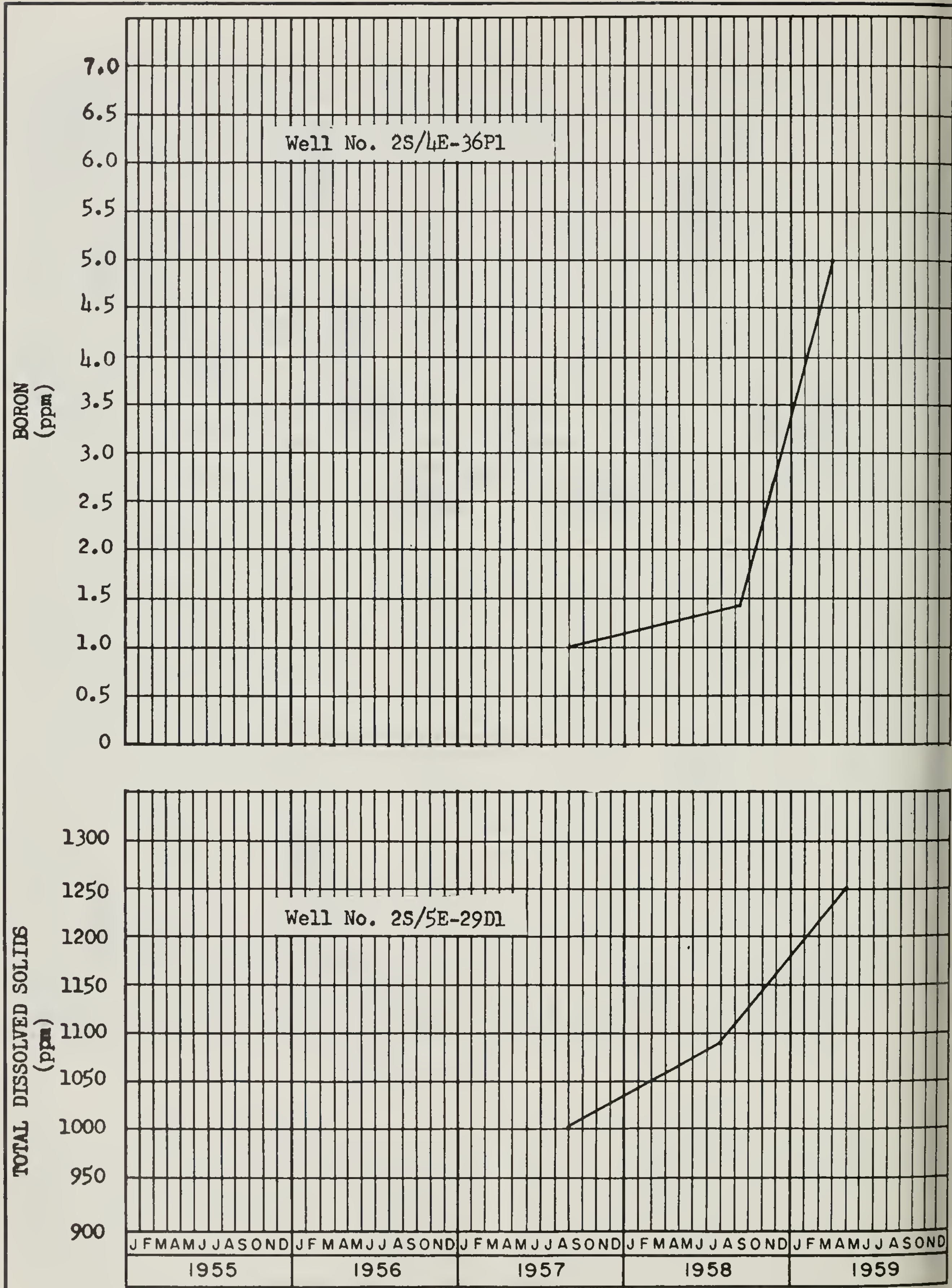
ignificant Water Quality Changes. A comparison of analyses of samples colected in 1958 with those of 1959 showed a general increase in boron concenrations. The largest increase, 3.6 ppm, occurred in well 2S/4E-36P1 located bout 6 miles northwest of Tracy. A moderate increase in total dissolved olids occurred in well 2S/5E-29D1, located approximately 1 mile west of

Tracy. Total dissolved solids in this well increased from 1,000 ppm in 1957 to 1,250 ppm in 1959 (see fluctuation graph).



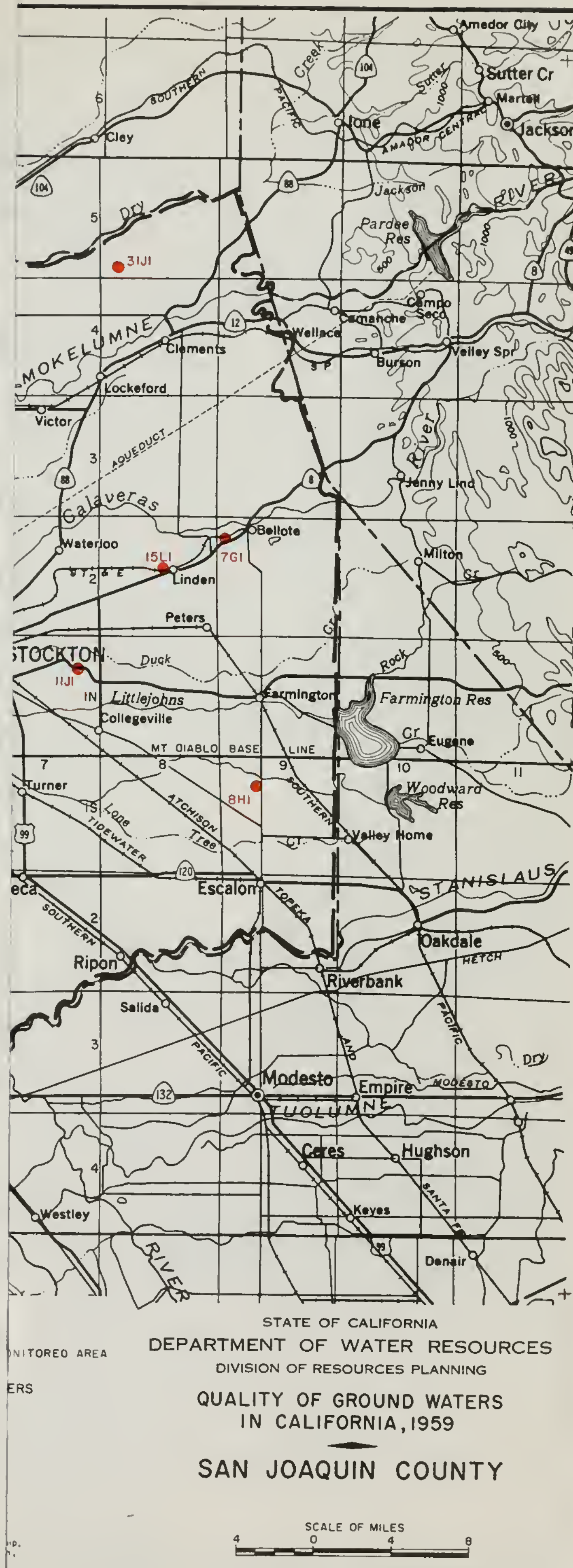
WATER QUALITY RANGES

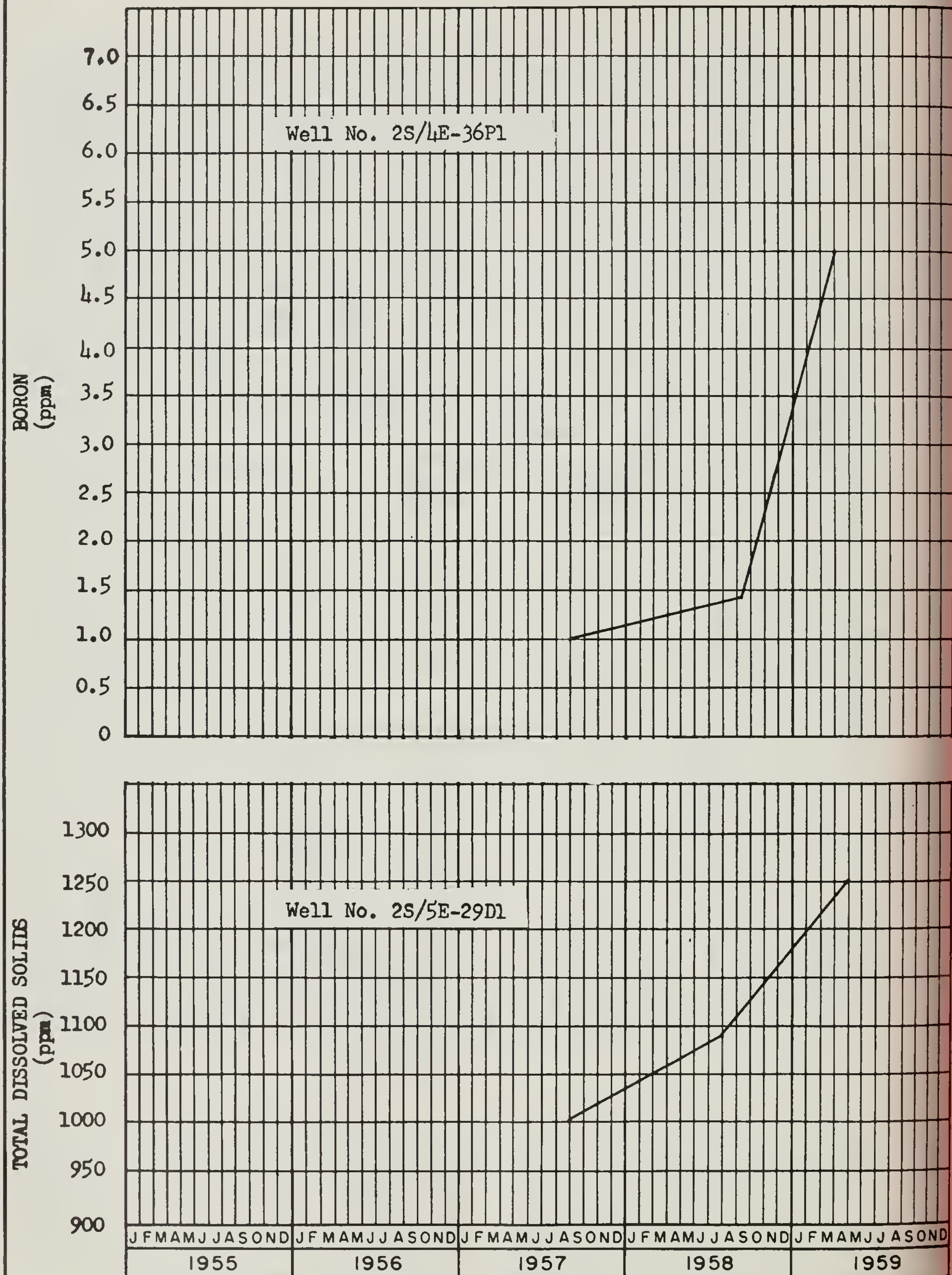
SAN JOAQUIN COUNTY



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

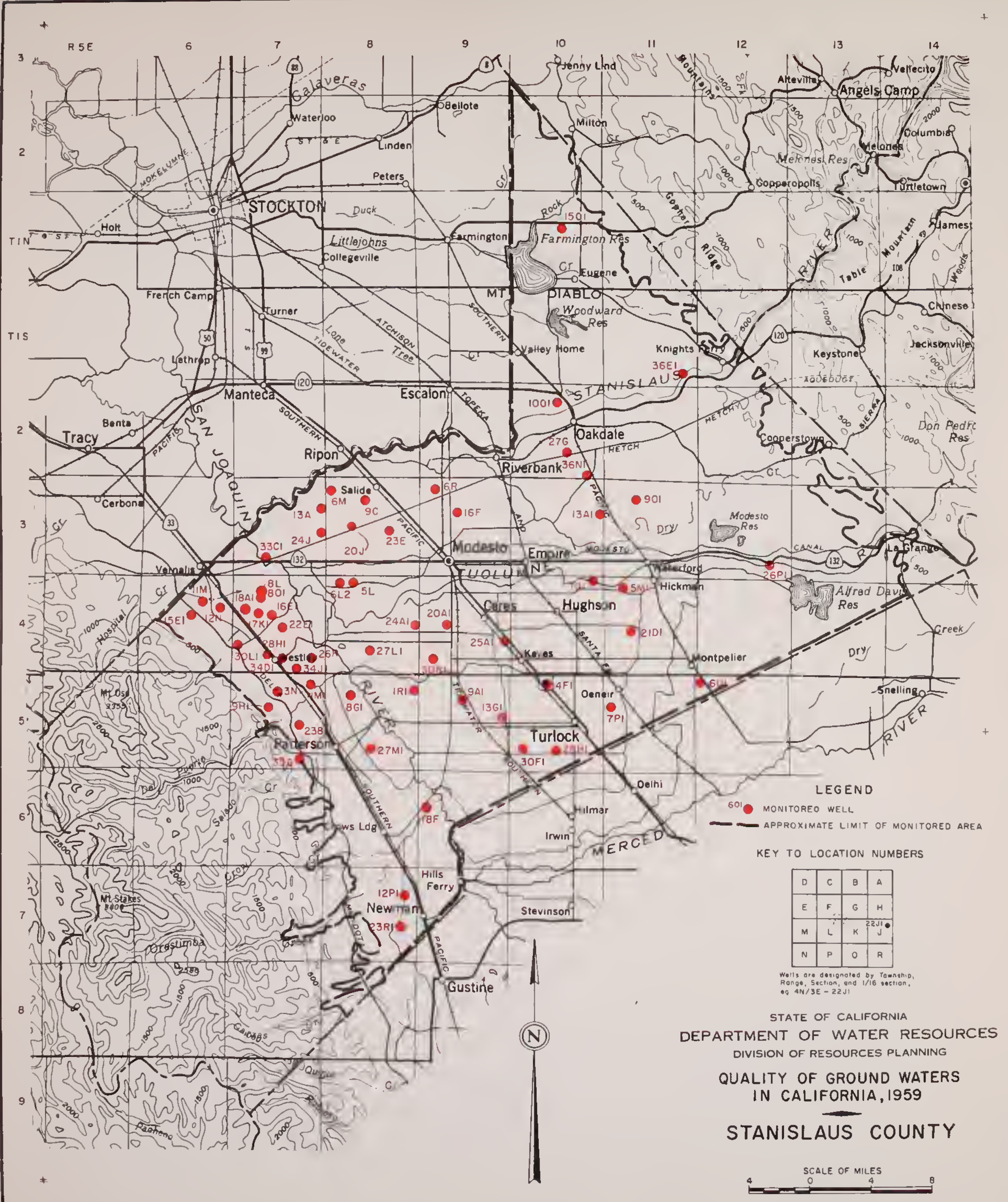
SAN JOAQUIN COUNTY


Amedor City
Sutter Cr
Martell
Jackson
Ione
Cley
SOUTHERN
PACIFIC
Creek
Sutter
AMADOR CENTRAL
Jackson
RIVER
Pardee Res
Dry
31J1
MOKELUMNE
Clements
Camanche
Campo Seco
Wallace
Burson
Valley Spr
Lockeford
Victor
AQUEDUCT
Calaveras
River
Jenny Lind
Bellote
Waterloo
15L1
7G1
Linden
Milton
Peters
STOCKTON
1IJ1
Duck
Rock
Littlejohns
Collegeville
Farmington
Farmington Res
Eugene
MT DIABLO BASE LINE
Turner
8H1
Woodward Res
Lone Tree
TIDEWATER
ATCHISON
TOPEKA
Valley Home
STANISLAUS
Escalon
Oakdale
Ripon
Riverbank
HETCH
Salida
PACIFIC
Dry
Modesto
Empire
MODESTO
TUOLUMNE
Ceres
Hughson
Keyes
SANTA FE
Westley
RIVER
Denair
ONITORED AREA
ERS
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
SAN JOAQUIN COUNTY
SCALE OF MILES
4 0 4 8



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

SAN JOAQUIN COUNTY



STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959

STANISLAUS COUNTY

STANISLAUS COUNTY

The monitored portion of Stanislaus County includes most of the valley floor land in the county, and comprises an area of approximately 1,000 square miles.

Monitoring Program. Because of the presence of ground waters containing high concentrations of total dissolved solids and boron, Stanislaus County was included in the monitoring program in 1957. During the period of August - October 1959, samples were collected from 59 wells in the area.

Ground Water Occurrence. Recent alluvium, and the underlying Pliocene to Pleistocene Modesto, Riverbank and Turlock Lake formations are the principal water-bearing units. The Corcoran clay confines a lower zone of ground water. This clay bed occurs generally in the southwestern portion of the county and becomes discontinuous or is missing in the other portions of the county. Older formations of continental origin are locally important aquifers in and near the eastern foothills.

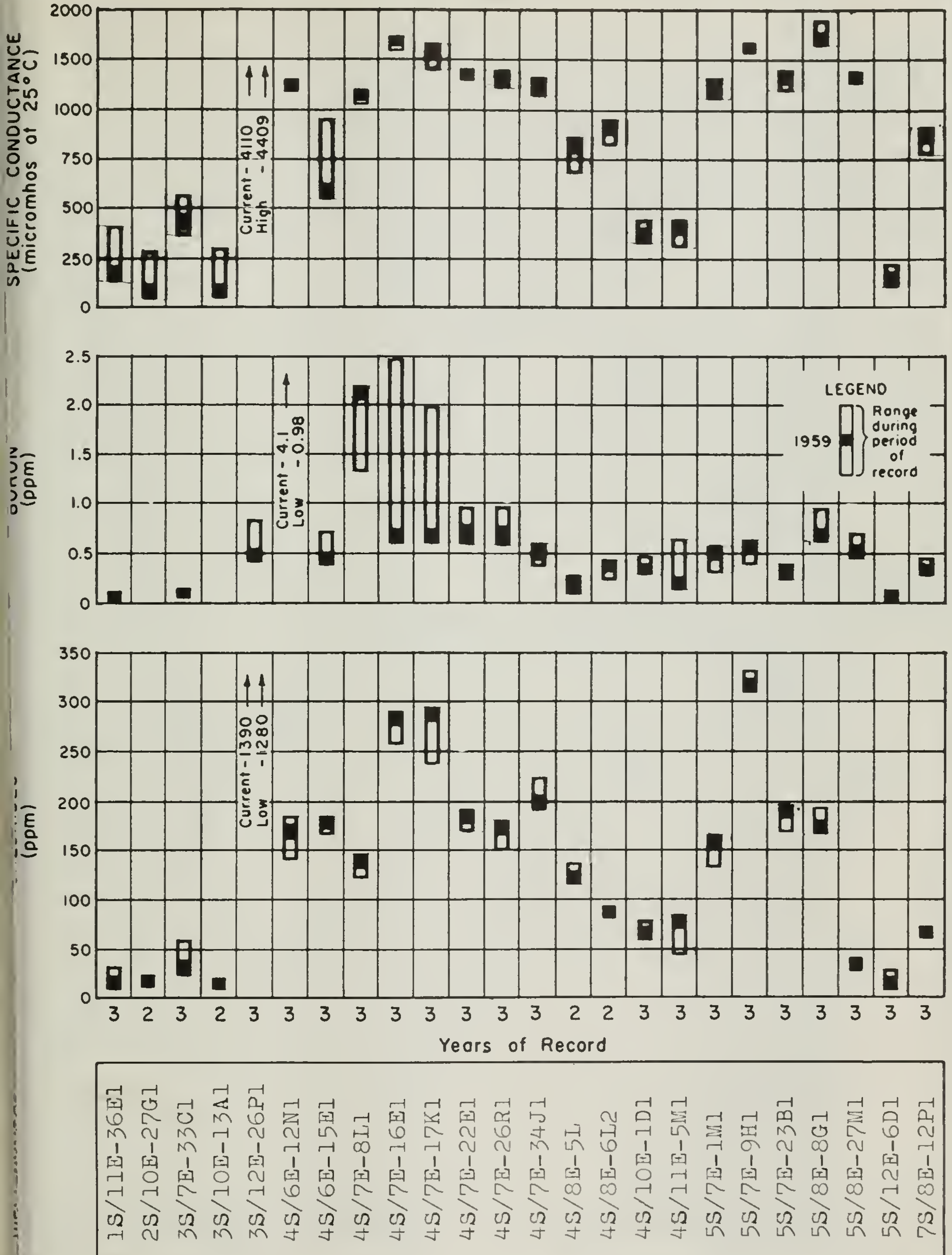
Ground Water Development. Ground water supplies of Stanislaus County are developed to the extent of overdraft in areas that do not have adequate surface water supplies. Large irrigation wells on the valley floor yield more than 1,000 gpm.

Beneficial Uses of Ground Water. The ground waters of Stanislaus County are used chiefly to supply industrial, municipal and irrigation needs.

Major Waste Discharges. The major waste water discharges in Stanislaus County are effluent from the Cities of Modesto, Oakdale, Patterson and Turlock. Effluent from the sewage treatment plant located at Modesto is disposed of by percolation ponds and by an outfall to the Tuolumne River. The plant at Oakdale uses percolation ponds as the principal means of disposal. However, during the canning season, the waste water is partially discharged to the Stanislaus River. The plant at Patterson uses percolation ponds for disposal and the plant at Turlock disposes its waste into the San Joaquin River.

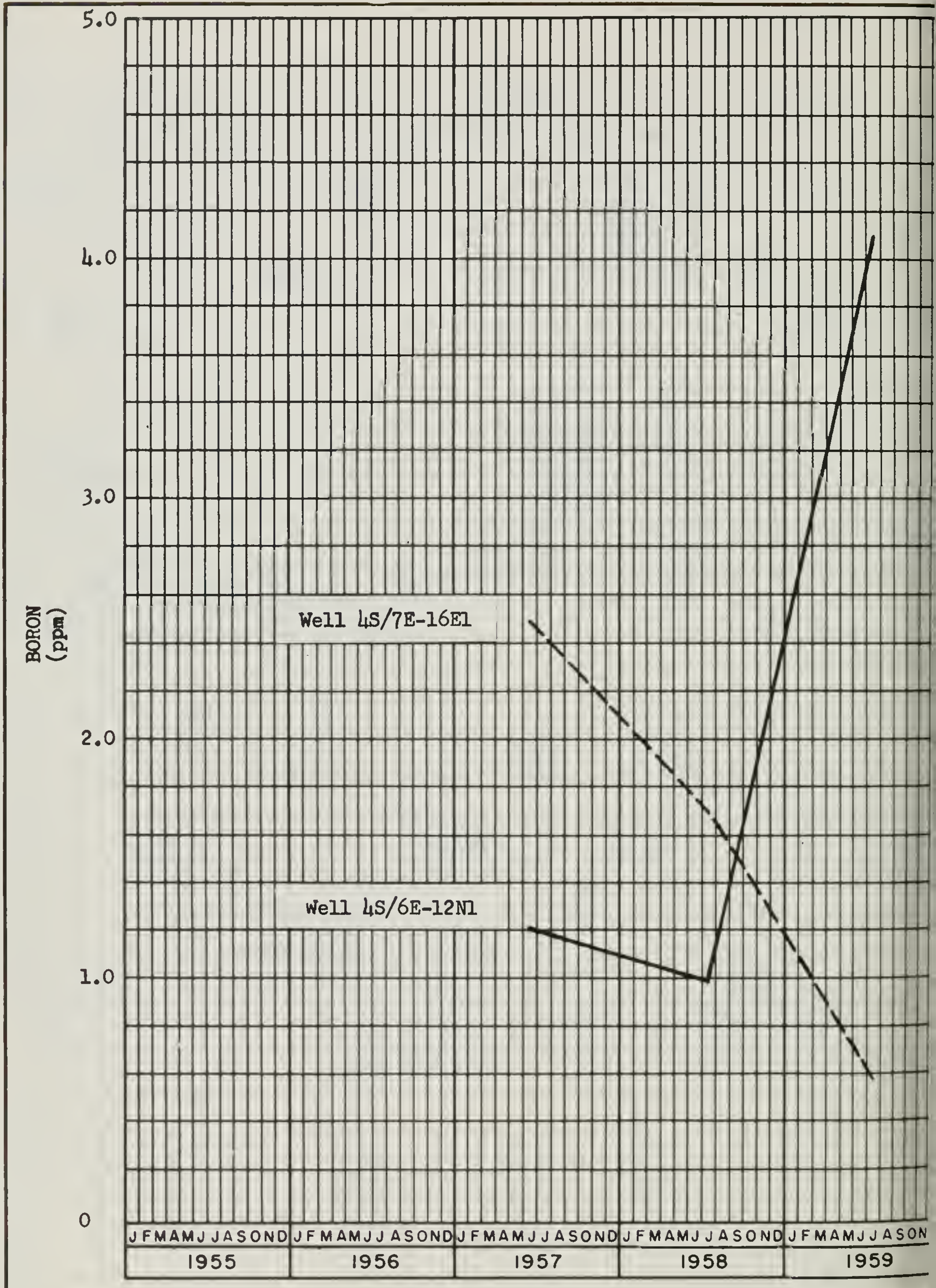
Evaluation of Water Quality. Ground waters in the eastern part of the monitored area are generally bicarbonate in type and of excellent mineral quality. Sodium chloride type waters containing high concentrations of total dissolved solids have been found in the trough of the valley. The west side ground waters are chiefly calcium-magnesium bicarbonate type of excellent mineral quality, although waters moderately high in boron and sulfate are also present.

Significant Water Quality Changes. Comparison of the 1959 analyses with those of 1958 showed no significant changes in mineral concentrations, with the exception of boron in a few wells. The greatest change in boron occurred in well 4S/6E-12N1, located approximately 5 miles west of the San Joaquin River, where boron increased from 0.98 to 4.1 ppm between July 1958 and July 1959 (see fluctuation graph). Five other wells in the vicinity of well 4S/6E-12N1 also showed marked increases or decreases in boron concentrations. The greatest decrease occurred in well 4S/7E-16E1, approximately 2 miles west of the San Joaquin River. Since boron is characteristically high in this portion of the area, fluctuations in its content in individual wells does not necessarily reflect a trend.



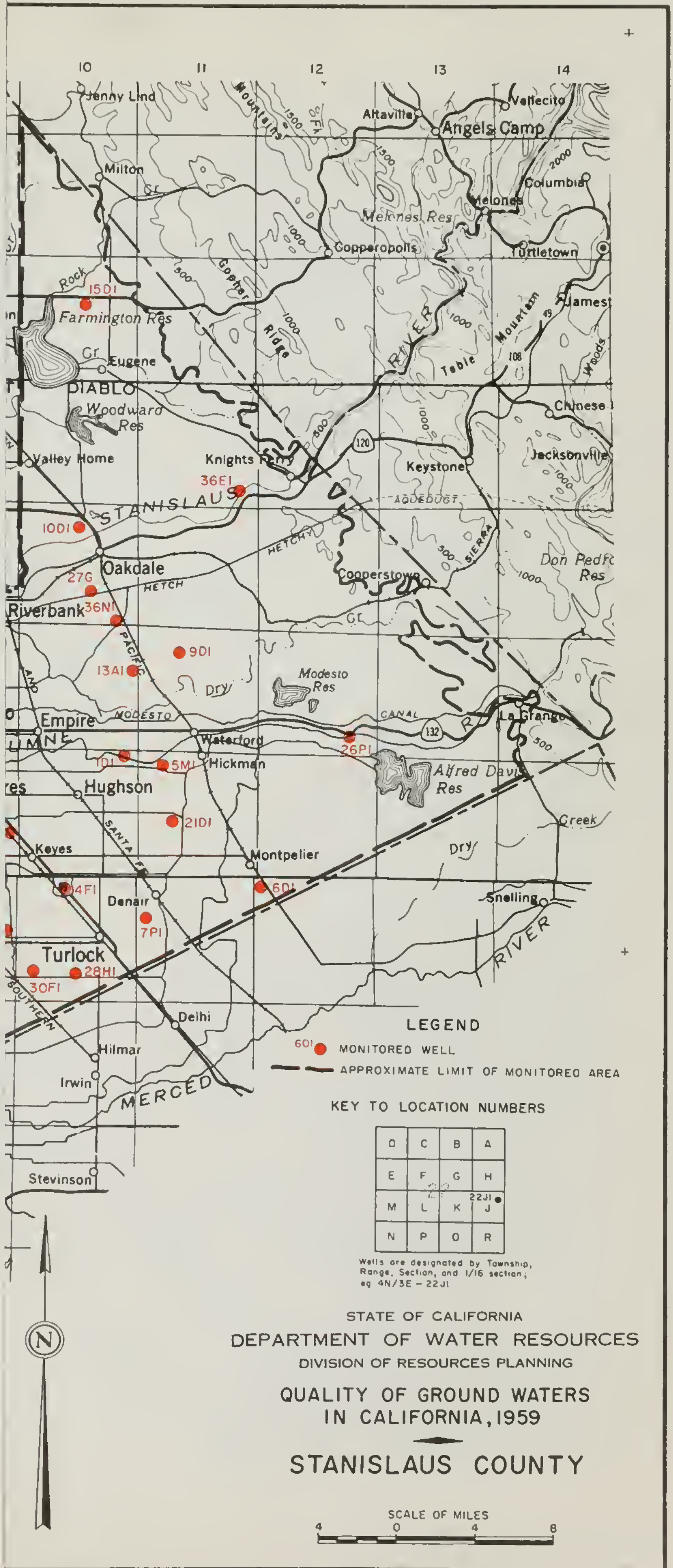
WATER QUALITY RANGES

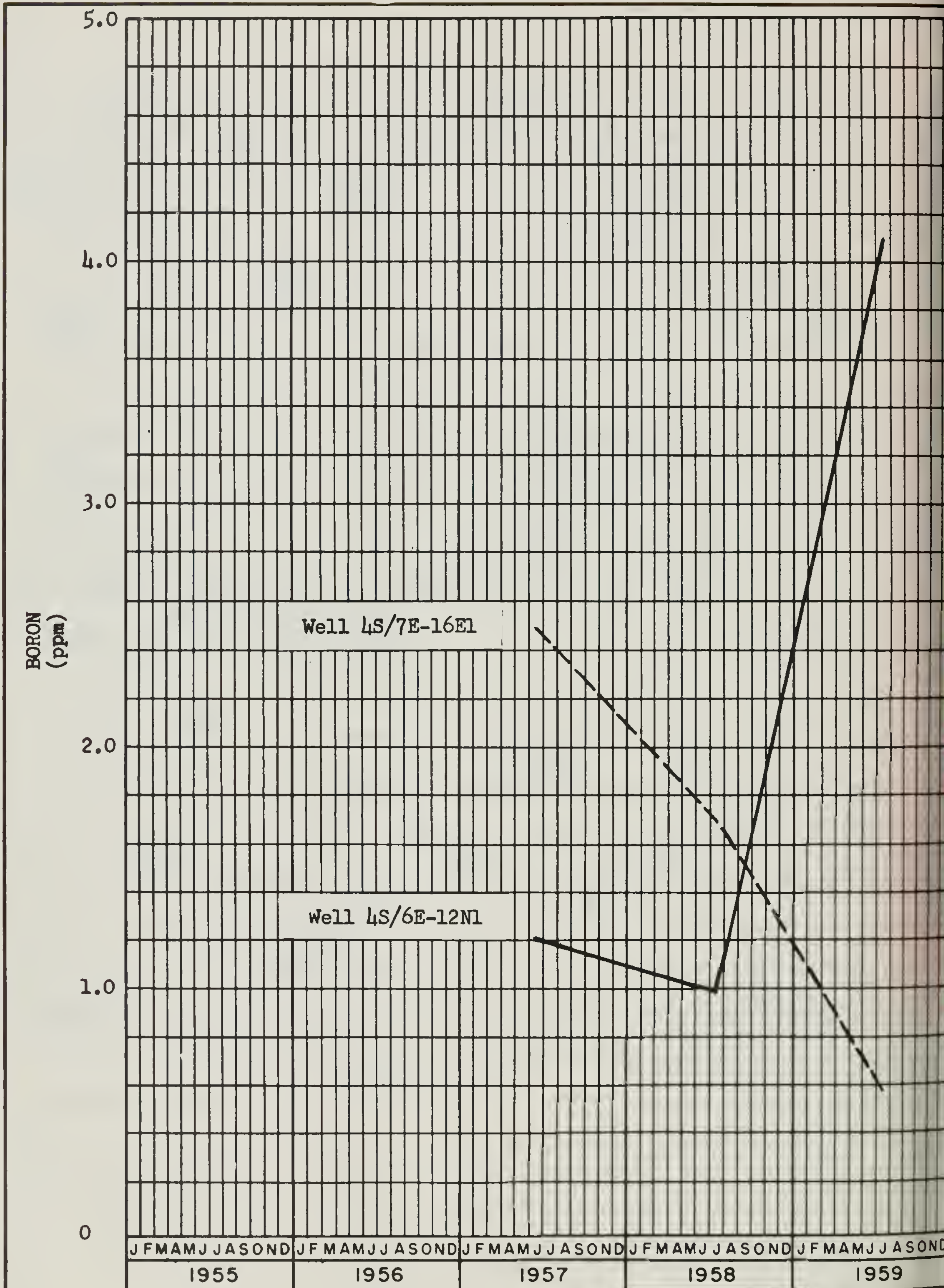
STANISLAUS COUNTY



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

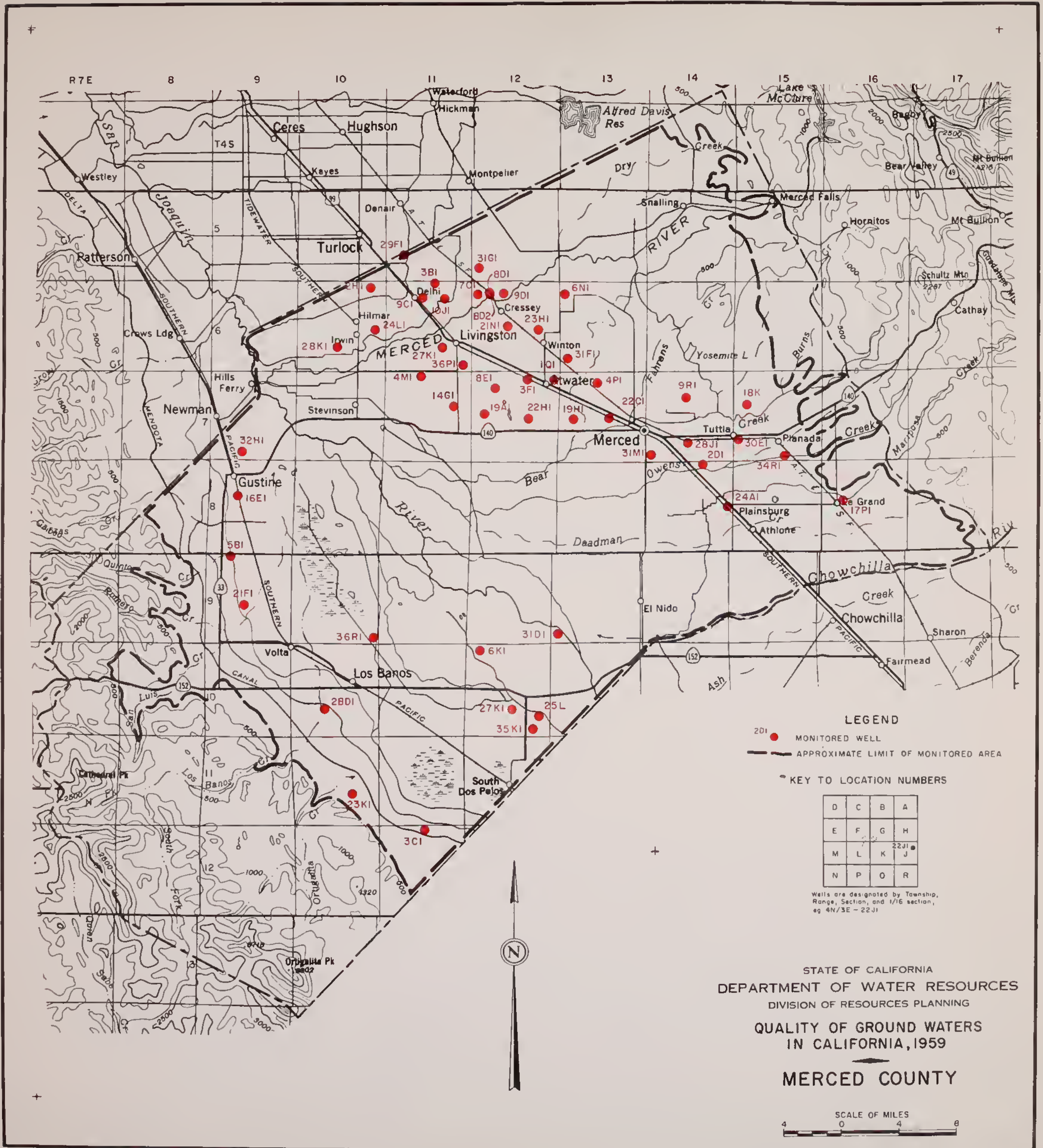
STANISLAUS COUNTY


LEGEND
601 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section; eg 4N/3E - 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
STANISLAUS COUNTY
SCALE OF MILES
4 0 4 8
N
15D1
36E1
10D1
27G
36N1
9D1
13A1
1D1
5M1
26P1
21D1
4F1
6D1
7P1
28H1
30F1
Jenny Lind
Milton
Altaville
Angels Camp
Vallecito
Columbia
Melones
Melones Res
Copperopolis
Tuttletown
Farmington Res
Eugene
Woodward Res
Valley Home
Knights Ferry
Keystone
Chinese
Jacksonville
Oakdale
Riverbank
Cooperstown
Don Pedro Res
Modesto Res
Empire
Waterford
Hickman
La Grange
Alfred Davis Res
Hughson
Keyes
Montpelier
Denair
Snelling
Turlock
Delhi
Hilmar
Irwin
Stevinson
STANISLAUS
MERCED
RIVER
HETCH HETCHY
MODESTO CANAL
AQUEDUCT
SOUTHERN PACIFIC
SANTA FE



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

STANISLAUS COUNTY



STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959

MERCED COUNTY

MERCED COUNTY

The monitoring program in Merced County consists of two separate areas. One area lies along the west side of the San Joaquin River between the Stanislaus and Fresno county lines. This area varies in width from 6 to 16 miles, is about 32 miles in length and comprises about 300 square miles. The second area is located east of the San Joaquin River in the central part of the county. It is from 10 to 12 miles in width, about 40 miles in length and includes about 400 square miles.

Monitoring Program. Merced County was included in the monitoring program in 1957 to maintain surveillance on water quality conditions and to detect migration of highly mineralized ground waters which occur near the trough of the valley. Samples were collected from 50 wells in 1959, during the period of June - August.

Ground Water Occurrence. The principal aquifers comprise Recent alluvium and the underlying Pliocene to Pleistocene Modesto, Riverbank and Turlock Lake formations. The Corcoran clay occurs beneath most of the central part of the monitored area; it pinches out east of Merced and west of Gustine. The clay separates the water-bearing materials into upper and lower water-bearing zones and acts as a confining layer upon the lower zone ground water.

Ground Water Development. Ground water in Merced County is moderately developed. Yields of irrigation wells range from about 500 to more than 3,000 gpm and average about 1,400 gpm.

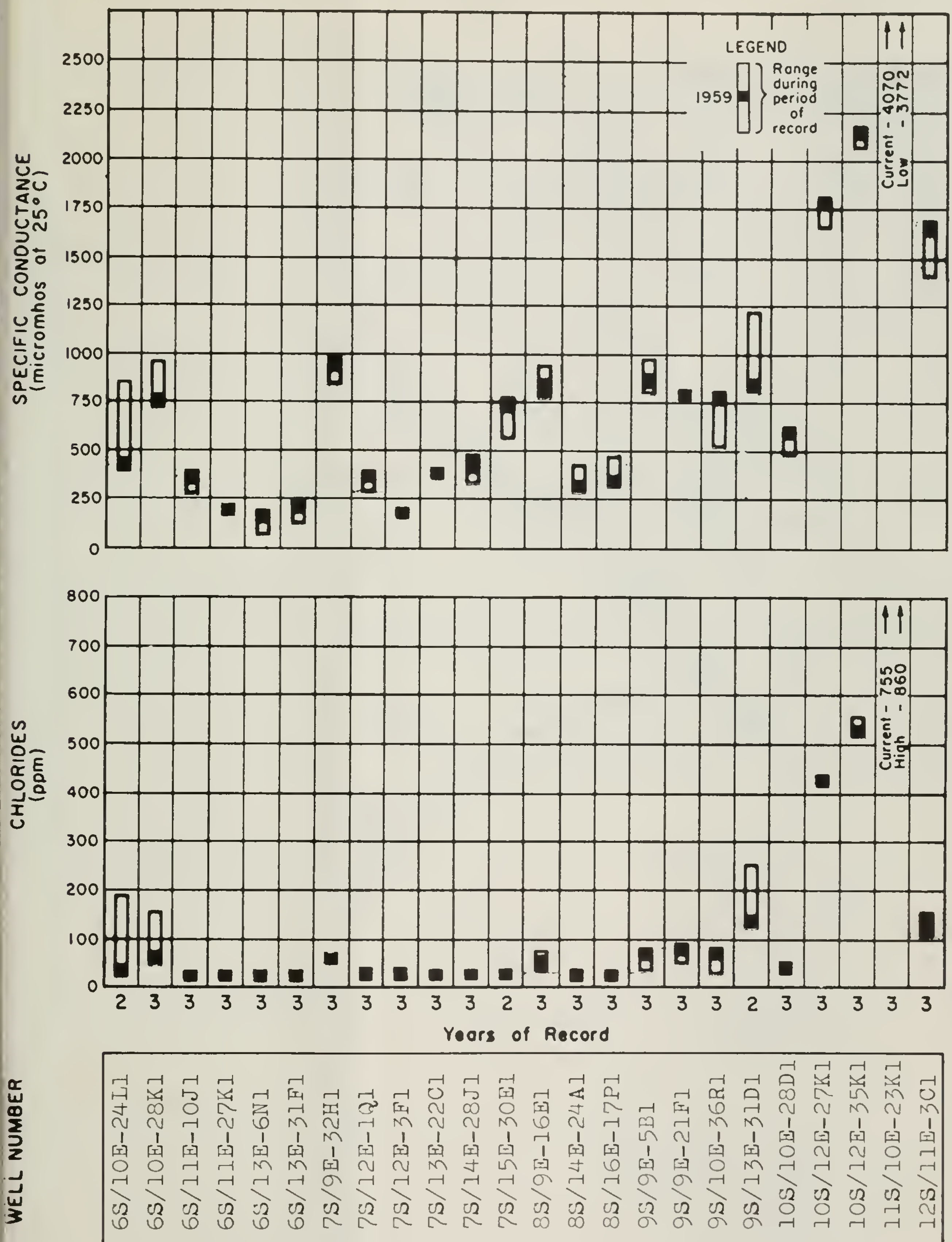
Beneficial Uses of Ground Water. Ground water is used moderately for domestic and irrigation needs, and is the principal source of municipal and industrial supplies.

Major Waste Discharges. The principal waste discharges in Merced County consist of effluent from sewage treatment plants at the Cities of Merced, Atwater and Los Banos, which, after primary treatment, are discharged to Miles Creek, Bear Creek and Mud Slough, respectively; from the City of Gustine, which is discharged to percolation ponds; and from Castle Air Force Base, which, after secondary treatment, is discharged to Canal Creek. None of these waste discharges carry any known toxic substances and are, therefore, not considered threats to ground water quality.

Evaluation of Water Quality. Ground waters in the area west of the San Joaquin River vary from excellent to poor in mineral quality. High chloride concentrations render much of the water, particularly in the southern portion, unsatisfactory for irrigation. Moderately high boron concentrations are also present in the west side area. Sulfates and nitrates in excess of recommended limits for drinking water are found locally.

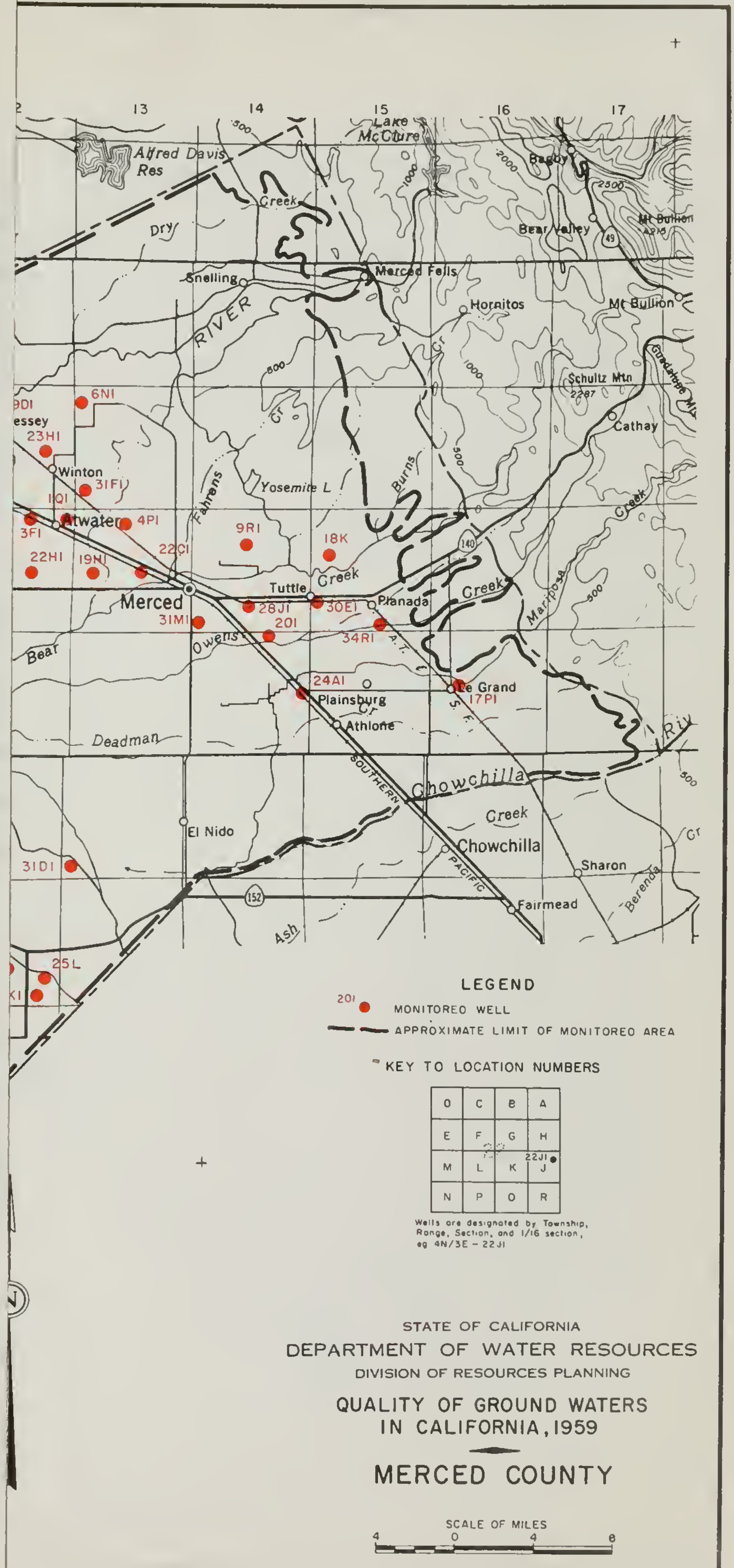
Ground waters east of the San Joaquin River are of good to excellent mineral quality. These waters are bicarbonate in type with sodium or calcium the predominant cation. Total dissolved solids are consistently below 700 ppm and percent sodium below 60.

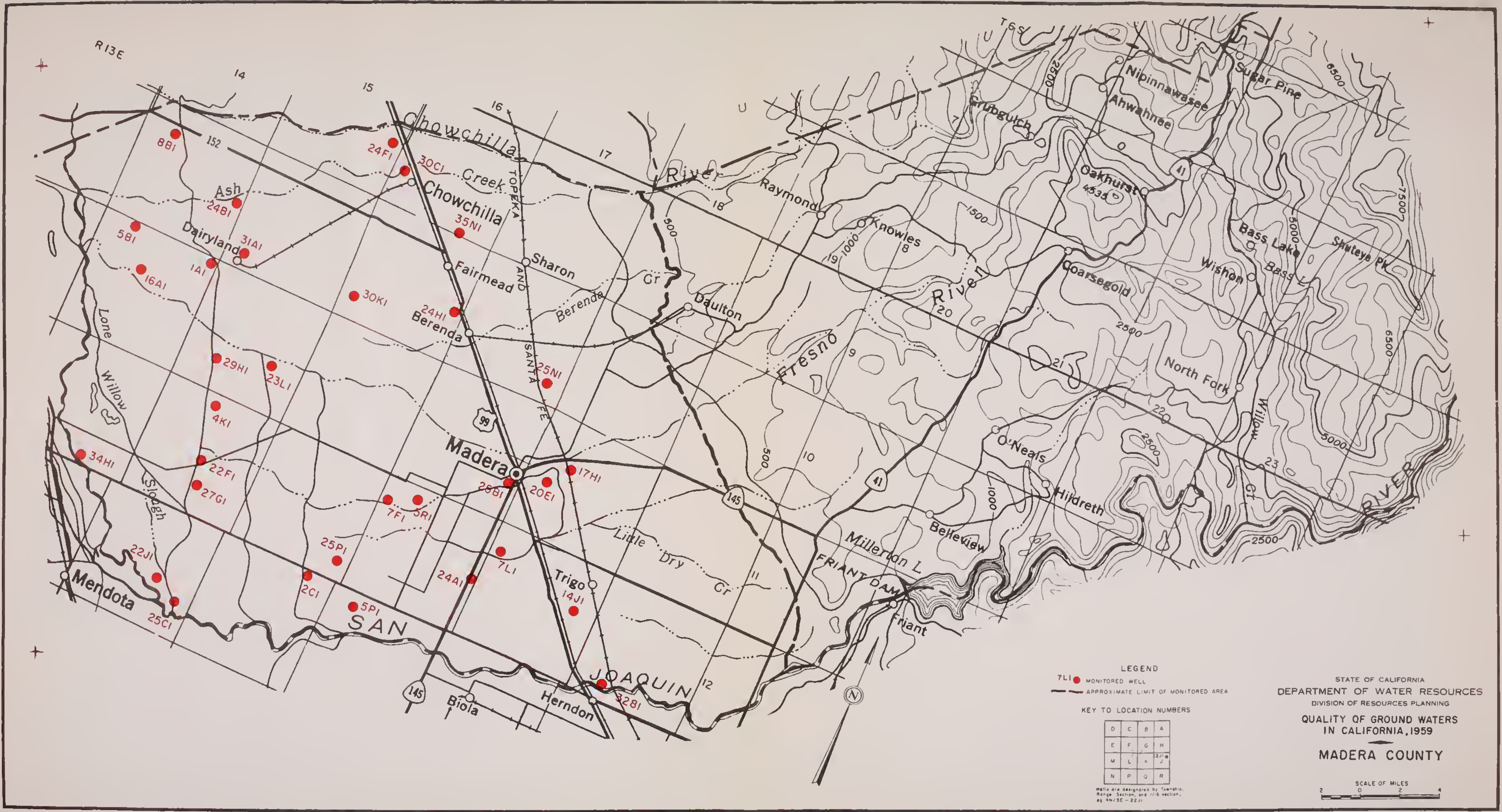
Significant Water Quality Changes. Analyses of samples collected in 1959 showed decreases in chlorides in two of the monitored wells. In wells 6S/10E-24L1, located approximately 6 miles south of Turlock, and 9S/13E-31D1, located approximately 14 miles south of Merced, chlorides decreased from 189 to 34 ppm and from 251 to 124 ppm, respectively, between the summers of 1958 and 1959. Total dissolved solids in each well decreased proportionally. Since there are only two years of record on these two wells, it is not known whether these decreases indicate water quality improvements or a heterogeneity in the ground water mixture..



WATER QUALITY RANGES

MERCED COUNTY


13
14
15
16
17
Lake McClure
Alfred Davis Res
Dry
Creek
Bagby
Bear Valley
Mt Bullion
Snelling
Merced Falls
Hornitos
RIVER
Schultz Mtn
2287
Cathay
6N1
23H1
Winton
31F1
1Q1
Atwater
4P1
3F1
22H1
19N1
22C1
9R1
18K
Yosemite L
Fahrens
Burns
Tuttle
Creek
Merced
28J1
30E1
Planada
31M1
20I
34R1
Owens
Bear
Greek
Mariposa
Creek
24A1
Plainsburg
Le Grand
17P1
Athlone
Deadman
SOUTHERN
PACIFIC
Chowchilla
Creek
Chowchilla
El Nido
Sharon
31D1
152
Fairmead
Ash
Berenda
25L
LEGEND
MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
22J1
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E - 22J1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
MERCED COUNTY
SCALE OF MILES
4 0 4 8


STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
MADERA COUNTY
LEGEND
7L1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
SCALE OF MILES
2 0 2 4
R13E
14
15
16
17
18
19
20
21
22
23
T6S
7
8
9
10
11
12
Chowchilla River
Chowchilla Creek
Chowchilla
Ash
Dairyland
Fairmead
Berenda
Berenda Cr
Sharon
Daulton
Raymond
Knowles
Fresno River
Madera
Little Dry Cr
Trigo
Herndon
Biola
Mendota
San Joaquin
Lone Willow Slough
Millerton L
FRIANT DAM
Friant
Belleview
Hildreth
O'Neals
Coarsegold
Oakhurst
Ahwahnee
Nipinnawasee
Grubgulch
Sugar Pine
Bass Lake
Wishon
North Fork
Shuteye Pk
Willow Cr
TOPEKA AND SANTA FE
99
41
145
152
8B1
24F1
30C1
35N1
24B1
31A1
5B1
1A1
16A1
30K1
24H1
29H1
23L1
25N1
4K1
34H1
22F1
27G1
25B1
20E1
17H1
7F1
5R1
25P1
7L1
22J1
2C1
24A1
14J1
5P1
25C1
32B1

MADERA COUNTY

All of the valley floor land in Madera County is included in the ground water monitoring program. The area extends from the foothills on the east to the San Joaquin River on the west, and from the Merced county line on the north to the Fresno county line on the south. The monitored area in Madera County comprises about 950 square miles.

Monitoring Program. Madera County was included in the monitoring program in 1957, due to the presence in the area of ground waters containing excessive concentrations of chlorides and high sodium percentages. During July 1959, 32 wells were sampled in Madera County.

Ground Water Occurrence. The ground waters in Madera County are divided into an upper and lower zone by the Corcoran clay. The upper zone consists of unconsolidated sediments ranging in age from Pleistocene to Recent, and contains unconfined to semi-confined waters. The lower zone consists of Pleistocene to Pliocene sediments, and is confined by the clay.

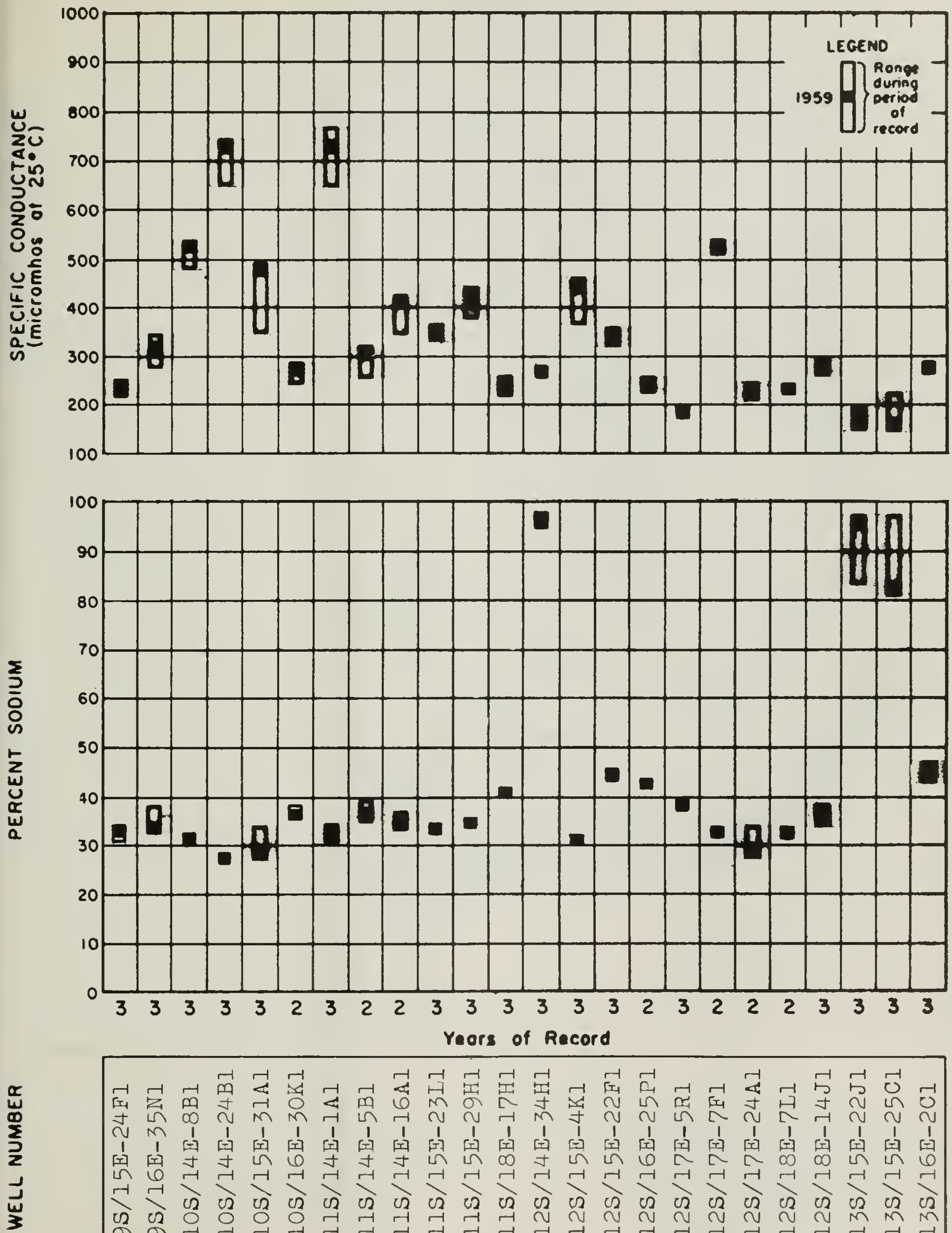
Ground Water Development. Ground water is extensively developed in sections of the county where surface water is not available. The larger wells are capable of yielding up to 1,000 gpm.

Beneficial Uses of Ground Water. Ground water is used beneficially for domestic, municipal, industrial and irrigation supplies.

Major Waste Discharges. Major waste discharges in Madera County consist of effluent from sewage treatment plants located at the Cities of Chowchilla and Madera. The sewage treatment plant located at Chowchilla disposes of the waste water to percolation ponds, the Berenda Slough and by reuse for irrigation. The waste water from the plant at Madera is used for irrigation. Minor waste discharges in the county emanate from various industrial installations. These waste waters are disposed of by percolation ponds, by discharging into streams and by reuse for irrigation.

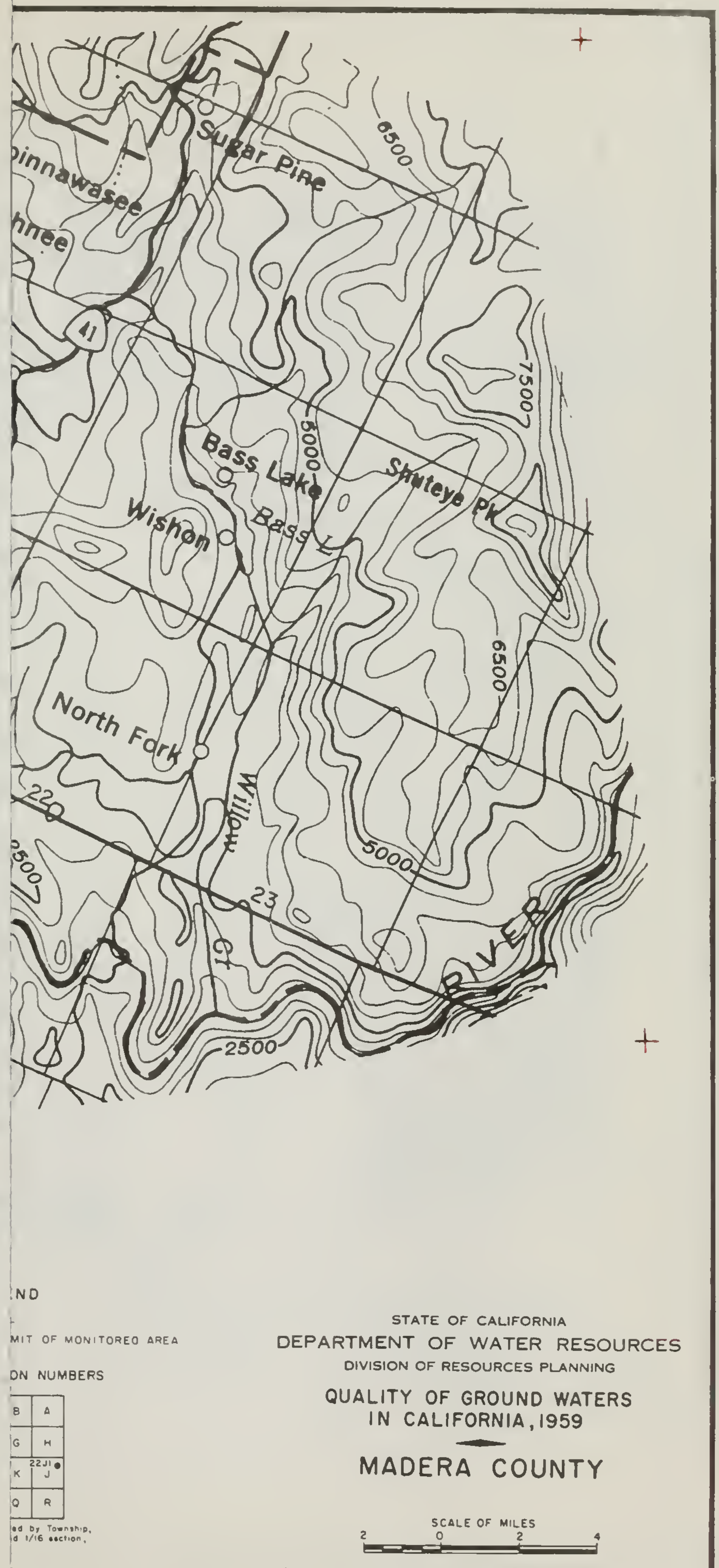
Evaluation of Water Quality. The water in the lower zones in the western portion of the county, which is effectively confined by the Corcoran clay, is predominantly sodium bicarbonate in type with sodium percentages often exceeding limits for irrigation waters. Wells in this area bordering the San Joaquin River generally yield water high in chlorides. Wells in the remainder of the county usually yield a bicarbonate type water of excellent mineral quality. These waters generally range from slightly to moderately hard, total dissolved solids average around 240 ppm, boron is usually less than 0.2 ppm and percent sodium is less than 40.

Significant Water Quality Changes. A comparison of mineral analyses for 1959 with previous analyses showed a slight increase in total dissolved solids in most of the monitored wells.

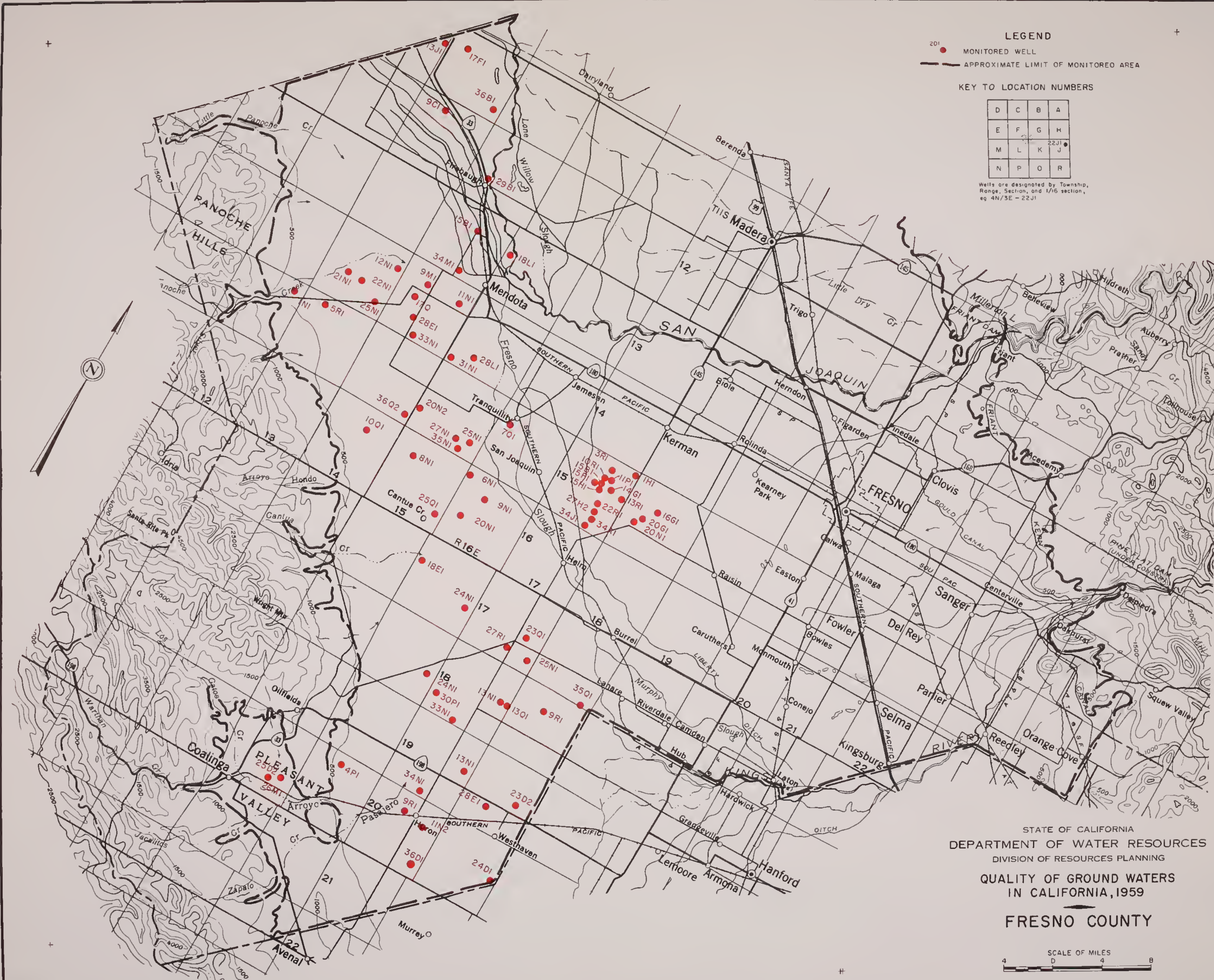


WATER QUALITY RANGES

MADERA COUNTY



Sugar Pine
6500
innawawasee
hnee
41
7500
5000
Bass Lake
Shuteye Pk
Wishon
Bass L
6500
North Fork
Willow
Cr
22
2500
5000
23
RIVER
2500
ND
MIT OF MONITORED AREA
ON NUMBERS
B A
G H
K J 22J1
Q R
ed by Township,
d 1/16 section,
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
MADERA COUNTY
SCALE OF MILES
2 0 2 4



STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959

FRESNO COUNTY

FRESNO COUNTY

Most of the valley floor area in Fresno County is included in the monitoring program. This area extends from the Sierra Nevada foothills on the east to the base of the Diablo Range on the west and from the Merced county line on the north to the Kings county line on the south. The total area is approximately 2,500 square miles.

Monitoring Program. Due to the presence of highly mineralized ground water in the western part of Fresno County, a monitoring program was initiated in the area in 1953. Samples were collected from 72 wells in the county during the period July - August 1959.

Ground Water Occurrence. There are two principal water-bearing zones on the west side of the valley which are separated by the Corcoran clay. Ground water in the lower zone is confined, and in the upper zone, unconfined or semi-confined. Eighty percent or more of the ground water used for irrigation is drawn from the lower zone. Saline waters underlie the west side area at depths ranging from about 1,000 to 3,000 feet.

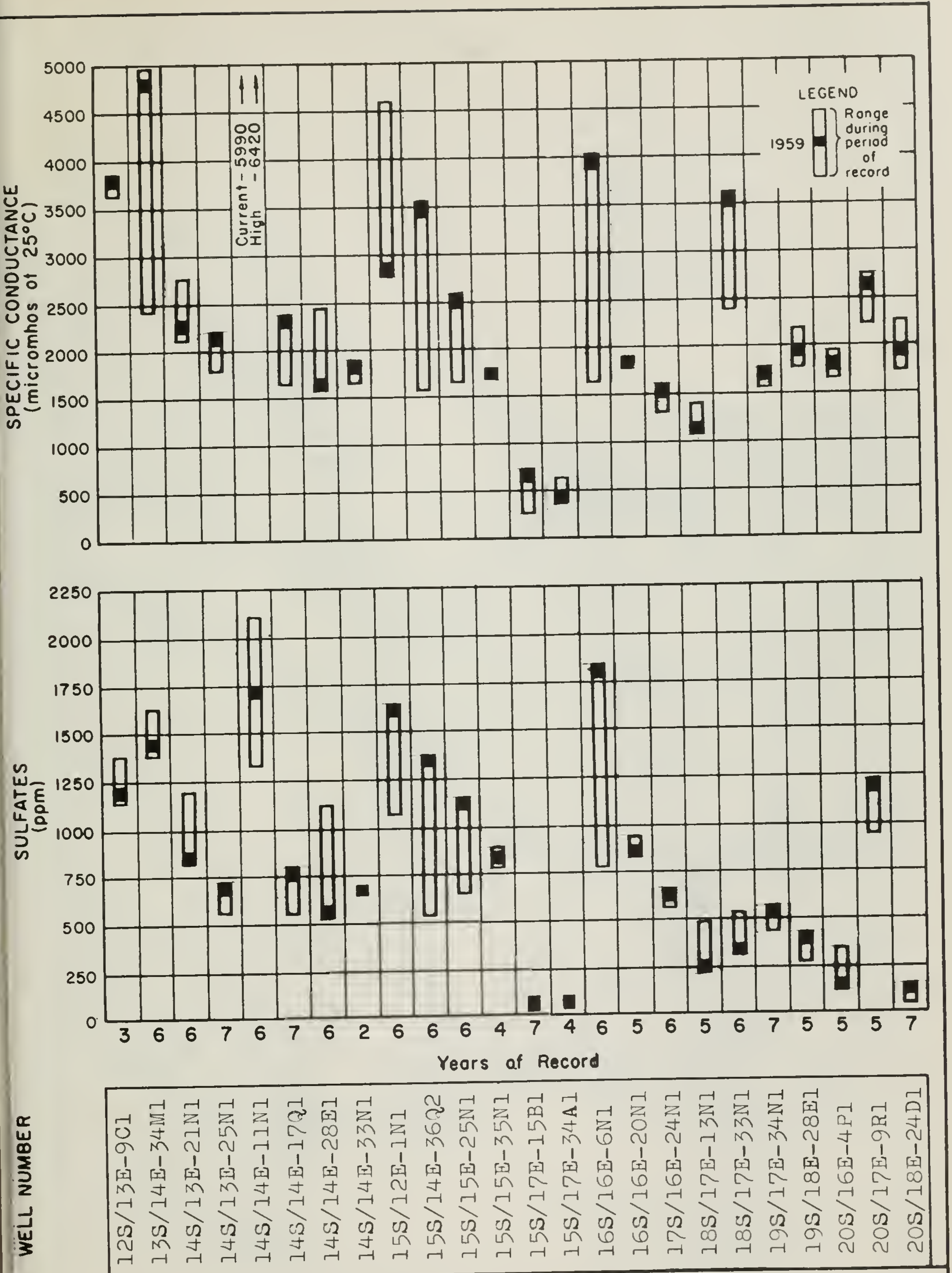
Ground Water Development. Ground water in Fresno County is extensively developed, resulting in overdraft of the ground water basin. Wells in both the upper and lower zones yield about 1,300 gpm.

Beneficial Uses of Ground Water. The chief use is irrigation; other uses include domestic, industrial and stock watering.

Major Waste Discharges. The principal waste discharges consist of effluent from sewage treatment plants serving the Cities of Fresno, Sanger, Selma, Reedley and Coalinga. These wastes normally contain no toxic substances and are either used for irrigation or disposed of by percolation. Oil field wastes at Raisin City are disposed of by injection into the underlying saline water body at a depth of more than 1,500 feet.

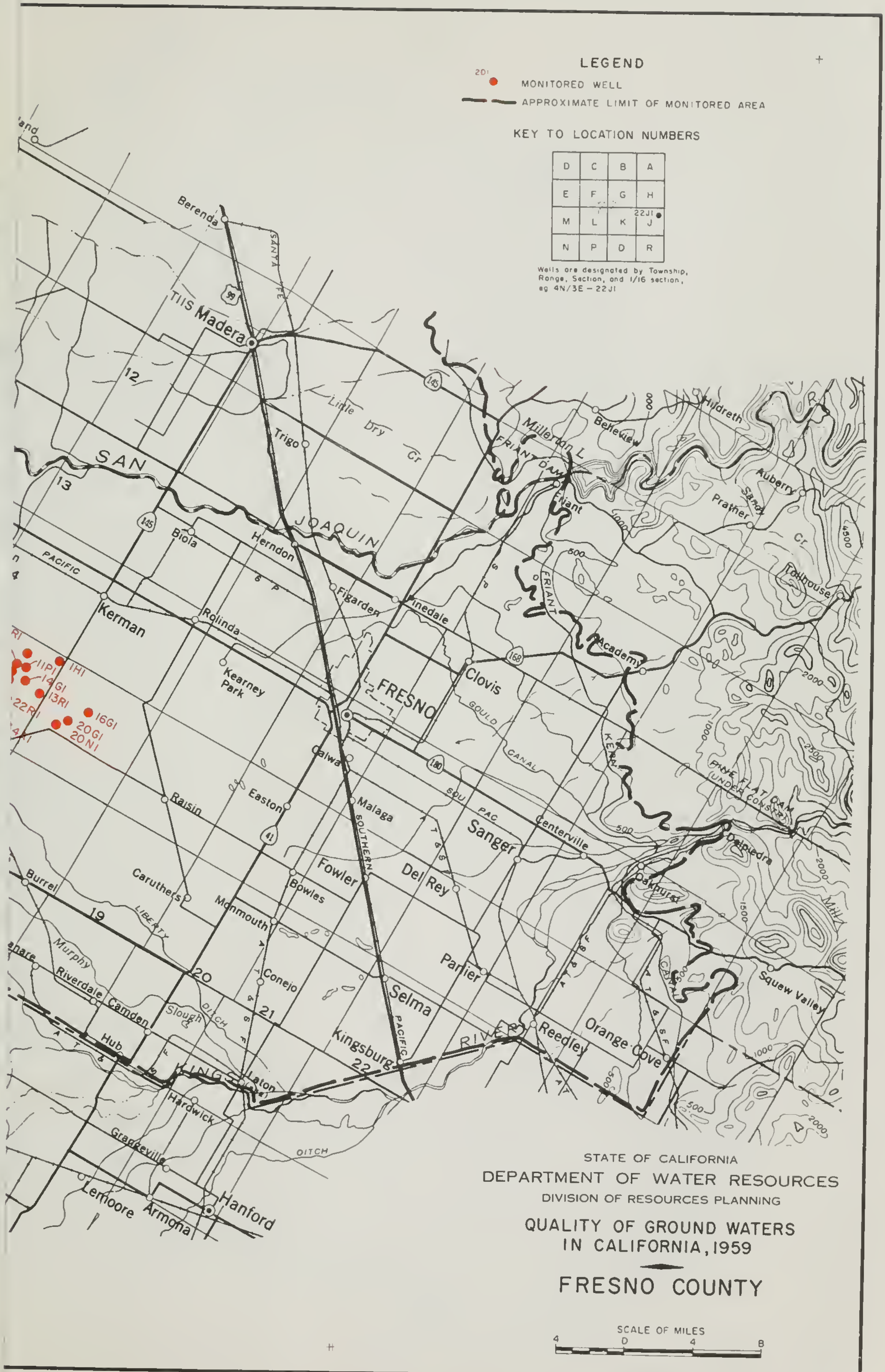
Evaluation of Water Quality. Good quality ground waters are generally found in the eastern portion of the monitored area. In the upper zone, ground waters in the central part of this area are generally too highly mineralized for most uses. In the western portion of the monitored area, upper zone waters are calcium-magnesium sulfate in type with an average total dissolved solids content of about 3,000 ppm. Upper zone waters near Mendota are sodium sulfate-chloride in type with about 5,000 ppm total dissolved solids. Lower zone west side ground waters are primarily sodium sulfate in type and contain an average total dissolved solids content of approximately 800 ppm. Sodium content is generally about 75 percent of base constituents. Sulfates exceeded 250 ppm in 48 of the monitored wells tested in 1959. Radioassays during 1959 of samples from 16 wells showed a maximum gross radioactivity of 16.77 $\mu\mu c/l$.

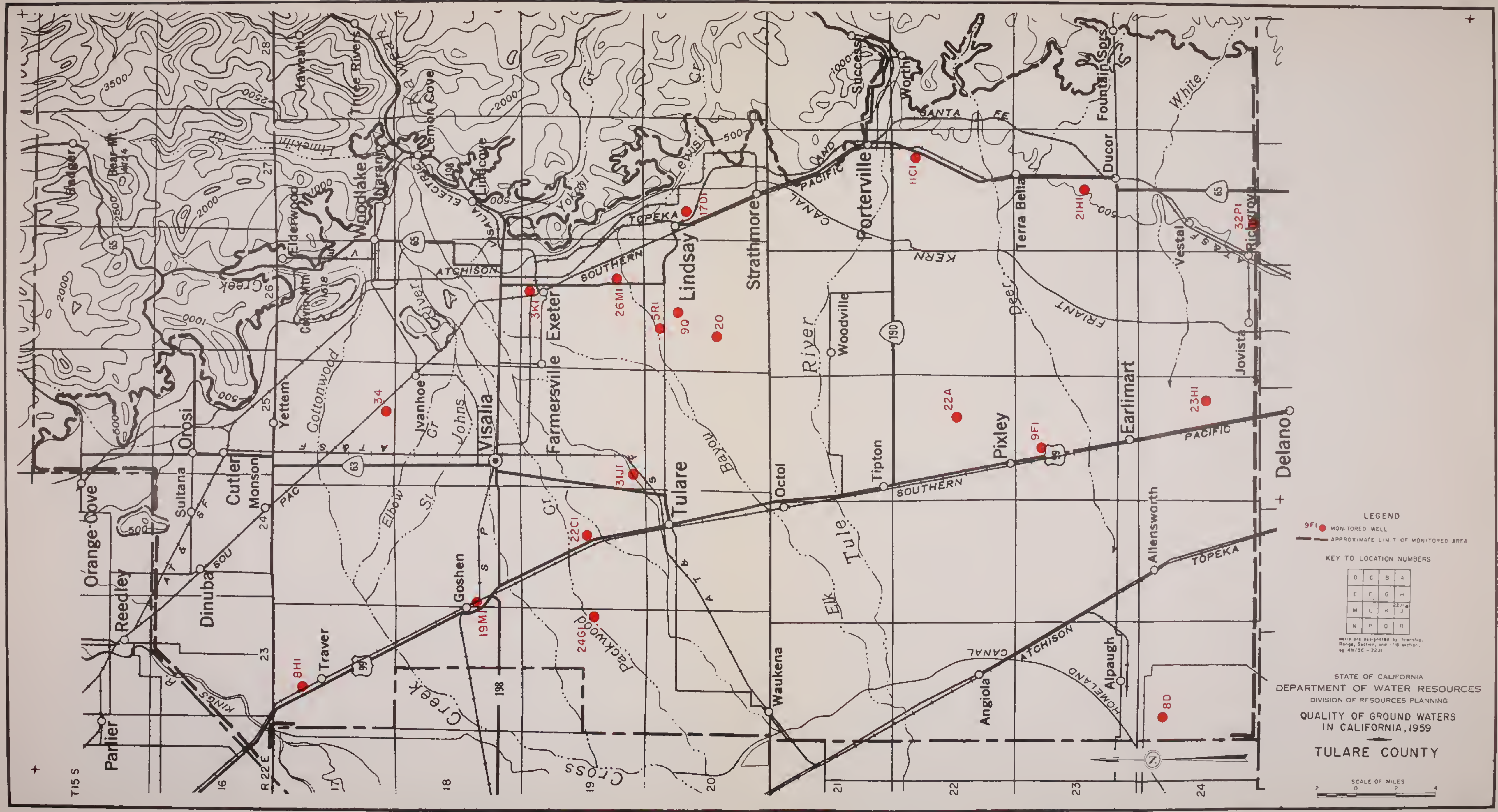
Significant Water Quality Changes. None.



WATER QUALITY RANGES

FRESNO COUNTY


LEGEND
MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E – 22J1
Berenda
Madera
Millerton L.
Friant Dam
Friant
Belleview
Hildreth
Auberry
Prather
Tollhouse
SAN JOAQUIN
Trigo
Little Dry Cr
Biola
Herndon
Kerman
Rolinda
Figarden
Pinedale
Kearney Park
FRESNO
Clovis
Academy
Calwa
Easton
Malaga
Raisin
Sanger
Centerville
Piedra
Fowler
Del Rey
Bowles
Caruthers
Burrell
Monmouth
Conejo
Selma
Parlier
Reedley
Orange Cove
Squew Valley
Kingsburg
Riverdale
Camden
Hub
Laton
Hardwick
Grangeville
Hanford
Lemoore
Armona
PINE FLAT DAM (UNDER CONST.)
11P1
1H1
14G1
13R1
22R1
16G1
20G1
20N1
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS IN CALIFORNIA, 1959
FRESNO COUNTY
SCALE OF MILES


LEGEND
9F1 MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
TULARE COUNTY
SCALE OF MILES
Badger
Elderwood
Woodlake
Naranjo
Lemon Cove
Three Rivers
Kaweah
Lindcove
Exeter
Farmersville
Visalia
Ivanhoe
Yettem
Orosi
Cutler
Sultana
Monson
Orange Cove
Reedley
Dinuba
Parlier
Traver
Goshen
Tulare
Lindsay
Strathmore
Porterville
Success
Terra Bella
Ducor
Fountain Sprs
Richgrove
Vestal
Jovista
Delano
Earlimart
Pixley
Tipton
Woodville
Octol
Waukena
Angiola
Alpaugh
Allensworth
Tule River
Deer Cr
White
Kings R
Cross Creek
Packwood
Elk
Cottonwood
Elbow
St Johns
Kaweah
Yokohl
Lewis Cr
SOUTHERN PACIFIC
ATCHISON TOPEKA SANTA FE
FRIANT KERN CANAL
HOMELAND CANAL
VISALIA ELECTRIC
34
3K1
26M1
5R1
9Q
2Q
17Q1
11C1
21H1
32P1
22A
9F1
23H1
31J1
22C1
19M1
24G1
8H1
8D
T15 S
R 22 E

TULARE COUNTY

The monitored portion of Tulare County includes the valley floor area between the Sierra Nevada foothills and the Kings county line. This area comprises approximately one-third of the county. Its maximum dimensions are about 58 miles north to south and 37 miles east to west.

Monitoring Program. Tulare County was included in the monitoring program in 1957 with the establishment of a network of wells to maintain surveillance on the ground water quality and to detect significant changes. During the period June - September 1959, nineteen wells were sampled as part of the monitoring program.

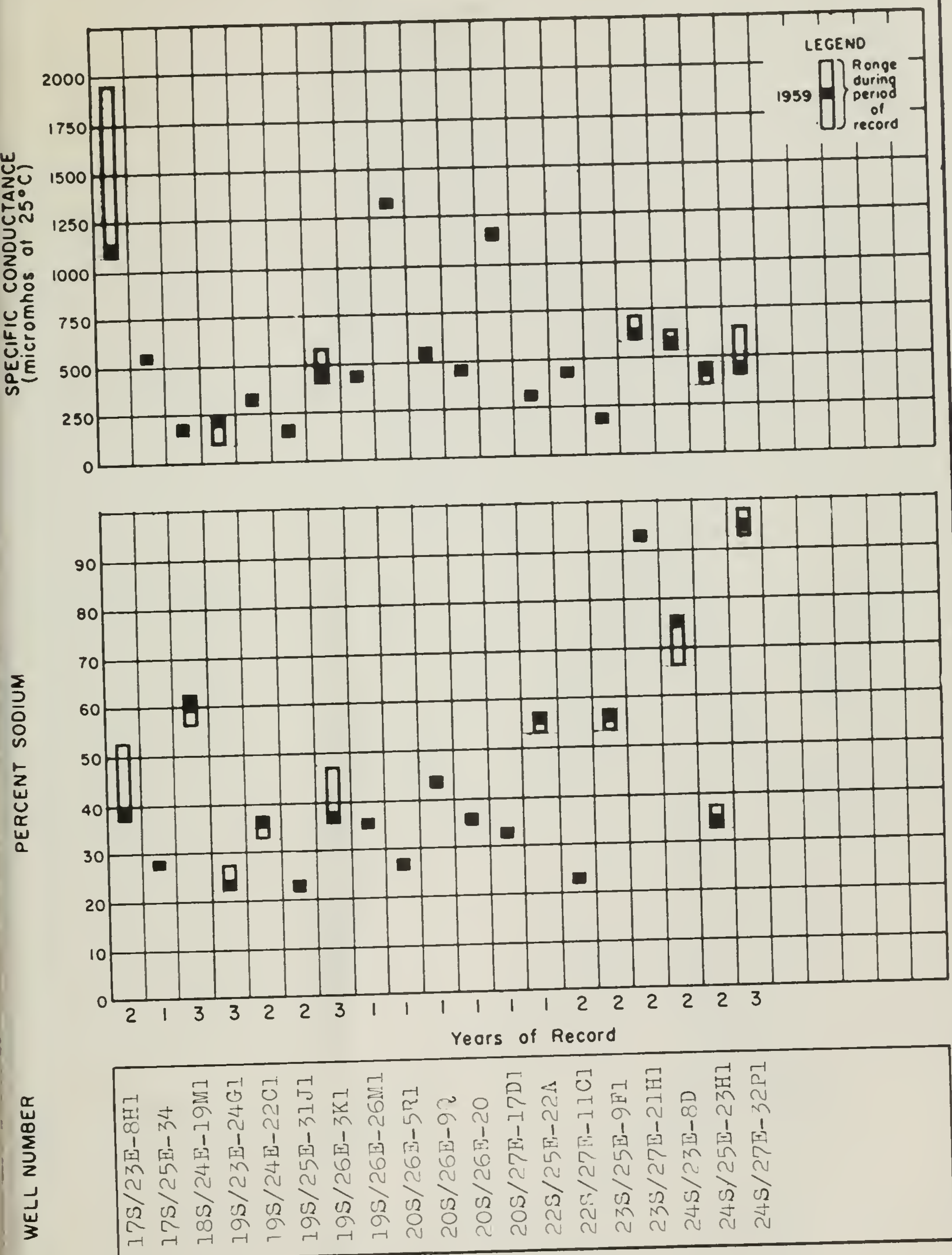
Ground Water Occurrence. Ground water in this area is found in a series of poorly connected beds and lenses of sand and gravel, locally confined by silt and clay. Individual beds are generally of limited extent with the notable exception of the Corcoran clay. The eastern edge of this clay extends from Earlimart northward to Tulare, where it swings northwesterly. Ground waters below the Corcoran clay are considered to be confined while those above the clay area are unconfined or only locally confined. The eastern two-thirds of the monitored area in Tulare County contains unconfined ground water. The larger irrigation wells produce up to 1,000 gpm.

Beneficial Uses of Ground Water. Ground waters of Tulare County are extensively used for irrigation, domestic and municipal supplies.

Major Waste Discharges. Major waste water discharges in Tulare County consist of effluent from sewage treatment plants located at the Cities of Dinuba, Exeter, Lindsay, Porterville, Reedley, Tulare and Visalia. Waste water from all of the above-mentioned sewage treatment plants, with the exception of the one located at Reedley, is reused for irrigation purposes. The waste water from the plant at Reedley is disposed of mainly by percolation ponds.

Evaluation of Water Quality. Ground waters in the eastern half of the monitored area along the Sierra foothills are primarily calcium bicarbonate in type and of excellent mineral quality. This water is typical of the shallow to moderate depth ground water zones receiving recharge from the Sierra streams. Sodium bicarbonate type waters occur both below and to the west of those areas containing calcium bicarbonate type water. Sodium generally exceeds 75 percent of base constituents in the sodium bicarbonate type waters and these waters are usually class 3 for irrigation use. In general, total dissolved solids tend to increase with depth in this area. The maximum gross radioactivity observed in 1959 was 21.35 $\mu\mu c/l$.

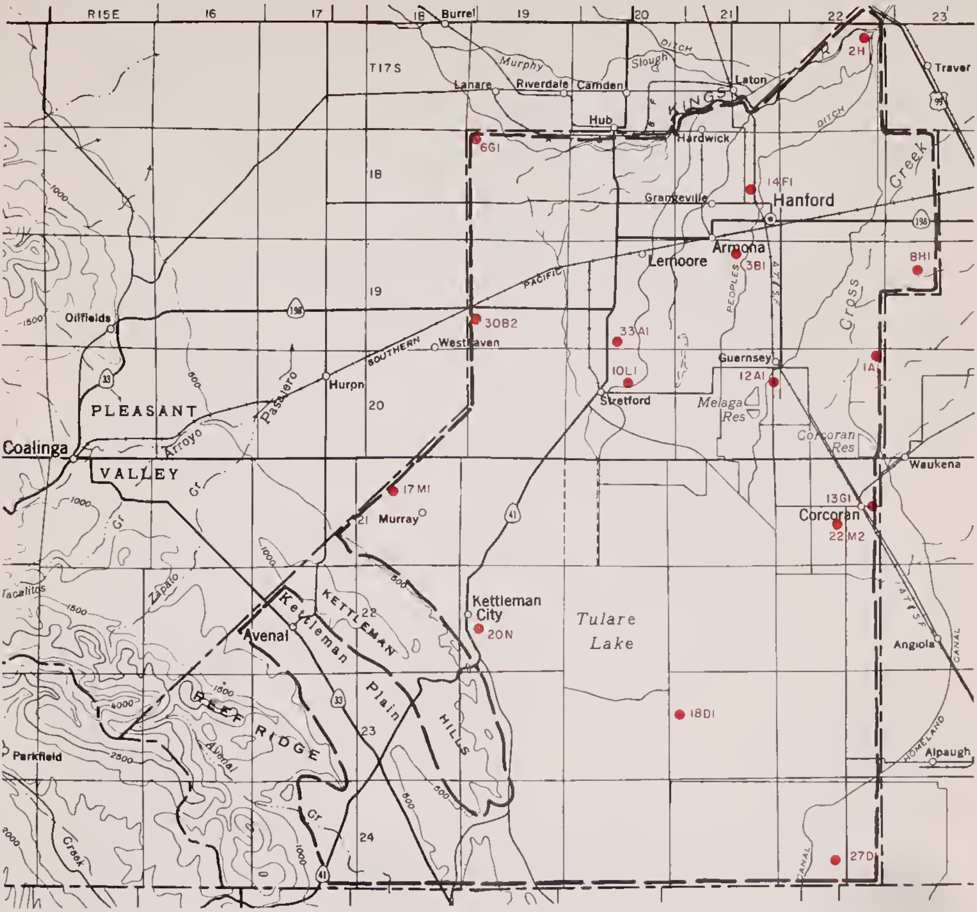
Significant Water Quality Changes. Comparison of analyses of samples collected in 1959 with those of 1958 or earlier showed only minor changes in mineral constituents in all but a few monitored wells. Boron increased from 0.07 to 0.64 ppm in well 23S/27E-21H, located approximately 12 miles east of Earlimart. Nitrates in well 24S/25E-23H1 located approximately 4 miles south of Earlimart increased from 29 to 51 ppm during the period from February 1957 to August 1959, the latter value being in excess of the recommended limit of 44 ppm for domestic waters. The reasons for these increases in boron and nitrates are not known.



WATER QUALITY RANGES

TULARE COUNTY


Allensworth



LEGEND

8H1 MONITORED WELL

APPROXIMATE LIMIT OF MONITORED AREA

KEY TO LOCATION NUMBERS

D	C	B	A
E	F	G	H
M	L	K	J 22J1
N	P	Q	R

Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E – 22J1

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS IN CALIFORNIA, 1959

KINGS COUNTY

SCALE OF MILES
4 0 4 8

KINGS COUNTY

Most of the valley floor land in Kings County is included in the ground water monitoring program. The area extends, generally, from the Diablo Mountains of the Coast Range on the east to Tulare County on the west, and from Fresno County on the north to Kern County on the south. The total monitored area encompasses approximately 1,000 square miles.

Monitoring Program. Due to the existence in the area of ground waters containing excessive concentrations of mineral constituents, a monitoring program was established in Kings County in 1958. During August 1959, 16 wells were sampled as part of the monitoring program.

Ground Water Occurrence. Ground waters in Kings County are separated into an upper and a lower water-bearing zone by the Corcoran clay. The clay confines and restricts vertical interchange of upper and lower zone water. Ground waters occurring above the Corcoran clay are unconfined, while those below the clay are generally confined. Each zone contains water of a distinct chemical character. The water-bearing deposits are composed of Quaternary and Late Tertiary sediments washed into the San Joaquin Valley from the Coast Range and the Sierra Nevada. In general, the sediments consist of unconsolidated to loosely consolidated clay, silt, sand and gravel. Poorly permeable, fine grained sediments underlying the lake bed area and valley trough restrict ateral movement of ground water.

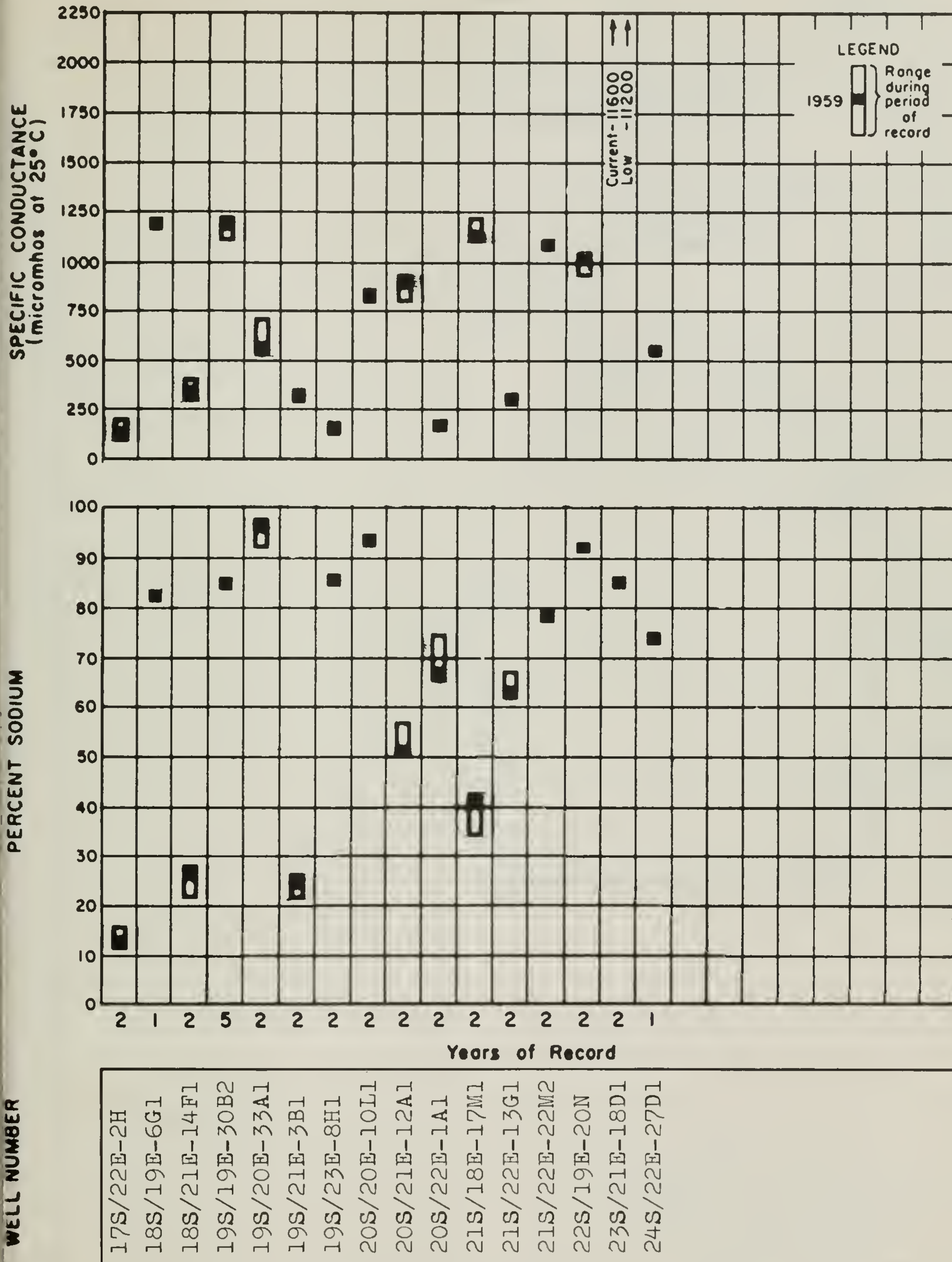
round Water Development. The ground waters in Kings County are extensively eveloped in areas where there is no appreciable surface water supply. Wells n Kings County vary between small domestic wells yielding around 10 gpm to arge irrigation wells yielding up to 2,000 gpm.

Beneficial Uses of Ground Water. The ground waters are beneficially used for irrigation, domestic, industrial and municipal purposes.

Major Waste Discharges. The two principal waste discharges in Kings County consist of effluent from sewage treatment plants located at the Cities of Hanford and Corcoran. The effluent from these plants is reclaimed for irrigation use or is disposed of by percolation ponds.

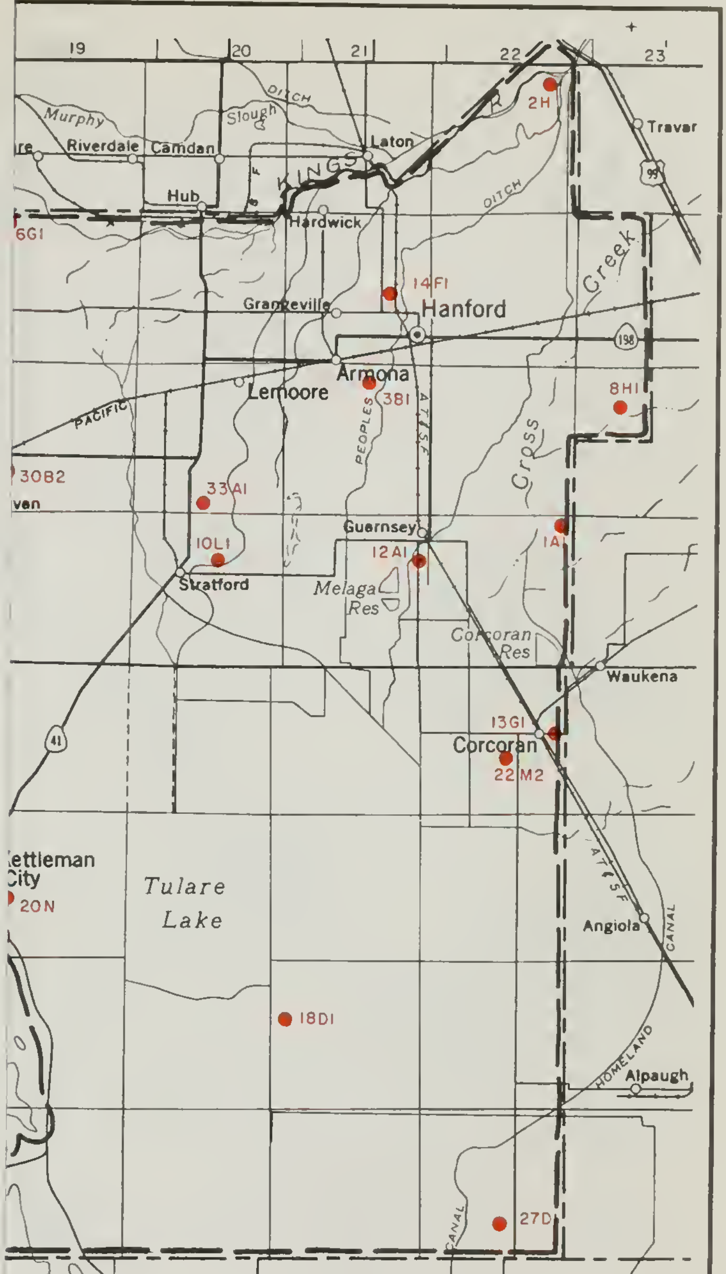
Evaluation of Water Quality. The ground waters of Kings County vary in type and quality depending on the horizontal and vertical location of the water. Wells which extract water from above the Corcoran clay, in the east side of the area, generally yield sodium bicarbonate type water. With the exception of sodium percentage, which generally exceeds 60, this water is of excellent mineral quality. Above the Corcoran clay, in the western portion of the area, the ground water is typically sodium sulfate in type and moderately to very hard. It contains sulfates in excess of 250 ppm and the percent sodium generally exceeds 85. The water in the western portion below the Corcoran clay is sodium chloride in type and excessively high in chlorides, percent sodium, boron and total dissolved solids.

Significant Water Quality Changes. None.



WATER QUALITY RANGES

KINGS COUNTY

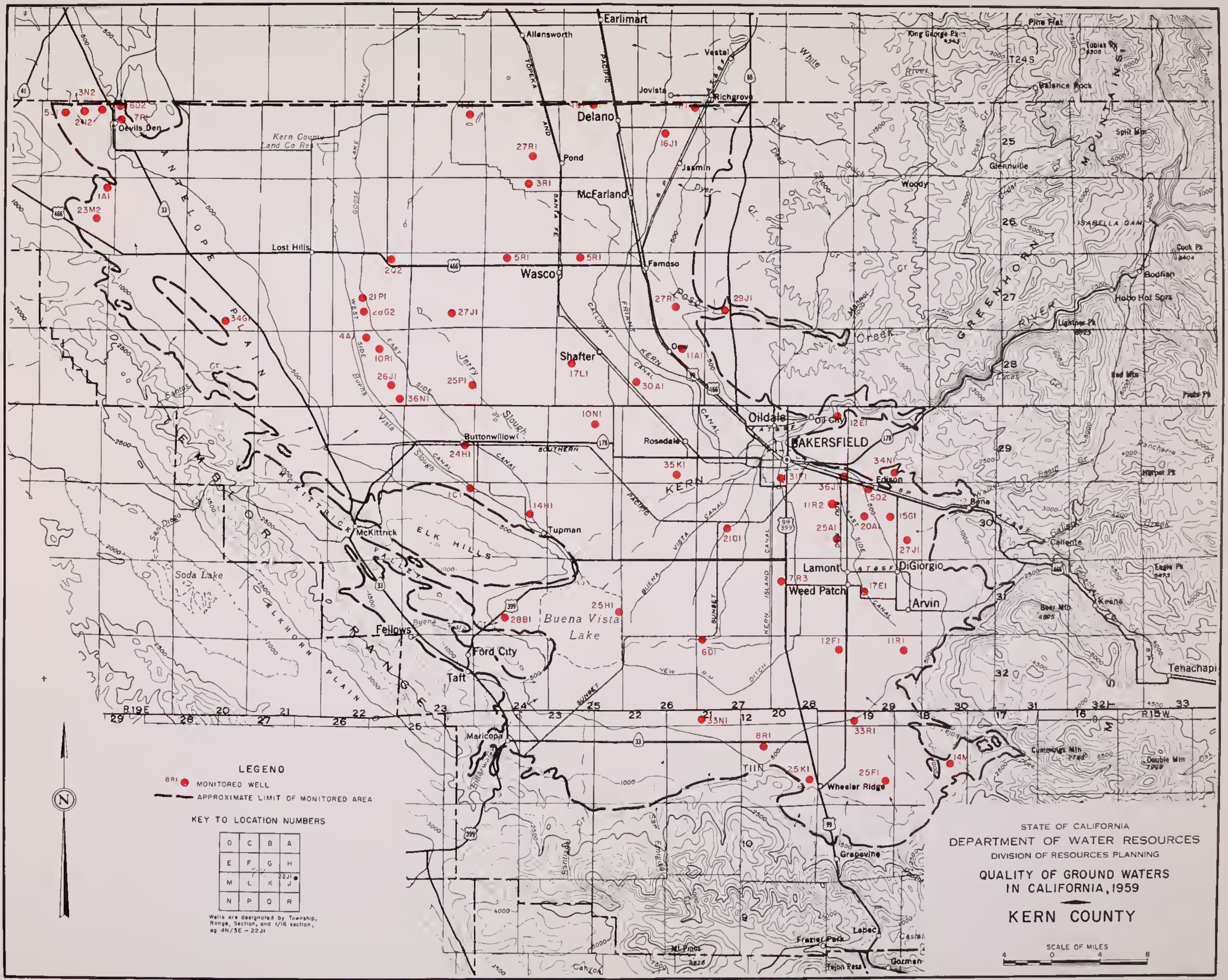


STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959

KINGS COUNTY

SCALE OF MILES
4 0 4 8


STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
KERN COUNTY
SCALE OF MILES
LEGEND
MONITORED WELL
APPROXIMATE LIMIT OF MONITORED AREA
KEY TO LOCATION NUMBERS
D C B A
E F G H
M L K J
N P Q R
Wells are designated by Township, Range, Section, and 1/16 section, eg 4N/3E - 22J1
Earlimart
Allensworth
Vestal
Jovista
Richgrove
Delano
Pond
McFarland
Jasmin
Woody
Glennville
Famoso
Lost Hills
Wasco
Shafter
Oildale
Oil City
BAKERSFIELD
Rosedale
Buttonwillow
Edison
Tupman
McKittrick
ELK HILLS
Lamont
DiGiorgio
Weed Patch
Arvin
Caliente
Keene
Tehachapi
Bodfish
Hobo Hot Sprs
ISABELLA DAM
Soda Lake
Buena Vista Lake
Fellows
Ford City
Taft
Maricopa
Wheeler Ridge
Grapevine
Lebec
Frazier Park
Gorman
Tejon Pass
Devils Den
Kern County Land Co Res
ANTELOPE PLAIN
TEMBLOR RANGE
ELKHORN PLAIN
GREENHORN MOUNTAINS
KERN RIVER
Poso Creek
White River
Pine Flat
Balance Rock
Bear Mtn
Cummings Mtn
Double Mtn
Mt Pinos
3N2
6D2
5J1
2N2
7R1
27R1
16J1
3R1
1A1
23M2
2Q2
5R1
5R1
21P1
28G2
27J1
27R1
29J1
34G1
4A1
10R1
11A1
26J1
25P1
30A1
17L1
36N1
10N1
12E1
24H1
35K1
34N1
31F1
36J1
1C1
14H1
11R2
502
15G1
20A1
25A1
21Q1
27J1
7R3
17E1
25H1
28B1
6D1
12F1
11R1
33N1
33R1
8R1
25K1
25F1
14M1
R19E
R15W
T24S
T11N

KERN COUNTY

The monitored portion of Kern County extends from the Sierra Nevada foothills on the east to the Coast Range on the west, and from the Tehachapi Mountains on the south to the Tulare-Kings county line on the north. The area has a north-south length of approximately 60 miles, a width of about 35 miles, and encompasses an area of approximately 2,100 square miles.

Monitoring Program. A monitoring program was begun in Kern County in 1953 to maintain a check on effects of waste water from Edison and Devils Den oil fields. The remainder of the area was added to the program in 1957. During June 1959, samples were taken from 59 wells in the area.

Ground Water Occurrence. Ground waters in Kern County exist primarily in poorly-sorted silt, sand and gravel deposited in alluvial fans, and in well-sorted sand and clay originally deposited in lakes and swampy overflow basins. Thickness of the sediments ranges from a few feet on the valley margins to more than 16,000 feet on the west side of the valley. The Corcoran clay pinches out and becomes discontinuous south of a line between Buttonwillow and Delano. Outside of this area, confinement occurs as the result of fine-grained lake sediments of Buena Vista and Kern Lakes, and poorly sorted fine-grained alluvial deposits. Unconfined to semi-confined ground water overlies the confined areas.

Ground Water Development. Ground water in Kern County is extensively developed for all uses to the extent that overdraft of the ground water reservoir has occurred. Well yields range generally from 100 to 2,000 gpm, and average about 1,000 gpm.

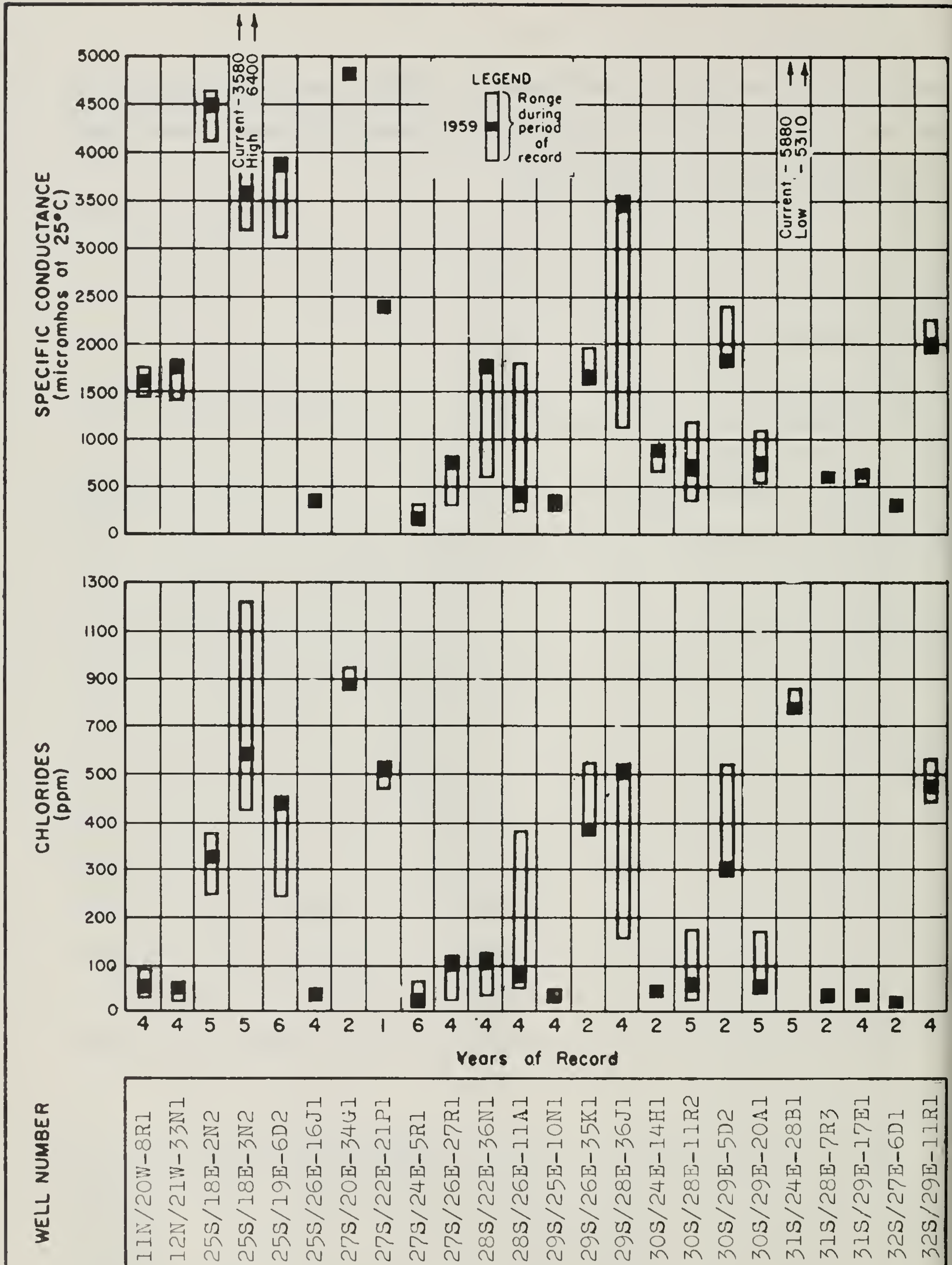
Beneficial Uses of Ground Water. Ground water is used extensively for irrigation, domestic, municipal and industrial purposes.

Major Waste Discharges. The principal waste discharges consist of effluent from sewage treatment plants serving the Cities of Bakersfield, Wasco, McFarland Delano and Taft. The discharges normally contain no toxic substances and are used almost entirely for irrigation. Smaller waste discharges emanate from wineries, oil refineries, oil field operations and other industries. These smaller wastes are discharged almost exclusively into percolation ponds.

Evaluation of Water Quality. Ground water quality varies widely in Kern County. High concentrations of boron, chlorides and sulfates, along with high sodium percentages, occur throughout large portions of the monitored area, particularly in the south and west. Ground waters in the area south of Bakersfield are extremely hard and contain relatively low sodium percentages.

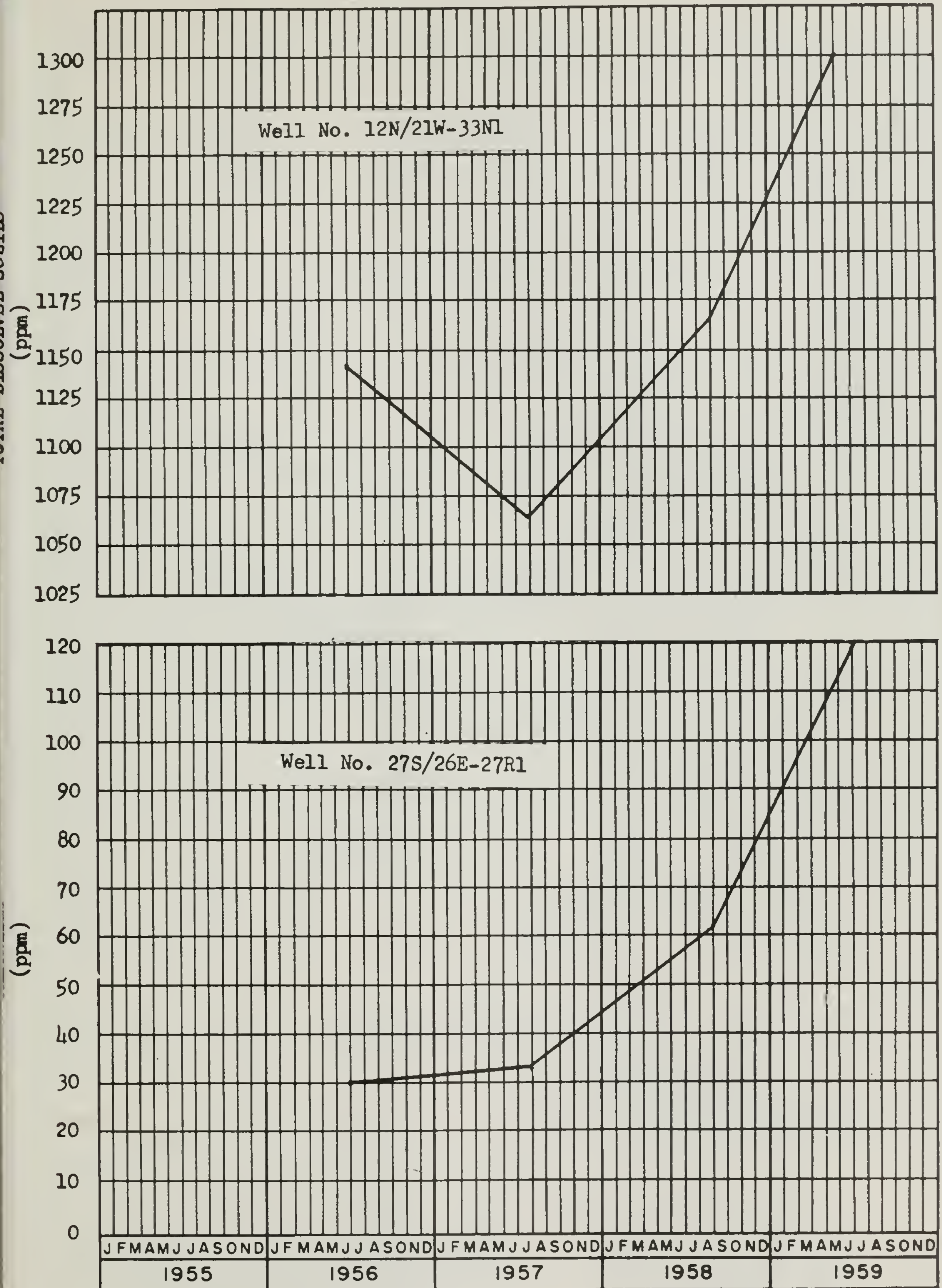
A possible source of the high chlorides and sulfates is connate marine waters which occur at depth throughout most of the area. At structural highs, such as Buttonwillow and Semitropic ridges, these waters occur at lesser depths. A large number of deep wells throughout the county yield waters containing excessive sodium percentages. Excessive concentrations of sulfates, chlorides and boron are found in waters near Devils Den oil field and at other scattered locations throughout the monitored area. Radioassays during 1959 of samples from 11 wells showed a gross radioactivity of 12.9 $\mu\mu c/l$.

Significant Water Quality Changes. Analyses of samples collected in 1959 compared to those of previous years generally showed only minor fluctuations in mineral concentrations. However, well 12N/21W-33N1, located about 11 miles northwest of Wheeler Ridge, has shown a gradual increase in total dissolved solids over a 4 year period (see fluctuation graph). Well 27S/26E-27R1, located about 12 miles north of Bakersfield, showed an increase in chlorides from 62 ppm in 1958 to 119 ppm in 1959.



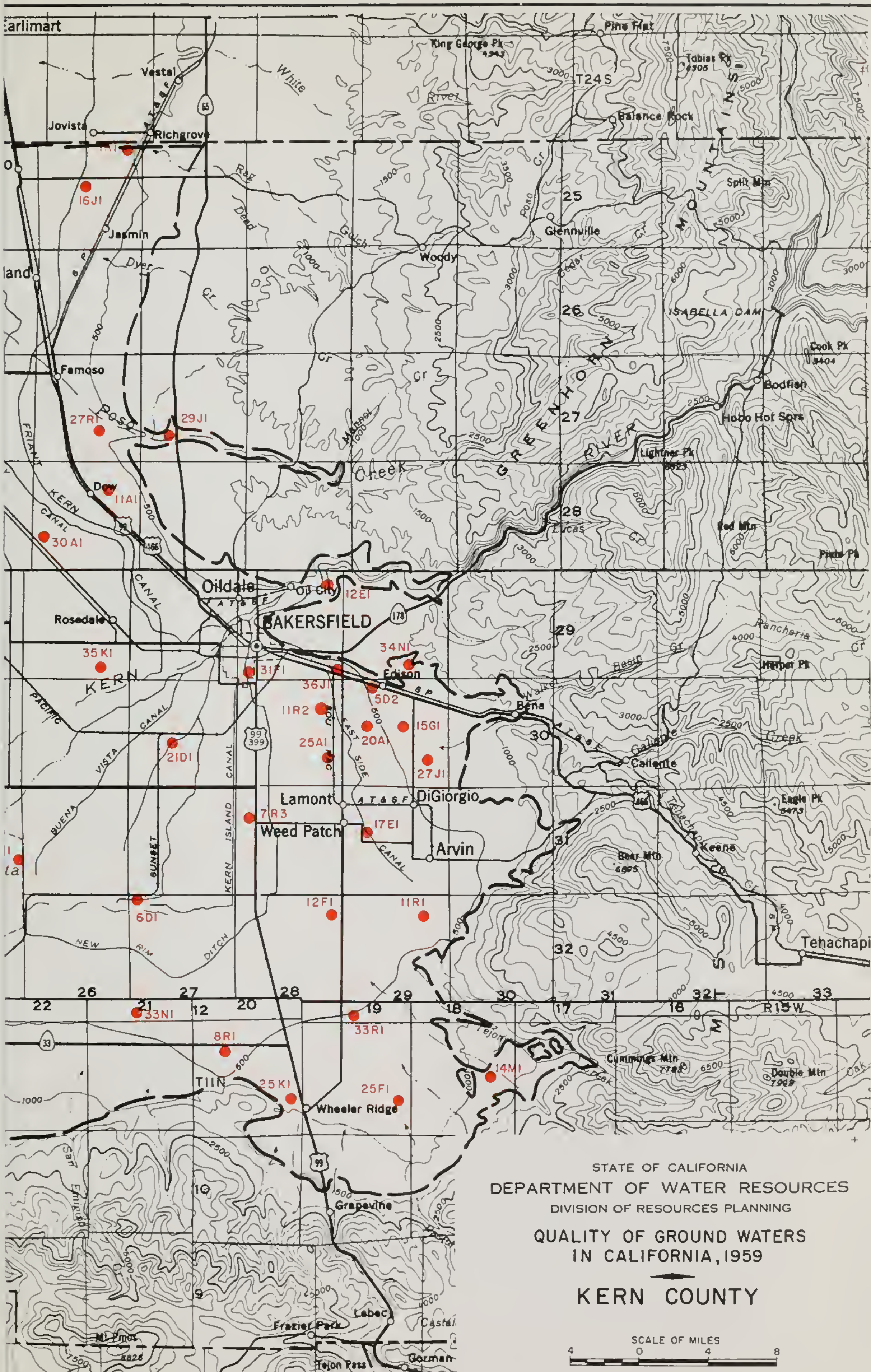
WATER QUALITY RANGES

KERN COUNTY



FLUCTUATIONS OF CONSTITUENTS IN SELECTED WELLS

KERN COUNTY


STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING
QUALITY OF GROUND WATERS
IN CALIFORNIA, 1959
KERN COUNTY
SCALE OF MILES
4 0 4 8
Earlimart
Vestal
Jovista
Richgrove
Jasmin
Famoso
Dow
Oildale
Oil City
Rosedale
BAKERSFIELD
Edison
Bena
Caliente
Lamont
DiGiorgio
Weed Patch
Arvin
Keene
Tehachapi
Wheeler Ridge
Grapevine
Lebec
Frazier Park
Tejon Pass
Gorman
Pine Flat
Balance Rock
Glennville
Woody
Bodfish
Isabella Dam
Hobo Hot Sprs
GREENHORN
KERN RIVER
Poso Creek
16J1
27R1
29J1
11A1
30A1
12E1
35K1
31F1
36J1
34N1
5D2
11R2
15G1
25A1
20A1
21D1
27J1
7R3
17E1
6D1
12F1
11R1
33N1
33R1
8R1
25K1
25F1
14M1
T24S
T11N
R15W

INDEX OF MONITORED AREAS

NORTH COASTAL REGION (NO 1)

- 1-1 SMITH RIVER PLAIN
- 1-3 BUTTE VALLEY
- 1-4 SHASTA VALLEY
- 1-5 SCOTT RIVER VALLEY
- 1-8 MAD RIVER VALLEY
- 1-9 EUREKA PLAIN
- 1-10 EEL RIVER VALLEY
- -15 UKIAH VALLEY
- -16 SANEL VALLEY
- 1-17 ALEXANDER VALLEY
- 1-18 SANTA ROSA VALLEY

SAN FRANCISCO BAY REGION (NO 2)

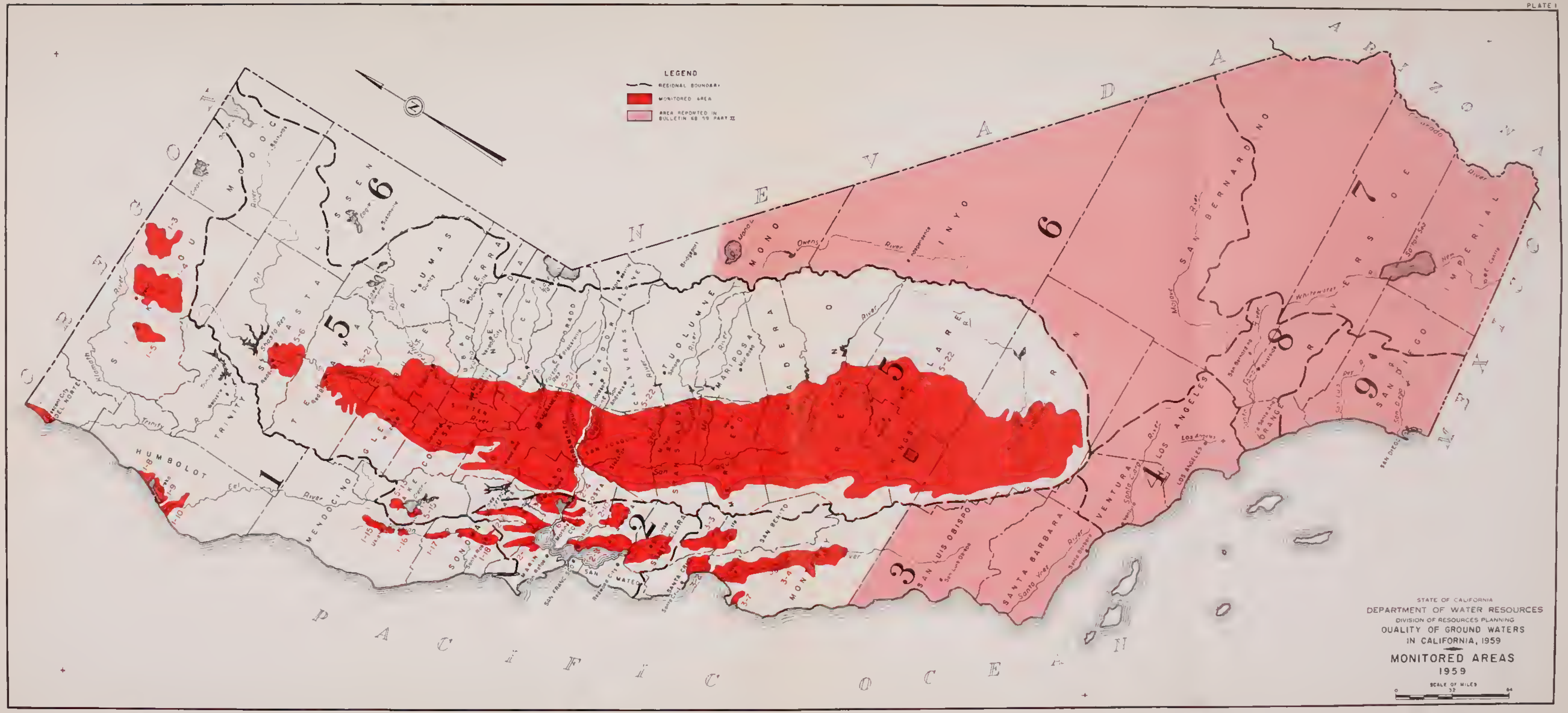
- 2-1 PETALUMA VALLEY
- 2-2 NAPA-SONOMA VALLEY
- 2-3 SUISUN-FAIRFIELD VALLEY
- 2-4 PITTSBURG PLAIN
- 2-5 CLAYTON VALLEY
- 2-6 YGNACIO VALLEY
- 2-9 SANTA CLARA VALLEY
  - EAST BAY AREA
  - SOUTH BAY AREA
- 2-10 LIVERMORE VALLEY

CENTRAL COASTAL REGION (NO 3)

- 3-2 PAJARO VALLEY
- 3-3 GILROY-HOLLISTER BASIN
- 3-4 SALINAS VALLEY
- 3-7 CARMEL VALLEY

CENTRAL VALLEY REGION (NO 5)

- 5-6 REDDING BASIN
- 5-12 UPPER LAKE VALLEY
- 5-15 KELSEYVILLE VALLEY
- 5-21 SACRAMENTO VALLEY
  - TEHAMA COUNTY
  - GLENN COUNTY
  - BUTTE COUNTY
  - COLUSA COUNTY
  - SUTTER COUNTY
  - YUBA COUNTY
  - PLACER COUNTY
  - YOLO COUNTY
  - SACRAMENTO COUNTY
  - SOLANO COUNTY
- 5-22 SAN JOAQUIN VALLEY
  - SAN JOAQUIN COUNTY
  - STANISLAUS COUNTY
  - MERCED COUNTY
  - MADERA COUNTY
  - FRESNO COUNTY
  - TULARE COUNTY
  - KINGS COUNTY
  - KERN COUNTY



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APPENDIX A

PROCEDURES AND CRITERIA

Types of Mineral Analyses

The following tabulation indicates the tests made, and the properties and constituents usually analyzed for, in the various types of mineral analyses performed under the Ground Water Quality Monitoring Program.

Constituents and properties	Analysis: Standard mineral	Partial mineral	Heavy metals
Specific conductance	x	x	
pH	x	x	
Total dissolved solids	x		
Percent sodium	x		
Hardness	x	x	
Temperature	x	x	
Calcium	x		
Magnesium	x		
Sodium	x	x	
Potassium	x		
Carbonate	x		
Bicarbonate	x		
Sulfate	x		
Chloride	x	x	
Nitrate	x		
Fluoride	x		
Boron	x	x	
Silica	x		
Aluminum			x
Iron			x
Manganese			x
Chromium			x
Copper			x
Lead			x
Zinc			x
Arsenic			x

Laboratory Methods and Procedures

Analytical methods used in determination of the various constituents reported in the following tables conform, in general, to those presented in "Standard Methods for the Examination of Water and Sewage", a joint publication of the American Public Health Association, the American Water Works Association, and the Federation of Sewage and Industrial Wastes Association, 10th edition, 1955. For certain specific analyses, the methods described in "Methods of Water Analyses", United States Geological Survey, 1956, now in preparation, have been used.

Laboratory analyses of the water samples are performed by the Water Quality Branch of the United States Geological Survey, the Department of Water Resources laboratories located in Sacramento, or by the Terminal Testing Laboratories located in Los Angeles. The laboratory which performed each reported analysis is indicated in the right hand column of Table A-4.

The methods and procedures for sample preparation and determination of radioactivity in ground waters are as follows:

1. Sample Preparation
   a. Samples are collected in one-half gallon jugs by the Department of Water Resources and delivered to the Radiological Laboratory of the California Disaster Office for radioassay.
   b. Each sample is mixed by agitating the jug, and 250 ml are removed.
   c. The sample is placed in a 250 ml volumetric flask and one drop of aerosol solution added. The flask is then inverted and the mouth placed in a 2 x 1/4" aluminum culture dish that has been treated with Desicote. The flask is supported by a ring stand and the water level adjusted to the lip of the dish in a "chicken-feeder-type" arrangement. The dish rests on a hot-plate, regulated so that the specimen is taken to dryness at a temperature well below the boiling point to prevent spattering.
   d. The specimen is now ready to be measured for radioactivity.

2. Counting Techniques

   a. A gross beta-gamma determination is made for each specimen.

   b. Beta-gamma activity is determined with an internal gas flow counter operating in the proportional region, using argon-methane mixture as a flow gas. Background determinations are made before the first specimen count each day, and subsequently after each four specimen counts throughout the day. Determinations of counter efficiency are made with a reference standard (Thallium 204). Each determination of specimen and background count rate is made for a total of 1,024 counts. Average time required for each specimen count is from 30 to 40 minutes.

3. Calculations

   a. Results are expressed as micromicrocuries per liter (μμc/l). One micromicrocurie is equivalent to 2.22 disintegrations per minute.

   b. Sample counts are corrected for background and geometric efficiency.

   c. Standard statistical procedures are utilized to compute the 0.9 error. The final result is expressed (symbolically) as $x \pm y$ μμc/l. This means that in a series of determinations on the same sample, the value of x should fall between $x - y$ and $x + y$, 90% of the time.

Water Quality Criteria

Presented herein are general criteria and limiting values presently used by the Department of Water Resources in evaluating and classifying water quality. In general, these values should be considered only as guides and indicators, not as absolute limitations.

Criteria for Drinking Water

Water that is used for drinking and culinary purposes should be clear, colorless, odorless, pleasant to the taste, and must not endanger the lives or health of human beings. These general requirements pertain to the water, treated if necessary, as it is finally delivered to the consumer.

Chapter 7, Section 4010.5, of the California Health and Safety Code contains laws and standards relating to domestic water supply adopted from drinking water standards promulgated by the U. S. Public Health Service for water used on interstate carriers. These standards are set forth in detail in U. S. Public Health Report, Volume 61, No. 11, March 15, 1946.

According to Section 4.2 of the U. S. Public Health Report, chemical substances in drinking water supplies, either natural or treated, should not exceed the concentrations shown in Table A-1.

TABLE A-1

LIMITING CONCENTRATIONS OF
MINERAL CONSTITUENTS IN DRINKING WATER

United States Public Health Service
Drinking Water Standards, 1946

Constituent	ppm
Mandatory	
Fluoride (F)	1.5
Lead (Pb)	0.1
Selenium (Se)	0.05
Hexavalent chromium (Cr^{+6})	0.05
Arsenic (As)	0.05
Nonmandatory but Recommended Values	
Iron (Fe) and manganese (Mn) together	0.3
Magnesium (Mg)	125
Chloride (Cl)	250
Sulfate (SO_4)	250
Copper (Cu)	3.0
Zinc (Zn)	15
Phenolic compounds in terms of phenol	0.001
Dissolved solids, desirable	500
Dissolved solids, permitted	1,000

Interim standards for certain mineral constituents have recently been adopted by the California State Board of Public Health. Based on these standards, temporary permits may be issued for drinking water supplies failing to meet the U. S. Public Health Service Drinking Water Standards, provided the mineral constituents in the following table are not exceeded.

UPPER LIMITS OF TOTAL SOLIDS AND SELECTED MINERALS IN DRINKING WATER AS DELIVERED TO THE CONSUMER

	Permit in ppm	Temporary permit in ppm
Total solids	500 (1,000)*	1,500
Sulfates (SO_4)	250 (500)*	600
Chlorides (Cl)	250 (500)*	600
Magnesium (Mg)	125	150

* Numbers in parentheses are maximum permissible, to be used only where no other more suitable waters are available in sufficient quantity for use in the system.

The California State Board of Public Health has recently defined the following maximum safe amounts of fluoride in drinking water in relation to mean annual temperature:

Mean annual temperature in °F	Maximum mean monthly Fluoride ion concentration in ppm
50	1.5
60	1.0
70 - above	0.7

Other organic or mineral substances may be limited in concentration if their presence in water renders it hazardous as determined by state or local health authorities. The monitoring program reported herein does not include bacterial examinations.

The relationship of infant methemoglobinemia (a reduction of oxygen content in the blood, constituting a form of asphyxia) to nitrates in the water supply has led to limitation of nitrates in drinking water. The California State Department of Public Health has recommended a tentative limit of 10 ppm nitrate nitrogen (44 ppm nitrates) for domestic waters. Waters containing higher concentrations of nitrates may be considered to be of questionable quality for domestic and municipal use.

Criteria for Hardness

An additional factor with which users are concerned is the hardness of water. Hardness is principally due to calcium and magnesium and is generally evidenced by inability to develop soap suds in the water. In general domestic use, hardness can result in increased soap consumption and excessive repairs to plumbing. The following classification of water, according to range of hardness, has been suggested by the U. S. Geological Survey:

Range of hardness in ppm	Relative classification
0 - 55	Soft
56 - 100	Slightly hard
101 - 200	Moderately hard
Greater than 200	Very hard

Criteria for Exposure to Radioactivity

Provisional criteria for permissible concentrations of radioactivity in water have been published in Handbook 69 of the U. S. Department of Commerce, National Bureau of Standards, issued June 5, 1959. This handbook lists maximum permissible concentrations for identified radionuclides, ranging from 10^{-7} uc/cc (100 $\mu\mu c$/l) to 2 x 10^{3} uc/cc (2 x 10^{12} $\mu\mu c$/l). For continuous occupational exposure (168 hour week) it lists 10^{-7} uc/cc (100 $\mu\mu c$/l) as the provisional maximum permissible concentration for any unidentified radionuclide or mixture of unidentified radionuclides in water. For interim application in the neighborhood of an atomic energy plant, 1/10 of the above value is recommended.

Criteria for Irrigation Water

The following criteria for mineral quality of irrigation waters have been developed at the University of California at Davis and at the U. S. Department of Agriculture Regional Salinity Laboratory at Riverside. Because of diverse climatological conditions and variations in crops and soils in California, only general limits of quality for irrigation waters can be suggested. The department uses the three broad classifications of irrigation waters listed in Table A-2.

TABLE A-2

QUALITATIVE CLASSIFICATION OF IRRIGATION WATERS

Chemical properties	Class 1 Excellent to good (Suitable for most plants under any conditions of soil and climate)	Class 2 Good to injurious (Possibly harmful for some crops under certain soil conditions	Class 3 Injurious to unsatisfactory (Harmful to most crops and unsatisfactory for all but the most tolerant)
Total dissolved solids			
In ppm	Less than 700	700 - 2,000	More than 2,000
In conductance, EC x 10^6	Less than 1,000	1,000 - 3,000	More than 3,000
Chloride ion concentration			
In milliequivalents per liter	Less than 5	5 - 10	More than 10
In ppm	Less than 175	175 - 350	More than 350
Sodium in percent of base constituents	Less than 60	60 - 75	More than 75
Boron in ppm	Less than 0.5	0.5 - 2.0	More than 2.0

Criteria for Industrial Uses

Quality criteria for the diversified uses of water in industry range from exacting requirements for makeup water used in high pressure boilers to minimum requirements for water for washdown and ore quenching.

Industrial use of water includes utilization for food processing. Except for certain canning operations, water used in food processing must at least conform to quality requirements for drinking water supplies. The requirements of some food processing industries, however, are more stringent than those contained in the drinking water standards of the U. S. Public Health Service.

Because of the large number of industrial uses of water with widely varied quality requirements, it is difficult to establish more than broad criteria for quality. Therefore, these requirements are expressed, where possible, for groups of related industries rather than for individual manufacturing or other plants. The general quality requirements of several single industries and for representative major groups of industrial uses are listed in Table A-3.

TABLE A-3

WATER QUALITY TOLERANCE FOR INDUSTRIAL USES[a]

Allowable limits in parts per million

Use	Turbidity	Color	Hardness as $CaCO_3$	Iron[c] as Fe	Manganese as Mn	Total solids	Alkalinity as $CaCO_3$	Odor, taste	Hydrogen sulfide	Miscellaneous Requirements: Health	Miscellaneous Requirements: Other
Air conditioning	-	-	-	0.5	0.5	-	-	Low	1	-	No corrosiveness, slime formation
Baking	10	10	-	0.2	0.2	-	-	Low	0.2	Potable[b]	
Brewing											
Light Beer	10	-	-	0.1	0.1	500	75	Low	0.2	Potable[b]	NaCl less than 275 ppm (pH 6.5-7.0).
Dark Beer	10	-	-	0.1	0.1	1,000	150	Low	0.2	Potable[b]	NaCl less than 275 ppm (pH 7.0 or more)
Canning											
Legumes	10	-	25-75	0.2	0.2	-	-	Low	1	Potable[b]	
General	10	-	-	0.2	0.2	-	-	Low	1	Potable[b]	
Carbonated beverages	2	10	250	0.2	0.2	850	50-100	Low	0.2	Potable[b]	Organic color plus oxygen consumed less than 10 ppm.
Confectionery	-	-	-	0.2	0.2	100	-	Low	0.2	Potable[b]	pH above 7.0 for hard candy.
Cooling	50	-	50	0.5	0.5	-	-	-	5	-	No corrosiveness, slime formation.
Food: General	10	-	-	0.2	0.2	-	-	Low	-	Potable[b]	
Ice	5	5	-	0.2	0.2	-	-	Low	-	Potable[b]	SiO_2 less than 10 ppm.
Laundering	-	-	50	0.2	0.2	-	-	-	-	-	
Plastics, clear,											
Uncolored	2	2	-	0.02	0.02	200	-	-	-	-	
Paper and pulp:											
Groundwood	50	20	180	1.0	0.5	-	-	-	-	-	No grit, corrosiveness.
Draft pulp	25	15	100	0.2	0.1	300	-	-	-	-	
Soda and sulfide	15	10	100	0.1	0.05	200	-	-	-	-	
High-grade light papers	5	5	50	0.1	0.05	200	-	-	-	-	
Rayon (viscose):											
Pulp production	5	5	8	0.05	0.03	100	total 50; hydroxide 8	-	-	-	Al_2O_3 less than 8 ppm, SiO_2 less than 25 ppm, Cu less than 5 ppm.
Manufacture	0.3	-	55	0.0	0.0	-	-	-	-	-	pH 7.8 to 8.3
Tanning	20	10-100	50-135	0.2	0.2	-	total 135; hydroxide 8	-	-	-	
Textiles: General	5	20	-	0.25	0.25	-	-	-	-	-	
Dyeing	5	5-20	-	0.25	0.25	200	-	-	-	-	Constant composition. Residual alumina less than 0.5 ppm.
Wool scouring	-	70	-	1.0	1.0	-	-	-	-	-	
Cotton bandage	5	5	-	0.2	0.2	-	-	Low	-	-	

a-Moore, E. W., Progress Report of the Committee on Quality Tolerances of Water for Industrial Uses: Journal New England Water Works Association, Volume 54, Page 271, 1940.
b-Potable water, conforming to U. S. P.H.S. standards, is necessary.
c-Limit given applies to both iron alone and the sum of iron and manganese.

APPENDIX B

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
						Mineral constituents in parts per million / equivalents per million																	
								NORTH COASTAL REGION (NO. 1) SMITH RIVER PLAIN (1-1)															
	HB&M																						
A. Short domestic	16N/1W-2Q1	8-14-59	-	231	7.8	15 0.75	12 0.98	17 0.74	0.5 0.01	0 0.00	123 2.02	5.4 0.11	10 0.28	0.8 0.01	0.0 0.00	0.0	39	Fe 0.00 (dis.) Fe 8.1 (total)	161	30	86	(	USGS
L. Cadza domestic	-7F1	9-14-59	-	304	8.1	26 1.30	14 1.14	17 0.74	1.6 0.04	0 0.00	146 2.39	4.6 0.10	26 0.73	0.1 0.00	0.0 0.00	0.1	26	Fe 0.00 (dis.) Fe 0.40 (total)	187	23	122	2	USGS
L. L. Farley domestic	-15C1	10- -59	-	102	7.7	3.8 0.19	5.6 0.46	8.1 0.35	0.2 0.01	0 0.00	42 0.69	0.6 0.01	7.2 0.20	5.5 0.09	0.0 0.00	0.0	19	Fe 0.00 (dis.) Fe 0.07 (total)	71	35	33	0	USGS
Fine Grove School domestic	-16D1	9-4-59	-	192	7.6	6.2 0.31	13 1.09	11 0.48	0.4 0.01	0 0.00	73 1.20	3.0 0.06	20 0.56	1.5 0.02	0.0 0.00	0.0	28	Fe 0.00 (dis.) Fe 0.23 (total)	119	25	70	10	USGS
S. R. Mattson domestic	-17K	9-18-59	-	208	6.9	8.0 0.40	14 1.12	14 0.61	0.5 0.01	0 0.00	72 1.18	14 0.29	23 0.65	2.2 0.04	0.2 0.01	0.0	32	Fe 0.04 (total)	143	29	76	17	USGS
A. Fullen domestic	-20A2	9-18-59	-	208	6.9	5.6 0.28	11 0.88	19 0.83	0.9 0.02	0 0.00	48 0.79	8.0 0.17	22 0.62	25 0.40	0.0 0.00	0.0	25	Fe 0.09 (total)	141	41	58	19	USGS
W. Story domestic	-20H1	9-18-59	-	237	7.7	7.6 0.38	15 1.26	15 0.65	0.8 0.02	0 0.00	70 1.15	10 0.21	22 0.62	18 0.29	0.1 0.01	0.0	23	Fe 0.08 (total)	146	28	82	25	USGS
H. C. Keikland domestic	-26D1	10-20-59	-	299	7.6	18 0.90	14 1.12	18 0.78	0.6 0.02	0 0.00	80 1.31	0.0 0.00	32 0.90	34 0.55	0.1 0.01	0.0	24	Fe 0.07 (total)	180	28	101	35	USGS
E. Mello irrigation	17N/1W-2G1	8-27-59	-	110	7.5	4.6 0.23	6.9 0.57	6.9 0.30	0.2 0.01	0 0.00	49 0.80	1.4 0.03	7.1 0.20	3.0 0.05	0.0 0.00	0.0	18	Fe 0.00 (dis.) Fe 0.68 (total)	72	27	40	0	USGS
R. H. Emmerson irrigation	-9A1	9-3-59	-	251	8.1	6.0 0.30	27 2.22	5.5 0.24	0.3 0.01	0 0.00	155 2.54	2.0 0.04	6.0 0.17	1.4 0.02	0.0 0.00	0.0	35	Fe 0.00 (dis.) Fe 0.11 (total)	159	9	126	0	USGS
Redwood School domestic	-14C1	8-14-59	-	367	8.4	21 1.05	15 1.22	39 1.70	3.3 0.08	5 0.17	191 3.13	15 0.31	14 0.39	0.7 0.01	0.0 0.00	0.1	20	Fe 0.00 (dis.) Fe 0.01 (total)	227	42	113	0	USGS
D. E. Johnson irrigation	-15E1	9-30-59	-	136	7.5	2.8 0.14	13 1.06	5.5 0.24	0.5 0.01	0 0.00	62 1.02	3.0 0.06	9.5 0.27	2.5 0.04	0.1 0.01	0.0	30	Fe 0.03 (total)	98	17	60	9	USGS
R. W. Struebing domestic	18N/1W-5G1	8-27-59	-	106	6.6	7.2 0.36	0.7 0.06	11 0.48	0.7 0.02	0 0.00	18 0.30	1.0 0.02	20 0.56	1.7 0.03	0.2 0.01	0.1	14	Fe 0.30 (total)	66	52	21	6	USGS
M. J. Sierka domestic	-17R1	10- -59	-	254	7.7	14 0.70	14 1.15	20 0.87	0.5 0.01	0 0.00	139 2.28	0 0.00	16 0.45	0.3 0.00	0.0 0.00	0.0	17	Fe 0.01 (dis.) Fe 7.5 (total)	150	32	93	0	USGS
M. J. Sierka domestic	-17R2	8-27-59	-	203	7.9	11 0.55	13 1.07	12 0.52	0.1 0.00	0 0.00	108 1.77	0.6 0.01	13 0.37	0.1 0.00	0.0 0.00	0.00	34	Fe 0.23 (dis.) Fe 2.6 (total)	137	24	81	0	USGS
Jepson domestic and stock	-34M2	9-3-59	-	329	8.3	12 0.60	36 2.95	4.3 0.19	0.7 0.02	3 0.10	205 3.36	5.1 0.08	4.0 0.11	5.1 0.08	0.0 0.00	0.0	37	Fe 0.00 (dis.) Fe 0.02 (total)	207	5	178	5	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Mineral constituents in parts per million / equivalents per million

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
	MDB&M							BUTTE VALLEY (1-3)															
L. D. Parsons irrigation	45N/1E-2L1	7-24-59	52	154	8.0	9.6 / 0.48	6.8 / 0.56	14 / 0.61	2.2 / 0.06	0 / 0.00	88 / 1.44	5.0 / 0.10	7.0 / 0.20	0.70 / 0.01	0.0 / 0.00	0.0	42		130	36	52	0	USGS
A. Eeck irrigation	-9C2	9-2-59	59	153	8.0	8.8 / 0.44	7.3 / 0.60	13 / 0.57	2.2 / 0.06	0 / 0.00	92 / 1.51	3.0 / 0.06	5.0 / 0.14	0.0 / 0.00	0.0 / 0.00	0.0	42		126	34	52	0	USGS
D. Mills irrigation	45N/2W-1P1	7-15-59	50	136	7.9	11 / 0.55	7.9 / 0.65	6.8 / 0.30	1.4 / 0.04	0 / 0.00	76 / 1.25	3.0 / 0.06	8.0 / 0.23	3.0 / 0.05	0.0 / 0.00	0.0	42		120	20	60	0	USGS
K. Holbrook irrigation	46N/1E-15D1	8-4-59	68	203	8.1	7.6 / 0.38	4.6 / 0.38	28 / 1.22	8.1 / 0.21	0 / 0.00	120 / 1.97	0.0 / 0.00	7.5 / 0.21	0.7 / 0.01	0.1 / 0.01	0.1	52		168	56	38	0	USGS
B. Cheyne irrigation	46N/1W-2F1	8-4-59	60	363	8.5	18 / 0.90	12 / 1.02	45 / 1.96	8.6 / 0.22	10 / 0.33	180 / 2.95	33 / 0.69	5.0 / 0.14	6.1 / 0.10	0.0 / 0.00	0.1	44		271	48	96	0	USGS
G. Osborn irrigation	-17B1	7-24-59	54	309	7.9	22 / 1.10	15 / 1.26	32 / 1.39	3.6 / 0.09	0 / 0.00	202 / 3.31	3.0 / 0.06	20 / 0.56	0.35 / 0.01	0.0 / 0.00	0.0	37		233	36	118	0	USGS
Butte Valley Irrigation District irrigation	46N/2W-25R2	7-15-59	52	297	3.1	20 / 1.00	23 / 1.92	13 / 0.57	4.5 / 0.12	0 / 0.00	162 / 2.66	19 / 0.40	15 / 0.42	6.9 / 0.11	0.0 / 0.00	0.0	52		233	16	146	13	USGS
F. E. Johnson irrigation	47N/1E-29N1	9-2-59	60	220	8.1	11 / 0.55	4.5 / 0.37	34 / 1.48	7.7 / 0.20	0 / 0.00	124 / 2.03	1.0 / 0.02	20 / 0.56	1.4 / 0.02	0.2 / 0.01	0.1	3.0		144	57	46	0	USGS
E. Harrison irrigation	47N/1W-23H1	7-24-59	54	3,670	8.5	40 / 2.00	156 / 12.80	644 / 28.01	90 / 2.30	35 / 1.17	792 / 12.98	990 / 20.61	394 / 11.11	9.5 / 0.15	0.0 / 0.00	1.1	48		2,800	62	740	32	USGS
Butte Valley Farms irrigation	-34Q1	8-4-59	60	432	8.3	21 / 1.05	17 / 1.39	50 / 2.18	12 / 0.31	6 / 0.20	261 / 4.28	0.0 / 0.00	9.0 / 0.25	6.2 / 0.10	0.2 / 0.01	0.3	46		296	44	122	0	USGS
								SHASTA VALLEY (1-4)															
E. Spada domestic	42N/5W-20J1	7-30-59	64	302	8.1	13 / 0.65	23 / 1.87	20 / 0.87	2.3 / 0.06	0 / 0.00	194 / 3.18	1.0 / 0.02	7.0 / 0.20	0.5 / 0.01	0.2 / 0.01	0.1	56		219	25	126	0	USGS
G. G. Maxwell domestic	42N/6W-10J1	7-30-59	64	575	8.3	11 / 0.55	78 / 6.39	4.9 / 0.21	0.5 / 0.01	7 / 0.23	402 / 6.59	7.0 / 0.15	4.5 / 0.13	3.6 / 0.06	0.1 / 0.01	0.0	53		368	3	347	6	USGS
Big Springs Irrigation District irrigation	43N/5W-2C1	7-30-59	54	266	8.1	18 / 0.90	13 / 1.10	18 / 0.78	2.2 / 0.06	0 / 0.00	148 / 2.43	4.0 / 0.08	12 / 0.34	0.4 / 0.01	0.2 / 0.01	0.2	56		197	27	100	0	USGS
Dougherty & Sons irrigation	43N/6W-21R1	7-30-59	60	396	7.8	48 / 2.40	20 / 1.62	6.6 / 0.29	2.3 / 0.06	0 / 0.00	252 / 4.13	10 / 0.21	2.6 / 0.07	2.4 / 0.04	0.1 / 0.01	0.0	28	Fe 0.00 (dis.)	244	7	201	0	USGS
J. C. Martin irrigation	44N/4W-6M1	7-31-59	56	545	8.0	45 / 2.25	22 / 1.79	43 / 1.87	2.7 / 0.07	0 / 0.00	310 / 5.08	11 / 0.23	22 / 0.62	6.4 / 0.10	0.1 / 0.01	1.2	53		359	31	202	0	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr)

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							SHASTA VALLEY (1-4) (Cont.)															
S. D. Nelson domestic and irrigation	44N/5W-32F1	9-3-59	66	878	8.6	39 1.95	69 5.69	80 3.48	3.8 0.10	39 1.30	482 7.90	21 0.44	48 1.35	0.0 0.00	0.2 0.01	0.6	53		591	31	332	0	USGS
H. Silva irrigation	-34H1	7-24-59	58	620	8.4	42 2.10	35 2.90	54 2.35	7.1 0.18	16 0.53	348 5.70	9.0 0.19	32 0.90	9.3 0.15	0.0 0.00	0.5	66		442	31	250	0	USGS
G. Weldon domestic	45N/6W-19E1	8-14-59	70	349	8.3	28 1.40	11 0.88	36 1.57	1.5 0.04	8 0.27	166 2.72	7.0 0.15	25 0.71	0.35 0.01	0.4 0.02	0.2	27		226	40	114	0	USGS
								SCOTT RIVER VALLEY (1-5)															
C. W. Black irrigation	42N/9W-2G1	7-16-59	54	355	8.0	33 1.65	22 1.81	6.6 0.29	1.7 0.04	0 0.00	224 3.67	4.0 0.08	2.5 0.07	7.9 0.13	0.0 0.00	0.0	29	Fe 0.00 (dis.)	217	8	173	0	USGS
C. R. McConnell irrigation	-10Q1	7-16-59	56	203	8.0	20 1.00	11 0.90	6.6 0.29	2.1 0.05	0 0.00	128 2.10	3.0 0.06	2.9 0.08	1.4 0.02	0.1 0.01	0.0	29	Fe 0.00 (dis.)	139	13	95	0	USGS
L. L. Lukas irrigation	43N/9W-24F1	7-16-59	52	425	7.8	44 2.20	29 2.36	6.6 0.29	1.8 0.05	0 0.00	274 4.49	7.0 0.15	1.5 0.04	12 0.19	0.0 0.00	0.0	29	Fe 0.00 (dis.)	266	6	228	3	USGS
N. C. Marvin irrigation	-24F2	7-16-59	54	423	8.3	42 2.10	27 2.26	6.6 0.29	1.7 0.04	0 0.00	268 4.39	9.0 0.19	1.8 0.05	16 0.26	0.0 0.00	0.0	31	Fe 0.00 (dis.)	267	6	218	0	USGS
O. E. Heinke domestic and stock	44N/9W-34R1	7-16-59	66	292	8.1	37 1.85	13 1.03	6.6 0.29	1.8 0.05	0 0.00	164 2.69	9.0 0.19	3.2 0.09	13 0.21	0.0 0.00	0.0	22	Fe 0.00 (dis.)	187	9	144	10	USGS
	HB&M							MAD RIVER VALLEY (1-8)															
Jacoby Creek School domestic	5N/1E-4H2	9-9-59	-	399	8.1	23 1.15	21 1.71	34 1.48	3.6 0.09	0 0.00	210 3.44	5.0 0.10	30 0.85	0.8 0.01	0.5 0.03	0.1	22	Fe 0.00 (dis.) Fe 0.14 (total)	243	33	143	0	USGS
Lane Portland Lumber Company industrial	8J1	9-11-59	-	301	8.0	17 0.85	16 1.31	30 1.30	1.3 0.03	0 0.00	170 2.79	7.0 0.15	18 0.51	1.8 0.03	0.1 0.01	0.0	37	Fe 0.04 (dis.) Fe 1.1 (total)	212	37	108	0	USGS
F. Coleman domestic and irrigation	6N/1E-7M1	9-9-59	-	495	3.3	30 1.50	40 3.30	10 0.44	3.3 0.08	6 0.20	278 4.56	5 0.10	23 0.65	0.1 0.00	0.0 0.00	0.1	22	Fe 0.0 (dis.) Fe 15 (total)	277	8	240	2	USGS
C. Barber domestic	-8H1	9-9-59	-	182	6.7	10 0.50	2.7 0.22	20 0.87	1.8 0.05	0 0.00	31 0.51	0.0 0.00	20 0.56	36 0.58	0.1 0.01	0.2	20	Fe 0.00 (dis.) Fe 0.35 (total)	126	53	36	11	USGS
Iverson irrigation	-17D1	9-9-59	-	442	8.3	38 1.90	31 2.58	6.8 0.30	0.0 0.00	6 0.20	230 3.77	21 0.44	17 0.48	0.5 0.01	0.0 0.00	0.1	34	Fe 0.1 (dis.) Fe 7.0 (total)	268	6	224	26	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
MAD RIVER VALLEY (1-8) (Cont.)																							
	HB&M																						
N. Holgerson domestic and stock	6N/1E-19Q1	9-9-59	-	379	8.1	50 / 2.50	14 / 1.18	7.1 / 0.31	0.0 / 0.00	0 / 0.00	226 / 3.70	1.0 / 0.02	12 / 0.34	0.6 / 0.01	0.0 / 0.00	0.1	26	Fe 0.0 (dis.) Fe 1.2 (total)	222	8	184	0	USGS
R. Stuart domestic and stock	-30N1	9-9-59	-	349	8.4	52 / 2.59	17 / 1.41	9.7 / 0.42	1.1 / 0.03	6 / 0.20	210 / 3.44	21 / 0.44	10 / 0.28	3.5 / 0.06	0.0 / 0.00	0.0	32	Fe 0.04 (dis.) Fe 1.1 (total)	255	9	200	18	USGS
Arcata Plywood industrial	-32F1	9-11-59	-	782	8.1	15 / 0.75	11 / 0.89	141 / 6.13	9.2 / 0.24	0 / 0.00	262 / 4.29	7.0 / 0.15	122 / 3.44	1.3 / 0.02	0.1 / 0.01	0.4	29	Fe 0.05 (dis.) Fe 0.38 (total)	465	77	82	0	USGS
Ace Bulb Farm domestic and irrigation	6N/1W-1H1	9-3-59	-	166	6.9	6.4 / 0.32	5.4 / 0.44	17 / 0.74	0.5 / 0.01	0 / 0.00	28 / 0.46	6.0 / 0.12	21 / 0.59	20 / 0.32	0.3 / 0.02	0.1	19	Fe 0.00 (dis.) Fe 0.28 (total)	110	49	38	15	USGS
J. M. Vieira industrial	-1P1	9-9-59	-	18,400	7.5	211 / 10.53	512 / 42.11	3,410 / 148.34	164 / 4.20	0 / 0.00	87 / 1.43	790 / 16.45	6,560 / 184.99	8.0 / 0.18	0.0 / 0.00	1.1	13	Fe 0.00 (dis.) Fe 21 (total)	11,710	72	2,630	2,579	USGS
G. A. Curtis domestic	7N/1E-18Q1	9-9-59	-	294	6.2	14 / 0.70	15 / 1.24	22 / 0.96	1.1 / 0.03	0 / 0.00	168 / 2.75	0.0 / 0.00	14 / 0.39	0.1 / 0.00	0.0 / 0.00	0.1	21	Fe 2.6 (dis.) Fe 3.0 (total)	173	32	97	0	USGS
T. Gralty	-30B1	9-9-59	-	115	6.9	6.4 / 0.32	4.6 / 0.38	11 / 0.48	0.8 / 0.02	0 / 0.00	40 / 0.66	8.0 / 0.17	9.0 / 0.25	5.4 / 0.09	0.2 / 0.01	0.0	26	Fe 0.00 (dis.) Fe 0.44 (total)	91	40	35	2	USGS
EUREKA PLAIN (1-9)																							
S. Christiansen irrigation	3N/1W-5K1	9-17-59	-	145	7.1	7.2 / 0.36	5.4 / 0.44	15 / 0.65	1.3 / 0.03	0 / 0.00	56 / 0.92	2.0 / 0.04	17 / 0.48	0.4 / 0.01	0.1 / 0.01	0.0	34	Fe 0.48 (dis.) Fe 1.4 (total)	111	44	40	0	USGS
P. G. & E. industrial	4N/1W-8P1	9-15-59	-	158	7.6	7.2 / 0.36	8.3 / 0.68	13 / 0.57	1.7 / 0.04	0 / 0.00	66 / 1.08	6.0 / 0.12	16 / 0.45	0.0 / 0.00	0.2 / 0.01	0.0	24	Fe 0.28 (dis.) Fe 0.35 (total)	110	35	52	0	USGS
P. Lorenzen irrigation	-16H1	9-11-59	-	549	8.4	45 / 2.25	31 / 2.51	36 / 1.57	6.5 / 0.17	6 / 0.20	300 / 4.92	35 / 0.73	26 / 0.73	0.0 / 0.00	0.1 / 0.01	0.0	46	Fe 0.06 (dis.) Fe 1.3 (total)	380	24	238	0	USGS
P. G. & E. industrial	-17B	9-15-59	-	161	8.2	8.0 / 0.40	8.3 / 0.68	12 / 0.52	1.6 / 0.04	0 / 0.00	70 / 1.15	2.6 / 0.05	1.4 / 0.39	0.3 / 0.00	0.0 / 0.00	0.0	21	Fe 0.08 (dis.) Fe 0.11 (total)	102	32	54	0	USGS
Arcata Redwood Co. domestic and industrial	5N/1E-18Q1	9-11-59	-	374	8.1	18 / 0.90	14 / 1.14	157 / 6.83	0.2 / 0.01	0 / 0.00	350 / 5.74	1.0 / 0.02	115 / 3.24	1.1 / 0.02	0.2 / 0.01	1.7	49	Fe 0.0 (dis.) Fe 0.4 (total)	529	77	102	0	USGS
L. L. Spinney domestic	-20Q1	9-11-59	-	279	8	10 / 0.50	14 / 1.18	26 / 1.13	0.0 / 0.00	0 / 0.00	116 / 1.90	1.0 / 0.02	32 / 0.90	0.2 / 0.00	0.0 / 0.00	0.0	43	Fe 0.0 (dis.) Fe 0.1 (total)	183	40	84	0	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm a	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
						Mineral constituents in parts per million / equivalents per million																	
								EEL RIVER VALLEY (1-10)															
A. Capaul irrigation	2N/1W-4D1	7-23-59	-	406	7.7	52 / 2.59	17 / 1.39	10 / 0.44	2.2 / 0.06	0 / 0.00	219 / 3.59	26 / 0.54	8.5 / 0.24	7.4 / 0.12	0.2 / 0.01	0.1	17	Fe 0.00 (dis.) Fe 0.00 (total)	248	10	199	19	USGS
H. Wilson irrigation	-7A1	10-1-59	-	309	8.1	28 / 1.40	18 / 1.52	12 / 0.52	21 / 0.05	0 / 0.00	172 / 2.82	5.0 / 0.10	16 / 0.45	5.3 / 0.09	0.2 / 0.01	0.0	25		197	15	146	5	USGS
E. Calanchini irrigation	-7F1	9-17-59	-	437	8.0	29 / 1.45	30 / 2.47	19 / 0.83	0.0 / 0.00	0 / 0.00	186 / 3.05	47 / 0.98	25 / 0.71	1.0 / 0.02	0.2 / 0.01	0.0	21	Fe 0.0 (dis.)	264	17	196	43	USGS
A. Johnson domestic and irrigation	-12D1	9-17-59	-	203	7.9	13 / 0.65	9.4 / 0.77	17 / 0.74	0.8 / 0.02	0 / 0.00	105 / 1.72	5.0 / 0.10	10 / 0.28	0.9 / 0.01	0.0 / 0.00	0.0	26	Fe 0.00 (dis.) Fe 1.4 (total)	134	34	71	0	USGS
C. Anderson irrigation	-17G1	7-23-59	-	495	6.5	32 / 1.60	32 / 2.64	28 / 1.22	2.7 / 0.07	0 / 0.00	228 / 3.74	47 / 0.98	25 / 0.70	0.3 / 0.00	0.2 / 0.01	0.0	22	Fe 0.29 (dis.) Fe 3.3 (total)	301	22	212	25	USGS
C. Peterson domestic and irrigation	3N/1W-18D2	9-11-59	-	163	7.7	4.0 / 0.20	9.7 / 0.80	16 / 0.70	0.0 / 0.00	0 / 0.00	68 / 1.11	1.0 / 0.02	17 / 0.48	1.9 / 0.03	0.0 / 0.00	0.0	36	Fe 0.0 (dis.)	119	41	50	0	USGS
Golden State Company industrial	-18K1	9-30-59	-	1,160	8.0	49 / 2.45	89 / 7.35	77 / 3.35	4.5 / 0.12	0 / 0.00	296 / 4.85	72 / 1.50	245 / 6.91	1.0 / 0.02	0.1 / 0.01	0.0	26		710	25	490	247	USGS
C. Gobel irrigation	-29G1	10-5-59	-	628	8.1	33 / 1.65	49 / 4.03	33 / 1.44	4.5 / 0.12	0 / 0.00	312 / 5.11	30 / 0.62	56 / 1.58	0.0 / 0.00	0.2 / 0.01	0.0	20		380	20	284	28	USGS
Humboldt Creamery Association industrial	-29H1	9-15-59	-	315	7.7	18 / 0.90	21 / 1.74	19 / 0.83	2.0 / 0.05	0 / 0.00	177 / 2.90	15 / 0.31	10 / 0.28	1.9 / 0.03	0.4 / 0.02	0.1	29	Fe 0.00 (dis.) Fe 0.08 (total)	203	24	132	0	USGS
R. Tedson irrigation	-30N1	10-1-59	-	526	8.1	48 / 2.40	37 / 3.08	11 / 0.48	0.0 / 0.00	0 / 0.00	306 / 5.02	23 / 0.48	12 / 0.34	6.0 / 0.10	0.0 / 0.00	0.1	15	Fe 0.0 (dis.)	303	8	274	23	USGS
J. V. Toste	3N/2W-2A2	10-1-59	-	1,890	7.1	54 / 2.69	73 / 5.99	191 / 8.31	0.0 / 0.00	0 / 0.00	24 / 0.39	15 / 0.31	570 / 16.07	4.0 / 0.06	0.0 / 0.00	0.0	6.9	Fe 0.0 (dis.)	926	49	434	414	USGS
E. E. Tranferani irrigation	-13J1	10-5-59	-	3,100	7.9	161 / 8.03	189 / 15.57	152 / 6.61	5.5 / 0.14	0 / 0.00	214 / 3.51	31 / 0.65	900 / 25.38	1.9 / 0.03	0.0 / 0.00	0.0	14		1,560	22	1,180	1,000	USGS
R. M. Christiansen irrigation	-27G1	10-1-59	-	1,500	7.7	60 / 2.99	88 / 7.21	111 / 4.83	0.4 / 0.01	0 / 0.00	208 / 3.41	29 / 0.64	382 / 10.77	2.3 / 0.04	0.0 / 0.00	0.1	21	Fe 0.0 (dis.)	796	32	510	339	USGS
Russ Connick Co. irrigation	-32Q1	7-21-59	-	1,000	8.0	29 / 1.45	32 / 2.63	142 / 6.18	5.2 / 0.13	0 / 0.00	231 / 3.79	41 / 1.02	198 / 5.58	1.3 / 0.02	0.5 / 0.03	0.1	28	Fe 0.00 (dis.) Fe 0.88 (total)	599	59	204	15	USGS
P. C. Lorenzen irrigation	-35M1	10-1-59	-	1,090	8.3	40 / 2.00	61 / 5.00	80 / 3.48	1.8 / 0.05	6 / 0.20	244 / 4.00	25 / 0.52	216 / 6.09	1.7 / 0.03	0.0 / 0.00	0.1	29	Fe 0.0 (dis.)	581	33	350	140	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					UKIAH VALLEY (1-15)																	
S. M. Williams domestic	14N/12W-5K1	9-16-59	62	600	8.0	62 3.09	20 1.61	41 1.78	1.6 0.04	0 0.00	315 5.16	50 1.04	7.3 0.20	0.7 0.01	0.4 0.02	0.95	24		363	27	235	0	DWR
R. Kirchen domestic	-11N1	9-6-59	62	301	7.7	18 0.90	21 1.72	8.7 0.38	0.9 0.02	0 0.00	121 1.98	21 0.44	8.2 0.23	18 0.29	0.2 0.01	0.13	20		175	12	131	32	DWR
D. T. Torell domestic	-26K1	9-17-59	63	379	7.6	23 1.15	19 1.59	20 0.87	0.5 0.01	0 0.00	182 2.98	3.3 0.07	17 0.48	0.6 0.01	0.3 0.02	2.6	31		206	24	137	0	DWR
Mayfield domestic	15N/12W-8D1	9-17-59	62	432	8.1	29 1.45	21 1.71	25 1.09	0.6 0.02	0 0.00	227 3.72	10 0.21	7.8 0.22	3.4 0.05	0.2 0.01	0.17	26		235	26	158	0	DWR
City of Ukiah municipal	-16E1	10-5-59	66	208	7.5	18 0.90	10 0.82	8.0 0.35	1.3 0.03	0 0.00	113 1.85	3.8 0.08	4.9 0.14	0.2 0.00	0.1 0.00	0.24	16		118	17	86	0	DWR
Regina Water Company municipal	-21H1	9-16-59	64	235	8.1	22 1.10	11 0.88	9.8 0.43	1.2 0.03	0 0.00	135 2.21	4.1 0.08	4.6 0.13	0.6 0.01	0.2 0.01	0.61	17		137	18	99	0	DWR
D. Broggi domestic and irrigation	-35D1	9-16-59	66	423	7.9	38 1.90	13 1.10	33 1.44	0.8 0.02	0 0.00	230 3.77	3.6 0.07	20 0.56	0.9 0.01	0.4 0.02	0.20	47		270	32	150	0	DWR
F. Brown domestic	16N/12W-5D1	9-17-59	61	359	8.0	22 1.10	19 1.60	24 1.04	0.5 0.01	0 0.00	182 2.98	0.3 0.01	24 0.68	0.4 0.01	0.2 0.01	0.12	30		210	28	135	0	DWR
F. G. & E. industrial	-9Q1	9-17-59	63	417	8.2	28 1.40	17 1.38	42 1.83	0.9 0.02	0 0.00	254 4.16	7.1 0.15	8.0 0.22	0.6 0.01	0.5 0.03	0.11	29		258	40	139	0	DWR
H. L. Miller domestic	17N/12W-18A1	9-17-59	58	2,034	7.7	38 1.90	6.1 0.50	364 15.83	1.0 0.02	0 0.00	218 3.57	0.0 0.00	524 14.78	0.1 0.00	0.8 0.04	83	20		1,144	87	120	0	DWR
H. Mathews domestic	-28M1	9-17-59	61	230	7.3	18 0.90	10 0.84	10 0.44	0.4 0.01	0 0.00	84 1.38	15 0.31	7.4 0.21	16 0.26	0.1 0.00	0.05	32		150	20	87	18	DWR
						SANEL VALLEY (1-16)																	
A. Mercantonio domestic	12N/11W-2F1	9-16-59	64	419	8.2	44 2.20	21 1.76	12 0.52	1.5 0.04	0 0.00	236 3.87	17 0.35	7.7 0.22	2.1 0.03	0.2 0.01	0.39	19		241	12	198	4	DWR
F. F. Hawn irrigation	13N/11W-7D1	9-17-59	60	357	8.1	25 1.25	26 2.15	9.2 0.40	0.5 0.01	0 0.00	207 3.39	12 0.25	5.1 0.14	0.4 0.01	0.2 0.01	0.23	21		202	10	170	0	DWR
A. Damiano irrigation	-18B1	9-16-59	64	221	7.7	19 0.95	10 0.87	10 0.44	1.2 0.03	0 0.00	122 2.00	5.6 0.12	4.8 0.14	0.4 0.01	0.2 0.01	0.84	14		126	19	91	0	DWR
J. H. Pomroy Co. irrigation	-18D1	9-16-59	60	374	7.9	26 1.30	25 2.04	16 0.70	1.0 0.02	0 0.00	216 3.54	11 0.23	6.3 0.18	4.9 0.08	0.2 0.01	1.4	21		219	17	167	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDH&M							SANEL VALLEY (1-16) (Cont.)															
Hopland Public Ch. District - Municipal	13N/11W-19N1	9-16-59	62	324	8.0	26 / 1.30	20 / 1.68	9.2 / 0.40	0.5 / 0.01	0 / 0.00	163 / 2.67	21 / 0.44	7.8 / 0.22	1.6 / 0.02	0.1 / 0.00	0.42	20		187	12	149	15	DWR
Grace Ranch domestic and irrigation	-30H1	9-16-59	61	302	7.8	23 / 1.15	19 / 1.57	9.4 / 0.41	0.7 / 0.02	0 / 0.00	157 / 2.57	15 / 0.31	6.8 / 0.19	2.5 / 0.04	0.1 / 0.00	0.28	21		175	13	136	7	DWR
								ALEXANDER VALLEY (1-17)															
Redwood Hereford Ranch domestic and irrigation	9N/8W-7Q1	9- -59	-	588	8.4	4.8 / 0.24	1.2 / 0.10	134 / 5.83	6.2 / 0.16	11 / 0.37	292 / 4.79	1.0 / 0.02	38 / 1.07	0.2 / 0.00	0.9 / 0.05	0.4	74		416	92	17	0	USGS
H. Dick irrigation	9N/9W-1P1	9- -59	-	311	8.3	25 / 1.25	19 / 1.57	12 / 0.52	0.8 / 0.02	4 / 0.13	172 / 2.82	11 / 0.23	4.8 / 0.14	4.8 / 0.08	0.2 / 0.01	0.0	28		195	15	141	0	USGS
H. B. Remmel irrigation	10N/9W-18R1	9- -59	-	297	8.1	29 / 1.45	18 / 1.47	8.4 / 0.37	0.9 / 0.02	0 / 0.00	170 / 2.79	13 / 0.27	4.8 / 0.14	5.3 / 0.09	0.1 / 0.01	0.5	21		185	11	146	7	USGS
W. D. Dana irrigation	-26L1	9- -59	-	479	8.5	28 / 1.40	47 / 3.86	12 / 0.52	0.3 / 0.01	14 / 0.47	278 / 4.56	11 / 0.23	5.8 / 0.16	13 / 0.21	0.0 / 0.00	0.0	39		307	9	263	12	USGS
Springfield Mill industrial	-32R1	9- -59	-	506	8.2	37 / 1.85	7.9 / 0.65	70 / 3.04	3.4 / 0.09	0 / 0.00	289 / 4.74	24 / 0.50	12 / 0.34	1.6 / 0.03	0.4 / 0.02	0.4	51		350	54	125	0	USGS
Italian Swiss Colony irrigation	11N/10W-28N1	9- -59	-	399	8.0	47 / 2.35	20 / 1.63	11 / 0.48	1.0 / 0.03	0 / 0.00	246 / 4.03	12 / 0.25	8.4 / 0.24	0.2 / 0.00	0.0 / 0.00	0.2	19		240	11	199	0	USGS
Italian Swiss Colony domestic and industrial	-33A1	9- -59	-	248	8.2	24 / 1.20	12 / 1.02	11 / 0.48	1.4 / 0.04	0 / 0.00	144 / 2.36	9.0 / 0.19	7.5 / 0.21	0.6 / 0.01	0.2 / 0.01	0.6	19		156	18	111	0	USGS
C. Pellegrini domestic	-33C1	9- -59	-	183	7.0	9.2 / 0.46	6.3 / 0.52	16 / 0.70	0.6 / 0.02	0 / 0.00	40 / 0.66	4.0 / 0.08	24 / 0.68	14 / 0.23	0.0 / 0.00	0.0	35		129	41	49	16	USGS
								SANTA ROSA VALLEY (1-18)															
R. R. Mattri irrigation	5N/9W-3F1	9- -59	-	535	8.5	13 / 0.65	5.2 / 0.43	110 / 4.78	2.0 / 0.05	7 / 0.23	255 / 4.18	23 / 0.48	34 / 0.96	0.4 / 0.01	0.2 / 0.01	0.8	28		350	81	54	0	USGS
G. I. Crane irrigation	6N/7W-17E1	9- -59	-	531	7.7	43 / 2.15	15 / 1.23	53 / 2.31	2.8 / 0.07	0 / 0.00	197 / 3.23	95 / 1.98	21 / 0.59	1.2 / 0.02	0.3 / 0.02	0.4	58		387	40	169	7	USGS
J. J. Wilson irrigation	-18R1	9- -59	-	770	8.1	60 / 2.99	37 / 3.01	69 / 3.00	1.6 / 0.04	0 / 0.00	406 / 6.65	50 / 1.04	48 / 1.35	0.6 / 0.01	0.2 / 0.01	0.1	66		532	33	300	0	USGS
I. Carley irrigation	-30D1	9- -59	-	298	8.2	28 / 1.40	14 / 1.16	17 / 0.74	1.4 / 0.04	0 / 0.00	176 / 2.88	8.0 / 0.17	9.5 / 0.27	2.7 / 0.04	0.1 / 0.01	0.0	82		250	22	128	0	USGS

a Determined by addition of constituents.
b. Gravimetric determination.
c Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					SANTA ROSA VALLEY (1-18) (Cont.)																	
G. Mallory domestic	6N/8W-3B1	9- -59	-	378	8.2	24 / 1.20	22 / 1.80	18 / 0.78	1.5 / 0.04	0 / 0.00	144 / 2.36	6.0 / 0.12	40 / 1.13	6.6 / 0.11	0.0 / 0.00	0.0	38		227	20	150	32	USGS
J. Padranzini irrigation	-16R1	9- -59	-	341	8.2	16 / 0.80	8.3 / 0.68	52 / 2.26	8.2 / 0.07	0 / 0.00	166 / 2.72	5.0 / 0.10	30 / 0.85	8.3 / 0.13	0.1 / 0.01	0.0	71		276	59	74	0	USGS
Cotati Public Utility District municipal	-35A2	9- -59	-	291	7.8	15 / 0.75	6.4 / 0.53	39 / 1.70	2.0 / 0.05	0 / 0.00	111 / 1.82	9.0 / 0.19	34 / 0.96	0.0 / 0.00	0.1 / 0.01	0.0	71		232	56	64	0	USGS
City of Sebastapool municipal	6N/9W-2G1	9- -59	-	307	8.2	42 / 2.10	8.2 / 0.23	17 / 0.74	1.0 / 0.03	0 / 0.00	153 / 2.51	5.4 / 0.11	19 / 0.54	0.3 / 0.00	0.0 / 0.00	0.0	45		208	24	117	0	USGS
Kenwood Fire Dept. domestic and municipal	7N/6W-29F1	9- -59	-	351	8.4	20 / 1.00	13 / 1.04	44 / 1.91	3.3 / 0.08	8 / 0.27	210 / 3.44	4.0 / 0.08	11 / 0.31	0.0 / 0.00	0.1 / 0.01	0.1	55		262	47	102	0	USGS
M. Clark domestic and irrigation	7N/7W-15C1	9- -59	-	250	8.1	15 / 0.75	11 / 0.91	23 / 1.00	5.1 / 0.13	0 / 0.00	152 / 2.49	0.0 / 0.00	9.0 / 0.25	0.1 / 0.00	0.1 / 0.01	0.0	78		216	36	83	0	USGS
E. F. Bethards domestic and irrigation	-29D1	9- -59	-	474	8.1	32 / 1.60	19 / 1.56	49 / 2.13	8.0 / 0.20	0 / 0.00	292 / 4.79	1.0 / 0.02	18 / 0.51	0.0 / 0.00	0.2 / 0.01	0.4	87		359	39	158	0	USGS
W. E. Samuelson domestic	7N/8W-3L1	9- -59	-	428	8.4	25 / 1.25	17 / 1.41	46 / 2.00	3.0 / 0.08	6 / 0.20	194 / 3.18	45 / 0.94	18 / 0.51	0.5 / 0.01	0.2 / 0.01	0.2	73		329	42	133	0	USGS
C. Bordessa domestic	-5G1	9- -59	-	451	8.1	25 / 1.25	23 / 1.91	29 / 1.26	5.7 / 0.15	0 / 0.00	156 / 2.56	10 / 0.21	50 / 1.41	23 / 0.37	0.0 / 0.00	0.1	82		325	28	158	30	USGS
H. Rasmussen irrigation	-18Q1	9- -59	-	587	8.5	26 / 1.30	18 / 1.48	90 / 3.92	2.4 / 0.06	15 / 0.50	319 / 5.23	2.0 / 0.04	28 / 0.79	0.0 / 0.00	0.0 / 0.00	0.2	61		400	58	139	0	USGS
A. Marks domestic and irrigation	-33M1	9- -59	-	354	8.4	21 / 1.05	12 / 1.01	47 / 2.04	2.0 / 0.05	4 / 0.13	198 / 3.25	10 / 0.21	19 / 0.54	0.5 / 0.01	0.0 / 0.00	0.1	42		255	49	103	0	USGS
C. W. Gilbert irrigation	7N/9W-9F1	9- -59	-	160	7.7	11 / 0.55	4.5 / 0.37	15 / 0.65	1.6 / 0.04	0 / 0.00	64 / 1.05	8.0 / 0.17	12 / 0.34	0.0 / 0.00	0.1 / 0.01	0.0	67		151	40	46	0	USGS
Sebastapol Meat Co. industrial and irrigation	-36M1	9- -59	-	362	8.2	28 / 1.40	8.3 / 0.72	39 / 1.70	1.9 / 0.05	0 / 0.00	184 / 3.02	1.0 / 0.02	27 / 0.76	1.4 / 0.02	0.2 / 0.01	0.0	49		247	44	106	0	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
	MDB&M					SANTA ROSA VALLEY (1-18) (Cont.)																	
H. A. Faught	8N/8W-20Q1	9- -59	-	521	8.4	24 / 1.20	25 / 2.04	50 / 2.18	9.5 / 0.24	12 / 0.40	248 / 4.06	15 / 0.21	31 / 0.87	0.0 / 0.00	0.1 / 0.01	0.2	85		374	39	162	0	USGS
A. Silveria irrigation	8N/9W-23D	9- -59	-	256	7.9	12 / 0.60	7.5 / 0.62	31 / 1.35	10 / 0.26	0 / 0.00	128 / 2.10	3.0 / 0.06	18 / 0.51	7.4 / 0.12	0.0 / 0.00	0.0	86		238	48	61	0	USGS
E. R. Russman irrigation	-36P1	9- -59	-	952	7.7	15 / 0.75	6.9 / 0.57	211 / 9.18	10 / 0.26	0 / 0.00	444 / 7.28	25 / 0.52	110 / 3.10	0.0 / 0.00	0.3 / 0.02	4.0	67		668	85	66	0	USGS
Frei Bros. Winery domestic and industrial	9N/10W-1C1	9- -59	-	204	8.0	14 / 0.70	9.0 / 0.74	18 / 0.78	0.6 / 0.02	0 / 0.00	124 / 2.03	1.0 / 0.02	5.5 / 0.16	0.0 / 0.00	0.4 / 0.02	0.0	54		164	35	72	0	USGS

Mineral constituents in parts per million / equivalents per million.

a Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
						Mineral constituents in parts per million / equivalents per million																	
SAN FRANCISCO BAY REGION (NO. 2)																							
PETALUMA VALLEY (2-1)																							
	MDB&M																						
H. Cloakie	3N/6W-1.1	3-23-59	60	1,310	7.7	30 1.50	30 2.50	230 10.00	611 0.16	0 0.00	604 9.90	0.3 0.01	140 3.95	10 0.16	0.6 0.03	0.26	37	Fe 0.73(total)	781	71	200	0	DWR
		9-28-59	65	1,300	8.4	33 1.65	34 2.81	211 9.18	6.4 0.16	10 0.33	548 8.98	6.0 0.12	170 4.79	6.8 0.11	0.1 0.01	0.3	41		789	67	223	0	USGS
O. White domestic and irrigation	-3C1	3-23-59	64	3,880	7.2	159 7.93	195 16.05	317 13.79	22 0.56	0 0.00	564 9.24	0.00 0.00	1,030 29.05	24 0.39	0.2 0.01	0.28	36	Fe 4.6 (total)	2,060	36	1,200	740	DWR
		9-22-59	65	3,890	7.3	164 8.18	193 15.88	320 13.92	24 0.61	0 0.00	540 8.85	3.6 0.07	1,070 30.17	18 0.29	0.0 0.00	0.3	39		2,100	36	1,200	757	USGS
W. Wright stock	-5A1	3-23-59	52	11,000	7.4	253 12.62	400 32.93	1,640 70.04	119 3.07	0 0.00	1,140 18.68	0 0.00	3,500 98.70	2.7 0.04	0.2 0.01	0.69	33	Fe 0.13(total)	5,980	59	2,280	1,355	DWR
		9-22-59	64	14,490	7.9	68 3.39	555 45.61	2,360 102.66	60 1.53	0 0.00	597 9.78	66 1.37	5,120 144.38	3.0 0.05	0.0 0.00	0.4	27		8,550	67	2,450	1,960	USGS
Sleepy Hallow Dairy domestic and stock	-11B1	3-23-59	64	2,120	7.5	38 1.90	49 4.05	321 13.96	8.6 0.22	0 0.00	604 9.90	0.0 0.00	364 10.26	0.4 0.01	0.4 0.02	0.56	42	Fe 0.57(total)	950	69	298	0	DWR
		9-22-59	62	1,920	8.1	39 1.95	46 3.79	327 14.22	9.2 0.24	0 0.00	578 9.47	0 0.00	371 10.46	12 0.19	0.0 0.00	0.2	47		1,140	70	287	0	USGS
C. Strozzi	-15M1	3-23-59	58	422	6.5	31 1.55	10 0.87	22 0.96	1.4 0.04	0 0.00	97 1.59	43 0.90	30 0.85	1.4 0.02	0.0 0.00	0.61	28	Fe 0.25(total)	215	28	121	41	DWR
		9-22-59	66	174	7.2	10 0.50	62 0.51	15 0.65	3.5 0.09	0 0.00	32 0.52	25 0.52	23 0.65	1.2 0.02	0.0 0.00	0.1	24		124	37	51	25	USGS
Rupprecht irrigation	-18M1	3-23-59	-	658	6.7	34 1.70	44 3.59	25 1.09	0.1 0.00	0 0.00	164 2.69	41 0.85	48 1.35	91 1.47	0.0 0.00	0.46	26	Fe 0.01(total)	390	17	265	131	DWR
		9-22-59	62	578	7.1	30 1.50	39 3.21	27 1.17	0.2 0.01	0 0.00	175 2.87	39 0.81	53 1.49	36 0.58	0.0 0.00	0.0	26		336	20	235	89	USGS
C. Johnson domestic	3N/7W-14F1	9-22-59	68	677	8.2	29 1.45	32 2.62	70 3.04	1.0 0.03	0 0.00	264 4.33	25 0.52	73 2.06	0.9 0.01	0.5 0.03	0.6	33		395	43	203	0	USGS
Lores domestic	4N/6W-7H1	3-23-59	54	1,040	7.7	63 3.14	66 5.43	78 3.39	0.8 0.02	0 0.00	605 9.92	29 0.60	38 1.07	23 0.37	0.6 0.03	2.2	21	Fe 0.00(total)	620	28	429	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							PETALUMA VALLEY (2-1) (Cont.)															
Lopes domestic	4N/6W-7H1	9-22-59	63	1,040	8.2	58 / 2.89	65 / 5.31	94 / 4.09	0.8 / 0.02	0 / 0.00	607 / 9.95	36 / 0.75	39 / 1.10	28 / 0.45	0.3 / 0.02	1.9	22		644	33	410	0	USGS
Lopes irrigation	-7H2	3-23-59	54	5,260	7.4	90 / 4.49	98 / 8.10	925 / 40.24	6.8 / 0.17	0 / 0.00	506 / 8.29	300 / 6.25	1,360 / 38.35	15 / 0.24	0.5 / 0.03	2.5	19	Fe 0.04(total)	3,060	76	630	215	DWR
		9-22-59	-	4,630	7.7	70 / 3.49	80 / 6.55	855 / 37.19	8.0 / 0.20	0 / 0.00	528 / 8.65	254 / 5.29	1,140 / 32.15	26 / 0.42	0.5 / 0.03	2.5	22		2,720	78	502	69	USGS
L. A. Bourke domestic and stock	-21Q1	3-23-59	60	1,130	8.0	18 / 0.90	15 / 1.26	210 / 9.14	2.2 / 0.06	0 / 0.00	381 / 6.24	27 / 0.56	164 / 4.62	0.4 / 0.01	0.2 / 0.01	1.0	13	Fe 0.71 (total)	638	80	108	0	DWR
		9-22-59	65	980	8.6	14 / 0.70	10 / 0.82	203 / 8.83	3.2 / 0.08	16 / 0.53	357 / 5.85	24 / 0.50	121 / 3.41	0.0 / 0.00	0.0 / 0.00	1.1	48		616	85	76	0	USGS
	4N/6W-27N1	3-23-59	58	1,150	7.8	49 / 2.44	34 / 2.83	160 / 6.96	3.0 / 0.08	0 / 0.00	491 / 8.05	13 / 0.27	136 / 3.84	1.0 / 0.02	0.3 / 0.02	0.33	27	Fe 0.30 (total)	665	56	264	0	DWR
		9-22-59	74	1,090	8.2	34 / 1.70	33 / 2.74	155 / 6.74	3.0 / 0.08	0 / 0.00	452 / 7.41	2.0 / 0.04	124 / 3.50	1.4 / 0.02	0.0 / 0.00	0.3	18		594	60	222	0	USGS
Sleepy Hallow Dairy stock	-27R1	3-23-59	58	1,160	8.2	42 / 2.10	29 / 2.42	175 / 7.61	2.8 / 0.07	0 / 0.00	446 / 7.31	18 / 0.37	156 / 4.40	1.0 / 0.02	0.4 / 0.02	0.94	20	Fe 0.19(total)	664	62	226	0	DWR
		9-22-59	68	1,050	8.2	31 / 1.55	31 / 2.53	147 / 6.39	2.6 / 0.07	0 / 0.00	393 / 6.44	12 / 0.25	145 / 4.09	0.7 / 0.01	0.1 / 0.01	0.7	29		593	61	204	0	USGS
O. White irrigation and stock	-33R1	3-23-59	55	5,520	7.4	287 / 14.32	304 / 25.04	376 / 16.36	21 / 0.54	0 / 0.00	577 / 9.46	0.0 / 0.00	1,660 / 46.81	0.6 / 0.01	0.1 / 0.00	0.17	36	Fe 2.9 (total)	2,970	29	1,970	1,500	DWR
		9-22-59	62	3,980	7.9	165 / 8.23	199 / 16.37	359 / 15.62	24 / 0.61	0 / 0.00	553 / 9.06	4.4 / 0.09	1,110 / 31.30	18 / 0.29	0.0 / 0.00	0.3	40		2,190	38	1,230	777	USGS
Union Oil Company industrial	4N/7W-2D1	3-21-59	61	25,700	7.1	330 / 16.47	2,350 / 193.32	2,620 / 113.97	37 / 0.95	0 / 0.00	144 / 2.36	1,150 / 23.94	10,600 / 298.92	13 / 0.21	0.0 / 0.00	0.66	40	Fe 5.7(total)	20,560	35	10,500	10,400	DWR
		9-23-59	-	23,500	7.4	398 / 19.76	2,020 / 166.15	2,400 / 104.40	45 / 1.15	0 / 0.00	99 / 1.61	989 / 20.59	9,200 / 259.44	3.7 / 0.06	0.0 / 0.00	0.7	28		15,100	36	9,300	9,219	USGS
G. Myles domestic and stock	5N/6W-30D1	3-23-59	56	1,400	7.6	125 / 6.24	49 / 4.03	113 / 4.92	2.4 / 0.06	0 / 0.00	475 / 7.78	163 / 3.39	139 / 3.92	1.0 / 0.02	0.5 / 0.03	0.38	28	Fe 0.07(total)	855	32	514	124	DWR
		9-23-59	65	1,350	7.9	121 / 6.04	34 / 2.76	131 / 5.70	2.0 / 0.05	0 / 0.00	480 / 7.87	120 / 2.50	139 / 3.92	1.1 / 0.02	0.3 / 0.02	0.3	31		816	39	440	46	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Mineral constituents in parts per million / equivalents per million

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
	MDB&M					PETALUMA VALLEY (2-1) (Cont.)																	
N. J. Matzen domestic	5N/7W-8D3	3-23-59	58	1,100	7.7	85 / 4.24	39 / 3.21	72 / 3.13	4.9 / 0.12	0 / 0.00	247 / 4.05	43 / 0.90	204 / 5.75	0.8 / 0.01	0.3 / 0.02	0.18	27	Fe 1.2 (total)	599	29	373	171	DWR
		9-23-59	62	1,030	8.1	79 / 3.94	39 / 3.20	73 / 3.18	5.2 / 0.13	0 / 0.00	232 / 3.80	42 / 0.87	199 / 5.61	1.0 / 0.02	0.1 / 0.01	0.1	27		579	30	356	166	USGS
Oberg Lumber Co.	-19A1	3-23-59	57	552	7.8	35 / 1.75	10 / 0.83	67 / 2.91	2.6 / 0.07	0 / 0.00	224 / 3.67	34 / 0.71	41 / 1.16	0.3 / 0.00	0.2 / 0.01	0.13	28	Fe 0.59 (total)	329	52	129	0	DWR
		9-23-59	60	532	8.4	36 / 1.80	9.7 / 0.80	68 / 2.96	2.7 / 0.07	6 / 0.20	216 / 3.54	34 / 0.71	42 / 1.18	0.0 / 0.00	0.1 / 0.01	0.0	29		334	53	130	0	USGS
E. Scott industrial and stock	-20C1	3-23-59	56	882	7.1	60 / 2.99	25 / 2.04	62 / 2.70	2.7 / 0.07	0 / 0.00	130 / 2.13	6.7 / 0.14	187 / 5.27	18 / 0.29	0.2 / 0.01	0.20	40	Fe 0.16 (total)	466	35	252	145	DWR
		9-23-59	-	871	8.1	72 / 3.59	26 / 2.13	78 / 3.39	3.8 / 0.10	0 / 0.00	177 / 2.90	124 / 2.58	125 / 3.52	2.1 / 0.03	0.0 / 0.00	0.1	37		555	37	286	141	USGS
Drake Equipment Co. domestic and industrial	-20L2	3-23-59	61	1,920	7.2	228 / 11.38	40 / 3.32	80 / 3.48	2.4 / 0.06	0 / 0.00	203 / 3.33	18 / 0.37	394 / 11.11	191 / 3.08	0.0 / 0.00	0.01	41	Fe 0.06 (total)	1,090	19	736	570	DWR
		9-23-59	60	2,210	8.0	266 / 13.27	38 / 3.13	107 / 4.65	1.2 / 0.03	0 / 0.00	199 / 3.26	16 / 0.33	460 / 12.97	289 / 4.66	0.1 / 0.01	0.1	47		1,320	22	820	657	USGS
Calif. Water Service municipal	-22Q1	9-23-59	64	422	8.4	14 / 0.70	33 / 2.70	34 / 1.48	2.3 / 0.06	8 / 0.27	237 / 3.88	9 / 0.19	20 / 0.56	0.0 / 0.00	0.0 / 0.00	0.0	48		285	30	170	0	USGS
R. E. Atkinson irrigation and stock	26E1	3-23-59	48	601	8.6	24 / 2.30	13 / 1.10	95 / 4.13	3.0 / 0.08	20 / 0.67	245 / 4.01	18 / 0.37	48 / 1.35	0.8 / 0.01	0.2 / 0.01	0.37	25	Fe 1.2(total)	335	65	115	0	DWR
Calif. Water Service municipal	-28A1	9-23-59	64	552	7.9	14 / 0.70	21 / 1.74	80 / 3.48	2.2 / 0.06	0 / 0.00	255 / 4.18	25 / 0.52	39 / 1.10	0.0 / 0.00	0.0 / 0.00	0.1	27		334	58	122	0	USGS
Calif. Water Service municipal	-28H3	9-23-59	65	525	7.1	8.8 / 0.44	39 / 3.20	42 / 1.83	1.4 / 0.04	0 / 0.00	231 / 3.79	43 / 0.90	25 / 0.71	0.0 / 0.00	0.0 / 0.00	0.0	99		372	33	182	0	USGS
G. E. Park domestic	-28N1	9-23-59	65	1,560	7.8	8.8 / 0.44	119 / 9.76	123 / 5.35	1.2 / 0.03	0 / 0.00	280 / 4.59	97 / 2.02	252 / 7.11	98 / 1.58	0.2 / 0.01	0.0	63		900	34	510	280	USGS
H. E. Clark domestic and irrigation	-34E2	3-23-59	49	854	8.5	4.1 / 0.20	3.4 / 0.28	188 / 8.18	1.5 / 0.04	14 / 0.47	370 / 6.06	20 / 0.42	66 / 1.86	0.7 / 0.01	0.4 / 0.02	0.19	23	Fe 0.12(total)	503	94	24	0	DWR
		9-23-59	-	818	8.5	4.8 / 0.24	3.4 / 0.28	188 / 8.18	4.4 / 0.11	14 / 0.47	361 / 5.92	16 / 0.33	66 / 1.86	0.5 / 0.01	0.3 / 0.02	0.1	24		500	93	26	0	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							PETALUMA VALLEY (2-1) (Cont.)															
R. H. Sartori irrigation	5N/7W-35K1	3-23-59	51	678	7.0	61 / 3.04	30 / 2.43	35 / 1.52	3.0 / 0.08	0 / 0.00	296 / 4.85	24 / 0.50	44 / 1.24	21 / 0.34	0.2 / 0.01	0.07	66	Fe 0.01 (total)	430	21	274	31	DWR
		9-27-59	67	649	8.2	61 / 3.04	28 / 2.28	40 / 1.74	3.7 / 0.09	0 / 0.00	287 / 4.70	44 / 0.92	48 / 1.35	19 / 0.31	0.2 / 0.01	0.0	59		444	24	266	31	USGS
								NAPA-SONOMA VALLEY (2-2)															
E. F. Nunn domestic	3N/3W-18G1	5-18-59	62	1,430	8.2	83 / 4.14	74 / 6.13	121 / 5.26	1.0 / 0.02	0 / 0.00	460 / 7.54	100 / 2.00	174 / 4.91	56 / 0.90	0.7 / 0.04	0.24	28	Fe 0.00 (total)	864	34	514	137	DWR
		9-31-59	-	1,370	8.5	83 / 4.14	66 / 5.47	118 / 5.13	0.9 / 0.02	16 / 0.53	388 / 6.36	108 / 2.25	160 / 4.51	69 / 1.11	0.6 / 0.03	0.17	28		841	35	481	137	DWR
D. L. Pickens	-18G2	5-18-59	-	1,410	8.0	78 / 3.89	70 / 5.72	109 / 4.74	0.9 / 0.02	0 / 0.00	390 / 6.39	84 / 1.75	148 / 4.17	125 / 2.02	0.6 / 0.03	0.19	25	Fe 0.00 (total)	833	33	481	161	DWR
		9-31-59	-	1,450	8.6	92 / 4.59	61 / 5.02	97 / 4.22	0.9 / 0.02	20 / 0.67	319 / 5.23	33 / 0.69	176 / 4.96	13[illegible] / 2.24	0.6 / 0.03	0.10	23		800	30	481	186	DWR
Irvine Estates stock	3N/4W-4P1	9-28-59	64	2,380	8.2	32 / 1.60	59 / 4.83	448 / 19.49	8.7 / 0.22	0 / 0.00	1,000 / 16.39	0.8 / 0.02	332 / 9.36	11 / 0.18	0.4 / 0.02	0.76	53		1,440	74	322	0	DWR
	-9D1	3-24-59	60	1,900	7.8	16 / 0.80	66 / 5.45	317 / 13.79	8.0 / 0.20	0 / 0.00	851 / 13.95	0 / 0.00	229 / 6.46	0.3 / 0.00	0.8 / 0.04	0.88	53	Fe 0.04 (total)	1,100	68	313	0	DWR
Napa Co. Airport domestic	4N/4W-2L1	3-25-59	57	745	6.6	67 / 4.84	18 / 1.50	50 / 2.18	0.5 / 0.01	0 / 0.00	145 / 2.38	86 / 1.79	93 / 2.62	9.3 / 0.15	0.5 / 0.03	0.29	43		440	31	242	123	DWR
		9-28-59	-	728	8.2	66 / 3.29	17 / 1.43	54 / 2.35	0.5 / 0.01	0 / 0.00	150 / 2.46	89 / 1.85	92 / 2.59	10 / 0.16	0.3 / 0.02	0.15	45		448	33	236	0	DWR
N. Rhodes domestic	-5C1	3-24-59	56	319	7.1	7.8 / 0.39	7.4 / 0.61	44 / 1.91	1.5 / 0.04	0 / 0.00	99 / 1.62	10 / 0.21	29 / 0.82	17 / 0.27	0.4 / 0.02	0.16	49	Fe 0.05 (total)	215	65	50	0	DWR
		9-29-59	-	308	7.6	6.6 / 0.33	7.2 / 0.59	45 / 1.96	1.4 / 0.04	0 / 0.00	96 / 1.57	8.7 / 0.18	28 / 0.79	19 / 0.31	0.4 / 0.02	0.09	49		212	67	46	0	DWR
Press Wireless domestic	-7A1	3-24-59	57	493	7.0	12 / 0.60	13 / 1.10	65 / 2.83	1.2 / 0.03	0 / 0.00	140 / 2.29	2.0 / 0.04	80 / 2.26	0.8 / 0.01	0.2 / 0.01	0.18	47	Fe 7.0 (total)	297	62	85	0	DWR
		9-29-59	-	480	7.6	12 / 0.60	12 / 1.02	65 / 2.83	1.1 / 0.03	0 / 0.00	140 / 2.29	2.0 / 0.04	76 / 2.14	4.0 / 0.06	0.2 / 0.01	0.09	43		284	63	31	0	DWR
G. Lawrence stock	-13E1	3-24-59	54	1,690	7.1	130 / 6.49	42 / 3.48	162 / 7.18	1.5 / 0.04	0 / 0.00	300 / 4.92	211 / 4.39	266 / 7.50	15 / 0.24	0.4 / 0.02	0.26	33	Fe 0.06 (total)	1,010	42	499	253	DWR
		9-28-59	-	1,730	8.1	126 / 6.29	47 / 3.83	176 / 7.66	1.4 / 0.04	0 / 0.00	296 / 4.85	226 / 4.70	280 / 7.90	22 / 0.32	0.4 / 0.02	0.14	8.9		1,030	43	509	226	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Per-cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
						NAPA-SONOMA VALLEY (2-2) (Cont.)																	
H. Mini domestic	MDB&M 4N/4W-25K1	3-24-59	58	1,200	7.8	37 1.85	93 7.62	89 3.87	2.6 0.07	0 0.00	515 8.44	54 1.12	93 2.62	66 1.06	0.3 0.02	0.10	31	Fe 0.0 (total)	719	29	474	52	DWR
		9-28-59	-	1,090	8.3	34 1.70	86 7.05	79 3.44	2.6 0.07	6 0.20	490 8.03	50 1.04	66 1.86	63 1.02	0.4 0.02	0.92	33		662	28	438	26	DWR
Risso Bros. domestic and stock	4N/5W-2Q2	3-24-59	54	1,050	7.5	34 1.70	20 1.62	162 7.05	3.6 0.09	0 0.00	364 5.96	33 0.69	135 3.81	2.0 0.03	0.1 0.00	0.15	28	Fe 0.16(total)	597	67	166	0	DWR
		9/29/59	-	1,370	8.2	15 0.75	16 1.31	254 11.05	4.0 0.10	0 0.00	268 4.39	46 0.96	280 7.90	3.4 0.05	0.4 0.02	0.09	68		819	84	103	0	DWR
U. S. Navy municipal	14D2	3-24-59	65	940	7.3	11 0.55	8.9 0.73	177 7.70	4.4 0.11	0 0.00	306 5.02	49 1.02	111 3.13	1.8 0.03	0.5 0.03	0.13	82	Fe 0.21(total)	596	85	64	0	DWR
		9-29-59	78	940	8.3	9.2 0.46	10 0.86	173 7.74	3.6 0.09	3 0.10	304 4.98	47 0.98	112 3.16	3.8 0.06	0.4 0.02	0.15	75		591	84	66	0	DWR
Sonoma Ranch stock	-32B1	9-28-59	·	4,940	8.0	112 5.59	163 13.39	695 30.23	18 0.46	0 0.00	731 11.98	0.0 0.00	1,320 37.22	26 0.42	0.4 0.02	0.21	54		2,750	61	950	351	DWR
	-34D1	3-24-59	53	2,620	8.6	35 1.75	97 7.96	376 16.36	14.0 0.36	20 0.67	530 8.69	0 0.00	601 16.95	4.8 0.08	0.0 0.00	0.19	55	Fe 0.40(total)	1,460	62	486	18	DWR
		9-28-59	64	2,060	8.1	49 2.44	62 5.07	307 13.35	13 0.33	0 0.00	600 9.83	0.2 0.00	375 10.58	39 0.63	0.2 0.01	1.7	64		1,210	63	376	0	DWR
M. L. George domestic	5N/4W-9Q2	3-24-59	60	478	7.6	24 1.20	14 1.18	58 2.57	1.0 0.02	0 0.00	231 3.79	4.4 0.09	35 0.99	0.2 0.00	0.5 0.03	0.09	37	Fe 2.4 (total)	288	51	119	0	DWR
		9-29-59	66	470	7.9	25 1.25	13 1.09	59 2.57	0.7 0.02	0 0.00	230 3.77	6.4 0.13	34 0.96	3.7 0.06	0.5 0.03	0.11	40		295	52	117	0	DWR
W. Gellemger domestic	-11F3	3-24-59	64	700	7.3	15 0.75	8.6 0.71	126 5.48	6.9 0.18	0 0.00	267 4.38	0 0.00	87 2.45	0.1 0.00	3.5 0.18	2.0	70	Fe 0.06(total)	450	77	73	0	DWR
		9-30-59	-	703	8.0	15 0.75	7.7 0.63	125 5.44	6.3 0.16	0 0.00	261 4.28	0.3 0.01	89 2.51	0.6 0.01	0.4 0.02	2.3	74		449	78	69	0	DWR
P. A. Gasser domestic	-14C1	3-24-59	63	266	6.7	14 0.70	14 1.12	17.9 0.78	2.0 0.05	0 0.00	115 1.88	4.8 0.10	17 0.48	0.5 0.01	3.1 0.16	0.17	59	Fe 5.90(total)	195	29	91	0	DWR
		9-30-59	64	238	7.5	12 0.60	11 0.90	17 0.74	2.2 0.06	0 0.00	100 1.64	5.1 0.11	19 0.54	0.4 0.01	0.2 0.01	0.05	66		182	32	75	0	DWR
J. B. Healy domestic	-15E1	3-14-59	60	433	7.3	21 1.05	15 1.25	48 2.09	3.0 0.08	0 0.00	201 3.29	0.0 0.00	39 1.10	0.3 0.00	0.4 0.02	0.17	49	Fe 0.68(total)	276	47	115	0	DWR
		9-29-59	62	643	7.7	36 1.80	21 1.76	60 2.61	3.5 0.09	0 0.00	193 3.16	0.6 0.01	104 2.93	4.8 0.08	0.2 0.01	0.11	43		373	42	178	20	DWR
A. L. Poe domestic	-21P2	3-24-59	53	2,320	7.9	42 2.10	14 1.16	451 19.62	9.1 0.23	0 0.00	429 7.03	138 2.87	469 13.22	1.0 0.02	0.4 0.02	0.54	37	Fe 0.05(total)	1,370	85	163	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Per-cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					NAPA-SONOMA VALLEY (2-2) (Cont.)																	
A. L. Poe domestic	5N/4W-21P2	9-29-59	-	2,310	8.4	41 / 2.04	13 / 1.10	448 / 19.49	8.2 / 0.21	10 / 0.33	427 / 7.00	132 / 2.75	442 / 12.46	1.8 / 0.03	0.2 / 0.01	0.50	38		1,340	85	157	0	DWR
Napa State Hospital irrigation	-23C2	3-24-59	80	327	7.3	15 / 0.75	9.4 / 0.77	38 / 1.65	4.1 / 0.10	0 / 0.00	164 / 2.69	0 / 0.00	19 / 0.54	0.1 / 0.00	0.6 / 0.03	2.2	108	Fe 0.35(total)	295	50	76	0	DWR
		9-30-54	80	322	7.7	15 / 0.75	9.1 / 0.75	39 / 1.70	4.1 / 0.10	0 / 0.00	164 / 2.69	0 / 0.00	19 / 0.54	0.7 / 0.01	0.4 / 0.02	0.30	99		268	52	75	0	DWR
Adams and Forbes municipal	-26B1	3-24-59	61	363	7.8	18 / 0.90	12 / 1.00	40 / 1.74	5.0 / 0.13	0 / 0.00	200 / 3.28	0 / 0.00	17 / 0.48	0 / 0.00	0.3 / 0.02	0.29	111	Fe 0.19(total)	302	46	95	0	DWR
		9-30-59	38	364	8.3	18 / 0.90	12 / 0.96	40 / 1.74	4.7 / 0.12	2 / 0.07	197 / 3.23	0 / 0.00	16 / 0.45	0.2 / 0.00	0.3 / 0.02	0.25	110		300	47	93	0	DWR
J. Firminger domestic	5N/5W-18D2	3-24-59	60	512	6.9	26 / 1.30	24 / 1.94	40 / 1.74	2.3 / 0.06	0 / 0.00	172 / 2.82	17 / 0.35	31 / 0.87	59 / 0.95	0.4 / 0.02	0.12	82	Fe 0.05(total)	367	34	162	21	DWR
		9-28-59	-	519	7.9	24 / 1.20	24 / 2.02	42 / 1.83	1.8 / 0.05	0 / 0.00	166 / 2.72	16 / 0.33	32 / 0.90	66 / 1.06	0.4 / 0.02	0.15	86		374	36	161	25	DWR
L. Migloretti domestic and irrigation	-20R1	3-24-59	62	961	8.0	18 / 0.90	11 / 0.88	210 / 9.14	2.1 / 0.05	0 / 0.00	487 / 7.98	20 / 0.42	94 / 2.65	1.6 / 0.02	0.2 / 0.01	4.1	22	Fe 0.03(total)	623	83	89	0	DWR
		9-30-59	-	1,240	8.3	28 / 1.40	16 / 1.30	238 / 10.35	2.0 / 0.05	2 / 0.07	511 / 8.38	27 / 0.56	141 / 3.98	1.7 / 0.03	0.2 / 0.01	3.6	22		734	79	135	0	DWR
R. V. Masnade irrigation	-33K1	3-24-59	69	7,560	4.9	361 / 18.01	379 / 31.14	585 / 25.41	16 / 0.41	0 / 0.00	0 / 0.00	138 / 2.87	2,600 / 73.32	2.0 / 0.03	0.0 / 0.00	0.06	7.1	Fe 25 (total)	4,110	34	2,460	2,460	DWR
		9-30-59	70	7,230	7.4	470 / 23.45	451 / 37.09	320 / 13.92	11 / 0.28	0 / 0.00	46 / 0.75	109 / 2.27	2,540 / 71.63	3.7 / 0.06	0.1 / 0.00	0.06	70		4,000	19	3,030	2,992	DWR
W. Bearden domestic and stock	5N/6W-12F1	3-24-59	58	420	7.2	16 / 0.80	15 / 1.22	50 / 2.18	2.0 / 0.05	0 / 0.00	211 / 3.46	5.3 / 0.11	23 / 0.65	0.5 / 0.01	0.5 / 0.03	1.1	52	Fe 0.50(total)	269	51	101	0	DWR
		9-28-59	-	403	8.2	13 / 0.65	11 / 0.91	61 / 2.62	1.8 / 0.05	0 / 0.00	221 / 3.62	1.6 / 0.03	20 / 0.56	0.4 / 0.01	0.3 / 0.02	0.82	51		270	62	78	0	DWR
M. Kiser irrigation	-24K1	9-28-59	64	281	7.9	21 / 1.05	13 / 1.09	15 / 0.65	1.3 / 0.03	0 / 0.00	155 / 2.54	2.8 / 0.06	9.4 / 0.26	1.1 / 0.02	0.2 / 0.01	0.05	68		208	23	107	0	DWR
Fisher domestic	-25F1	3-24-59	58	544	6.8	31 / 1.55	19 / 1.59	42 / 1.83	2.5 / 0.06	0 / 0.00	160 / 2.62	7.6 / 0.16	77 / 2.17	3.2 / 0.05	0.2 / 0.01	0.12	83	Fe 0.05(total)	345	36	157	26	DWR
		9-28-59	-	517	7.8	25 / 1.25	15 / 1.21	61 / 2.65	2.0 / 0.05	0 / 0.00	207 / 3.39	9.0 / 0.19	52 / 1.47	2.3 / 0.04	0.2 / 0.01	0.40	68		337	51	123	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm a	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					NAPA-SONOMA VALLEY (2-2) (Cont.)																	
C. L. Barber irrigation	6N/4W-6P1	3-24-59	64	411	7.0	20 / 1.00	32 / 2.62	16 / 0.70	0.7 / 0.02	0 / 0.00	179 / 2.93	42 / 0.87	11 / 0.31	16 / 0.26	0.3 / 0.02	0.07	56	Fe 0.47 (total)	282	16	181	34	DWR
		9-30-59	66	329	7.5	17 / 0.85	20 / 1.67	21 / 0.91	2.7 / 0.07	0 / 0.00	185 / 3.03	6.2 / 0.13	9.4 / 0.26	0.5 / 0.01	0.3 / 0.02	0.28	54		222	26	126	0	DWR
A. R. Johnson domestic and stock	-15Q1	3-25-59	62	272	7.8	13 / 0.65	6.7 / 0.55	26 / 1.13	4.1 / 0.10	0 / 0.00	110 / 1.80	7.4 / 0.15	8.4 / 0.24	16 / 0.26	0.1 / 0.00	0.61	53	Fe 0.08 (total)	190	46	60	0	DWR
		9-29-59	66	254	8.1	10 / 0.50	5.6 / 0.46	35 / 1.52	4.0 / 0.10	0 / 0.00	133 / 2.18	2.1 / 0.04	8.4 / 0.24	9.1 / 0.15	0.3 / 0.02	0.20	45		185	58	48	0	DWR
R. Ohlandt irrigation	-17A1	3-24-59	58	365	6.9	24 / 1.20	17 / 1.38	26 / 1.13	3.4 / 0.09	0 / 0.00	181 / 2.97	21 / 0.44	12 / 0.34	0.4 / 0.01	0.1 / 0.00	0.36	40	Fe 15 (total)	248	30	129	0	DWR
		9-29-59	60	359	8.1	23 / 1.15	17 / 1.43	26 / 1.13	2.8 / 0.07	0 / 0.00	184 / 3.02	20 / 0.42	11 / 0.31	3.2 / 0.05	0.3 / 0.02	0.19	39		232	30	129	0	DWR
N. Tarrid domestic	6N/6W-23M2	3-24-59	65	488	7.8	15 / 0.75	7.4 / 0.61	65 / 2.83	15 / 0.38	0 / 0.00	138 / 2.26	8.0 / 0.16	72 / 2.03	0.5 / 0.01	1.0 / 0.05	2.5	148	Fe 0.12 (total)	396	62	68	0	DWR
		9-28-59	-	537	8.1	15 / 0.75	9.4 / 0.77	73 / 3.18	12 / 0.31	0 / 0.00	146 / 2.39	2.5 / 0.05	87 / 2.45	1.2 / 0.02	1.3 / 0.07	1.6	87		362	63	76	0	DWR
	-26E1	3-24-59	59	451	7.9	3.9 / 0.19	0.4 / 0.03	86 / 3.74	9.4 / 0.24	0 / 0.00	148 / 2.42	3.1 / 0.06	57 / 1.61	0.2 / 0.00	1.3 / 0.07	3.2	143	Fe 0.15 (total)	380	89	11	0	DWR
		9-28-59	-	448	8.2	3.2 / 0.16	0.5 / 0.04	87 / 3.78	8.7 / 0.22	0 / 0.00	152 / 2.49	2.8 / 0.06	55 / 1.55	0.4 / 0.01	1.4 / 0.07	2.2	74		310	90	10	0	DWR
A. Fagiani domestic	7N/4W-30L1	3-24-59	54	97.8	6.8	6.3 / 0.31	3.3 / 0.27	5.2 / 0.23	1.9 / 0.05	0 / 0.00	36 / 0.59	0.3 / 0.01	6.6 / 0.19	0.8 / 0.01	0.1 / 0.00	0.10	36	Fe 0.15 (total)	79	27	29	0	DWR
		9-29-59	-	96.3	7.3	6.7 / 0.33	3.3 / 0.27	5.2 / 0.23	1.5 / 0.04	0 / 0.00	39 / 0.64	3.6 / 0.07	4.9 / 0.14	0.6 / 0.01	0.0 / 0.00	0.01	35		80	26	30	0	DWR
Wheeler domestic and stock	7N/5W-5A1	3-24-59	61	564	6.6	49 / 2.44	31 / 2.59	18 / 0.78	7.6 / 0.19	0 / 0.00	262 / 4.29	35 / 0.73	27 / 0.76	6.9 / 0.11	0.2 / 0.01	0.44	26	Fe 0.04 (total)	330	13	252	37	DWR
		9-29-59	-	512	8.0	18 / 0.90	46 / 3.76	17 / 0.74	3.9 / 0.10	0 / 0.00	235 / 3.85	51 / 1.06	16 / 0.45	4.6 / 0.07	0.2 / 0.01	0.52	27		300	13	233	40	DWR
G. Van Vlack domestic	-22G2	3-24-59	58	755	7.1	29 / 1.45	48 / 3.96	52 / 2.26	0.5 / 0.01	0 / 0.00	230 / 3.77	31 / 0.64	99 / 2.79	20 / 0.32	0.2 / 0.01	5.8	32	Fe 0.09 (total)	430	29	271	82	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
						Mineral constituents in parts per million / equivalents per million																	
								NAPA-SONOMA VALLEY (2-2) (Cont.)															
	MD[B&M]																						
J. Alcouffe domestic and stock	9N/6W-31Q1	3-24-59	58	122	6.1	9.8 / 0.49	2.8 / 0.23	7.0 / 0.30	0.6 / 0.02	0 / 0.00	32 / 0.52	511 / 0.11	5.9 / 0.17	12 / 0.19	0.0 / 0.00	0.11	39	Fe 0.22 (total)	98	29	36	10	DWR
		9-29-59	68	138	6.7	11 / 0.55	3.5 / 0.29	9.0 / 0.39	0.5 / 0.01	0 / 0.00	43 / 0.70	11 / 0.23	6.2 / 0.17	6.5 / 0.10	0.1 / 0.00	0.04	40		109	31	42	7	DWR
R. H. Archerd domestic	9N/7W-25N1	3-24-59	76	719	7.2	13 / 0.65	5.2 / 0.43	115 / 5.00	8.7 / 0.22	0 / 0.00	154 / 2.52	0.2 / 0.00	130 / 3.67	7.6 / 0.12	2.0 / 0.10	7.8	64	Fe 0.17 (total)	430	79	54	0	DWR
		9-29-59	-	920	7.5	13 / 0.65	5.7 / 0.47	169 / 7.35	8.7 / 0.22	0 / 0.00	200 / 3.28	0.0 / 0.00	178 / 5.02	1.5 / 0.02	5.7 / 0.30	14	64		558	84	56	0	DWR
								SUISUN-FAIRFIELD VALLEY (2-3)															
Taylor domestic	3N/1E-4B	5-14-59	68	1,070	8.5	12 / 0.62	0.2 / 0.02	246 / 10.70	2.5 / 0.06	15 / 0.50	490 / 8.03	40 / 0.83	70 / 1.97	4.7 / 0.08	0.5 / 0.03	3.0	30	Fe 0.04 (total)	665	94	31	0	DWR
		9-31-59	67	1,070	8.7	9.2 / 0.46	5.1 / 0.42	237 / 10.31	2.5 / 0.06	18 / 0.60	482 / 7.90	42 / 0.87	68 / 1.92	4.2 / 0.07	0.6 / 0.03	1.5	30		656	92	44	0	DWR
McDougal Livestock Company domestic	-21D	5-14-59	55	1,800	8.5	11 / 0.55	0.8 / 0.07	420 / 18.27	1.9 / 0.05	41 / 1.37	646 / 10.59	102 / 2.12	177 / 4.99	1.3 / 0.02	0.5 / 0.03	7.7	17	Fe 2.5 (total)	1,100	96	31	0	DWR
		9-31-59	-	1,780	8.8	6.7 / 0.33	4.0 / 0.33	425 / 18.49	1.6 / 0.04	32 / 1.07	658 / 10.78	104 / 2.16	175 / 4.94	0.7 / 0.01	0.5 / 0.03	7.9	28		1,108	96	33	0	DWR
	-22F2	5-14-59	68	1,590	8.4	32 / 1.60	16 / 1.34	307 / 13.35	2.4 / 0.06	18 / 0.60	494 / 8.10	74 / 1.54	210 / 5.92	18 / 0.29	0.7 / 0.04	4.6	25	Fe 0.18	951	82	147	0	DWR
		9-31-59	-	1,640	8.6	27 / 1.35	25 / 2.07	308 / 13.40	2.0 / 0.05	20 / 0.67	478 / 7.83	71 / 1.48	240 / 6.77	28 / 0.45	0.8 / 0.04	4.4	25		986	79	171	0	DWR
	-22F3	5-14-59	68	1,550	8.6	24 / 1.20	19 / 1.56	302 / 13.14	1.8 / 0.05	24 / 0.80	478 / 7.83	72 / 1.50	196 / 5.53	17 / 0.27	0.7 / 0.04	4.5	24	Fe 0.82 (total)	922	82	138	0	DWR
		9-31-59	-	1,630	8.6	27 / 1.35	25 / 2.05	308 / 13.40	2.0 / 0.05	20 / 0.67	479 / 7.85	70 / 1.46	246 / 6.94	19 / 0.31	0.8 / 0.04	4.6	25		982	80	170	0	DWR
G. Stewart	4N/1E-8F	5-14-59	-	1,010	7.9	47 / 2.34	23 / 1.86	126 / 5.48	3.1 / 0.08	0 / 0.00	238 / 3.90	48 / 1.00	164 / 4.62	6.1 / 0.10	0.7 / 0.04	0.91	64	Fe 0.00 (total)	600	56	210	15	DWR
		9-31-59	-	1,010	8.3	47 / 2.34	25 / 2.04	127 / 5.52	3.7 / 0.09	3 / 0.10	239 / 3.92	61 / 1.27	162 / 4.57	7.4 / 0.12	0.3 / 0.04	0.91	69		624	55	219	18	DWR
Dept. Fish and Game domestic	4N/1W-33A1	9-31-59	-	3,750	8.5	68 / 3.39	62 / 5.06	684 / 29.75	4.1 / 0.10	26 / 0.87	555 / 9.10	138 / 2.87	890 / 25.10	2.2 / 0.04	0.6 / 0.03	15	25		2,138	78	423	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
						Mineral constituents in parts per million / equivalents per million																	
						SUISUN-FAIRFIELD VALLEY (2-3) (Cont.)																	
	MDB&M																						
Southern Pacific Co. industrial	4N/2W-4G1	5-14-59	-	1,390	8.5	21 / 1.05	27 / 2.19	257 / 11.18	1.3 / 0.03	18 / 0.60	464 / 7.60	86 / 1.79	155 / 4.37	0.8 / 0.01	0.8 / 0.04	1.9	11	Fe 0.00 (total)	808	77	162	0	DWR
	-5Q	5-14-59	-	431	7.1	22 / 1.10	11 / 0.92	49 / 2.13	3.0 / 0.08	0 / 0.00	170 / 2.79	1.6 / 0.03	51 / 1.44	0.5 / 0.01	0.3 / 0.02	0.51	64	Fe 0.41 (total)	287	50	101	0	DWR
		9-31-59	-	442	7.9	23 / 1.15	12 / 0.97	50 / 2.18	2.7 / 0.07	0 / 0.00	172 / 2.82	4.9 / 0.10	52 / 1.47	0.2 / 0.00	0.3 / 0.02	0.38	81		311	50	106	0	DWR
F. F. Smith stock	-18M1	5-14-59	62	1,130	7.8	100 / 4.99	39 / 3.20	87 / 3.78	0.5 / 0.01	0 / 0.00	392 / 6.42	112 / 2.33	108 / 3.04	7.8 / 0.12	0.5 / 0.03	0.70	27	Fe 0.00 (total)	676	32	410	89	DWR
		9-31-59	60	1,100	7.9	97 / 4.84	26 / 2.13	75 / 3.26	0.4 / 0.01	0 / 0.00	283 / 4.64	124 / 2.58	103 / 2.90	7.4 / 0.12	0.4 / 0.02	0.61	28		601	32	349	117	DWR
D. R. Mangels irrigation	4N/3W-13G1	5-14-59	72	1,070	8.3	95 / 4.74	37 / 3.03	94 / 4.09	1.0 / 0.02	7 / 0.23	408 / 6.69	130 / 2.71	72 / 2.03	4.9 / 0.08	0.5 / 0.03	0.83	25	Fe 0.02 (total)	668	34	389	42	DWR
		9-31-59	72	1,070	8.4	94 / 4.69	34 / 2.84	99 / 4.31	1.7 / 0.04	19 / 0.63	388 / 6.36	128 / 2.66	74 / 2.09	1.8 / 0.03	0.5 / 0.03	0.88	26		670	36	377	0	DWR
H. J. Beck domestic	5N/2W-27J4	5-18-59	68	852	8.0	77 / 3.84	34 / 2.27	71 / 3.09	0.4 / 0.01	0 / 0.00	448 / 7.34	36 / 0.75	38 / 1.07	24 / 0.39	0.6 / 0.03	1.3	27	Fe 0.48 (total)	529	32	331	0	DWR
		10-1-59	65	819	8.6	68 / 3.39	34 / 2.80	59 / 2.57	0.3 / 0.01	20 / 0.67	391 / 6.41	31 / 0.64	34 / 0.96	2.0 / 0.03	0.6 / 0.03	1.1	26		468	29	310	0	DWR
W. & L. Pierce irrigation	-29L3	5-14-59	62	483	8.1	40 / 2.00	21 / 1.74	30 / 1.30	1.0 / 0.02	0 / 0.00	232 / 3.30	27 / 0.56	23 / 0.65	2.6 / 0.04	0.3 / 0.02	0.42	40	Fe 0.01 (total)	300	26	187	0	DWR
B. Sheldon irrigation	-33A3	5-14-59	68	1,380	7.9	86 / 4.29	84 / 6.90	101 / 4.39	2.4 / 0.06	0 / 0.00	682 / 11.18	64 / 1.33	105 / 2.96	2.6 / 0.04	0.6 / 0.03	1.4	37	Fe 0.00 (total)	819	28	560	1	DWR
City of Fairfield municipal	-34B	5-14-59	66	983	8.0	39 / 1.95	42 / 3.44	125 / 5.44	1.7 / 0.04	0 / 0.00	468 / 7.67	40 / 0.83	79 / 2.17	0.5 / 0.01	0.6 / 0.03	3.3	31	Fe 0.00 (total)	590	50	270	0	DWR
		9-31-59	67	921	8.4	43 / 2.14	22 / 1.84	121 / 5.26	1.6 / 0.04	5 / 0.17	366 / 6.00	41 / 0.85	74 / 2.09	0.2 / 0.00	0.6 / 0.03	2.5	31		522	57	190	0	DWR
L. Sing domestic and irrigation	-34P3	5-14-59	68	1,660	7.7	83 / 4.14	75 / 6.17	188 / 8.18	1.7 / 0.04	0 / 0.00	718 / 11.77	105 / 2.19	160 / 4.51	4.4 / 0.07	0.8 / 0.04	2.2	27	Fe 0.00 (total)	1,000	44	516	0	DWR
		9-31-59	65	1,890	7.8	97 / 4.84	86 / 7.11	212 / 9.22	1.4 / 0.04	0 / 0.00	736 / 12.06	121 / 2.52	233 / 6.57	6.4 / 0.10	0.7 / 0.04	2.1	26		1,150	43	598	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							PITTSBURG PLAIN (2-4)															
Continental Can Co. domestic	2N/1E-7R1	7-8-59	70	2,760	7.8	50 2.50	153 12.58	312 13.57	12 0.31	0 0.00	355 5.82	471 9.81	489 13.79	1.2 0.02	0.6 0.03	0.60	52		1,720	47	755	464	DWR
Dow Chemical Co. irrigation	-22C1	11-25-59	64	1,360	8.4	84 4.19	45 3.72	172 7.48	7.0 0.18	7 0.23	312 5.11	378 7.87	81 2.28	0.3 0.00	0.4 0.02	0.54	39		967	48	396	130	DWR
Fibreboard Products, Inc. domestic	2N/2E-20A1	7-8-59	68	1,560	7.9	34 1.70	80 6.61	168 7.31	6.0 0.15	0 0.00	333 5.46	134 2.79	243 6.85	23 0.37	0.5 0.03	0.56	54		907	46	416	143	DWR
								CLAYTON VALLEY (2-5)															
G. Curletto domestic and irrigation	1N/1W-4A1	7-7-59	66	1,620	8.0	113 5.64	65 5.37	134 5.83	0.7 0.02	0 0.00	540 8.85	121 2.52	155 4.37	43 0.69	0.4 0.02	1.9	30		930	34	551	108	DWR
		11-25-59	65	616	8.4	50 2.50	37 3.05	30 1.30	0.7 0.02	5 0.17	269 4.41	62 1.29	27 0.76	8.3 0.13	0.2 0.01	0.43	27		381	19	278	48	DWR
F. Baker domestic	2N/1W-30J1	11-25-59	59	935	8.1	80 3.99	53 4.36	53 2.30	0.8 0.02	0.0 0.00	414 6.78	102 2.12	49 1.38	15 0.24	0.2 0.01	0.48	32		589	22	418	79	DWR
J. Disbrow domestic	-30K1	11-25-59	-	1,490	8.1	132 6.59	79 6.48	109 4.74	1.0 0.02	0.0 0.00	541 8.87	301 6.27	91 2.57	0.7 0.01	0.3 0.02	1.4	26		1,007	26	654	210	DWR
F. Dorville domestic	-31D1	7-7-59	68	1,060	8.4	63 3.14	36 2.93	109 4.74	0.5 0.01	8 0.27	304 4.98	86 1.79	118 3.33	36 0.58	0.4 0.02	0.57	31		637	44	304	42	DWR
C. Thoyode domestic	-32Q1	7-7-59	69	1,160	8.0	63 3.14	38 3.11	131 5.70	0.6 0.02	0 0.00	396 6.49	50 1.04	133 3.75	32 0.52	0.6 0.03	0.77	26		670	48	313	0	DWR
R. B. Ogilvie domestic	2N/2W-13P1	7-8-59	66	884	7.9	33 1.65	32 2.63	103 4.48	1.5 0.04	0 0.00	244 4.00	54 1.12	115 3.24	15 0.24	0.5 0.03	0.30	34		[illegible]	51	214	14	DWR
Bertinoia domestic	-26B1	11-25-59	65	966	8.0	49 2.44	34 2.79	110 4.78	1.6 0.04	0 0.00	370 6.06	16 0.33	129 3.64	1.5 0.02	0.2 0.01	1.8	2.7		552	48	262	0	DWR
J. D. Nailen domestic	-36J1	7-7-59	70	3,390	7.9	182 9.08	186 15.30	274 11.92	0.9 0.02	0 0.00	604 9.90	374 7.79	585 16.50	128 2.06	0.5 0.03	1.6	35		2,060	33	1,220	725	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

32505-E-G 6-61 500 SPO

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							YGNACIO VALLEY (2-6)															
A. Sebastiani domestic	1N/1W-7K1	7-8-59	66	2,300	7.9	101 / 5.04	90 / 7.41	299 / 13.01	1.6 / 0.04	0 / 0.00	444 / 7.28	553 / 11.51	232 / 6.54	20 / 0.32	0.5 / 0.03	2.0	24		1,540	51	623	259	DWR
[illegible]. J. Ganley domestic and irrigation	-19B1	11-25-59	-	1,100	8.5	77 / 3.84	49 / 4.07	103 / 4.48	1.6 / 0.04	26 / 0.87	449 / 7.36	55 / 1.14	103 / 2.90	6.9 / 0.11	0.5 / 0.03	2.3	27		671	36	396	0	DWR
N. F. Davis domestic	-29G1	7-8-59	66	1,950	7.6	31 / 1.55	118 / 9.68	226 / 9.83	2.0 / 0.05	0 / 0.00	516 / 8.46	252 / 5.25	243 / 6.85	28 / 0.45	1.1 / 0.06	0.90	21		1,130	46	562	139	DWR
C. Hook irrigation	1N/2W-11N1	7-8-59	74	1,220	8.5	66 / 3.29	40 / 3.28	134 / 5.83	3.0 / 0.08	14 / 0.47	429 / 7.03	28 / 0.58	150 / 4.23	1.8 / 0.03	0.4 / 0.02	1.2	39		688	47	329	0	DWR
J. E. Wells domestic and irrigation	-13P1	7-8-59	65	952	8.0	78 / 3.89	54 / 4.44	36 / 1.57	0.5 / 0.01	0 / 0.00	295 / 4.84	75 / 1.56	92 / 2.59	52 / 0.84	0.2 / 0.01	0.41	31		564	16	417	175	DWR
D. R. Johnson irrigation	-35D1	11-25-59	-	1,820	8.2	194 / 9.68	84 / 6.90	120 / 5.22	3.4 / 0.09	0 / 0.00	527 / 8.64	416 / 8.66	161 / 4.54	3.0 / 0.05	0.3 / 0.02	1.4	18		1,260	24	830	398	DWR
F. H. Dunham domestic	2N/2W-27R1	7-8-59	67	1,680	8.0	35 / 1.75	35 / 2.85	286 / 12.44	4.0 / 0.10	0 / 0.00	520 / 8.52	1.6 / 0.03	298 / 8.40	0.86 / 0.01	0.3 / 0.02	6.0	37		960	72	230	0	DWR
domestic	-36E1	11-25-59	-	3,520	7.5	245 / 12.22	156 / 12.79	301 / 13.09	1.0 / 0.02	0 / 0.00	635 / 10.41	439 / 9.14	600 / 16.92	100 / 1.61	0.5 / 0.03	1.7	35		2,191	34	1,250	731	DWR
domestic	-36E2	11-25-59	-	1,790	8.3	136 / 6.79	97 / 7.95	130 / 5.66	3.1 / 0.08	12 / 0.40	573 / 9.39	95 / 1.98	282 / 7.95	23 / 0.37	0.1 / 0.00	6.5	25		1,092	28	738	249	DWR
								SANTA CLARA VALLEY, EAST BAY AREA (2-9)															
Manasse Block Tanning Co. industrial	1S/4W-4A1	6-29-59	67	2,140	8.0	145 / 7.24	97 / 7.96	172 / 7.48	3.0 / 0.08	0 / 0.00	377 / 6.18	214 / 4.46	428 / 12.07	18 / 0.29	0.1 / 0.01	0.2	29	Al 0.26 d Cu 0.01 Cr +6 0.04	1,290	32	760	451	USGS
Red Star Yeast Co. industrial	-34F[illegible]	6-29-59	65	1,010	8.2	36 / 1.80	29 / 2.39	144 / 6.26	4.0 / 0.10	0 / 0.00	278 / 4.56	31 / 0.65	182 / 5.13	6.4 / 0.10	0.1 / 0.01	0.2	40	Al 0.70 As 0.01 d Cu 0.01	610	59	209	0	USGS
General Metals industrial	2S/3W-21J	6-30-59	64	5,140	7.6	520 / 25.95	190 / 15.65	297 / 12.92	0.0 / 0.00	0 / 0.00	234 / 3.84	63 / 1.31	1,810 / 51.04	12 / 0.19	0.1 / 0.01	0.3	33	Fe 0.01 (dis.) d Al 0.10	3,040	24	2,080	1,890	USGS
City of Alameda irrigation	-30A	8-19-59	-	988	8.0	70 / 3.47	24 / 1.95	101 / 4.39	3.2 / 0.08	0 / 0.00	276 / 4.52	15 / 0.31	178 / 5.02	0.2 / 0.00	0.1 / 0.01	0.2	38	Al 0.04 d	566	44	272	46	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
						Mineral constituents in parts per million / equivalents per million																	
	DDR&M					SANTA CLARA VALLEY, EAST BAY AREA (2-9) (Cont.)																	
Soares irrigation	2S/3W-30D2	6-29-59	65	3,190	7.6	283 / 14.12	106 / 8.68	192 / 8.35	9.4 / 0.24	0 / 0.00	176 / 2.88	87 / 1.81	948 / 26.73	2.4 / 0.04	0.0 / 0.00	0.3	37	Al 2.3[d] Cu 0.01	1,740	26	1,140	996	USGS
Hobener Packing Co. domestic and irrigation	-33H3	6-30-59	66	615	7.9	34 / 1.70	19 / 1.58	72 / 3.13	0.8 / 0.02	0 / 0.00	321 / 5.26	25 / 0.52	25 / 0.71	2.7 / 0.04	0.1 / 0.01	0.4	31	Al 0.07[d] As 0.07	368	49	164	0	USGS
U. S. Navy	2S/4W-3E1	6-29-59	66	761	8.0	35 / 1.75	19 / 1.53	103 / 4.48	1.8 / 0.05	0 / 0.00	292 / 4.79	25 / 0.52	86 / 2.43	0.5 / 0.01	0.2 / 0.01	0.4	39	Al 0.05[d]	454	57	164	0	USGS
Todd Ship Yard industrial	-3F1	6-29-59	65	708	7.5	45 / 2.25	13 / 1.03	87 / 3.78	1.6 / 0.04	0 / 0.00	263 / 4.31	19 / 0.40	86 / 2.43	2.3 / 0.04	0.1 / 0.01	0.3	36	Al 0.09[d] Zn 0.01	420	53	164	0	USGS
Ratto	-25A1	6-29-59	61	819	8.5	47 / 2.35	11 / 0.93	128 / 5.57	4.0 / 0.10	9 / 0.30	292 / 4.79	46 / 0.96	100 / 2.82	0.2 / 0.00	0.1 / 0.01	0.4	39	Al 0.47 Zn 0.04[d] Cu 0.01 As 0.01	529	62	164	0	USGS
Bayside Nursery irrigation	3S/2W-7J1	7-1-59	64	1,100	7.6	106 / 5.29	37 / 3.01	83 / 3.61	3.6 / 0.09	0 / 0.00	390 / 6.39	93 / 1.94	102 / 2.88	32 / 0.52	0.1 / 0.01	0.4	37	Al 0.81[d] Cu 0.03	686	30	415	95	USGS
Kruger and Sons industrial	-19R4	7-1-59	62	1,090	7.9	114 / 5.69	32 / 2.67	75 / 3.26	4.4 / 0.11	0 / 0.00	392 / 6.42	65 / 1.35	115 / 3.24	32 / 0.52	0.1 / 0.01	0.3	31	Al 0.07[d] As 0.04	662	28	418	97	USGS
Mt. Eden Nursery domestic and irrigation	-32D	7-1-59	72	747	8.2	27 / 1.35	8.9 / 0.73	133 / 5.79	4.0 / 0.10	0 / 0.00	252 / 4.13	54 / 1.12	87 / 2.45	0.8 / 0.01	0.1 / 0.01	0.4	28	Al 0.23[d] Cu 0.04	467	73	104	0	USGS
Mt. Eden Nursery irrigation	-32E1	8-13-59	-	971	8.1	46 / 2.30	14 / 1.14	146 / 6.35	3.2 / 0.08	0 / 0.00	294 / 4.82	49 / 1.02	145 / 4.09	0.0 / 0.00	0.1 / 0.01	0.1	26	Fe 0.02 (dis.)[d] Al 0.06	574	64	172	0	USGS
Avinsino Mortenson irrigation	3S/3W-1G3	6-30-59	75	994	8.0	37 / 1.85	20 / 1.61	165 / 7.18	3.2 / 0.08	0 / 0.00	340 / 5.57	61 / 1.27	128 / 3.61	0.8 / 0.01	0.1 / 0.01	0.7	32	Al 0.47[d] Cu 0.03	613	67	173	0	USGS
A. N. Breed	-3J2	6-30-59	65	588	8.2	55 / 2.74	20 / 1.63	50 / 2.18	2.7 / 0.07	0 / 0.00	284 / 4.65	31 / 0.65	35 / 0.99	8.0 / 0.13	0.1 / 0.01	0.2	35	Al 0.47[d] Cu 0.01	377	33	218	0	USGS
Trojan Powder industrial	-11Q1	6-30-59	68	1,380	7.8	68 / 3.39	22 / 1.84	188 / 8.18	5.2 / 0.13	0 / 0.00	208 / 3.41	65 / 1.35	322 / 9.08	1.7 / 0.03	0.1 / 0.01	0.5	26	Al 0.93[d] Cu 0.03	800	60	262	91	USGS
Greenwood Corporation domestic and irrigation	-24J1	8-12-59	-	706	8.0	48 / 2.40	19 / 1.58	87 / 3.78	2.9 / 0.07	0 / 0.00	316 / 5.18	46 / 0.96	53 / 1.49	0.4 / 0.01	0.1 / 0.01	0.4	31	Cu 0.02[d]	444	48	199	0	USGS
Kaiser Industry industrial	4S/1W-21M1	9-4-59	66	652	8.1	60 / 2.99	28 / 2.33	40 / 1.74	1.8 / 0.05	0 / 0.00	268 / 4.39	65 / 1.35	45 / 1.27	1.0 / 0.02	0.1 / 0.01	0.6	16	Al 0.11[d]	390	24	266	46	USGS
Alameda Co. Water Dist. municipal	-21P1	9-4-59	64	721	8.0	64 / 3.19	30 / 2.49	48 / 2.09	1.8 / 0.05	0 / 0.00	296 / 4.85	43 / 0.90	70 / 1.97	4.5 / 0.07	0.1 / 0.01	0.7	18	Al 0.08[d] Zn 0.1	420	27	284	41	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					SANTA CLARA VALLEY, EAST BAY AREA (2-9) (Cont.)																	
M. DeSalles domestic and irrigation	4S/1W-21R2	5- -59	-	980	7.9	74 / 3.69	28 / 2.32	111 / 4.83	2.0 / 0.05	0 / 0.00	485 / 7.95	71 / 1.48	44 / 1.24	11 / 0.18	0.2 / 0.01	2.0	18	Fe 0.01 (total)	599	44	301	0	DWR
		11-5-59	57	939	8.1	70 / 3.49	28 / 2.30	103 / 4.48	2.0 / 0.05	0 / 0.00	461 / 7.56	72 / 1.50	42 / 1.18	11 / 0.18	0.2 / 0.01	1.7	19		576	43	290	0	DWR
A. J.Rezendes irrigation	-22M2	5- -59	-	1,560	7.7	79 / 3.94	26 / 2.15	265 / 11.53	6.3 / 0.16	0 / 0.00	853 / 13.98	70 / 1.46	76 / 2.14	8.6 / 0.14	0.3 / 0.02	4.4	26	Fe 1.1 (total)	981	65	305	0	DWR
		11-5-59	65	1,190	8.3	28 / 1.40	20 / 1.62	228 / 9.92	5.6 / 0.14	4 / 0.13	630 / 10.32	55 / 1.14	55 / 1.55	3.8 / 0.06	0.3 / 0.02	3.5	26		739	76	151	0	DWR
J. & M Braga domestic and irrigation	-28D4	5- -59	-	671	7.9	62 / 3.09	27 / 2.26	41 / 1.78	1.8 / 0.05	0 / 0.00	278 / 4.56	65 / 1.35	39 / 1.10	4.1 / 0.07	0.2 / 0.01	0.66	17	Fe 0.15 (total)	395	25	268	40	DWR
M. DeSalles domestic and irrigation	-28E3	5- -59	-	2,270	7.8	223 / 11.13	101 / 8.29	72 / 3.13	3.0 / 0.08	0 / 0.00	346 / 5.67	64 / 1.33	546 / 15.40	11 / 0.18	0.2 / 0.01	0.64	17	Fe 0.14 (total)	1,210	14	972	688	DWR
		11-5-59	60	3,900	7.7	371 / 18.51	202 / 16.65	108 / 4.70	4.0 / 0.10	0 / 0.00	291 / 4.77	68 / 1.42	1,130 / 33.28	14 / 0.22	0.2 / 0.01	0.64	18		2,110	12	1,760	1,521	DWR
F. Lewis domestic and irrigation	-29M2	5- -59	-	942	8.3	94 / 4.69	38 / 3.10	41 / 1.78	1.8 / 0.05	2 / 0.07	258 / 4.23	61 / 1.27	138 / 3.89	4.2 / 0.07	0.2 / 0.01	0.50	18	Fe 0.03 (total)	526	18	390	175	DWR
		11-3-59	60	914	8.2	100 / 4.99	30 / 2.48	39 / 1.70	2.1 / 0.05	0 / 0.00	264 / 4.33	58 / 1.21	133 / 3.75	4.2 / 0.07	0.2 / 0.01	0.50	17		513	18	374	158	DWR
Rodrigues irrigation	-29M6	5- -59	-	4,620	7.5	467 / 23.30	220 / 18.06	125 / 5.44	4.5 / 0.12	0 / 0.00	347 / 5.69	112 / 2.33	1,350 / 38.07	13 / 0.21	0.2 / 0.01	0.46	18	Fe 0.52(total)	2,480	12	2,070	1,790	DWR
		11-3-59	62	4,860	7.5	546 / 27.24	172 / 14.12	168 / 7.31	4.6 / 0.12	0 / 0.00	370 / 6.06	163 / 3.39	1,430 / 40.33	11 / 0.18	0.2 / 0.01	0.42	19		2,700	15	2,070	1,770	DWR
J. Silva	-30C2	5- -59	-	2,440	7.7	272 / 13.57	100 / 8.21	64 / 2.78	3.7 / 0.09	0 / 0.00	372 / 6.10	107 / 2.23	561 / 15.82	16 / 0.26	0.2 / 0.01	0.27	20	Fe 1.9 (total)	1,330	11	1,090	785	DWR
		11-5-59	60	2,460	7.9	271 / 13.52	108 / 8.86	71 / 3.09	3.8 / 0.10	0 / 0.00	336 / 5.51	116 / 2.42	606 / 17.09	11 / 0.18	0.10 / 0.00	0.46	17		1,370	12	1,120	844	DWR
Cloverdale Creamery industrial	-30G1	5- -59	-	690	8.0	74 / 3.69	22 / 1.78	35 / 1.52	1.8 / 0.05	0 / 0.00	246 / 4.03	53 / 1.10	64 / 1.80	5.1 / 0.80	0.2 / C.01	0.32	21	Fe 0.01 (total)	397	22	274	72	DWR
		11-5-59	62	567	8.2	49 / 2.44	23 / 1.88	33 / 1.44	1.7 / 0.04	0 / 0.00	196 / 3.21	48 / 1.00	50 / 1.41	4.8 / 0.08	0.2 / 0.01	0.39	21		327	25	216	55	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr)

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					SANTA CLARA VALLEY, EAST BAY AREA (2-9) (Cont.)																	
J. F. Booth Cannery industrial	4S/1W-30K2	5- -59	-	5,100	7.3	494 24.65	213 17.51	210 9.14	5.0 0.13	0 0.00	334 5.47	148 3.08	1,510 42.58	13 0.21	0.2 0.01	0.35	21	Fe 4.6 (total)	2,780	18	2,110	1,840	DWR
W. E. Hutchins irrigation	-31A2	5- -59	-	638	8.1	61 3.04	9.7 0.80	62 2.70	1.4 0.04	0 0.00	258 4.23	46 0.96	49 1.38	3.4 0.05	0.2 0.01	0.40	21	Fe 0.05 (total)	381	41	192	0	DWR
		11-10-59	58	760	8.2	72 3.59	20 1.66	60 2.61	1.6 0.04	0 0.00	267 4.38	50 1.04	83 2.34	2.6 0.04	0.2 0.01	0.42	22		443	33	263	44	DWR
Alameda Co.Water Dist. municipal	-31B3	5- -59	-	628	7.7	58 2.89	12 1.03	62 2.70	1.4 0.04	0 0.00	258 4.23	46 0.96	48 1.35	3.5 0.06	0.1 0.00	0.43	21	Fe 0.01 (total)	379	40	196	0	DWR
		11-5-59	67	650	8.2	57 2.84	15 1.26	60 2.61	1.5 0.04	0 0.00	254 4.16	46 0.96	56 1.58	2.6 0.04	0.2 0.01	0.40	22		386	39	205	0	DWR
F. Maciel irrigation and stock	-32A2	5- -59	-	2,350	8.1	191 9.53	106 8.73	154 6.70	3.5 0.09	0 0.00	623 10.21	88 1.83	434 12.24	23 0.37	0.1 0.00	0.09	19	Fe 0.23 (total)	1,320	27	914	403	DWR
		11-3-59	62	2,270	7.8	162 8.08	109 9.00	150 6.52	3.5 0.09	0 0.00	415 6.80	84 1.75	512 14.44	17 0.27	0.2 0.01	0.96	19		1,260	28	855	515	DWR
J. Nolls irrigation	-32C1	5- -59	-	932	8.0	99 4.94	35 2.85	42 1.83	2.1 0.05	0 0.00	290 4.75	56 1.16	131 3.69	7.6 0.12	0.2 0.01	0.54	19	Fe 0.23 (total)	535	19	390	152	DWR
G. Mewhinney irrigation	-34P2	5- -59	-	933	8.5	102 5.09	28 2.32	68 2.96	3.0 0.08	14 0.47	384 6.29	85 1.77	66 1.86	2.1 0.03	0.4 0.02	0.21	21	Fe 0.06 (total)	579	28	371	32	DWR
		11-3-59	56	898	8.5	99 4.94	19 1.53	77 3.35	2.9 0.07	17 0.57	394 6.46	69 1.44	57 1.61	0.2 0.00	0.4 0.02	0.29	18		553	34	324	0	DWR
Alameda Co.Water Dist. municipal	-35P3	5- -59	-	741	8.0	46 2.30	16 1.36	100 4.35	1.7 0.04	0 0.00	385 6.31	20 0.42	47 1.32	1.0 0.02	0.1 0.01	0.44	25	Fe 0.01 (total)	446	54	183	0	DWR
		11-3-59	67	718	8.4	44 2.20	15 1.22	100 4.35	1.7 0.04	7 0.23	364 5.96	23 0.48	40 1.13	0.2 0.00	0.2 0.01	0.36	24		434	56	171	0	DWR
Andrada domestic and irrigation	4S/2W-3R1	5- -59	-	554	8.3	36 1.80	10 0.84	72 3.13	1.8 0.05	6 0.20	252 4.13	37 0.77	26 0.73	1.5 0.02	0.3 0.02	0.41	21	Fe 0.06 (total)	336	54	132	0	DWR
		11-4-59	67	574	8.2	40 2.00	11 0.88	74 3.22	1.8 0.05	2 0.07	284 4.65	41 0.85	20 0.56	0.8 0.01	0.3 0.02	0.39	25		356	52	144	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
						SANTA CLARA VALLEY, EAST BAY AREA, (2-9) (Cont.)																	
	MDB&M																						
City of Hayward municipal	4S/2W-5A14	7-1-59	70	649	8.2	30 / 1.50	9.7 / 0.80	100 / 4.35	3.6 / 0.09	0 / 0.00	268 / 4.39	41 / 0.85	56 / 1.58	0.7 / 0.01	0.1 / 0.01	0.4	28	Al 0.35 [d] Cu 0.03	402	65	115	0	USGS
Holly Sugar industrial	-10C1	11-4-59	70	696	8.2	42 / 2.10	15 / 1.22	85 / 3.70	2.3 / 0.06	0 / 0.00	249 / 4.08	44 / 0.92	72 / 2.03	1.4 / 0.02	0.2 / 0.01	0.42	22		406	52	166	0	DWR
Holly Sugar industrial	-10F2	5- -59	-	593	8.3	52 / 2.59	13 / 1.07	59 / 2.57	2.4 / 0.06	4 / 0.13	280 / 4.59	37 / 0.77	29 / 0.82	2.6 / 0.04	0.3 / 0.02	0.40	21	Fe 0.22(total)	359	41	183	0	DWR
Scutto Bros. domestic and irrigation	-10Q2	5- -59	-	2,210	8.0	214 / 10.68	116 / 9.50	85 / 3.70	2.8 / 0.07	0 / 0.00	460 / 7.54	344 / 7.16	311 / 8.77	42 / 0.68	0.1 / 0.00	0.56	21	Fe 0.03(total)	1,360	15	1,010	633	DWR
		11-4-59	61	2,220	8.2	245 / 12.22	104 / 8.56	94 / 4.09	3.1 / 0.08	0 / 0.00	487 / 7.98	313 / 6.52	357 / 10.07	29 / 0.47	0.1 / 0.00	0.54	22		1,410	16	1,040	641	DWR
S. May irrigation	-13C2	5- -59	-	1,400	7.9	137 / 6.84	63 / 5.15	65 / 2.83	2.0 / 0.05	0 / 0.00	415 / 6.80	103 / 2.14	180 / 5.08	45 / 0.72	0.1 / 0.00	0.46	20	Fe 0.10(total)	820	19	600	260	DWR
		11-4-59	61	1,370	8.1	111 / 5.54	64 / 5.29	78 / 3.39	2.1 / 0.05	0 / 0.00	294 / 4.82	127 / 2.64	217 / 6.12	64 / 1.03	0.2 / 0.01	0.44	21		824	23	542	301	DWR
T. E. Harvey irrigation	-14E1	5- -59	-	2,440	7.9	237 / 11.83	104 / 8.55	134 / 5.83	3.1 / 0.08	0 / 0.00	478 / 7.83	295 / 6.14	417 / 11.76	21 / 0.34	0.5 / 0.03	0.79	17	Fe 0.01(total)	1,460	22	1,020	628	DWR
A. Caetor domestic and irrigation	-14J1	5- -59	-	676	7.8	70 / 3.49	23 / 1.90	35 / 1.52	2.0 / 0.05	0 / 0.00	277 / 4.54	53 / 1.10	41 / 1.16	12 / 0.19	0.1 / 0.00	0.37	22	Fe 0.00(total)	394	22	270	43	DWR
		11-4-59	61	643	8.1	66 / 3.29	22 / 1.80	36 / 1.57	2.1 / 0.05	0 / 0.00	250 / 4.10	55 / 1.14	43 / 1.21	13 / 0.21	0.1 / 0.00	0.40	23		384	23	255	50	DWR
I. P. Harvey domestic and irrigation	-15C1	5- -59	-	600	7.8	61 / 3.04	13 / 1.04	45 / 1.96	2.0 / 0.05	0 / 0.00	264 / 4.32	43 / 0.90	29 / 0.82	12 / 0.19	0.1 / 0.00	0.36	26	Fe 0.02(total)	361	32	204	0	DWR
		11-10-59	66	615	8.1	63 / 3.14	19 / 1.58	42 / 1.83	2.0 / 0.05	0 / 0.00	280 / 4.59	43 / 0.90	29 / 0.82	10 / 0.16	0.2 / 0.01	0.33	25		372	28	236	6	DWR
King	-15L4	5- -59	-	627	8.2	68 / 3.39	19 / 1.55	33 / 1.44	2.6 / 0.07	0 / 0.00	279 / 4.57	48 / 1.00	29 / 0.82	10 / 0.16	0.3 / 0.02	0.54	22	Fe 0.03(total)	369	22	247	18	DWR
		11-4-59	63	628	8.1	70 / 3.49	19 / 1.58	33 / 1.44	2.7 / 0.07	0 / 0.00	275 / 4.51	49 / 1.02	33 / 0.93	9.6 / 0.15	0.2 / 0.01	0.34	22		374	22	254	28	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as [illegible]

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					SANTA CLARA VALLEY, EAST BAY AREA (2-9) (Cont.)																	
Patterson Ranch irrigation	4S/2W-23F2	5- -59	-	611	8.2	69 / 3.44	18 / 1.44	32 / 1.39	2.2 / 0.06	0 / 0.00	268 / 4.39	50 / 1.04	30 / 0.85	8.9 / 0.14	0.3 / 0.02	0.56	23	Fe 0.12(total)	366	22	244	24	DWR
		11-4-59	62	561	8.0	60 / 2.99	16 / 1.31	33 / 1.44	1.7 / 0.04	0 / 0.00	232 / 3.80	50 / 1.04	31 / 0.87	9.1 / 0.15	0.2 / 0.01	0.35	22		337	25	215	25	DWR
L. Croce	-24D4	5- -59	-	550	7.9	58 / 2.89	17 / 1.43	32 / 1.39	2.0 / 0.05	0 / 0.00	244 / 4.00	44 / 0.92	24 / 0.68	9.7 / 0.16	0.2 / 0.01	0.59	19	Fe 0.39(total)	327	24	216	16	DWR
		11-5-59	63	542	8.0	53 / 2.64	19 / 1.58	33 / 1.44	1.8 / 0.05	0 / 0.00	229 / 3.75	46 / 0.96	26 / 0.73	11 / 0.18	0.2 / 0.01	0.36	21		323	25	211	23	DWR
J. A. Macado irrigation	-24J1	5- -59	-	581	8.0	62 / 3.09	17 / 1.37	36 / 1.57	2.3 / 0.06	0 / 0.00	252 / 4.13	50 / 1.04	32 / 0.90	1.0 / 0.02	0.1 / 0.00	0.40	15	Fe 3.0(total)	340	26	223	16	DWR
		11-4-59	60	633	8.3	68 / 3.39	21 / 1.76	31 / 1.35	1.9 / 0.05	2 / 0.07	251 / 4.11	60 / 1.25	3.2 / 0.90	6.2 / 0.10	0.2 / 0.01	0.49	20		366	20	258	49	DWR
M. Kitani domestic and irrigation	-24L6	5- -59	-	562	7.7	63 / 3.14	16 / 1.34	31 / 1.35	1.8 / 0.05	0 / 0.00	254 / 4.16	41 / 0.85	26 / 0.73	5.4 / 0.09	0.1 / 0.00	0.36	19	Fe 0.22(total)	329	23	224	16	DWR
		11-4-59	62	576	8.1	60 / 2.99	18 / 1.47	32 / 1.39	2.0 / 0.05	0 / 0.00	237 / 3.88	49 / 1.02	32 / 0.90	10 / 0.16	0.3 / 0.02	0.36	21		341	24	223	29	DWR
H. H. Patterson irrigation	-26A1	5- -59	-	598	8.0	52 / 2.59	12 / 1.01	54 / 2.35	1.7 / 0.04	0 / 0.00	228 / 3.74	47 / 0.98	42 / 1.18	5.1 / 0.08	0.3 / 0.02	0.61	22	Fe 6.2(total)	355	39	180	0	DWR
		11-4-59	63	644	8.2	56 / 2.79	17 / 1.41	51 / 2.22	1.8 / 0.05	0 / 0.00	209 / 3.42	50 / 1.04	67 / 1.89	5.9 / 0.10	0.1 / 0.00	0.38	22		374	34	210	39	DWR
J. L. Abbau irrigation and stock	-26J1	5- -59	-	626	8.3	40 / 2.00	7.0 / 0.58	90 / 3.92	2.3 / 0.06	5 / 0.17	244 / 4.00	39 / 0.81	54 / 1.52	1.8 / 0.03	0.2 / 0.01	0.38	20	Fe 0.40(total)	380	60	129	0	DWR
		11-4-59	65	776	8.4	48 / 2.40	13 / 1.08	98 / 4.26	2.3 / 0.06	7 / 0.23	236 / 3.87	43 / 0.90	98 / 2.76	1.4 / 0.02	0.1 / 0.00	0.35	23		450	55	174	0	DWR
H. H. Patterson domestic and irrigation	-27L1	5- -59	-	611	8.1	22 / 1.10	5.1 / 0.42	113 / 4.92	1.2 / 0.03	0 / 0.00	305 / 5.00	27 / 0.56	32 / 0.90	1.4 / 0.02	0.2 / 0.01	0.45	24	Fe 0.04(total)	376	76	76	0	DWR
		11-4-59	65	572	8.3	23 / 1.15	5.7 / 0.47	100 / 4.35	1.2 / 0.03	3 / 0.10	269 / 4.41	38 / 0.79	24 / 0.68	0.6 / 0.01	0.3 / 0.02	0.39	21		349	72	81	0	DWR

a Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					SANTA CLARA VALLEY, EAST BAY AREA (2-9) (Cont.)																	
E. Milani industrial	4S/2W-35L2	5- -59	-	598	8.1	23 / 1.15	3.0 / 0.25	113 / 4.92	1.0 / 0.02	0 / 0.00	282 / 4.62	33 / 0.69	32 / 0.90	1.2 / 0.02	0.3 / 0.02	0.41	23	Fe 1.4 (total)	369	78	70	0	DWR
		11-4-59	67	592	8.4	20 / 1.00	3.9 / 0.32	113 / 4.92	1.1 / 0.03	6 / 0.20	265 / 4.34	34 / 0.71	31 / 0.87	0.4 / 0.01	0.2 / 0.01	0.39	22		362	78	66	0	DWR
I. G. Reira	-36F1	5- -59	-	2,630	8.0	258 / 12.87	94 / 7.71	120 / 5.22	7.3 / 0.19	0 / 0.00	289 / 4.74	48 / 1.00	714 / 20.13	6.2 / 0.10	0.1 / 0.00	0.44	24	Fe 1.0 (total)	1,420	20	1,030	793	DWR
L. Mallani domestic and irrigation	5S/1W-6G1	5- -59	-	1,640	8.0	152 / 7.58	42 / 3.45	110 / 4.78	3.8 / 0.10	0 / 0.00	260 / 4.26	30 / 0.62	384 / 10.83	4.6 / 0.07	0.2 / 0.01	0.33	20	Fe 0.51 (total)	875	30	552	339	DWR
		11-9-59	66	690	8.5	46 / 2.30	14 / 1.18	82 / 3.57	2.0 / 0.05	7 / 0.23	267 / 4.38	26 / 0.54	69 / 1.94	1.4 / 0.02	0.2 / 0.01	0.28	20		399	50	174	0	DWR
A. F. Brosius domestic and irrigation	-9K1	5- -59	-	744	8.4	60 / 2.99	19 / 1.55	84 / 3.65	2.4 / 0.06	14 / 0.47	361 / 5.92	35 / 0.73	41 / 1.16	1.6 / 0.02	0.4 / 0.02	0.51	23	Fe 1.1 (total)	459	44	227	0	DWR
		11-3-59	59	789	8.3	72 / 3.59	18 / 1.44	79 / 3.44	3.1 / 0.08	4 / 0.13	383 / 6.28	44 / 0.92	44 / 1.24	2.8 / 0.04	0.2 / 0.01	0.36	25		480	40	252	0	DWR
W. B. Brinker irrigation	-9M1	5- -59	-	951	8.4	70 / 3.49	26 / 2.10	86 / 3.74	4.0 / 0.10	4 / 0.13	266 / 4.36	31 / 0.64	149 / 4.20	2.7 / 0.04	0.2 / 0.01	0.24	22	Fe 2.5 (total)	526	40	280	55	DWR
		11-3-59	67	1,040	8.2	84 / 4.19	24 / 2.00	90 / 3.92	4.2 / 0.11	0 / 0.00	268 / 4.39	35 / 0.73	180 / 5.08	2.8 / 0.04	0.1 / 0.00	0.25	25		577	38	310	90	DWR
P. Encisco domestic and stock	5S/2W-1B1	5- -59	-	569	8.4	17 / 0.85	3.8 / 0.31	111 / 4.83	1.0 / 0.02	5 / 0.17	283 / 4.64	32 / 0.67	17 / 0.48	0.2 / 0.00	0.2 / 0.01	0.32	27	Fe 0.04 (total)	353	80	58	0	DWR
		11-3-59	69	561	8.5	16 / 0.80	4.4 / 0.36	108 / 4.70	1.0 / 0.02	7 / 0.23	280 / 4.59	31 / 0.64	17 / 0.48	0.0 / 0.00	0.2 / 0.01	0.40	25		347	30	58	0	DWR
Westraco Chemical industrial	-1N1	5- -59	-	1,390	8.4	108 / 5.39	29 / 2.38	128 / 5.57	4.0 / 0.10	5 / 0.17	259 / 4.24	38 / 0.79	291 / 8.21	3.6 / 0.60	0.1 / 0.00	0.34	27	Fe 0.07	761	41	369	168	DWR
		11-4-59	75	429	8.2	4.5 / 0.22	1.4 / 0.12	94 / 4.09	0.8 / 0.02	0 / 0.00	212 / 3.47	25 / 0.52	14 / 0.39	0.6 / 0.01	0.2 / 0.01	0.11	27		272	92	17	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm a	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					SANTA CLARA VALLEY, SOUTH BAY AREA (2-9)																	
City of Palo Alto municipal	5S/3W-35G1	7-28-59	70	1,110	8.2	64 / 3.19	24 / 1.96	120 / 5.22	8.0 / 0.20	0 / 0.00	255 / 4.18	40 / 0.83	210 / 5.92	0.7 / 0.01	0.2 / 0.01	0.2	26	Al 0.14 Pb 0.02[d] Mn 0.06 Zn 0.06 Cu 0.20	619	49	258	49	USGS
J. C. Rose domestic	6S/1E-4M1	7-29-59	66	1,060	8.1	96 / 4.79	43 / 3.53	81 / 3.52	4.6 / 0.12	0 / 0.00	494 / 8.10	51 / 1.06	80 / 2.26	35 / 0.56	0.2 / 0.01	0.2	32	Al 0.16 Zn 0.25[d] Cu 0.02 Fe 0.02 (dis.)	666	29	416	11	USGS
Winsor Bros.	-7C	7-20-59	68	562	8.3	32 / 1.60	15 / 1.27	79 / 3.44	2.3 / 0.06	4 / 0.13	275 / 4.51	46 / 0.96	26 / 0.73	0.1 / 0.00	0.2 / 0.01	0.1	19	Al 0.11[d] Cu 0.01	359	54	144	0	USGS
Y. Cortese irrigation	-21G1	8-25-59	74	837	7.9	55 / 2.74	24 / 1.98	103 / 4.48	3.2 / 0.08	0 / 0.00	393 / 6.44	71 / 1.48	44 / 1.24	3.9 / 0.06	0.2 / 0.01	0.3	28	Zn 0.02[d]	527	48	236	0	USGS
M. Machado Estate domestic and irrigation	-30M1	7-20-59	74	578	8.2	64 / 3.19	22 / 1.84	33 / 1.44	2.9 / 0.07	0 / 0.00	285 / 4.67	35 / 0.73	29 / 0.82	4.7 / 0.08	0.1 / 0.01	0.1	29	Al 0.12[d]	360	22	251	17	USGS
J. R. Watrous	6S/1W-11B1	7-20-59	68	564	8.1	57 / 2.84	19 / 1.56	46 / 2.00	4.8 / 0.12	0 / 0.00	290 / 4.75	43 / 0.90	22 / 0.62	0.4 / 0.01	0.0 / 0.00	0.1	24	Fe 0.01 (dis.)[d] Al 0.10 As 0.01	359	31	220	0	USGS
Collier Carbon and Chemical Company industrial	-16A1	7-21-59	74	728	8.0	42 / 2.10	16 / 1.28	104 / 4.52	7.0 / 0.18	0 / 0.00	236 / 3.37	79 / 1.64	80 / 2.26	0.6 / 0.01	0.0 / 0.00	0.0	23	Al 0.04[d] Cu 0.01	468	56	169	0	USGS
S. Ikegama	-19Q	7-21-59	70	495	8.0	48 / 2.40	18 / 1.44	39 / 1.70	3.3 / 0.08	0 / 0.00	264 / 4.33	39 / 0.81	22 / 0.62	1.1 / 0.02	0.0 / 0.00	0.2	27	Fe 0.01 (dis.)[d] Al 0.01 Cu 0.01	328	30	192	0	USGS
Wilcox Bros. irrigation	-26D1	7-20-59	76	431	8.3	30 / 1.50	9.5 / 0.78	54 / 2.35	2.5 / 0.06	3 / 0.10	198 / 3.25	29 / 0.60	22 / 0.62	0.1 / 0.00	0.2 / 0.01	0.0	26	Al 0.08 Zn 0.11[d] Pb 0.03	273	50	114	0	USGS
S. Weston	-28R	7-21-59	70	422	8.0	39 / 1.95	15 / 1.27	26 / 1.13	3.6 / 0.09	0 / 0.00	190 / 3.11	49 / 1.02	15 / 0.42	3.9 / 0.06	0.0 / 0.00	0.2	29	Fe 0.01 (dis.)[d] Al 0.05 As 0.02 Cu 0.02	275	25	161	5	USGS
G. H. Fukumoto	-29C1	7-21-59	70	414	8.0	30 / 1.50	18 / 1.46	37 / 1.61	3.6 / 0.09	0 / 0.00	208 / 3.41	27 / 0.56	18 / 0.51	1.3 / 0.02	0.1 / 0.01	0.2	29	Al 0.04[d] Cu 0.01	266	35	148	0	USGS
R. Rezentes domestic	6S/2W-9H1	7-22-59	76	563	8.4	39 / 1.95	19 / 1.57	65 / 2.83	4.7 / 0.12	8 / 0.27	270 / 4.43	33 / 0.69	34 / 0.96	0.4 / 0.01	0.0 / 0.00	0.2	28	Fe 0.02 (dis.)[d] Al 0.09 Mn 0.03 Zn 0.02 Cu 0.01 As 0.03	364	44	176	0	USGS
J. Joaquin	-9K1	7-22-59	70	511	8.3	44 / 2.20	14 / 1.12	54 / 2.35	0.4 / 0.10	4 / 0.13	260 / 4.26	27 / 0.56	26 / 0.73	0.8 / 0.01	0.0 / 0.00	0.2	29	Fe 0.02 (dis.)[d] Al 0.02 Zn 0.01 As 0.01	331	41	166	0	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

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ANALYSES OF GROUND WATER

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Mineral constituents in parts per million / equivalents per million

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm a	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
	MDB&M					SANTA CLARA VALLEY, SOUTH BAY AREA (2-9) (Cont.)																	
City of Palo Alto municipal	6S/2W-17D	7-23-59	76	679	8.3	47 / 2.35	20 / 1.63	78 / 3.39	2.4 / 0.06	5 / 0.17	289 / 4.74	45 / 0.94	52 / 1.47	1.9 / 0.03	0.1 / 0.01	0.1	35	Al 0.53[d] Mn 0.15	428	46	199	0	USGS
Calif. Water Service Co. municipal	-20	7-23-59	72	646	8.0	40 / 2.00	43 / 3.57	39 / 1.70	2.2 / 0.06	0 / 0.00	354 / 5.80	15 / 0.31	30 / 0.85	11 / 0.18	0.0 / 0.00	0.0	31	Al 0.05[d] Zn 0.01	385	23	279	0	USGS
F. Ormonde	-21A	7-22-59	68	744	7.9	86 / 4.29	32 / 2.67	33 / 1.44	4.3 / 0.11	0 / 0.00	334 / 5.47	81 / 1.69	40 / 1.13	13 / 0.21	0.0 / 0.00	0.2	29	Fe 0.02 (dis.)[d] Al 0.12 Cu 0.01 As 0.01	484	17	348	74	USGS
Hom Bros.	-24M3	8-24-59	78	480	8.1	38 / 1.90	17 / 1.38	46 / 2.00	1.2 / 0.03	0 / 0.00	252 / 4.13	29 / 0.60	20 / 0.56	0.0 / 0.00	0.1 / 0.01	0.4	34	Fe 0.01 (dis.)[d] Al 0.05	310	38	164	0	USGS
J. H. Mantelli irrigation	-28R1	8-18-59	70	493	8.0	56 / 2.79	21 / 1.73	21 / 0.91	1.0 / 0.03	0 / 0.00	260 / 4.26	21 / 0.44	22 / 0.62	8.5 / 0.14	0.1 / 0.01	0.3	29	Fe 0.01 (dis.)[d] Al 0.09 Zn 0.52	308	17	226	13	USGS
O. F. Gluhaich irrigation	-36H2	7-21-59	68	553	8.0	48 / 2.40	22 / 1.80	32 / 1.39	4.2 / 0.11	0 / 0.00	184 / 3.02	51 / 1.06	50 / 1.41	16 / 0.26	0.0 / 0.00	0.3	25	Al 0.05[d] Cu 0.01	340	24	210	59	USGS
City of Palo Alto municipal	6S/3W-1B1	7-25-59	75	1,120	7.3	62 / 3.09	17 / 1.38	146 / 6.35	7.6 / 0.19	0 / 0.00	270 / 4.43	45 / 0.94	200 / 5.64	23 / 0.04	0.1 / 0.01	0.2	29	Al 0.11 Cu 0.04[d] Mn 0.03	642	53	224	3	USGS
	-2D1	7-28-59	66	714	8.0	64 / 3.19	16 / 1.28	67 / 2.19	3.0 / 0.08	0 / 0.00	285 / 4.67	55 / 1.15	63 / 1.78	3.3 / 0.05	0.2 / 0.01	0.1	23	Al 0.05[d] Cu 0.10	435	39	224	0	USGS
	-12C1	7-29-59	74	637	8.1	40 / 2.00	6.8 / 0.56	82 / 3.57	3.1 / 0.08	0 / 0.00	263 / 4.31	42 / 0.87	44 / 1.24	0.9 / 0.01	0.1 / 0.01	0.0	29	Al 0.04[d]	378	57	128	0	USGS
L. E. Inman irrigation	7S/1W-3G1	7-21-59	68	615	8.1	75 / 3.74	24 / 1.94	26 / 1.13	4.0 / 0.10	0 / 0.00	248 / 4.06	89 / 1.85	23 / 0.65	11 / 0.18	0.0 / 0.00	0.2	29	Fe 0.02 (dis.)[d] Al 0.05	403	16	284	81	USGS
W. S. Bennet	-5L	8-18-59	68	748	8.0	80 / 3.99	38 / 3.09	36 / 1.57	2.1 / 0.05	0 / 0.00	368 / 6.03	39 / 0.81	58 / 1.64	16 / 0.26	0.1 / 0.01	0.2	29	Al 0.06[d]	479	18	354	52	USGS
						LIVERMORE VALLEY (2-10)																	
F. Gustanich domestic	2S/2E-35G2	7-3-59	-	2,670	8.3	59 / 2.94	51 / 4.18	470 / 20.45	14 / 0.36	8 / 0.26	372 / 6.10	73 / 1.52	685 / 19.32	18 / 0.29	1.0 / 0.05	6.4	25	Al 0.20 Pb 0.01[d] Cu 0.01 Zn 0.05	1,590	73	356	38	USGS
T. F. Bishop Co. irrigation	2S/1W-22A1	6-24-59	63	957	8.0	79 / 3.94	12 / 1.02	103 / 4.48	4.6 / 0.12	0 / 0.00	302 / 4.95	13 / 0.27	162 / 4.57	1.6 / 0.03	0.1 / 0.01	0.2	34	Al 0.09[d] Cu 0.02 Pb 0.05	559	47	248	0	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S.Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (PCC)

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1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					LIVERMORE VALLEY (2-10) (Cont.)																	
Alameda Co.	3S/1E-3Q1	7-1-59	68	1,240	8.3	54 2.69	46 3.81	166 0.14	3.2 7.22	8 0.08	444 0.27	71 7.28	158 1.48	19 4.46	0.3 0.31	2.3 0.02	28	Al 1.3 d As 0.01	775	52	325	0	USGS
U. S. Air Force domestic and irrigation	-8H3	6-24-59	64	1,090	8.0	65 3.24	63 5.16	79 3.44	3.2 0.08	0 0.00	368 6.03	75 1.56	137 3.86	13 0.21	0.1 0.01	0.8	37	Al 0.16 Cu 0.01 d Cr +6 0.01 Zn 0.04	654	29	420	118	USGS
E. D. Hagemann domestic & irrigation	-11H1	7-1-59	70	679	8.2	48 2.40	52 4.28	17 0.74	2.9 0.07	0 0.00	312 5.11	38 0.79	50 1.41	18 0.29	0.0 0.00	0.3	28	Al 0.16 Zn 0.14 d Cu 0.03	408	10	334	78	USGS
Calif. Rock and Gravel domestic	-13P2	6-24-59	63	551	7.8	51 2.54	31 2.58	16 0.70	2.8 0.07	0 0.00	242 3.97	45 0.94	35 0.99	0.9 0.01	0.2 0.01	0.3	20	Al 0.08 Zn 0.02 d Cu 0.03	321	12	256	58	USGS
H. J. Kaiser Inds. domestic	-15L1	6-24-59	63	544	7.7	53 2.64	28 2.32	15 0.65	2.8 0.07	0 0.00	232 3.80	37 0.77	36 1.02	9.7 0.16	0.1 0.01	0.2	24	Al 0.13 Zn 0.03 d Cu 0.03	320	11	248	58	USGS
Pleasanton Township Water District irrigation	-16P1	8-12-59	-	484	8.1	20 1.00	7.7 0.63	78 3.39	1.4 0.04	0 0.00	204 3.34	21 0.44	38 1.07	3.7 0.06	0.0 0.00	0.3	28	Cu 0.02 d	298	67	81	0	USGS
M. Kruse irrigation	-17H2	8-12-59	-	1,020	7.8	94 4.69	54 4.47	36 1.57	3.1 0.08	0 0.00	422 6.92	57 1.19	83 2.34	11 0.18	0.0 0.00	0.3	26	Cr^{+6} 0.01 d Cu 0.01	572	15	458	112	USGS
San Francisco Water Dept. irrigation and municipal	-19A5	7-8-59	-	641	8.0	53 2.64	36 2.96	35 1.52	2.5 0.06	0 0.00	278 4.56	55 1.15	34 0.96	14 0.23	0.1 0.01	0.3	20	Al 0.08 d Cu 0.01	387	21	280	52	USGS
Calif. Water Service Co.	3S/2E-4H1	7-1-59	74	675	7.9	38 1.90	39 3.22	50 2.18	2.9 0.07	0 0.00	270 4.43	29 0.60	61 1.72	25 0.40	0.1 0.01	0.5	32	Al 0.13 Cu 0.05 d Cr +6 0.01 Zn 0.02	411	30	256	35	USGS
H. L. Hagemann domestic and irrigation	-7K1	7-1-59	-	727	8.4	47 2.35	59 4.82	29 1.26	3.1 0.08	15 0.50	322 5.28	43 0.90	44 1.24	15 0.24	0.1 0.01	0.1	20	Al 0.21 Zn 0.13 d	433	15	358	69	USGS
Calif. Water Service Co. municipal	-8H1	6-24-59	30	640	7.8	34 1.70	35 2.90	51 2.22	2.7 0.07	0 0.00	246 4.03	27 0.56	57 1.61	26 0.42	0.1 0.01	0.5	33	Al 0.13 Cu 0.10 d Cr +6 0.01 Zn 0.04	387	32	230	28	USGS
J. H. Barber domestic and irrigation	-10E1	7-1-59	71	1,400	7.8	83 4.14	88 7.21	76 3.31	3.5 0.09	0 0.00	428 7.01	39 0.81	206 5.81	52 0.84	0.2 0.01	0.1	33	Al 0.27 d	792	22	567	216	USGS
Amling DeVore Nursery domestic and irrigation	3S/2E-10H1	7-1-59	-	764	8.4	40 2.00	36 2.99	63 2.74	4.4 0.11	24 0.80	233 3.82	51 1.06	76 2.14	15 0.24	0.2 0.01	0.8	31	Al 0.13 d Cr +6 0.01	456	35	250	19	USGS
B. Wagonor irrigation	-17N1	7-15-59	82	878	8.3	21 1.05	9.1 0.75	168 7.31	3.4 0.09	7.9 0.26	336 5.51	33 0.69	101 2.85	0.2 0.00	0.3 0.02	2.7	23	Al 0.08 Zn 0.03 d Cu 0.03	535	79	90	0	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					LIVERMORE VALLEY (2-10) (Cont.)																	
B. G. Wood irrigation	3S/2E-29D1	6-24-59	69	756	8.3	51 / 2.54	26 / 2.14	80 / 3.48	2.9 / 0.07	5.9 / 0.20	272 / 4.46	43 / 0.90	79 / 2.23	13 / 0.21	0.1 / 0.01	0.4	26	Al 0.08 Zn 0.05[d] Cu 0.02 As 0.01	461	42	234	1	USGS
J. Amaral	3S/3E-19C1	7-1-59	71	1,570	8.6	34 / 1.70	44 / 3.58	271 / 11.79	10 / 0.26	41 / 1.37	458 / 7.51	77 / 1.60	225 / 6.35	1.3 / 0.02	0.3 / 0.02	7.0	31	Al 0.15 Zn 0.01[d] Cu 0.05	968	68	264	0	USGS
E. D. Nevin domestic	3S/1W-1G1	6-24-59	61	1,050	7.6	116 / 5.79	32 / 2.65	80 / 3.48	1.9 / 0.05	0 / 0.00	452 / 7.41	101 / 2.10	85 / 2.40	0.6 / 0.01	0.5 / 0.03	0.3	25	Al 0.18 Pb 0.01[d] Cu 0.01	665	29	422	51	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
						Mineral constituents in parts per million / equivalents per million																	
						CENTRAL COASTAL REGION (NO. 3)																	
	MDB&M					PAJARO VALLEY (3-2)																	
Rinaldi Bros. irrigation	12S/1E-10J1	5-27-59	63	3,120	7.7	190/9.48	123/10.14	234/10.18	5.0/0.13	0/0.00	214/3.51	132/2.75	837/23.60	2.9/0.05	0.3/0.02	0.30	44	Fe 0.29 (total)	1,670	34	982	807	DWR
		10-13-59	67	3,640	3.0	192/9.58	148/12.14	296/12.88	8.6/0.22	0/0.00	182/2.98	157/3.27	1,040/29.33	7.8/0.13	0.0/0.00	0.0	51		1,990	37	1,086	937	USGS
State of California domestic	-11N	5-27-59	66	471	7.9	33/1.65	22/1.81	20/0.87	1.6/0.04	0/0.00	179/2.93	27/0.56	22/0.62	11/0.18	0.2/0.01	0.32	44	Fe 0.44 (total)	269	20	173	26	DWR
		10-13-59	67	423	8.2	25/1.25	27/2.19	21/0.91	1.7/0.04	0/0.00	174/2.85	30/0.62	28/0.79	0.2/0.00	0.0/0.00	0.0	45		264	21	172	29	USGS
J. Roach, Jr. irrigation	-14J1	5-27-59	65	417	7.5	26/1.30	18/1.46	25/1.09	1.4/0.04	0/0.00	126/2.06	17/0.35	33/0.93	30/0.48	0.1/0.00	0.27	39	Fe 0.11 (total)	252	28	138	35	DWR
		10-13-59	90	428	8.0	21/1.05	22/1.77	30/1.30	1.8/0.05	0/0.00	114/1.87	15/0.31	61/1.72	7.3/0.12	0.1/0.01	0.0	42		256	31	141	48	USGS
E. L. Patten domestic	-23R1	5-27-59	62	904	7.9	42/2.10	33/2.72	88/3.83	13/0.33	0/0.00	326/5.34	16/0.33	119/3.36	0.9/0.01	0.1/0.00	0.29	29	Fe 12 (total)	501	43	241	0	DWR
		10-13-59	63	553	8.4	25/1.25	30/2.47	51/2.22	6.0/0.15	5/0.17	256/4.20	45/0.94	30/0.85	0.0/0.00	0.0/0.00	0.0	30		348	36	186	0	USGS
H. Traffon irrigation	-24G1	5-27-59	61	574	7.9	46/2.30	28/2.32	29/1.26	3.4/0.09	0/0.00	279/4.57	34/0.71	20/0.56	1.1/0.02	0.2/0.01	0.28	38	Fe 0.26 (total)	337	21	231	2	DWR
		10-13-59	-	535	8.2	39/1.95	35/2.85	31/1.35	4.1/0.10	0/0.00	302/4.95	21/0.44	25/0.70	2.6/0.04	0.0/0.00	0.0	31		338	22	240	0	USGS
Casson irrigation	-24J2	5-27-59	64	1,310	8.0	107/5.34	72/5.93	44/1.91	3.3/0.08	0/0.00	294/4.82	64/1.33	254/7.16	0.7/0.01	0.2/0.01	0.13	34	Fe 0.92 (total)	723	14	564	323	DWR
H. Tottino irrigation	-25B2	5-27-59	67	499	8.1	29/1.45	19/1.59	47/2.04	2.7/0.07	0/0.00	212/3.47	50/1.04	22/0.62	0.4/0.01	0.1/0.00	0.08	29	Fe 0.06 (total)	303	40	152	0	DWR
H. Tottino irrigation	-25C1	5-27-59	66	837	8.0	36/1.80	20/1.68	96/4.18	10/0.26	0/0.00	188/3.08	50/1.04	132/3.72	0.4/0.01	0.2/0.01	0.23	32	Fe 0.81 (total)	469	53	174	20	DWR
A. L. Waugaman irrigation	12S/2E-7K1	5-27-59	63	529	7.9	58/2.89	21/1.71	22/0.96	2.3/0.06	0/0.00	259/4.24	34/0.71	21/0.59	3.4/0.05	0.2/0.01	0.21	38	Fe 0.02 (total)	327	17	230	18	DWR
Barba irrigation	-10J2	5-27-59	62	1,120	7.7	121/6.04	50/4.15	62/2.70	2.0/0.05	0/0.00	576/9.44	86/1.79	64/1.80	0.5/0.01	0.4/0.02	0.34	34	Fe 0.17 (total)	703	21	510	38	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					PAJARO VALLEY (3-2) (Cont.)																	
E. Struve irrigation	12S/2E-18D1	10-13-59	67	426	8.2	32 / 1.60	24 / 1.98	22 / 0.96	3.0 / 0.08	0 / 0.00	222 / 3.64	28 / 0.58	17 / 0.48	0.0 / 0.00	0.2 / 0.01	0.0	47		282	21	179	0	USGS
M. Williamson domestic and irrigation	-19M1	5-27-59	64	639	7.8	71 / 3.54	23 / 1.93	32 / 1.39	2.6 / 0.07	0 / 0.00	314 / 5.15	55 / 1.14	22 / 0.62	0.2 / 0.00	0.2 / 0.01	0.15	38	Fe 0.03 (total)	398	20	274	17	DWR
J. Fenaglio domestic and irrigation	-30N1	7-21-59	66	571	7.9	30 / 1.50	29 / 2.36	37 / 1.61	2.5 / 0.06	0 / 0.00	155 / 2.54	40 / 0.83	53 / 1.49	45 / 0.72	0.2 / 0.01	0.12	37		350	29	193	66	DWR
Zunind-Tornavaca irrigation	-31K1	7-21-59	66	971	8.0	66 / 3.29	47 / 3.90	56 / 2.44	3.9 / 0.10	0 / 0.00	232 / 3.80	62 / 1.29	158 / 4.46	10 / 0.16	0.2 / 0.01	0.30	39		556	25	360	170	DWR
S. H. Cowell domestic and irrigation	-32C1	7-21-59	66	580	8.0	38 / 1.90	31 / 2.58	34 / 1.48	2.9 / 0.07	0 / 0.00	223 / 3.65	52 / 1.08	44 / 1.24	3.3 / 0.05	0.2 / 0.01	0.20	36		352	24	224	41	DWR
L. Banovac irrigation	12S/3E-7B1	5-27-59	61	1,240	7.7	116 / 5.79	57 / 4.70	81 / 3.52	2.1 / 0.05	0 / 0.00	468 / 7.67	201 / 4.18	81 / 2.28	0.9 / 0.01	0.4 / 0.02	0.52	30	Fe 2.3 (total)	800	25	525	141	DWR
		10-15-59	61	1,220	8.1	89 / 4.44	71 / 5.82	88 / 3.83	3.3 / 0.08	0 / 0.00	439 / 7.20	213 / 4.43	92 / 2.59	0.0 / 0.00	0.2 / 0.01	0.4	30		803	27	513	153	USGS
Tanimura Bros. irrigation	-9Q1	5-27-59	61	1,500	8.0	126 / 6.29	61 / 5.00	121 / 5.26	2.6 / 0.07	0 / 0.00	524 / 8.59	199 / 4.14	146 / 4.12	0.6 / 0.01	0.3 / 0.02	1.6	27	Fe 4.6 (total)	943	32	565	132	DWR
		10-15-59	63	1,520	8.1	114 / 5.69	76 / 6.27	123 / 5.35	3.6 / 0.09	0 / 0.00	546 / 8.95	192 / 4.00	145 / 4.09	0.2 / 0.00	0.1 / 0.01	1.3	30		954	31	598	150	USGS
Hurley domestic and irrigation	13S/1E-1A1	7-21-59	-	1,410	8.0	88 / 4.39	62 / 5.06	103 / 4.48	4.4 / 0.11	0 / 0.00	217 / 3.56	97 / 2.02	280 / 7.90	21 / 0.34	0.2 / 0.01	0.26	38		801	32	473	295	DWR
G. H. Hurley irrigation	13S/2E-6F3	7-21-59	68	1,310	8.1	73 / 3.64	53 / 4.35	109 / 4.74	4.3 / 0.11	0 / 0.00	224 / 3.67	124 / 2.58	224 / 6.32	28 / 0.45	0.0 / 0.00	0.30	44		770	37	400	216	DWR
Giberson irrigation	-6R1	7-21-59	68	711	8.1	50 / 2.50	32 / 2.65	49 / 2.13	4.0 / 0.10	0 / 0.00	252 / 4.13	51 / 1.06	74 / 2.09	4.4 / 0.07	0.2 / 0.01	0.25	41		430	29	258	51	DWR
Monterey Bay Salt Co. domestic and industrial	-7R1	6-17-59	72	848	8.1	16 / 0.80	6.1 / 0.50	162 / 7.05	3.6 / 0.09	0 / 0.00	249 / 4.08	92 / 1.92	82 / 2.31	1.6 / 0.02	0.3 / 0.02	0.23	45		531	84	65	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							GILROY-HOLLISTER BASIN (3-3)															
P. L. Hudson irrigation	10S/3E-1E2	8-27-59	61	426	8.3	38 / 1.90	25 / 2.06	20 / 0.87	0.9 / 0.02	3 / 0.10	217 / 3.56	26 / 0.54	14 / 0.39	19 / 0.31	0.5 / 0.03	0.2	27		281	18	198	15	USGS
J. Orlando domestic and irrigation	-23J	8-26-59	-	426	8.2	33 / 1.65	26 / 2.15	18 / 0.78	0.6 / 0.02	0 / 0.00	179 / 2.93	21 / 0.44	23 / 0.65	30 / 0.48	0.4 / 0.02	0.0	39		279	17	190	43	USGS
E. H. Henderson domestic and irrigation	-26J1	8-26-59	66	400	7.5	35 / 1.75	21 / 1.73	16 / 0.70	0.3 / 0.01	0 / 0.00	165 / 2.70	24 / 0.50	21 / 0.59	21 / 0.34	0.5 / 0.03	0.0	39		259	17	174	39	USGS
E. E. Davis domestic	10S/4E-17F1	8-26-59	-	746	7.6	46 / 2.30	46 / 3.80	51 / 2.22	1.8 / 0.05	0 / 0.00	395 / 6.47	19 / 0.40	48 / 1.35	3.5 / 0.06	0.3 / 0.02	0.1	32		443	27	305	0	USGS
W. Henzi domestic and irrigation	-18J1	8-26-59	-	426	8.2	35 / 1.75	22 / 1.77	26 / 1.13	1.9 / 0.05	0 / 0.00	216 / 3.54	19 / 0.40	18 / 0.51	15 / 0.24	0.2 / 0.01	0.1	29		272	24	176	0	USGS
D. Wolfe domestic and irrigation	-28D2	8-26-59	66	545	8.2	32 / 1.60	36 / 2.96	32 / 1.39	1.4 / 0.04	0 / 0.00	266 / 4.36	28 / 0.58	30 / 0.85	16 / 0.26	0.1 / 0.01	0.1	35		342	23	228	10	USGS
A. L. McGlashan domestic and irrigation	-34L5	8-25-59	66	675	7.7	51 / 2.54	34 / 2.80	49 / 2.13	1.6 / 0.04	0 / 0.00	306 / 5.02	43 / 0.90	42 / 1.18	32 / 0.52	0.2 / 0.01	0.1	33		437	28	267	16	USGS
G. Hosang irrigation	11S/4E-4C3	8-26-59	-	861	8.2	73 / 3.64	60 / 4.96	25 / 1.09	2.3 / 0.06	0 / 0.00	340 / 5.57	76 / 1.58	32 / 0.09	84 / 1.35	0.3 / 0.02	0.1	32		552	11	430	151	USGS
H. Hersman irrigation	-8F2	11-25-59	-	498	8.4	53 / 2.64	24 / 1.98	16 / 0.70	1.1 / 0.03	5 / 0.17	221 / 3.62	42 / 0.87	14 / 0.39	16 / 0.26	0.1 / 0.00	0.14	26		306	13	231	41	DWR
J. D. Fair domestic	-21B2	8-26-59	-	619	7.3	61 / 3.04	30 / 2.50	25 / 1.09	1.4 / 0.04	0 / 0.00	281 / 4.61	40 / 0.83	18 / 0.51	35 / 0.56	0.0 / 0.00	0.1	29		378	16	277	47	USGS
C. R. Lanini domestic	11S/5E-27L	7-28-59	-	528	7.5	48 / 2.40	24 / 2.01	26 / 1.13	1.4 / 0.04	0 / 0.00	242 / 3.97	47 / 0.98	22 / 0.62	2.8 / 0.04	0.4 / 0.02	0.11	18		309	20	221	23	DWR
Ferry Morse Seed Co. irrigation	12S/4E-34Q	7-28-59	63	1,480	7.5	162 / 8.08	48 / 3.95	94 / 4.09	2.4 / 0.06	0 / 0.00	422 / 6.92	216 / 4.50	146 / 4.12	36 / 0.58	0.6 / 0.03	0.28	26		938	25	602	256	DWR
Olympia School domestic	-35C	7-28-59	-	1,560	8.6	69 / 3.44	102 / 8.43	154 / 6.70	4.0 / 0.10	35 / 1.17	488 / 8.00	318 / 6.62	100 / 2.82	0.3 / 0.00	0.5 / 0.03	0.92	27		1,050	36	594	1[illegible]6	DWR
M. Diaz domestic	-36H	7-28-59	-	1,840	8.3	82 / 4.09	123 / 10.10	172 / 7.48	3.0 / 0.08	21 / 0.70	568 / 9.31	413 / 8.60	112 / 3.16	7.6 / 0.12	0.4 / 0.02	1.4	27		1,240	34	710	209	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					GILROY-HOLLISTER BASIN (3-3) (Cont.)																	
J. Hogan irrigation	12S/5E-8E	7-28-59	-	1,280	8.2	51 2.54	72 5.89	128 5.57	2.9 0.07	0 0.00	352 5.77	243 5.06	106 2.99	5.6 0.09	0.2 0.01	0.95	23		806	40	422	133	DWR
C. & J. Lomanto irrigation	-12M	7-28-59	-	1,180	8.2	79 3.94	58 4.73	87 3.78	2.8 0.07	0 0.00	370 6.06	88 1.83	156 4.40	9.8 0.16	0.3 0.02	6.1	54		723	30	434	131	DWR
P. Rovella domestic and irrigation	-36A	7-28-59	-	1,320	8.3	16 0.80	14 1.18	263 11.44	2.6 0.10	9 0.30	475 7.78	71 1.48	141 3.98	0.7 0.01	0.4 0.02	3.2	28		782	85	99	0	DWR
S. Bradon domestic and stock	12S/6E-7M	7-28-59	-	402	8.0	17 0.85	8.9 0.73	60 2.61	3.6 0.10	0 0.00	218 3.57	1.2 0.02	24 0.68	0.5 0.01	0.4 0.02	0.72	66		289	61	79	0	DWR
E. F. Broad Fort & Son domestic	-19E	7-28-59	-	1,520	8.3	35 1.75	26 2.17	252 10.96	8.0 0.20	9 0.30	346 5.67	3.6 0.07	318 8.97	0.6 0.01	0.4 0.02	19	41		883	73	196	0	DWR
I. Pillsbury domestic and irrigation	-31B	7-28-59	-	2,290	8.5	50 2.50	56 4.57	376 16.36	2.4 0.10	23 0.77	523 8.57	139 2.89	404 11.39	0.8 0.01	0.1 0.00	5.5	24		1,340	70	354	0	DWR
First Presbyterian Church domestic	13S/5E-3J	7-28-59	-	1,290	8.2	48 2.40	72 5.95	132 5.74	3.3 0.08	0 0.00	410 6.72	238 4.96	90 2.54	1.4 0.02	0.3 0.02	1.0	28		316	40	418	82	DWR
V. Lompo irrigation	-11B	8-11-59	66	1,290	8.1	55 2.74	69 5.71	123 5.35	3.0 0.08	0 0.00	375 6.15	245 5.10	95 2.68	10 0.16	0.5 0.03	0.92	26		811	38	423	115	DWR
V. Lompo irrigation	-11G	7-28-59	-	1,430	8.2	52 2.59	82 6.76	150 6.52	3.2 0.08	0 0.00	410 6.72	260 5.41	113 3.19	23 0.37	0.4 0.02	1.3	24		911	41	468	132	DWR
F. Matulich irrigation	13S/6E-19N1	7-28-59	63	1,830	8.4	54 2.69	79 6.52	246 10.70	4.4 0.10	10 0.33	401 6.57	367 7.64	192 5.41	3.9 0.06	0.4 0.02	1.5	17		1,170	53	461	115	DWR
						SALINAS VALLEY (3-4)																	
M. Minoto irrigation	13S/2E-16E1	6-17-59	68	923	8.0	50 2.50	28 2.28	89 3.87	5.9 0.15	0 0.00	229 3.75	23 0.48	162 4.57	3.8 0.06	0.2 0.01	0.18	49		523	44	239	51	DWR
Delfino & Calcagno domestic and irrigation	-17H1	6-17-59	72	1,420	7.9	74 3.69	44 3.62	132 5.74	11 0.28	0 0.00	231 3.79	33 0.69	316 8.91	5.0 0.08	0.1 0.00	0.29	46		775	43	366	177	DWR
T. Leonardini domestic and irrigation	-19R1	6-17-59	72	834	7.8	39 1.95	23 1.89	90 3.91	3.4 0.09	0 0.00	202 3.31	21 0.44	148 4.17	1.6 0.02	0.2 0.01	0.07	51		476	50	192	26	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

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						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							SALINAS VALLEY (3-4) (Cont.)															
Cal. Art. & Veg. Growers irrigation	13S/2E-20J1	6-17-59	72	908	8.0	54 / 2.69	28 / 2.27	83 / 3.61	3.1 / 0.08	0 / 0.00	193 / 3.16	39 / 0.81	164 / 4.62	0.9 / 0.01	0.2 / 0.01	0.06	56		523	42	248	90	DWR
Kaiser Industries industrial	-29C4	6-19-59	73	679	7.9	17 / 0.85	19 / 1.55	94 / 4.09	3.4 / 0.09	0 / 0.00	189 / 3.10	17 / 0.35	106 / 2.99	1.4 / 0.02	0.2 / 0.01	0.15	40		391	62	120	0	DWR
J. J. King irrigation	-30L1	6-19-59	70	1,720	7.8	37 / 1.85	31 / 2.55	265 / 11.53	8.2 / 0.21	0 / 0.00	238 / 3.90	43 / 0.90	406 / 11.45	1.5 / 0.02	0.3 / 0.02	0.25	43		952	71	220	25	DWR
J. J. King irrigation	-31D2	6-19-59	71	660	8.0	21 / 1.05	19 / 1.55	88 / 3.83	3.0 / 0.08	0 / 0.00	203 / 3.33	20 / 0.42	93 / 2.62	1.5 / 0.02	0.2 / 0.01	0.17	44		390	59	130	0	DWR
Molera Estates domestic	-31K2	6-18-59	68	596	8.1	41 / 2.04	13 / 1.06	68 / 2.96	3.0 / 0.08	0 / 0.00	243 / 3.98	11 / 0.23	64 / 1.80	0.8 / 0.01	0.3 / 0.02	0.16	44		364	48	155	0	DWR
E. Ballone irrigation	-31M2	6-18-59	70	806	7.8	32 / 1.60	21 / 1.72	98 / 4.26	3.1 / 0.08	0 / 0.00	217 / 3.56	24 / 0.50	130 / 3.67	1.7 / 0.03	0.4 / 0.02	0.23	43		460	56	166	0	DWR
E. Ballone irrigation	-31N2	6-17-59	72	994	7.7	57 / 2.84	28 / 2.33	92 / 4.00	3.6 / 0.09	0 / 0.00	152 / 2.49	49 / 1.02	202 / 5.70	1.8 / 0.03	0.4 / 0.02	0.18	47		556	43	259	134	DWR
	-32A2	6-19-59	73	633	8.1	43 / 2.14	18 / 1.46	60 / 2.61	3.2 / 0.08	0 / 0.00	242 / 3.97	13 / 0.27	67 / 1.89	1.6 / 0.02	0.2 / 0.01	0.13	42		367	41	180	0	DWR
O. F. Overhouse domestic and irrigation	-32C1	6-22-59	71	524	8.1	37 / 1.85	15 / 1.21	50 / 2.18	3.1 / 0.08	0 / 0.00	216 / 3.54	12 / 0.25	50 / 1.41	1.2 / 0.02	0.3 / 0.02	0.10	54		329	41	153	0	DWR
Molera Estates irrigation	-32N1	6-18-59	72	530	8.0	37 / 1.85	12 / 1.03	66 / 2.87	2.8 / 0.07	0 / 0.00	231 / 3.79	16 / 0.33	59 / 1.66	1.1 / 0.02	0.4 / 0.02	0.11	45		353	49	144	0	DWR
D. V. Orcutt irrigation	-33E1	6-19-59	65	1,190	7.7	96 / 4.79	41 / 3.38	69 / 3.00	4.3 / 0.11	0 / 0.00	198 / 3.24	38 / 0.79	254 / 7.16	1.8 / 0.03	0.3 / 0.02	0.13	39		640	26	409	247	DWR
C. Rissotti domestic and irrigation	-33R1	6-18-59	67	650	7.8	56 / 2.79	19 / 1.59	53 / 2.30	2.9 / 0.07	0 / 0.00	225 / 3.69	55 / 1.14	61 / 1.72	3.0 / 0.05	0.3 / 0.02	0.06	40		401	34	219	35	DWR
Molera Estates irrigation	14S/2E-5R2	6-18-59	66	2,210	7.6	214 / 10.68	77 / 6.30	105 / 4.57	6.1 / 0.16	0 / 0.00	142 / 2.33	102 / 2.12	608 / 17.14	0.5 / 0.01	0.3 / 0.02	0.20	41		1,220	21	850	734	DWR
L. Martin domestic and irrigation	-6Q1	6-22-59	73	591	7.9	32 / 1.60	14 / 1.14	72 / 3.13	2.7 / 0.07	0 / 0.00	223 / 3.65	25 / 0.52	61 / 1.72	1.3 / 0.02	0.5 / 0.03	0.13	50		369	56	137	0	DWR

a Determined by addition of constituents.
b. Gravimetric determination.
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d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
						Mineral constituents in parts per million / equivalents per million																	
						SALINAS VALLEY (3-4) (Cont.)																	
	MDB&M																						
E. Strove irrigation	14S/2E-6R2	6-18-59	73	552	8.1	33/1.65	12/0.97	65/2.83	2.8/0.07	0/0.00	217/3.56	22/0.46	53/1.49	0.9/0.01	0.4/0.02	0.13	48		344	51	131	0	DWR
J. Jefferson irrigation	-8M2	6-22-59	71	1,340	7.6	122/6.09	44/3.66	71/3.09	4.4/0.11	0/0.00	162/2.66	95/1.98	275/7.76	14/0.22	0.3/0.02	0.22	42		748	24	488	355	DWR
D. V. Orcutt irrigation	-9K1	6-18-59	67	626	7.9	44/2.20	20/1.64	55/2.39	3.4/0.09	0/0.00	170/2.79	106/2.21	47/1.32	0.7/0.01	0.2/0.01	0.18	44		404	38	192	53	DWR
J. F. Rodgers domestic and irrigation	-11D1	6-24-59	68	452	7.9	31/1.55	17/1.37	36/1.57	2.2/0.06	0/0.00	193/3.16	9.4/0.20	42/1.18	1.6/0.02	0.3/0.02	0.04	42		276	34	146	0	DWR
E. C. Eaton domestic and irrigation	-12Q1	6-16-59	72	518	8.2	54/2.69	15/1.25	34/1.48	2.3/0.06	0/0.00	252/4.13	6.2/0.13	38/1.07	2.9/0.05	0.3/0.02	0.07	34		311	27	197	0	DWR
L. A. Wilder domestic	-14N1	6-18-59	72	628	8.0	52/2.59	16/1.31	53/2.30	3.7/0.09	0/0.00	215/3.52	48/1.00	62/1.75	2.4/0.04	0.3/0.02	0.17	44		388	36	195	19	DWR
Monterey Co. Bank domestic and irrigation	-15L1	6-18-59	62	683	8.1	61/3.04	20/1.64	51/2.22	3.6/0.09	0/0.00	218/3.57	105/2.19	47/1.32	0.6/0.01	0.3/0.02	0.20	41		437	32	234	55	DWR
J. W. Orcutt irrigation	-16A1	6-18-59	62	659	7.9	48/2.40	21/1.72	56/2.44	3.5/0.09	0/0.00	179/2.93	110/2.29	52/1.47	0.7/0.01	0.2/0.01	0.19	40		420	37	206	59	DWR
J. G. Armstrong Co. irrigation	-18D1	6-18-59	65	1,050	7.7	71/3.54	36/2.95	86/3.74	4.4/0.11	0/0.00	142/2.33	163/3.39	166/4.68	5.2/0.08	0.2/0.01	0.23	38		640	36	325	209	DWR
A. H. Bordges irrigation	-23J1	6-23-59	73	816	8.0	56/2.79	26/2.15	65/2.83	4.4/0.11	0/0.00	170/2.79	128/2.66	75/2.12	4.0/0.06	0.2/0.01	0.26	42		485	36	247	108	DWR
N. T. DeSerpa domestic and irrigation	-24E1	6-23-59	73	564	8.1	41/2.04	16/1.32	48/2.09	3.0/0.08	0/0.00	201/3.29	35/0.73	45/1.27	2.1/0.03	0.4/0.02	0.11	45		335	38	168	3	DWR
M. Bordgers domestic and irrigation	-25A1	6-23-59	69	1,140	8.0	98/4.89	41/3.36	76/3.31	4.6/0.12	0/0.00	244/4.00	171/3.56	149/4.20	2.1/0.03	0.2/0.01	0.19	39		701	28	413	213	DWR
D. F. McFadden irrigation	-35Q1	6-18-59	72	455	7.9	48/2.40	12/1.00	26/1.13	2.9/0.07	0/0.00	144/2.36	82/1.71	18/0.51	1.2/0.02	0.4/0.02	0.08	44		306	24	170	52	DWR
	14S/3E-30F1	6-16-59	68	1,260	7.9	48/2.40	50/4.09	131/5.70	4.9/0.12	0/0.00	227/3.72	95/1.98	220/6.20	14/0.22	0.3/0.02	0.25	46		721	46	325	139	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					SALINAS VALLEY (3-4) (Cont.)																	
P.G.&E. municipal	14S/3E-33G1	6-26-59	71	6.2	8.0	50 / 2.50	24 / 2.00	52 / 2.26	3.0 / 0.08	0 / 0.00	190 / 3.11	45 / 0.94	95 / 2.68	3.2 / 0.05	0.4 / 0.02	0.12	42		408	33	225	69	DWR
L. Jacks irrigation	15S/2E-2Q1	6-23-59	70	1,020	8.0	75 / 3.74	54 / 4.45	62 / 2.70	4.4 / 0.11	0 / 0.00	279 / 4.57	207 / 4.31	77 / 2.17	0.3 / 0.00	0.2 / 0.01	0.28	42		659	24	410	181	DWR
D. P. McFadden irrigation	15S/3E-4L1	6-23-59	69	1,590	8.0	68 / 3.39	72 / 5.94	150 / 6.52	5.9 / 0.15	0 / 0.00	176 / 2.88	311 / 6.48	188 / 5.30	52 / 0.84	0.1 / 0.00	0.47	39		972	41	467	323	DWR
	-5Q4	6-22-59	71	2,350	8.0	197 / 9.83	82 / 6.71	234 / 10.18	7.4 / 0.19	0 / 0.00	498 / 8.16	566 / 11.78	231 / 6.51	1.1 / 0.02	0.3 / 0.02	0.56	36		1,600	38	828	420	DWR
F. Giffinini domestic and irrigation	-7D1	6-24-59	69	1,070	8.0	71 / 3.54	51 / 4.19	71 / 3.09	4.4 / 0.11	0 / 0.00	149 / 2.44	257 / 5.35	100 / 2.82	0.8 / 0.01	0.2 / 0.01	0.28	38		661	28	387	265	DWR
L. G. Foster irrigation	-8N1	6-19-59	69	1,050	7.8	46 / 2.30	79 / 6.49	65 / 2.83	4.4 / 0.11	0 / 0.00	355 / 5.82	213 / 4.43	57 / 1.61	0.3 / 0.00	0.3 / 0.02	0.22	39		678	24	440	149	DWR
Spreckles Sugar Co. irrigation	-16M1	6-26-59	72	900	7.9	60 / 2.99	52 / 4.28	49 / 2.13	3.8 / 0.10	0 / 0.00	216 / 3.54	192 / 4.00	71 / 2.00	1.5 / 0.02	0.2 / 0.01	0.16	37		573	22	364	187	DWR
J. Violini irrigation	-17F1	6-2[illegible]-59	70	916	7.7	43 / 2.14	48 / 3.91	83 / 3.61	5.2 / 0.13	0 / 0.00	410 / 6.72	28 / 0.58	90 / 2.54	0.2 / 0.00	0.2 / 0.01	0.15	44		544	37	303	0	DWR
K. R. Nutting irrigation	16S/4E-24A1	7-6-59	67	1,570	7.6	117 / 5.84	74 / 6.09	116 / 5.05	4.3 / 0.11	0 / 0.00	283 / 4.64	408 / 8.49	122 / 3.44	52 / 0.84	0.2 / 0.01	0.57	40		1,070	30	597	365	DWR
J. C. Twisselman	-25K1	7-6-59	67	1,290	7.6	100 / 4.99	58 / 4.74	97 / 4.22	4.3 / 0.11	0 / 0.00	351 / 5.75	312 / 6.50	75 / 2.12	0.6 / 0.01	0.1 / 0.00	0.42	37		356	30	487	199	DWR
irrigation	17S/6E-27K1	7-9-59	63	1,320	7.9	83 / 4.14	60 / 4.93	109 / 4.74	3.8 / 0.10	0 / 0.00	179 / 2.93	377 / 7.85	116 / 3.27	5.4 / 0.09	0.2 / 0.01	0.56	39		882	34	454	307	DWR
M. Baker irrigation	-35F1	7-9-59	68	1,270	7.7	83 / 4.14	53 / 4.39	111 / 4.83	3.7 / 0.09	0 / 0.00	234 / 3.84	346 / 7.20	91 / 2.57	3.1 / 0.05	0.2 / 0.01	0.57	37		844	36	427	235	DWR
V. Jacks irrigation	18S/6E-1E1	7-9-59	67	1,000	7.7	90 / 4.49	27 / 2.22	86 / 3.74	4.7 / 0.12	0 / 0.00	267 / 4.38	223 / 4.64	56 / 1.58	9.4 / 0.15	0.1 / 0.00	0.51	36		664	35	336	117	DWR
V. Jacks irrigation	-2N1	7-9-59	67	1,170	7.4	146 / 7.28	37 / 3.03	56 / 2.44	5.3 / 0.14	0 / 0.00	300 / 4.92	273 / 5.68	62 / 1.75	38 / 0.61	0.1 / 0.00	0.15	38		804	19	516	270	DWR

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d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M									CARMEL VALLEY (3-7)													
irrigation	16S/1E-17G1	7-22-59	68	1,140	8.0	115 / 5.74	30 / 2.49	87 / 3.78	4.2 / 0.11	0 / 0.00	351 / 5.75	147 / 3.06	121 / 3.41	1.0 / 0.02	0.5 / 0.03	0.15	31		709	31	412	124	DWR
irrigation	-18F2	7-22-59	66	844	7.0	63 / 3.14	18 / 1.46	83 / 3.61	2.2 / 0.06	0 / 0.00	222 / 3.64	52 / 1.08	122 / 3.44	2.8 / 0.04	0.5 / 0.03	0.09	36		438	44	230	48	DWR
City of Carmel industrial	16S/1W-13L2	7-22-59	64	2,260	7.3	148 / 7.38	54 / 4.49	234 / 10.18	6.3 / 0.16	0 / 0.00	236 / 3.87	159 / 3.31	529 / 14.92	1.6 / 0.02	0.3 / 0.02	0.10	28		1,280	46	594	400	DWR
B. Odello irrigation	-13Q2	7-22-59	68	964	7.9	94 / 4.69	31 / 2.52	68 / 2.96	4.7 / 0.12	0 / 0.00	279 / 4.57	152 / 3.16	87 / 2.45	0.9 / 0.01	0.3 / 0.02	0.07	29		604	29	361	132	DWR
B. Odello irrigation	-13R1	7-22-59	68	785	7.8	76 / 3.79	24 / 2.02	53 / 2.30	4.2 / 0.11	0 / 0.00	231 / 3.79	130 / 2.71	60 / 1.69	0.9 / 0.01	0.5 / 0.03	0.07	31		494	28	291	102	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
								CENTRAL VALLEY REGION (NO. 5) REDDING BASIN (5-6)															
	MDB&M																						
Cottonwood Water Dept. municipal	29N/4W-2M1	7-13-59	-	181	7.3	10 0.50	7.5 0.62	16 0.70	1.0 0.02	0 0.00	100 1.64	1.0 0.02	4.4 0.12	2.4 0.04	0.2 0.01	0.04	52		144	38	56	0	DWR
M. Hurley irrigation	-6N1	7-14-59	68	169	7.8	11 0.55	7.4 0.61	13 0.56	1.4 0.04	0 0.00	93 1.52	2.5 0.05	3.8 0.11	1.2 0.02	0.2 0.01	0.03	56		142	32	58	0	DWR
D. F. Park domestic & irrigation	30N/3W-4M1	7-13-59	-	203	7.8	12 0.60	12 0.98	11 0.47	2.1 0.05	0 0.00	113 1.85	4.0 0.08	3.6 0.10	2.6 0.04	0.1 0.00	0.02	84		187	22	79	0	DWR
D. Morton domestic	-34D1	7-13-59	-	246	7.5	18 0.90	13 1.06	13 0.56	1.0 0.02	0 0.00	140 2.29	4.0 0.08	3.2 0.09	6.1 0.10	0.1 0.00	0.16	49		176	22	98	0	DWR
T. Loftus irrigation	30N/4W-1E1	7-13-59	70	150	7.7	8.5 0.42	6.6 0.54	12 0.52	1.1 0.03	0 0.00	62 1.02	7.1 0.15	7.7 0.22	3.9 0.06	0.2 0.01	0.04	37		114	3[illegible]	48	0	DWR
Shasta County irrigation	-16H	7-13-59	64	208	7.6	13 0.65	12 0.95	11 0.48	1.2 0.03	0 0.00	108 1.77	6.7 0.14	5.7 0.16	1.8 0.03	0.1 0.00	0.19	52		157	23	80	0	DWR
Paul Bunyan Lumber Co. industrial	-25N1	7-13-59	71	114	7.4	10 0.50	7.8 0.64	14 0.61	0.9 0.02	0 0.00	92 1.51	3.3 0.07	4.3 0.12	0.9 0.01	0.2 0.01	0.00	46		132	34	57	0	DWR
Happy Valley School domestic & irrigation	30N/5W-15R1	7-13-59	-	180	7.7	8.7 0.43	6.4 0.53	20 0.87	1.0 0.02	0 0.00	101 1.65	5.8 0.12	3.1 0.09	0.3 0.00	0.3 0.02	0.03	45		141	47	48	0	DWR
C. A. Young domestic	-17R1	7-13-59	-	152	7.0	7.7 0.38	5.4 0.44	16 0.70	0.9 0.02	0 0.00	83 1.36	0.3 0.01	4.2 0.12	0.7 0.01	0.1 0.00	0.24	56		132	45	41	0	DWR
R. M. Gilbert irrigation	31N/3W-7K1	7-14-59	68	239	7.9	12 0.60	8.8 0.72	25 1.09	1.5 0.04	0 0.00	130 2.13	0.3 0.01	12 0.34	0.0 0.00	0.2 0.01	0.47	52		176	44	66	0	DWR
Gimblin domestic & irrigation	-12E1	7-14-59	-	199	7.4	18 0.90	8.3 0.68	9.2 0.40	2.4 0.06	0 0.00	107 1.75	3.3 0.07	4.1 0.12	2.6 0.04	0.1 0.00	0.20	71		171	20	79	0	DWR
T. Murphy irrigation	-29P1	8-12-59	-	189	7.6	12 0.60	11 0.88	9.0 0.39	2.1 0.05	0 0.00	104 1.70	1.0 0.02	3.6 0.10	1.7 0.03	0.2 0.01	0.05	78		170	20	74	0	DWR
Lawn Crest Cemetery irrigation	31N/4W-5F1	7-14-59	-	160	7.8	8.9 0.44	7.8 0.64	13 0.56	1.0 0.02	0 0.00	96 1.57	0.8 0.02	3.0 0.08	0.1 0.00	0.4 0.02	0.21	46		128	34	54	0	DWR
Enterprise School Dist. domestic & irrigation	-7A1	7-14-59	-	127	7.5	9.7 0.48	5.4 0.44	7.0 0.30	1.4 0.04	0 0.00	61 1.00	5.4 0.11	4.0 0.11	0.4 0.01	0.0 0.00	0.20	24		88	24	46	0	DWR
L. A. Stayer domestic & irrigation	-15B1	7-14-59	68	228	7.9	10 0.50	11 0.90	21 0.91	0.9 0.02	0 0.00	122 2.00	0.3 0.01	11 0.31	0.6 0.01	0.2 0.01	0.30	52		167	39	70	0	DWR
P. S. Tempelton domestic & irrigation	-16Q1	7-14-59	-	171	7.6	9.3 0.46	9.0 0.74	12 0.52	0.8 0.02	0 0.00	94 1.54	0.6 0.01	3.6 0.10	1.3 0.02	0.2 0.01	0.21	32		115	30	60	0	DWR
California Motel domestic & irrigation	31N/5W-13D1	7-14-59	-	386	7.7	14 0.70	8.8 0.72	54 2.35	2.0 0.05	0 0.00	149 2.44	0.8 0.02	46 1.30	0.4 0.01	0.4 0.02	0.33	52		252	62	71	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Per-cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							REDDING BASIN (5-6) (Cont.)															
U.S. Dept. of Interior domestic & irrigation	31N/5W-25K1	7-13-59	-	218	7.5	6.1 / 0.30	3.2 / 0.26	38 / 1.65	0.9 / 0.02	0 / 0.00	114 / 1.87	0.0 / 0.00	13 / 0.37	0.3 / 0.00	0.0 / 0.00	0.23	37		155	74	28	0	DWR
W. H. Johnson domestic & irrigation	32N/3W-17E2	3-30-59	-	3,770	7.5	41 / 2.04	5.1 / 0.42	750 / 32.62	2.6 / 0.07	0 / 0.00	155 / 2.54	171 / 3.56	1,030 / 29.05	1.6 / 0.02	0.9 / 0.05	1.5	12		2,090	93	123	0	DWR
		7-14-59	66	5,050	7.8	67 / 3.34	5.8 / 0.48	995 / 43.28	3.1 / 0.08	0 / 0.00	164 / 2.69	223 / 4.64	1,420 / 40.04	4.8 / 0.08	1.0 / 0.05	1.1	14		2,820	92	191	57	DWR
B. E. Irvin domestic and stock	-20F1	7-14-59	65	204	7.2	21 / 1.05	0.4 / 0.03	20 / 0.87	1.1 / 0.03	0 / 0.00	80 / 1.31	7.4 / 0.15	16 / 0.45	3.7 / 0.06	0.2 / 0.01	0.33	30		139	44	54	0	DWR
C. Boyle domestic	-32J2	7-14-59	-	729	7.8	42 / 2.10	24 / 1.98	62 / 2.70	2.9 / 0.07	0 / 0.00	166 / 2.72	17 / 0.35	136 / 3.84	1.1 / 0.02	0.1 / 0.00	0.39	68		434	39	204	68	DWR
Coldiron irrigation	-35C1	7-14-59	-	382	7.8	16 / 0.80	10 / 0.84	44 / 1.9	2.6 / 0.07	0 / 0.00	129 / 2.11	0.3 / 0.01	54 / 1.52	0.1 / 0.00	0.1 / 0.00	0.27	65		256	53	82	0	DWR
Hills & Dales Rest Home irrigation	32N/4W-14F2	7-14-59	-	216	7.0	14 / 0.70	5.1 / 0.42	24 / 1.04	0.4 / 0.01	0 / 0.00	111 / 1.82	0.5 / 0.01	10 / 0.28	3.8 / 0.06	0.1 / 0.00	0.12	34		146	48	56	0	DWR
E. Jones domestic	-20G2	7-14-59	-	276	7.9	15 / 0.75	19.6 / 1.61	15 / 0.65	1.0 / 0.02	0 / 0.00	167 / 2.74	4.4 / 0.09	4.3 / 0.12	1.2 / 0.02	0.2 / 0.01	0.02	46		189	21	118	0	DWR
Columbia School Dist. domestic	-34P1	7-14-59	-	282	8.3	17 / 0.85	6.2 / 0.51	32 / 1.39	1.9 / 0.05	3 / 0.10	130 / 2.13	0.3 / 0.01	21 / 0.59	0.2 / 0.00	0.1 / 0.00	0.46	32		178	50	68	0	DWR
H. Snow, Jr.	32N/5W-26M1	7-14-59	-	2.93	8.1	19 / 0.95	9.1 / 0.75	27 / 1.17	1.1 / 0.03	0 / 0.00	126 / 2.06	26 / 0.54	10 / 0.29	2.0 / 0.03	0.3 / 0.02	0.47	29		186	40	85	0	DWR
								UPPER LAKE VALLEY (5-13)															
Overington domestic	14N/9W-6F2	6-18-59	-	50.5	5.8	2.5 / 0.12	1.4 / 0.12	2.4 / 0.10	0.6 / 0.02	0 / 0.00	10 / 0.16	0.0 / 0.00	1.3 / 0.04	10 / 0.16	0.0 / 0.00	0.07	18		41	28	12	4	DWR
B. W. Patten irrigation	14N/10W-14E2	6-18-59	58	253	7.4	29 / 1.45	8.9 / 0.73	8.4 / 0.36	0.7 / 0.02	0 / 0.00	134 / 2.20	10 / 0.21	4.1 / 0.12	3.7 / 0.06	0.2 / 0.01	0.20	14		145	14	109	0	DWR
L. J. Skaggs irrigation	15N/9W-6F1	6-18-59	53	190	7.0	19 / 0.95	7.7 / 0.63	7.0 / 0.30	0.6 / 0.02	0 / 0.00	97 / 1.59	8.6 / 0.18	3.7 / 0.10	2.7 / 0.04	0.1 / 0.00	0.12	14		112	16	79	0	DWR
Upper Lake Cemetery irrigation	-7B	6-18-59	61	283	6.8	20 / 1.00	15 / 1.22	16 / 0.70	0.8 / 0.02	0 / 0.00	173 / 2.84	2.5 / 0.05	3.0 / 0.08	0.8 / 0.01	0.2 / 0.01	0.47	37		181	24	111	0	DWR
G. Bowers domestic	-17P1	6-18-59	-	414	7.9	30 / 1.50	30 / 2.50	14 / 0.61	0.6 / 0.02	0 / 0.00	261 / 4.28	6.7 / 0.14	4.3 / 0.12	3.4 / 0.05	0.2 / 0.01	0.22	35		252	13	200	0	DWR
C. B. Flick domestic	-31P1	6-18-59	-	172	7.3	8.3 / 0.44	8.0 / 0.66	15 / 0.65	0.5 / 0.01	0 / 0.00	104 / 1.70	0.0 / 0.00	3.2 / 0.09	0.6 / 0.01	0.1 / 0.00	0.09	23		110	37	55	0	DWR
E. Lewis, Jr. domestic and stock	15N/10W-3C1	6-19-59	-	407	7.2	44 / 2.20	20 / 1.68	9.5 / 0.41	0.2 / 0.00	0 / 0.00	224 / 3.67	16 / 0.33	4.7 / 0.13	10 / 0.16	0.1 / 0.00	0.22	18		233	10	194	10	DWR

a Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					UPPER LAKE VALLEY (5-13) (Cont.)																	
B. Dunton domestic	15N/10W-10E1	6-19-59	64	2,330	7.8	39 / 1.95	6.0 / 0.49	460 / 20.01	2.5 / 0.06	0 / 0.00	316 / 5.18	0.0 / 0.00	594 / 16.75	0.7 / 0.01	3.3 / 0.17	68	8.9		1,340	89	122	0	DWR
Lake County Cannery, Inc. industrial	-12K2	6-18-59	-	172	7.7	18 / 0.90	5.6 / 0.46	7.1 / 0.31	0.7 / 0.02	0 / 0.00	96 / 1.57	1.5 / 0.03	3.6 / 0.10	1.1 / 0.02	0.1 / 0.00	0.11	4.3		89	18	68	0	DWR
C. Davis domestic	-13A1	6-18-59	-	339	6.9	19 / 0.95	22 / 1.77	20 / 0.87	0.8 / 0.02	0 / 0.00	213 / 3.49	0.0 / 0.00	4.4 / 0.12	0.6 / 0.01	0.3 / 0.02	0.73	66		239	24	136	0	DWR
H. Jarvis irrigation	-24H	6-18-59	-	406	7.3	24 / 1.20	19 / 1.56	34 / 1.48	0.2 / 0.00	0 / 0.00	216 / 3.54	11 / 0.23	16 / 0.45	1.7 / 0.03	0.5 / 0.03	0.30	33		246	35	138	0	DWR
A. Santos domestic	16N/9W/31L3	6-13-59	-	191	7.2	21 / 1.05	5.7 / 0.47	8.0 / 0.35	1.3 / 0.03	0 / 0.00	102 / 1.67	7.6 / 0.16	3.2 / 0.09	1.4 / 0.02	0.1 / 0.00	0.13	9.4		108	18	76	0	DWR
						KELSEYVILLE VALLEY (5-15)																	
C. Benson irrigation	13N/9W-3C1	6-19-59	64	404	7.8	30 / 1.50	33 / 2.70	6.5 / 0.28	1.0 / 0.02	0 / 0.00	243 / 3.98	11 / 0.23	5.4 / 0.15	6.1 / 0.10	0.1 / 0.00	0.13	31		243	6	210	11	DWR
Davidson irrigation	-8C1	6-19-59	63	444	7.2	31 / 1.55	35 / 2.85	10 / 0.44	0.7 / 0.02	0 / 0.00	253 / 4.15	22 / 0.46	6.3 / 0.18	5.4 / 0.09	0.1 / 0.00	0.26	25		260	9	220	13	DWR
H. E. Marshall stock and irrigation	-8N1	6-19-59	-	293	6.9	24 / 1.20	16 / 1.32	12 / 0.52	0.8 / 0.02	0 / 0.00	163 / 2.67	4.3 / 0.09	9.6 / 0.27	2.3 / 0.04	0.1 / 0.00	0.22	27		176	17	126	0	DWR
L. Wright irrigation	-12M1	6-19-59	64	448	7.4	16 / 0.80	39 / 3.22	18 / 0.78	5.1 / 0.13	0 / 0.00	264 / 4.33	0.0 / 0.00	19 / 0.54	0.5 / 0.01	0.2 / 0.01	0.56	73		301	16	201	0	DWR
M. Fraser irrigation	16D1	6-19-59	70	973	6.8	71 / 3.54	84 / 6.93	23 / 1.00	2.9 / 0.07	0 / 0.00	684 / 11.21	0.0 / 0.00	12 / 0.34	0.4 / 0.01	0.2 / 0.01	0.53	85		615	9	524	0	DWR
M. Fraser domestic	-16D2	6-19-59	-	301	7.7	25 / 1.25	18 / 1.51	7.8 / 0.34	0.6 / 0.02	0 / 0.00	167 / 2.74	7.2 / 0.15	5.0 / 0.14	6.4 / 0.10	0.1 / 0.00	0.34	20		172	11	138	1	DWR
W. J. Stone irrigation	-22J1	6-19-59	67	434	7.1	17 / 0.85	43 / 3.55	9.8 / 0.43	2.4 / 0.06	0 / 0.00	273 / 4.47	4.8 / 0.10	6.3 / 0.18	3.7 / 0.06	0.2 / 0.01	0.13	60		281	9	220	0	DWR
I. Morrison domestic & irrigation	14N/9W-32J1	6-19-59	-	694	7.2	51 / 2.54	60 / 4.97	13 / 0.56	0.8 / 0.02	0 / 0.00	455 / 7.46	4.1 / 0.08	12 / 0.34	2.2 / 0.04	0.3 / 0.02	0.21	58		426	7	376	3	DWR
I. Morrison irrigation	-32J2	6-19-59	62	561	7.0	43 / 2.14	41 / 3.37	15 / 0.65	1.0 / 0.02	0 / 0.00	359 / 5.88	6.6 / 0.14	6.5 / 0.18	0.5 / 0.01	0.3 / 0.02	0.21	69		359	10	276	0	DWR

a Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							SACRAMENTO VALLEY (5-21) TEHAMA COUNTY															
Kelsey irrigation	23N/2W-5A	7-31-59	-	324	8.3	26 1.30	14 1.14	32 1.39	1.4 0.04	4 0.13	194 3.18	9.0 0.19	6.0 0.17	3.5 0.06	0.1 0.01	0.1	27	Fe 0.01[d] (dissolved) Al 0.16 Cu 0.01	219	36	122	0	USGS
W. Angleton irrigation	23N/3W-22Q	7-30-59	70	299	7.7	26 1.30	13 1.06	22 0.96	0.8 0.02	0 0.00	150 2.46	10 0.21	18 0.51	3.1 0.05	0.0 0.00	0.2	31	Al 0.10[d] Cu 0.02	198	29	118	0	USGS
D. D. Smith domestic and stock	-35B1	7-30-59	70	222	7.3	19 0.95	7.7 0.63	17 0.74	4.3 0.11	0 0.00	98 1.61	16 0.33	15 0.42	4.2 0.07	0.2 0.01	0.2	32	Al 0.16 Zn 0.02[d] Cu 0.06	164	30	79	0	USGS
R. Mitchell domestic	23N/5W-11L1	7-30-59	71	418	7.5	21 1.05	14 1.13	44 1.91	6.6 0.17	0 0.00	193 3.16	17 0.35	25 0.70	8.2 0.13	0.0 0.00	0.2	31	Al 0.16[d] Cu 0.08	262	45	109	0	USGS
J. Ayres domestic & irrigation	24N/2W-30C1	7-31-59	-	504	8.3	40 2.00	25 2.04	32 1.39	1.2 0.03	6 0.20	276 4.52	16 0.33	12 0.34	9.4 0.15	0.0 0.00	0.0	30	Al 0.12[d] Cu 0.01	308	25	202	0	USGS
G. Saulsbury domestic & irrigation	24N/3W-3P1	7-31-59	-	315	7.1	34 1.70	14 1.16	10 0.44	6.1 0.16	0 0.00	151 2.47	29 0.60	8.0 0.23	4.1 0.07	0.0 0.00	0.1	33	Al 0.12 Zn 0.01[d] Cu 0.06	212	13	143	19	USGS
Corning High School domestic	-14M1	7-31-59	-	236	7.9	23 1.15	10 0.83	12 0.52	0.7 0.02	0 0.00	135 2.21	4.2 0.09	3.8 0.11	5.1 0.08	0.1 0.01	0.0	30		156	21	99	0	USGS
W. E. Turner irrigation	-20N1	7-30-59	67	165	7.7	12 0.60	6.6 0.54	13 0.57	5.9 0.15	0 0.00	88 1.44	12 0.25	2.5 0.07	3.3 0.05	0.0 0.00	0.1	41	Al 0.03[d] Cu 0.06	139	31	57	0	USGS
A. Hiller domestic	24N/5W-21L1	7-30-59	71	371	7.7	26 1.30	11 0.90	44 1.91	1.8 0.05	0 0.00	180 2.95	13 0.27	28 0.79	9.4 0.15	0.0 0.00	0.0	30	Al 0.18[d] Cu 0.01	252	46	110	0	USGS
S. R. Pritchett	25N/1W-31M1	8-4-59	70	392	7.2	34 1.70	24 1.98	15 0.65	7.0 0.18	0 0.00	248 4.06	10 0.21	9.0 0.25	3.0 0.05	0.0 0.00	0.1	76	Al 0.23 Zn 0.02[d] Cu 0.06	300	14	184	0	USGS
Los Molinos Cemetery domestic	25N/2W-4M1	8-1-59	70	244	8.0	22 1.10	11 0.90	13 0.57	6.1 0.16	0 0.00	110 1.80	19 0.40	16 0.45	1.3 0.02	0.0 0.00	0.5	65	Al 0.07 Zn 0.01[d] Cu 0.05	208	21	100	10	USGS
F. B. Wray domestic	-7K1	8-1-59	66	531	7.7	41 2.05	37 3.07	23 1.00	1.4 0.04	0 0.00	264 4.33	21 0.44	36 1.02	8.3 0.13	0.1 0.01	0.0	31	Al 0.20 Zn 0.23[d] Cu 0.01	329	16	256	40	USGS
E. Clemens irrigation	-21Q1	7-29-59	78	359	8.2	2.4 0.12	0.2 0.02	76 3.31	8.1 0.21	0 0.00	165 2.70	11 0.23	24 0.68	0.5 0.01	0.2 0.01	0.2	66	Al 0.04 Zn 0.01[d] Cu 0.04	270	90	7	0	USGS
El Camino Irr. Dist. irrigation	25N/3W-3N1	7-31-59	68	369	8.2	28 1.40	21 1.74	19 0.83	6.5 0.17	0 0.00	203 3.33	7.0 0.15	20 0.56	2.2 0.04	0.0 0.00	0.2	40	Al 0.11 Zn 0.01[d] Cu 0.06	244	20	157	0	USGS
L. Clark domestic	-31R	7-31-59	68	403	8.3	49 2.45	22 1.79	9.7 0.42	1.6 0.04	4 0.13	233 3.82	21 0.44	6.5 0.18	3.5 0.06	0.1 0.01	0.0	20	Al 0.10 Zn 0.01[d] Cu 0.01	252	9	212	14	USGS
J. Munsinger irrigation	26N/2W-4C1	8-1-59	68	270	8.1	22 1.10	15 1.26	13 0.57	2.6 0.07	0 0.00	150 2.46	7.0 0.15	9.0 0.25	2.5 0.04	0.0 0.00	0.0	66	Al 0.16[d] Cu 0.01	211	19	118	0	USGS
A. Corda irrigation	-14F1	8-1-59	70	214	8.2	17 0.85	9.4 0.77	18 0.78	5.1 0.13	0 0.00	122 2.00	11 0.23	10 0.28	3.1 0.05	0.0 0.00	0.2	70	Al 0.21 Zn 0.01[d] Cu 0.04	204	31	81	0	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M									TEHAMA COUNTY (Cont.)													
Forward Bros. Lumber Co. domestic & industrial	26N/3W-10D1	8-1-59	68	266	8.3	28 / 1.40	12 / 0.96	12 / 0.52	0.8 / 0.02	2 / 0.07	140 / 2.29	11 / 0.23	8.0 / 0.23	5.7 / 0.09	0.1 / 0.01	0.0	36	Fe 0.01[d] (dissolved) Al 0.12 Cu 0.02	185	18	118	0	USGS
W. R. Merithew irrigation	-22G1	8-1-59	69	256	8.1	21 / 1.05	11 / 0.91	23 / 1.00	1.6 / 0.04	0 / 0.00	154 / 2.52	7.0 / 0.15	7.0 / 0.20	2.5 / 0.04	0.2 / 0.01	0.0	44	Al 0.21[d] Cu 0.02	193	33	98	0	USGS
J. Burch irrigation	26N/3W-29E1	8-1-59	68	158	7.0	9.6 / 0.48	7.1 / 0.58	13 / 0.57	3.0 / 0.08	0 / 0.00	78 / 1.28	5.0 / 0.10	8.0 / 0.23	5.8 / 0.09	0.2 / 0.01	0.0	43	Al 0.04 Zn 0.01[d] Cu 0.05	133	33	53	0	USGS
H. Dewitt domestic	26N/4W-10D1	8-1-59	74	333	8.5	32 / 1.60	17 / 1.40	24 / 1.04	1.3 / 0.03	6 / 0.20	222 / 3.64	1.6 / 0.02	5.0 / 0.14	2.4 / 0.04	0.0 / 0.00	0.0	36	Al 0.11 Zn 0.09[d] Cu 0.01	234	26	150	0	USGS
B. Kerstiens irrigation	27N/3W-10Q1	8-1-59	74	282	8.0	17 / 0.85	5.2 / 0.43	40 / 1.74	3.2 / 0.08	0 / 0.00	152 / 2.49	9.0 / 0.19	13 / 0.37	0.7 / 0.01	0.0 / 0.00	0.0	66	Fe 0.01[d] (dissolved) Al 0.15 Cu 0.01	229	56	64	0	USGS
	-15C1	8-1-59	70	282	8.0	27 / 1.35	13 / 1.05	11 / 0.48	1.8 / 0.05	0 / 0.00	144 / 2.36	9.0 / 0.19	11 / 0.31	3.3 / 0.05	0.0 / 0.00	0.0	56	Fe 0.01[d] (dissolved) Al 0.12 Cu 0.01 Zn 0.06	203	16	120	2	USGS
City of Red Bluff municipal	-19A1	8-3-59	69	248	7.6	24 / 1.20	8.8 / 0.72	20 / 0.87	5.1 / 0.13	0 / 0.00	154 / 2.52	3.0 / 0.06	8.0 / 0.23	2.7 / 0.04	0.1 / 0.01	0.1	55	Al 0.08 Zn 0.01[d] Cu 0.05	203	30	96	0	USGS
Wilcox Oaks Golf Course irrigation	27N/4W-1H2	8-3-59	70	264	8.2	26 / 1.30	5.4 / 0.44	25 / 1.09	5.1 / 0.13	0 / 0.00	160 / 2.62	3.0 / 0.06	6.5 / 0.18	1.7 / 0.03	0.0 / 0.00	1.4	48	Al 0.04[d] Cu 0.05	201	37	87	0	USGS
									GLENN COUNTY														
W. Wellin domestic	18N/2W-1E1	6-18-59	-	321	8.0	24 / 1.20	14 / 1.16	25 / 1.09	0.9 / 0.02	0 / 0.00	198 / 3.24	4.6 / 0.10	4.0 / 0.11	2.2 / 0.04	0.2 / 0.01	0.27	33		205	31	118	0	DWR
E. Frick irrigation	-7F1	6-18-59	70	597	8.2	36 / 1.80	31 / 2.52	55 / 2.39	0.6 / 0.02	0 / 0.00	297 / 4.87	68 / 1.42	7.6 / 0.21	7.9 / 0.13	0.4 / 0.02	0.34	27		380	36	216	0	DWR
U.S. Fish & Wildlife Service domestic	18N/3W-10K1	6-18-59	72	476	8.0	17 / 0.85	8.4 / 0.69	80 / 3.48	0.6 / 0.02	0 / 0.00	253 / 4.15	18 / 0.37	19 / 0.54	1.6 / 0.02	0.6 / 0.03	0.58	21		291	69	77	0	DWR
Michaels Ranch domestic	18N/4W-2F1	6-18-59	-	724	7.9	53 / 2.64	29 / 2.36	63 / 2.74	0.5 / 0.01	0 / 0.00	324 / 5.31	23 / 0.48	46 / 1.30	41 / 0.66	0.6 / 0.03	0.27	28		443	35	250	0	DWR
R. T. Smith domestic	19N/2W-6G1	6-13-59	65	328	7.7	35 / 1.75	14 / 1.17	12 / 0.52	0.5 / 0.01	0 / 0.00	189 / 3.10	6.9 / 0.14	5.2 / 0.15	2.8 / 0.04	0.2 / 0.01	0.08	29		199	15	146	0	DWR
C. Calvert domestic	-23N1	6-18-59	-	691	7.8	58 / 2.89	39 / 3.18	45 / 1.96	0.7 / 0.02	0 / 0.00	454 / 7.44	17 / 0.35	6.2 / 0.17	0.5 / 0.01	0.3 / 0.02	0.33	29		419	24	304	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M								GLENN COUNTY (Cont.)														
Alta California Dairy domestic & irrigation	19N/3W-9J1	6-18-59	69	523	8.1	32 / 1.60	22 / 1.84	51 / 2.22	0.6 / 0.02	0 / 0.00	290 / 4.75	31 / 0.64	8.0 / 0.22	5.4 / 0.09	0.6 / 0.03	0.21	26		319	39	172	0	DWR
T. Bem domestic	-18P1	6-18-59	-	596	7.9	42 / 2.10	24 / 1.96	54 / 2.35	3.3 / 0.08	0 / 0.00	281 / 4.60	62 / 1.29	22 / 0.62	4.1 / 0.07	0.6 / 0.03	0.36	23		373	36	203	0	DWR
A. Quinn domestic	20N/2W-11Q1	6-18-59	-	367	7.8	35 / 1.75	16 / 1.33	17 / 0.74	0.5 / 0.01	0 / 0.00	201 / 3.29	8.9 / 0.18	9.5 / 0.27	6.3 / 0.10	0.2 / 0.01	0.14	29		222	19	154	0	DWR
H. Perry domestic	-13Q1	6-18-59	65	467	7.9	42 / 2.10	28 / 2.28	19 / 0.83	0.4 / 0.01	0 / 0.00	295 / 4.84	7.6 / 0.16	5.9 / 0.17	1.6 / 0.02	0.2 / 0.01	0.15	29		279	16	219	0	DWR
F. Reiman irrigation	20N/3W-2D1	6-18-59	68	492	7.4	51 / 2.54	23 / 1.86	17 / 0.74	0.8 / 0.02	0 / 0.00	245 / 4.02	15 / 0.31	23 / 0.65	9.5 / 0.15	0.1 / 0.00	0.08	27		286	14	220	19	DWR
L. M. Berens domestic	20N/4W-2Q1	6-18-59	-	355	7.8	38 / 1.90	14 / 1.14	14 / 0.61	0.4 / 0.01	0 / 0.00	183 / 3.00	8.2 / 0.17	4.9 / 0.14	21 / 0.34	0.3 / 0.02	0.06	35		226	17	152	2	DWR
L. E. Dobbins irrigation	21N/2W-2D1	6-17-59	70	394	7.9	30 / 1.50	16 / 1.32	28 / 1.22	0.3 / 0.02	0 / 0.00	187 / 3.06	20 / 0.42	21 / 0.59	2.7 / 0.04	0.2 / 0.01	0.27	26		237	30	141	0	DWR
I. G. Finch irrigation	-15C1	6-17-59	70	377	7.7	35 / 1.75	15 / 1.21	20 / 0.87	0.8 / 0.02	0 / 0.00	175 / 2.87	14 / 0.29	22 / 0.62	5.4 / 0.09	0.1 / 0.00	0.20	26		224	22	148	4	DWR
Hamilton domestic	21N/3W-2Q1	6-18-59	-	580	8.0	65 / 3.24	25 / 2.04	22 / 0.96	0.9 / 0.02	0 / 0.00	292 / 4.78	23 / 0.48	30 / 0.85	8.5 / 0.14	0.1 / 0.00	0.17	26		346	15	264	25	DWR
B. R. Purviance irrigation	-14F1	6-18-59	68	459	7.6	48 / 2.40	20 / 1.68	15 / 0.65	0.8 / 0.02	0 / 0.00	224 / 3.67	17 / 0.35	21 / 0.59	7.9 / 0.13	0.1 / 0.00	0.18	28		268	14	204	20	DWR
Sletten irrigation	-20D1	6-18-59	71	359	7.8	23 / 1.15	15 / 1.21	29 / 1.26	0.6 / 0.02	0 / 0.00	162 / 2.66	6.2 / 0.13	28 / 0.79	1.1 / 0.02	0.2 / 0.01	0.28	27		210	35	118	0	DWR
Baker & McGowan irrigation	22N/1W-29C1	6-17-59	66	429	7.7	38 / 1.90	20 / 1.62	21 / 0.91	0.8 / 0.02	0 / 0.00	198 / 3.24	22 / 0.46	24 / 0.68	5.3 / 0.08	0.1 / 0.00	0.23	27		255	20	176	14	DWR
C. A. Nickel domestic	22N/2W-3A1	6-18-59	-	512	6.9	50 / 2.50	19 / 1.56	26 / 1.13	0.5 / 0.01	0 / 0.00	199 / 3.26	32 / 0.67	32 / 0.90	20 / 0.32	0.1 / 0.00	0.21	26		304	22	203	40	DWR
Mills Orchard, Inc. irrigation	-26B1	6-17-59	65	425	7.4	42 / 2.10	18 / 1.52	21 / 0.91	0.9 / 0.02	0 / 0.00	202 / 3.31	23 / 0.48	21 / 0.59	3.6 / 0.06	0.2 / 0.01	0.23	20		249	20	181	15	DWR
I. C. Wright domestic	22N/3W-4G1	6-18-59	65	425	7.5	44 / 2.20	16 / 1.28	19 / 0.83	0.7 / 0.02	0 / 0.00	197 / 3.23	18 / 0.37	26 / 0.73	1.5 / 0.02	0.1 / 0.00	0.20	8.9		231	19	174	12	DWR
City of Orland municipal	-22Q1	6-19-59	68	413	8.0	49 / 2.44	14 / 1.12	18 / 0.78	0.8 / 0.02	0 / 0.00	205 / 3.36	16 / 0.33	21 / 0.59	5.9 / 0.10	0.2 / 0.01	0.37	20		246	13	178	10	DWR
J. Freitas irrigation	-25B1	6-18-59	70	393	7.7	39 / 1.95	15 / 1.21	19 / 0.83	0.8 / 0.02	0 / 0.00	131 / 2.97	15 / 0.31	21 / 0.59	5.9 / 0.10	0.2 / 0.01	0.27	22		227	21	158	10	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C. ppm	Analyzed by [c]
	MDB&M							GLENN COUNTY (Cont.)															
Graves Cemetery irrigation	22N/4W-10B1	6-18-59	65	504	7.8	46 2.30	30 2.44	17 0.74	0.5 0.01	0 0.00	261 4.28	19 0.40	22 0.62	6.8 0.11	0.2 0.01	0.40	28		298	13	237	23	DWR
								BUTTE COUNTY															
D. E. Justeson domestic	17N/1E-1R1	8-5-59	-	343	8.0	22 1.10	19 1.54	25 1.09	4.0 0.10	0 0.00	209 3.43	5.0 0.10	9.0 0.25	0.1 0.00	0.1 0.01	0.0	59	Al 0.09[d] As 0.02	246	28	132	0	USGS
J. C. Davis irrigation	17N/2E-2D1	8-5-59	-	308	8.1	29 1.45	22 1.81	6.1 0.27	1.8 0.05	0 0.00	208 3.41	4.0 0.08	1.5 0.04	3.4 0.05	0.1 0.01	0.0	57	Al 0.06 Zn 0.15[d] Cu 0.01	227	8	163	0	USGS
Gridley Farm Labor Supply domestic	17N/3E-4D1	8-31-59	-	249	8.1	20 1.00	16 1.32	12 0.52	3.0 0.08	0 0.00	158 2.59	0.0 0.00	11 0.31	0.0 0.00	0.1 0.01	0.0	59	Fe 0.05[d] (dissolved) Al 0.06 Pb 0.01	199	18	116	0	USGS
E. White domestic & irrigation	-18Q1	8-28-59	-	433	8.0	33 1.65	31 2.55	20 0.87	2.0 0.05	0 0.00	296 4.85	5.0 0.10	1.0 0.03	4.0 0.06	0.1 0.01	0.0	70	Al 0.09 Zn 0.30[d] Cu 0.01	312	17	210	0	USGS
L. D. Stresser irrigation	17N/4E-20L1	8-31-59	-	332	8.1	26 1.30	15 1.22	25 1.09	1.5 0.04	0 0.00	155 2.54	20 0.42	22 0.62	0.9 0.01	0.1 0.01	0.0	66	Al 0.09[d] Cu 0.01	252	30	126	0	USGS
E. Edwards domestic and stock	18N/2E-12B1	8-5-59	-	212	7.4	18 0.90	12 0.99	9.0 0.39	1.6 0.04	0 0.00	124 2.03	5.0 0.10	4.0 0.11	1.3 0.02	0.0 0.00	0.0	54	Al 0.06[d] Zn 0.39	166	17	94	0	USGS
Butte Farms irrigation	18N/3E-16P2	9-14-59	-	445	7.6	36 1.80	34 2.78	7.2 0.31	2.9 0.07	0 0.00	250 4.10	26 0.54	1.8 0.05	18 0.29	0.1 0.01	0.0	43	Al 0.10[d] Cu 0.01	292	6	229	24	USGS
C. Jones domestic	18N/4E-7A1	8-26-59	-	136	7.4	11 0.55	4.3 0.35	11 0.48	1.9 0.05	0 0.00	66 1.08	5.0 0.10	5.2 0.15	2.8 0.05	0.1 0.01	0.0	65	Al 0.04[d] Zn 0.05	139	34	45	0	USGS
F. Guidici irrigation	-21P1	8-26-59	-	199	7.9	17 0.85	11 0.91	8.9 0.39	0.3 0.01	0 0.00	100 1.64	7.0 0.15	8.0 0.23	6.5 0.10	0.0 0.00	0.0	50	Al 0.04 Pb 0.01[d] Cu 0.01 Zn 0.05	158	18	88	6	USGS
H. J. Kaiser Co. industrial	19N/3E-36B1	8-26-59	-	359	7.9	29 1.45	15 1.27	28 1.22	2.8 0.07	0 0.00	206 3.38	14 0.29	10 0.28	1.5 0.02	0.1 0.01	0.6	36	Al 0.09[d]	238	30	136	0	USGS
Butte County Hospital domestic	19N/4E-6P1	8-27-59	-	291	7.6	22 1.10	15 1.22	18 0.78	2.0 0.05	0 0.00	162 2.66	6.0 0.12	7.5 0.21	7.3 0.12	0.1 0.01	0.0	65	Al 0.06[d] Zn 0.09	223	25	116	0	USGS
R. Norhelm irrigation	20N/1E-15F	7-21-59	-	239	8.1	20 1.00	15 1.22	6.3 0.27	1.9 0.05	0 0.00	146 2.39	4.0 0.08	3.5 0.10	1.8 0.03	0.1 0.01	0.0	65	Al 0.01[d] Cu 0.01	190	11	111	0	USGS
Berkeley Olive Assn. domestic	20N/3E-15H1	8-27-59	-	139	7.6	13 0.65	7.9 0.65	4.7 0.20	2.2 0.06	0 0.00	80 1.31	2.0 0.04	6.0 0.17	0.2 0.00	0.1 0.01	0.0	31	Fe 0.20[d] (dissolved) Al 0.01 Cu 0.01 Zn 1.94	108	13	65	0	USGS
C. Sprague domestic	21N/1W-26Q1	8-27-59	-	455	8.4	42 2.10	29 2.40	18 0.78	1.7 0.04	10 0.33	286 4.69	2.0 0.04	10 0.28	1.3 0.02	0.0 0.00	0.0	64	Al 0.06 Pb 0.01[d] Cu 0.01	319	15	225	0	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M								BUTTE COUNTY (Cont.)														
M. Compton domestic	21N/3E-10Q1	8-27-59	-	266	8.0	25 / 1.25	17 / 1.37	9.0 / 0.39	1.4 / 0.04	0 / 0.00	166 / 2.72	0.0 / 0.00	7.0 / 0.20	1.6 / 0.03	0.0 / 0.00	0.0	83	Al 0.05 Pb 0.01[d] Cu 0.02 Zn 0.10	226	13	131	0	USGS
S. Hopkins domestic and stock	22N/1E-9M1	7-15-59	-	840	8.5	69 / 3.44	64 / 5.24	25 / 1.09	0.6 / 0.02	25 / 0.83	417 / 6.83	17 / 0.35	21 / 0.59	73 / 1.18	0.1 / 0.01	0.0	66	Al 0.20 Cu 0.01[d] Cr^{+6} 0.02 Zn 0.26	566	11	434	51	USGS
Dept. Fish and Game domestic and stock	22N/2E-18J1	7-15-59	-	220	8.0	18 / 0.90	12 / 0.98	12 / 0.52	0.8 / 0.02	0 / 0.00	119 / 1.95	4.0 / 0.08	13 / 0.37	2.5 / 0.04	0.0 / 0.00	0.1	44	Al 0.06 Pb 0.01[d] Cu 0.01 Zn 0.04	165	21	94	0	USGS
C. Callaham stock	23N/1E-32K1	7-15-59	-	190	7.8	16 / 0.80	11 / 0.92	9.0 / 0.39	0.7 / 0.02	0 / 0.00	94 / 1.54	0.0 / 0.00	12 / 0.34	11 / 0.18	0.1 / 0.01	0.0	60	Al 0.07 Cu 0.01[d] Cr^{+6} 0.01 Zn 0.06	166	18	86	9	USGS
M. K. Barnes domestic & irrigation	23N/1W-9L1	7-15-59	-	484	8.3	39 / 1.95	36 / 2.99	11 / 0.48	1.3 / 0.03	6 / 0.20	259 / 4.25	13 / 0.27	8.0 / 0.23	19 / 0.31	0.0 / 0.00	0.0	68	Al 0.12 Cu 0.02[d] Cr^{+6} 0.01 Zn 0.13	328	9	247	25	USGS
									COLUSA COUNTY														
J. Miller domestic	13N/1E-22H1	6-18-59	74	785	8.2	71 / 3.54	49 / 4.05	26 / 1.13	1.2 / 0.03	0 / 0.00	401 / 6.57	49 / 1.02	30 / 0.85	15 / 0.24	0.1 / 0.00	0.18	45		483	13	380	51	DWR
J. V. Doherty domestic	13N/1W-7A1	6-18-59	71	1,240	8.0	104 / 5.19	39 / 3.18	67 / 2.91	0.7 / 0.02	0 / 0.00	170 / 2.79	12 / 0.25	274 / 7.73	11 / 0.18	0.3 / 0.02	0.44	32		624	26	419	280	DWR
L. Traynham irrigation	-8B1	6-18-59	68	1,630	7.3	123 / 6.14	69 / 5.65	70 / 3.04	1.6 / 0.04	0 / 0.00	167 / 2.74	7.7 / 0.16	403 / 11.36	7.2 / 0.12	0.3 / 0.02	0.43	39		803	20	590	453	DWR
W. West irrigation and stock	-15N1	6-24-59	-	495	8.0	26 / 1.30	18 / 1.50	51 / 2.22	1.9 / 0.05	0 / 0.00	237 / 3.88	10 / 0.21	36 / 1.02	0.9 / 0.01	0.3 / 0.02	0.58	38		299	44	140	0	DWR
M. V. Doherty domestic	-35Q1	6-18-59	75	408	8.1	25 / 1.25	16 / 1.31	35 / 1.52	2.4 / 0.06	0 / 0.00	200 / 3.28	6.9 / 0.14	22 / 0.62	3.2 / 0.05	0.4 / 0.02	0.37	58		267	37	128	0	DWR
Grant irrigation	13N/2W-10G1	6-17-59	73	1,110	7.3	54 / 2.69	32 / 2.64	125 / 5.44	1.6 / 0.04	0 / 0.00	205 / 3.36	26 / 0.54	233 / 6.57	10 / 0.16	0.3 / 0.02	2.5	29		614	50	267	99	DWR
A. Olivetti irrigation	-10M1	6-17-59	68	618	7.4	25 / 1.25	18 / 1.47	77 / 3.35	1.1 / 0.03	0 / 0.00	210 / 3.44	9.2 / 0.19	74 / 2.09	16 / 0.26	0.2 / 0.01	1.4	29		354	55	136	0	DWR
H. Charter irrigation	-22G1	6-17-59	70	849	7.8	42 / 2.10	41 / 3.41	72 / 3.13	1.4 / 0.04	0 / 0.00	292 / 4.78	14 / 0.29	121 / 3.41	8.1 / 0.13	0.3 / 0.02	1.4	30		475	36	276	37	DWR
W. J. Moore irrigation	-26A1	7-2-59	-	720	8.2	45 / 2.24	40 / 3.25	45 / 1.96	1.2 / 0.03	0 / 0.00	309 / 5.06	7.7 / 0.16	73 / 2.06	16 / 0.26	0.2 / 0.01	0.62	25		406	26	275	22	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
COLUSA COUNTY (Cont.)																							
Charter irrigation	13N/2W-29R1	6-17-59	72	1,020	7.9	43 / 2.14	38 / 3.15	115 / 5.00	1.9 / 0.05	0 / 0.00	265 / 4.34	27 / 0.56	188 / 5.30	4.2 / 0.07	0.4 / 0.02	0.22	30		578	48	265	48	DWR
Grand Island School domestic	14N/1E-18A1	6-18-59	80	469	8.2	16 / 0.80	9.7 / 0.80	75 / 3.26	0.9 / 0.02	0 / 0.00	237 / 3.88	16 / 0.33	21 / 0.59	0.5 / 0.01	0.1 / 0.00	0.26	36		291	67	80	0	DWR
Stapp & Co. domestic	14N/1W-2D1	6-18-59	68	1,610	8.0	82 / 4.09	69 / 5.70	138 / 6.00	3.2 / 0.08	0 / 0.00	315 / 5.16	180 / 3.75	240 / 6.77	1.7 / 0.03	0.2 / 0.01	0.22	45		914	38	490	232	DWR
S. Morse irrigation	-12A1	6-17-59	67	560	8.1	10 / 0.50	6.3 / 0.52	106 / 4.61	1.1 / 0.03	0 / 0.00	262 / 4.29	1.5 / 0.03	50 / 1.41	0.6 / 0.01	0.1 / 0.00	0.65	41		346	81	51	0	DWR
C. Hackbauth irrigation	14N/2W-12H2	6-18-59	68	582	8.2	32 / 1.60	29 / 2.36	47 / 2.04	1.6 / 0.04	0 / 0.00	274 / 4.49	16 / 0.33	40 / 1.13	1.4 / 0.02	0.4 / 0.02	0.17	43		344	34	198	0	DWR
H. L. Charter domestic & irrigation	-29J1	6-17-59	69	244	7.4	14 / 0.70	11 / 0.90	20 / 0.87	0.8 / 0.02	0 / 0.00	129 / 2.11	1.0 / 0.02	5.0 / 0.14	10 / 0.16	0.3 / 0.02	0.21	31		156	35	80	0	DWR
J. Stuckmeyer irrigation	-35P1	7-2-59	-	623	8.1	31 / 1.55	28 / 2.33	51 / 2.22	1.0 / 0.02	0 / 0.00	209 / 3.42	12 / 0.25	81 / 2.28	4.2 / 0.07	0.2 / 0.01	0.88	25		337	36	194	23	DWR
E. Arambell irrigation	14N/3W-12L1	6-24-59	-	406	8.1	39 / 1.95	12 / 1.01	27 / 1.17	1.1 / 0.03	0 / 0.00	190 / 3.11	20 / 0.42	19 / 0.54	9.3 / 0.15	0.2 / 0.01	0.14	24		246	28	148	0	DWR
B. Myers domestic and stock	15N/2W-32R1	6-17-59	72	711	8.0	59 / 2.94	25 / 2.06	62 / 2.70	0.6 / 0.02	0 / 0.00	322 / 5.28	49 / 1.02	36 / 1.02	19 / 0.31	0.6 / 0.03	0.41	24		434	35	250	0	DWR
P. Murphy domestic	15N/4W-25P1	6-17-59	70	1,020	7.9	45 / 2.24	29 / 2.40	137 / 5.96	1.0 / 0.02	0 / 0.00	344 / 5.64	97 / 2.02	105 / 2.96	3.9 / 0.06	0.6 / 0.03	0.60	24		612	56	232	0	DWR
Shell Oil Co. industrial	16N/1W-29J1	6-23-59	72	456	8.1	6.3 / 0.31	6.9 / 0.57	92 / 4.00	1.1 / 0.03	0 / 0.00	273 / 4.47	0.0 / 0.00	11 / 0.31	0.5 / 0.01	0.2 / 0.01	0.37	40		292	81	44	0	DWR
J. C. Baird irrigation	-31Q1	6-23-59	70	2,105	8.4	64 / 3.19	78 / 6.42	335 / 14.57	2.3 / 0.06	31 / 1.03	725 / 11.88	408 / 8.49	129 / 3.64	0.9 / 0.01	0.0 / 0.00	0.75	31		1,430	60	481	0	DWR
Watts Bros. domestic	16N/2W-4H1	6-18-59	68	456	8.1	28 / 1.40	19 / 1.56	39 / 1.70	1.2 / 0.03	0 / 0.00	218 / 3.57	28 / 0.58	16 / 0.45	3.3 / 0.05	0.2 / 0.01	0.14	39		281	36	148	0	DWR
J. W. Davie domestic	-35B1	6-17-59	72	730	7.8	21 / 1.05	26 / 2.15	100 / 4.35	1.4 / 0.04	0 / 0.00	277 / 4.54	83 / 1.73	47 / 1.32	1.1 / 0.02	0.5 / 0.03	0.43	45		461	57	160	0	DWR
F. J. Ortman domestic	16N/3W-9N1	6-18-59	78	662	8.1	46 / 2.30	22 / 1.80	58 / 2.52	0.6 / 0.02	0 / 0.00	231 / 3.79	23 / 0.48	81 / 2.28	3.6 / 0.06	0.6 / 0.03	0.33	23		372	38	205	16	DWR
W. L. Jeffreys irrigation	17N/1W-5D1	6-18-59	62	390	8.3	26 / 1.30	19 / 1.54	29 / 1.26	2.0 / 0.05	2 / 0.07	229 / 3.75	2.0 / 0.04	11 / 0.31	0.5 / 0.01	0.1 / 0.00	0.29	43		248	30	142	0	DWR
Libby irrigation	-20N1	6-18-59	65	388	8.2	24 / 1.20	13 / 1.10	41 / 1.78	1.5 / 0.04	0 / 0.00	225 / 3.69	2.0 / 0.04	12 / 0.34	0.5 / 0.01	0.1 / 0.00	0.18	36		240	43	115	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

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						Mineral constituents in parts per million / equivalents per million																	
	MDB&M								COLUSA COUNTY (Cont.)														
C. Tuttle domestic	17N/2W-12C1	6-18-59	70	499	8.2	40 / 2.00	22 / 1.82	34 / 1.48	1.2 / 0.03	0 / 0.00	282 / 4.62	7.7 / 0.16	18 / 0.51	0.4 / 0.01	0.2 / 0.01	0.16	33		296	28	191	0	DWR
R. Wilbur irrigation	-36P1	6-18-59	64	440	7.9	28 / 1.40	20 / 1.66	39 / 1.70	1.6 / 0.04	0 / 0.00	252 / 4.13	15 / 0.31	12 / 0.34	0.6 / 0.01	0.1 / 0.00	0.28	42		282	35	153	0	DWR
Maxwell Public Utility District municipal	17N/3W-33R1	6-18-59	70	937	8.2	48 / 2.40	30 / 2.50	108 / 4.70	1.1 / 0.03	0 / 0.00	330 / 5.41	102 / 2.12	73 / 2.06	2.2 / 0.04	0.4 / 0.02	0.35	52		579	49	245	0	DWR
									SUTTER COUNTY														
C. A. Richter domestic	12N/2E-9B2	9-15-59	-	630	8.3	8.8 / 0.44	11 / 0.94	124 / 5.39	2.0 / 0.05	10 / 0.33	258 / 4.23	16 / 0.33	62 / 1.75	0.5 / 0.01	0.0 / 0.00	0.4	50		412	79	69	0	USGS
Garner domestic	-11N1	9-15-59	-	1,270	8.2	26 / 1.30	14 / 1.18	228 / 9.92	5.6 / 0.14	0 / 0.00	272 / 4.46	2.0 / 0.04	270 / 7.61	1.1 / 0.02	0.0 / 0.00	1.7	51		733	79	124	0	USGS
domestic	-14B1	9- -59	-	4,280	7.7	131 / 6.54	117 / 9.66	505 / 21.97	3.4 / 0.09	0 / 0.00	199 / 3.26	35 / 0.73	1,260 / 35.53	0.5 / 0.01	0.1 / 0.01	0.4	30		2,180	57	810	647	USGS
L. A. Waight domestic	-16R1	9-15-59	-	828	8.6	20 / 1.00	13 / 1.10	167 / 7.26	4.8 / 0.12	20 / 0.67	428 / 7.01	15 / 0.31	48 / 1.35	0.6 / 0.01	0.0 / 0.00	0.6	49		549	77	105	0	USGS
Haun domestic	-23Q1	9-15-59	-	959	8.0	14 / 0.70	9.7 / 0.80	164 / 7.13	4.4 / 0.11	0 / 0.00	273 / 4.47	2.0 / 0.04	162 / 4.57	1.0 / 0.02	0.0 / 0.00	0.7	50		542	82	75	0	USGS
D. E. Mullen domestic	-26A1	9-15-59	-	1,060	8.3	16 / 0.80	19 / 1.56	183 / 7.96	6.0 / 0.15	8 / 0.27	273 / 4.47	3.0 / 0.06	202 / 5.70	1.5 / 0.02	0.0 / 0.00	0.8	48		621	76	118	0	USGS
T. Fields domestic	13N/3E-10M2	9-15-59	-	773	7.9	52 / 2.59	40 / 3.27	58 / 2.52	1.5 / 0.04	0 / 0.00	361 / 5.92	30 / 0.62	58 / 1.64	8.2 / 0.13	0.0 / 0.00	0.1	35		461	30	293	0	USGS
E. Silva irrigation	-11Q3	7-30-59	-	872	8.0	25 / 1.25	19 / 1.59	121 / 5.26	3.2 / 0.08	0 / 0.00	236 / 3.87	2.0 / 0.04	153 / 4.31	0.2 / 0.00	0.0 / 0.00	1.0	36		476	64	142	0	USGS
C. M. Owen irrigation	13N/4E-21A1	9-15-59	-	696	8.3	50 / 2.50	48 / 3.96	34 / 1.48	2.7 / 0.07	2 / 0.07	253 / 4.15	166 / 3.46	9.6 / 0.27	0.0 / 0.00	0.0 / 0.00	0.0	40		477	13	323	112	USGS
J. E. Jopson irrigation	-23Q1	9-15-59	-	200	7.7	12 / 0.60	10 / 0.86	13 / 0.57	0.9 / 0.02	0 / 0.00	88 / 1.44	4.0 / 0.08	14 / 0.39	4.8 / 0.08	0.1 / 0.01	0.0	53		155	28	73	1	USGS
C. E. Nelson irrigation	13N/5E-7R3	9-15-59	-	512	7.6	34 / 1.70	19 / 1.54	40 / 1.74	2.0 / 0.05	0 / 0.00	162 / 2.66	49 / 1.02	44 / 1.24	7.7 / 0.12	0.1 / 0.01	0.0	67		343	35	162	29	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Per-cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							SUTTER COUNTY (Cont.)															
Calif. Packing Corp. irrigation	13N/5E-9R1	9-15-59	-	398	7.9	25 / 1.25	11 / 0.91	46 / 2.00	1.3 / 0.03	0 / C.00	152 / 2.49	44 / 0.92	21 / 0.59	2.6 / 0.04	0.0 / 0.00	0.1	72		298	48	108	0	USGS
E. J. Gallegher irrigation	-19R2	9-15-59	-	240	7.9	16 / 0.80	12 / 0.96	16 / 0.70	1.5 / 0.04	0 / 0.00	104 / 1.70	5.0 / 0.10	20 / 0.56	2.0 / 0.03	0.1 / 0.01	0.0	72		196	28	88	3	USGS
West Ranch irrigation	-33L1	8-5-59	68	210	7.6	14 / 0.70	10 / 0.84	13 / 0.56	0.8 / 0.02	0 / 0.00	106 / 1.74	4.1 / 0.08	7.4 / 0.21	2.2 / 0.04	0.2 / 0.01	0.07	52		156	26	77	0	DWR
Frye Bros. domestic	14N/1E-1A1	9-13-59	-	577	8.6	38 / 1.90	48 / 3.92	26 / 1.13	1.1 / 0.03	24 / 0.80	313 / 5.13	18 / 0.37	14 / 0.39	2.7 / 0.04	0.0 / 0.00	0.0	53		379	16	291	0	USGS
S. A. McKeehan domestic	-2A1	9-15-59	-	629	7.8	56 / 2.79	43 / 3.53	17 / 0.74	1.4 / 0.04	0 / 0.00	343 / 5.62	16 / 0.33	33 / 0.93	0.0 / 0.00	0.0 / 0.00	0.0	53		388	10	316	35	USGS
C. S. Srah domestic & irrigation	14N/3E-5A3	9-15-59	-	869	8.1	50 / 2.50	44 / 3.64	56 / 2.44	2.4 / 0.06	0 / 0.00	460 / 7.54	13 / 0.27	42 / 1.18	0.1 / 0.00	0.1 / 0.01	0.0	29		464	28	307	0	USGS
L. Littlejohn domestic & irrigation	-14E2	9-15-59	-	289	8.0	22 / 1.10	20 / 1.64	11 / 0.48	1.2 / 0.03	0 / 0.00	178 / 2.92	6.0 / 0.12	4.8 / 0.14	0.4 / 0.01	0.0 / 0.00	0.0	43		196	15	137	0	USGS
S. E. Best domestic & irrigation	-16B2	8-11-59	-	1,400	8.2	67 / 3.34	93 / 7.66	61 / 2.65	3.7 / 0.09	0 / 0.00	177 / 2.90	80 / 1.67	306 / 8.63	0.1 / 0.00	0.0 / 0.00	0.0	28		726	19	550	405	USGS
R. Mahom irrigation	18A2	9-15-59	-	632	3.2	36 / 1.30	44 / 3.64	34 / 1.48	1.8 / 0.05	0 / 0.00	375 / 6.15	17 / 0.35	21 / 0.59	0.4 / 0.01	0.0 / 0.00	0.1	33		372	21	272	0	USGS
Sullivan irrigation	-23M2	7-30-59	-	310	8.2	24 / 1.20	23 / 1.90	9.6 / 0.42	1.1 / 0.03	0 / 0.00	183 / 3.00	17 / 0.35	3.2 / 0.09	0.1 / 0.00	0.0 / 0.00	0.0	46		214	12	155	5	USGS
L. Ott irrigation	-28D1	9-15-59	-	849	8.2	50 / 2.50	42 / 3.44	58 / 2.52	3.2 / 0.08	0 / 0.00	253 / 4.15	8.0 / 0.17	138 / 3.89	0.0 / 0.00	0.0 / 0.00	0.1	46		470	30	297	90	USGS
J. Serger irrigation	-28R1	9-15-59	-	1,610	3.1	35 / 1.75	139 / 11.43	62 / 2.70	3.7 / 0.09	0 / 0.00	358 / 5.87	24 / 0.50	350 / 9.87	1.3 / 0.02	0.1 / 0.01	0.0	36		827	17	659	365	USGS
L. Ott irrigation	-31B1	9-15-59	-	1,030	8.1	51 / 2.54	37 / 3.04	108 / 4.70	6.2 / 0.16	0 / 0.00	337 / 5.52	13 / 0.27	173 / 4.88	1.4 / 0.02	0.0 / 0.00	0.2	45		601	45	279	3	USGS
E. L. Cardthers domestic	15N/2E-26D2	6-18-59	-	813	8.4	27 / 1.35	66 / 5.45	43 / 1.87	1.2 / 0.03	8 / 0.27	316 / 5.18	27 / 0.56	59 / 1.66	43 / 0.69	0.1 / 0.01	0.0	50		480	21	340	68	USGS
A. Eager irrigation	15N/3E-4C2	7-30-59	-	726	7.8	15 / 0.75	76 / 6.23	26 / 1.13	2.5 / 0.06	0 / 0.00	395 / 6.47	43 / 0.90	14 / 0.39	20 / 0.32	0.1 / 0.01	0.3	58		450	14	349	25	USGS
R. Paillex irrigation	-26M1	9-15-59	-	373	3.4	22 / 1.10	21 / 1.72	38 / 1.65	3.3 / 0.08	1 / 0.03	238 / 3.90	6.6 / 0.14	11 / 0.31	0.0 / 0.00	0.0 / 0.00	0.2	39		259	36	141	0	USGS
W. A. Glentzer irrigation	-29G1	9-15-59	-	735	8.2	16 / 0.80	77 / 6.32	30 / 1.30	1.3 / 0.03	0 / 0.00	441 / 7.23	23 / 0.48	11 / 0.31	20 / 0.32	0.0 / 0.00	C.0	55		450	15	356	0	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C. ppm	Analyzed by [c]
	MDB&M								YUBA COUNTY														
City of Wheatland municipal	13N/5E-4B	3-20-59	61	897	7.8	46 / 2.30	13 / 1.10	105 / 4.57	2.4 / 0.06	0 / 0.00	116 / 1.90	14 / 0.29	210 / 5.92	0.8 / 0.01	0.2 / 0.01	0.47	61		510	57	170	75	DWR
E. Anthony domestic	14N/4E-7M1	3-6-59	-	497	7.7	42 / 2.10	26 / 2.16	24 / 1.04	1.3 / 0.03	0 / 0.00	267 / 4.38	19 / 0.40	21 / 0.59	0.0 / 0.00	0.1 / 0.00	0.03	30		294	20	213	0	DWR
E. Hofman irrigation	-22H1	8-4-59	-	227	7.5	14 / 0.70	9.5 / 0.78	16 / 0.70	1.6 / 0.04	0 / 0.00	101 / 1.66	4.1 / 0.08	15 / 0.42	2.5 / 0.04	0.2 / 0.01	0.07	56		169	32	74	0	DWR
E. Booth irrigation	14N/5E-15C1	8-4-59	-	203	7.8	13 / 0.65	8.9 / 0.73	13 / 0.56	0.9 / 0.02	0 / 0.00	90 / 1.43	2.3 / 0.05	12 / 0.34	1.8 / 0.03	0.2 / 0.01	0.06	71		167	28	69	0	DWR
W. M. Holmes irrigation	-16 C1	8-4-59	68	170	7.8	11 / 0.55	6.4 / 0.53	12 / 0.52	0.6 / 0.02	0 / 0.00	80 / 1.31	3.0 / 0.06	7.6 / 0.21	3.9 / 0.06	0.2 / 0.01	0.08	62		146	32	54	0	DWR
Waltz Bros. irrigation	-21G	8-7-59	65	312	7.6	20 / 1.00	7.8 / 0.64	26 / 1.13	1.5 / 0.04	0 / 0.00	85 / 1.39	6.2 / 0.13	44 / 1.24	1.3 / 0.02	0.2 / 0.01	0.10	74		223	40	82	12	DWR
H. Lightfoot irrigation	-32J	8-4-59	65	287	8.0	21 / 1.05	16 / 1.33	11 / 0.48	0.7 / 0.02	0 / 0.00	134 / 2.20	7.6 / 0.16	15 / 0.42	4.0 / 0.06	0.2 / 0.01	0.04	56		198	17	119	9	DWR
Linda County Water Dist. municipal	15N/4E-21J	8-20-59	-	321	8.2	25 / 1.25	21 / 1.71	13 / 0.57	1.1 / 0.03	0 / 0.00	165 / 2.70	31 / 0.65	4.9 / 0.14	1.4 / 0.02	0.0 / 0.00	0.0	44		222	16	148	13	USGS
Linda County Water Dist. municipal	-31A	8-20-59	-	233	8.1	21 / 1.05	12 / 0.95	12 / 0.52	1.1 / 0.03	0 / 0.00	140 / 2.29	4.0 / 0.08	5.5 / 0.16	0.0 / 0.00	0.0 / 0.00	0.0	38		163	20	100	0	USGS
U. S. Air Force municipal	15N/5E-19N1	8-4-59	-	175	7.5	10 / 0.50	6.1 / 0.50	14 / 0.61	1.0 / 0.02	0 / 0.00	73 / 1.20	1.8 / 0.04	8.4 / 0.24	6.2 / 0.10	0.2 / 0.01	0.08	67		151	37	50	0	DWR
La Finca Orchards irrigation	16N/3E-11N1	8-6-59	68	1,060	7.3	74 / 3.69	24 / 1.94	90 / 3.92	3.2 / 0.08	0 / 0.00	160 / 2.62	5.8 / 0.12	247 / 6.96	0.1 / 0.00	0.1 / 0.00	0.46	56		580	41	282	151	DWR
J. Pobel domestic	16N/4E-9D1	8-9-59	-	220	7.5	15 / 0.75	10 / 0.85	11 / 0.48	0.3 / 0.02	0 / 0.00	81 / 1.33	3.1 / 0.06	10 / 0.28	23 / 0.37	0.1 / 0.00	0.06	60		173	23	80	14	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
	MDB&M								PLACER	COUNTY													
K. Terioko irrigation	10N/5E-6D1	8-4-59	66	297	7.9	20 / 1.00	8.8 / 0.72	29 / 1.26	1.3 / 0.03	0 / 0.00	145 / 2.38	2.5 / 0.05	19 / 0.54	2.9 / 0.05	0.3 / 0.02	0.11	44		199	42	86	0	DWR
A. Lamben domestic & irrigation	10N/6E-5C	8-3-59	-	182	7.6	11 / 0.55	6.9 / 0.57	14 / 0.61	0.9 / 0.02	0 / 0.00	85 / 1.39	0.2 / 0.00	9.9 / 0.28	2.6 / 0.04	0.4 / 0.02	0.05	73		166	35	56	0	DWR
F. Wittsche irrigation	-11R1	8-4-59	-	247	7.9	16 / 0.80	9.2 / 0.76	21 / 0.91	1.3 / 0.03	0 / 0.00	124 / 2.03	8.1 / 0.17	10 / 0.28	0.9 / 0.01	0.1 / 0.00	0.06	84		212	36	78	0	DWR
R. Vandegrift irrigation	11N/5E-6A1	8-3-59	69	235	7.8	14 / 0.70	8.5 / 0.70	20 / 0.87	1.5 / 0.04	0 / 0.00	111 / 1.82	1.2 / 0.02	12 / 0.34	3.4 / 0.05	0.3 / 0.02	0.15	65		180	38	70	0	DWR
irrigation	-14P2	8-19-59	70	391	7.8	22 / 1.10	12 / 0.96	34 / 1.48	2.0 / 0.05	0 / 0.00	115 / 1.88	3.3 / 0.07	59 / 1.66	2.5 / 0.04	0.2 / 0.01	0.28	78		269	41	103	9	DWR
P. B. Minarick irrigation	-18H1	8-19-59	69	270	7.8	17 / 0.85	7.4 / 0.61	26 / 1.13	2.3 / 0.06	0 / 0.00	121 / 1.98	2.0 / 0.04	19 / 0.54	1.3 / 0.02	0.2 / 0.01	0.21	63		197	43	73	0	DWR
W. Armstrong irrigation	-31A1	8-4-59	68	294	7.9	12 / 0.60	11 / 0.94	29 / 1.26	1.6 / 0.04	0 / 0.00	132 / 2.16	2.3 / 0.05	21 / 0.59	3.0 / 0.05	0.2 / 0.01	0.26	62		207	44	77	0	DWR
F. Peterson irrigation	-33M	8-4-59	70	252	7.7	15 / 0.75	6.0 / 0.49	26 / 1.13	1.5 / 0.04	0 / 0.00	105 / 1.72	0.5 / 0.01	21 / 0.59	2.9 / 0.05	0.3 / 0.02	0.17	79		204	47	62	0	DWR
W. F. Fiddyment irrigation	11N/6E-16M	8-4-59	-	405	7.7	18 / 0.90	9.2 / 0.76	48 / 2.09	1.6 / 0.04	0 / 0.00	118 / 1.93	10 / 0.21	57 / 1.61	3.5 / 0.06	0.4 / 0.02	0.71	78		284	55	83	0	DWR
Sierra View Land Co. irrigation	-34B	8-3-59	70	273	8.0	21 / 1.05	10 / 0.85	20 / 0.87	1.4 / 0.04	0 / 0.00	147 / 2.41	2.8 / 0.06	11 / 0.31	0.9 / 0.01	0.2 / 0.01	0.09	80		219	31	95	0	DWR
R. Mariner irrigation	12N/5E-2B1	8-3-59	69	197	7.6	11 / 0.55	6.9 / 0.57	18 / 0.78	1.1 / 0.03	0 / 0.00	96 / 1.57	5.8 / 0.12	6.7 / 0.19	0.9 / 0.01	0.3 / 0.02	0.17	70		168	40	56	0	DWR
F. Bonnfield irrigation	-3D	8-19-59	-	230	7.5	12 / 0.60	6.3 / 0.52	25 / 1.09	1.3 / 0.03	0 / 0.00	111 / 1.82	0.0 / 0.00	16 / 0.45	0.0 / 0.00	0.2 / 0.01	0.26	68		183	49	56	0	DWR
U. S. Air Force industrial	-23C1	8-5-59	-	207	7.7	10 / 0.50	7.5 / 0.62	20 / 0.87	1.0 / 0.02	0 / 0.00	92 / 1.51	2.1 / 0.04	10 / 0.28	6.0 / 0.10	0.3 / 0.02	0.21	77		179	43	56	0	DWR
Fisher irrigation	12N/6E-27D1	8-5-59	68	1,590	7.6	61 / 3.04	8.5 / 0.70	246 / 10.70	3.0 / 0.03	0 / 0.00	90 / 1.48	79 / 1.64	393 / 11.08	4.0 / 0.06	0.5 / 0.03	0.32	72		911	74	187	113	DWR
G. Blake domestic	13N/5E-13D	8-4-59	-	298	7.6	13 / 0.65	6.0 / 0.49	35 / 1.52	1.2 / 0.03	0 / 0.00	81 / 1.33	18 / 0.37	30 / 0.85	4.1 / 0.07	0.3 / 0.02	0.25	77		225	56	57	0	DWR
J. W. Thorton irrigation	-22C2	8-3-59	68	571	7.7	30 / 1.50	12 / 1.02	56 / 2.44	1.8 / 0.05	0 / 0.00	82 / 1.34	26 / 0.54	109 / 3.07	3.0 / 0.05	0.2 / 0.01	0.32	74		352	49	126	59	DWR
W. Brown irrigation	-24P1	8-4-59	68	256	7.8	14 / 0.70	9.0 / 0.74	23 / 1.00	1.0 / 0.02	0 / 0.00	104 / 1.70	4.9 / 0.10	20 / 0.56	2.2 / 0.04	0.3 / 0.02	0.15	65		190	41	72	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							PLACER COUNTY (Cont.)															
L. Gunther domestic & irrigation	13N/6E-17A1	8-5-59	-	137	7.3	8.5 / 0.42	3.9 / 0.32	12 / 0.52	0.7 / 0.02	0 / 0.00	53 / 0.87	5.1 / 0.11	5.7 / 0.16	7.0 / 0.11	0.2 / 0.01	0.07	33		102	41	37	0	DWR
L. Franceschi irrigation	-33C1	8-4-59	60	540	7.8	30 / 1.50	19 / 1.60	49 / 2.13	1.0 / 0.02	0 / 0.00	166 / 2.72	29 / 0.60	66 / 1.86	2.5 / 0.04	0.3 / 0.02	1.4	45		325	40	155	19	DWR
H. Porter domestic & irrigation	14N/6E-31D	8-5-59	-	115	7.1	3.9 / 0.19	1.6 / 0.13	17 / 0.74	0.6 / 0.02	0 / 0.00	53 / 0.87	1.2 / 0.02	3.6 / 0.10	3.4 / 0.05	0.4 / 0.02	0.04	67		125	68	16	0	DWR
									YOLO COUNTY														
G. Hiramoto domestic	6N/3E-25A1	8-14-59	70	490	8.1	12 / 0.60	3.6 / 0.30	94 / 4.09	2.2 / 0.06	0 / 0.00	228 / 3.74	26 / 0.54	27 / 0.76	0.1 / 0.00	0.2 / 0.01	1.1	33		311	81	45	0	DWR
Glide Ranch domestic and stock	7N/3E-9J1	8-11-59	79	751	8.2	22 / 1.10	64 / 5.31	50 / 2.13	1.4 / 0.04	0 / 0.00	445 / 7.29	31 / 0.64	23 / 0.65	4.6 / 0.07	0.2 / 0.01	0.74	28		444	25	321	0	DWR
Mills Estate domestic	-31M1	8-11-59	78	887	8.1	41 / 2.04	72 / 5.95	53 / 2.30	1.5 / 0.04	0 / 0.00	513 / 8.41	43 / 0.90	33 / 0.93	11 / 0.18	0.3 / 0.02	0.75	35		542	22	400	0	DWR
E. O. Anderson domestic	7N/4E-33G1	8-14-59	72	2,090	7.8	70 / 3.49	23 / 1.88	324 / 14.09	13 / 0.33	0 / 0.00	229 / 3.75	0.0 / 0.00	558 / 15.74	0.1 / 0.00	0.2 / 0.01	2.1	50		1,150	71	269	81	DWR
B. Nobel irrigation	8N/1E-9E1	8-16-59	68	882	8.2	38 / 1.90	55 / 4.55	78 / 3.39	2.0 / 0.05	0 / 0.00	396 / 6.49	80 / 1.66	55 / 1.55	6.3 / 0.10	0.5 / 0.03	0.68	36		546	34	323	0	DWR
irrigation	-13G1	8-7-59	70	736	8.0	49 / 2.44	38 / 3.17	55 / 2.39	1.1 / 0.03	0 / 0.00	342 / 5.60	43 / 0.90	46 / 1.30	6.4 / 0.10	0.5 / 0.03	0.55	38		446	30	281	1	DWR
Willowbank Corp. domestic & irrigation	8N/2E-13F2	8-7-59	71	653	8.1	29 / 1.45	48 / 3.94	47 / 2.04	1.2 / 0.03	0 / 0.00	388 / 6.36	30 / 0.62	16 / 0.45	4.3 / 0.07	0.4 / 0.02	0.58	36		403	27	270	0	DWR
B. K. Howat	8N/3E-5P1	8-11-59	74	794	8.2	32 / 1.60	45 / 3.69	78 / 3.39	2.8 / 0.07	0 / 0.00	388 / 6.36	52 / 1.08	47 / 1.32	1.2 / 0.02	0.3 / 0.02	1.0	46		496	39	265	0	DWR
B. K. Howat irrigation	-5Q1	8-11-59	71	738	8.2	24 / 1.20	43 / 3.56	72 / 3.13	2.5 / 0.06	0 / 0.00	353 / 5.78	46 / 0.96	46 / 1.30	1.4 / 0.02	0.3 / 0.02	1.3	42		452	39	238	0	DWR
W. C. Hamel irrigation	-19D1	8-7-59	68	963	8.2	38 / 1.90	76 / 6.23	68 / 2.96	1.5 / 0.04	0 / 0.00	527 / 8.64	57 / 1.19	36 / 1.02	21 / 0.34	0.3 / 0.02	0.82	37		595	26	407	0	DWR
Wilber domestic	-19M2	8-7-59	80	1,920	8.0	62 / 3.09	187 / 15.35	125 / 5.44	2.0 / 0.05	0 / 0.00	1,030 / 16.88	139 / 2.89	83 / 2.34	110 / 1.77	0.3 / 0.02	2.2	41		1,260	23	923	78	DWR
Rice Growers Assn. industrial	8N/4E-3B1	8-14-59	82	788	7.8	47 / 2.34	25 / 2.08	62 / 2.70	6.0 / 0.15	0 / 0.00	170 / 2.79	0.0 / 0.00	162 / 4.57	0.02 / 0.00	0.1 / 0.00	0.36	54		441	37	221	82	DWR
Dumars irrigation	9N/1E-12A1	8-7-59	71	1,010	8.2	47 / 2.34	60 / 4.95	89 / 3.87	1.8 / 0.05	0 / 0.00	491 / 8.05	46 / 0.96	72 / 2.03	10 / 0.16	0.4 / 0.02	2.7	29		599	34	365	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

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						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							YOLO COUNTY (Cont.)															
T. Barrios irrigation	9N/2E-4L1	8-7-59	70	997	8.1	43 / 2.14	58 / 4.79	92 / 4.00	1.7 / 0.04	0 / 0.00	457 / 7.49	41 / 0.85	71 / 2.00	27 / 0.44	0.3 / 0.02	2.0	28		589	36	347	0	DWR
R. Statmueller irrigation	-10D1	8-7-59	70	1,220	7.8	51 / 2.54	82 / 6.75	105 / 4.57	1.2 / 0.03	0 / 0.00	637 / 10.44	45 / 0.94	79 / 2.23	13 / 0.21	0.6 / 0.03	3.2	28		721	33	465	0	DWR
E. Chiles domestic & irrigation	-35D1	8-7-59	-	1,350	8.6	32 / 1.60	93 / 7.63	140 / 6.09	1.2 / 0.03	19 / 0.63	577 / 9.46	102 / 2.12	111 / 3.13	4.4 / 0.07	0.5 / 0.03	2.2	27		816	40	462	0	DWR
Woodland Farms domestic	9N/3E-7D1	8-7-59	74	581	8.0	38 / 1.90	30 / 2.48	42 / 1.83	2.0 / 0.05	0 / 0.00	292 / 4.78	16 / 0.33	37 / 1.04	2.5 / 0.04	0.2 / 0.01	1.7	25		338	29	219	0	DWR
L. Weisickle domestic	9N/4E-33L1	8-14-59	76	1,500	8.0	67 / 3.34	26 / 2.11	192 / 8.35	7 / 0.18	0 / 0.00	236 / 3.87	0.0 / 0.00	362 / 10.21	0.2 / 0.00	0.1 / 0.00	1.7	43		815	60	273	79	DWR
Dumars domestic	9N/1W-16H1	8-5-59	85	890	8.0	55 / 2.74	27 / 2.20	103 / 4.48	1.7 / 0.04	0 / 0.00	325 / 5.33	72 / 1.50	90 / 2.54	1.2 / 0.02	0.5 / 0.03	0.85	30		541	47	247	0	DWR
Chapman Bros. irrigation	-30L1	8-7-59	70	858	7.5	60 / 2.99	34 / 2.82	70 / 3.04	1.3 / 0.03	0 / 0.00	310 / 5.08	67 / 1.39	77 / 2.17	14 / 0.22	0.4 / 0.02	0.78	30		506	34	291	37	DWR
Scarlett & Owens irrigation	10N/1E-1C1	8-6-59	74	981	8.3	70 / 3.49	60 / 4.96	56 / 2.44	1.7 / 0.04	0 / 0.00	496 / 8.13	30 / 0.62	69 / 1.94	18 / 0.29	0.2 / 0.01	2.3	25		576	22	423	16	DWR
N. Corcoran domestic	-15G1	8-7-59	69	889	7.9	68 / 3.39	52 / 4.26	44 / 1.91	2.9 / 0.07	0 / 0.00	446 / 7.31	32 / 0.67	52 / 1.47	18 / 0.29	0.1 / 0.00	2.0	17		507	20	383	17	DWR
A. Summ irrigation	-26A	8-6-59	69	670	7.8	45 / 2.24	37 / 3.03	44 / 1.91	2.6 / 0.07	0 / 0.00	327 / 5.36	29 / 0.60	45 / 1.27	4.5 / 0.07	0.2 / 0.01	2.0	16		386	26	264	0	DWR
W. K. Lowe domestic	10N/2E-1Q1	8-6-59	70	2,020	8.0	127 / 6.34	116 / 9.52	137 / 5.96	3.7 / 0.09	0 / 0.00	470 / 7.70	261 / 5.43	318 / 8.97	2.6 / 0.04	0.1 / 0.00	3.8	25		1,220	27	794	409	DWR
Spreckles Sugar Co. industrial	-16B1	8-6-59	70	696	8.0	46 / 2.30	37 / 3.01	48 / 2.09	2.5 / 0.06	0 / 0.00	334 / 5.47	26 / 0.54	50 / 1.41	5.3 / 0.08	0.1 / 0.00	1.9	27		408	28	266	0	DWR
City of Woodland municipal	-27H1	8-7-59	76	520	8.0	34 / 1.70	23 / 1.90	41 / 1.78	20 / 0.05	0 / 0.00	252 / 4.13	12 / 0.25	38 / 1.07	1.4 / 0.02	0.1 / 0.00	1.6	28		305	33	180	0	DWR
C. Davis irrigation	10N/1W-4B1	8-5-59	69	556	8.0	30 / 1.50	32 / 2.64	45 / 1.96	1.1 / 0.03	0 / 0.00	318 / 5.21	15 / 0.31	19 / 0.54	5.2 / 0.08	0.6 / 0.03	0.43	34		338	32	207	0	DWR
Ferro & Canepa irrigation	-36K1	8-5-59	68	1,110	8.0	71 / 3.54	50 / 4.09	97 / 4.22	3.0 / 0.08	0 / 0.00	414 / 6.78	95 / 1.98	111 / 3.13	5.1 / 0.08	0.2 / 0.01	3.3	21		661	35	382	43	DWR
J. Monroe irrigation	10N/2W-14A1	8-5-59	71	533	8.0	40 / 2.00	27 / 2.20	32 / 1.39	2.1 / 0.05	0 / 0.00	262 / 4.29	18 / 0.37	32 / 0.90	4.3 / 0.07	0.2 / 0.01	1.5	18		304	25	210	0	DWR
J. Peterson domestic & irrigation	-16L1	8-5-59	70	2,090	7.6	100 / 4.99	70 / 5.76	257 / 11.18	2.3 / 0.06	0 / 0.00	490 / 8.03	149 / 3.10	378 / 10.66	11 / 0.18	0.5 / 0.03	3.1	23		1,230	51	538	136	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					YOLO COUNTY (Cont.)																	
Howard stock	10N/2W-17J1	8-5-59	79	864	8.1	21 / 1.05	21 / 1.75	134 / 5.83	2.5 / 0.06	0 / 0.00	329 / 5.39	36 / 0.75	67 / 1.89	48 / 0.77	0.5 / 0.03	0.61	32		525	67	140	0	DWR
W. W. McClary domestic & irrigation	-18F2	8-5-59	76	1,740	7.3	139 / 6.94	64 / 5.25	147 / 6.39	1.2 / 0.03	0 / 0.00	493 / 8.08	201 / 4.18	226 / 6.37	10 / 0.16	0.4 / 0.02	1.8	32		1,060	34	610	206	DWR
V. White domestic	-18L1	8-5-59	80	1,640	7.8	137 / 6.84	56 / 4.57	158 / 6.87	1.4 / 0.04	0 / 0.00	477 / 7.82	223 / 4.64	190 / 5.36	10 / 0.16	0.4 / 0.02	2.2	23		1,040	38	571	180	DWR
C. A. Kutsuris domestic	-23A1	8-5-59	74	497	7.9	38 / 1.90	21 / 1.74	41 / 1.78	1.3 / 0.03	0 / 0.00	296 / 4.85	16 / 0.33	8.9 / 0.25	6.5 / 0.10	0.3 / 0.02	0.55	30		310	33	182	0	DWR
Wild Bros. domestic & irrigation	11N/1E-15C	8-6-59	82	534	8.2	34 / 1.70	24 / 2.00	43 / 1.87	2.9 / 0.07	0 / 0.00	270 / 4.42	14 / 0.29	33 / 0.93	1.1 / 0.02	0.2 / 0.01	1.2	50		336	33	185	0	DWR
J. J. Slaven irrigation	-17M	9-10-59	70	346	8.8	5.8 / 0.29	27 / 2.26	31 / 1.35	0.9 / 0.02	32 / 1.07	165 / 2.70	4.6 / 0.10	2.8 / 0.08	0.0 / 0.00	0.2 / 0.01	0.0	33		218	34	128	0	USGS
B. Miller domestic	11N/2E-22A1	8-6-59	76	1,660	8.2	53 / 2.64	77 / 6.37	214 / 9.31	2.8 / 0.07	0 / 0.00	586 / 9.60	138 / 2.87	206 / 5.81	9.9 / 0.16	0.2 / 0.01	6.4	34		1,030	51	451	0	DWR
O. Durst domestic	11N/2W-35J1	8-5-59	75	539	8.0	44 / 2.20	26 / 2.14	35 / 1.52	1.0 / 0.02	0 / 0.00	302 / 4.95	20 / 0.42	9.5 / 0.27	20 / 0.32	0.6 / 0.03	0.23	28		332	26	217	0	DWR
R. Bloom domestic & irrigation	11N/3W-9Q1	8-4-59	-	649	7.9	55 / 2.74	24 / 1.98	45 / 1.96	0.9 / 0.02	0 / 0.00	229 / 3.75	48 / 1.00	63 / 1.78	5.0 / 0.08	0.2 / 0.01	0.65	27		381	29	236	48	DWR
H. D. Everett	-10E1	8-4-59	71	610	7.6	49 / 2.44	22 / 1.80	47 / 2.04	0.9 / 0.02	0 / 0.00	228 / 3.74	58 / 1.21	46 / 1.30	5.4 / 0.09	0.2 / 0.01	0.80	26		367	32	212	25	DWR
G. Anolley irrigation	-26M3	9-5-59	69	759	7.7	69 / 3.44	33 / 2.73	44 / 1.91	0.9 / 0.02	0 / 0.00	343 / 5.62	42 / 0.87	54 / 1.52	9.2 / 0.15	0.3 / 0.02	0.99	29		451	24	309	28	DWR
Southern Pacific Railroad domestic	12N/1W-15N2	8-20-59	75	569	7.9	59 / 2.94	30 / 2.43	15 / 0.65	0.8 / 0.02	0 / 0.00	267 / 4.38	12 / 0.25	27 / 0.76	31 / 0.50	0.4 / 0.02	0.11	32		338	11	269	50	DWR
M. Dobkins domestic	12N/2W-2A1	8-6-59	76	736	7.9	51 / 2.54	35 / 2.89	56 / 2.44	1.2 / 0.03	0 / 0.00	373 / 6.20	4.0 / 0.08	56 / 1.58	12 / 0.19	0.1 / 0.00	0.80	30		432	31	272	0	DWR
						SACRAMENTO COUNTY																	
H. Alberg irrigation	5N/5E-3F1	8-20-59	-	294	8.2	21 / 1.05	13 / 1.05	22 / 0.96	1.5 / 0.04	0 / 0.00	174 / 2.85	1.8 / 0.04	7.6 / 0.21	0.5 / 0.01	0.2 / 0.01	0.05	50		204	31	105	0	DWR
Hart Ranch irrigation	6N/6E-29J1	7-20-59	-	244	8.0	16 / 0.80	11 / 0.94	18 / 0.78	2.6 / 0.07	0 / 0.00	125 / 2.05	8.0 / 0.17	7.8 / 0.22	2.3 / 0.04	0.4 / 0.02	0.0	79		207	30	87	0	USGS
M. Perry irrigation	7N/4E-4R1	10-29-59	-	203	8.1	15 / 0.75	11 / 0.91	8.0 / 0.35	2.1 / 0.05	0 / 0.00	114 / 1.87	1.0 / 0.02	6.6 / 0.19	0.8 / 0.01	0.1 / 0.00	0.05	33		134	17	83	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					SACRAMENTO COUNTY (Cont.)																	
State of California domestic	7N/5E-7C1	7-20-59	-	215	8.1	16 / 0.80	8.8 / 0.72	17 / 0.74	2.3 / 0.06	0 / 0.00	115 / 1.88	1.0 / 0.02	11 / 0.31	0.3 / 0.00	0.3 / 0.02	0.0	40		154	32	76	0	USGS
H. Sutter irrigation	-32J2	9-4-59	-	318	8.3	24 / 1.20	14 / 1.18	21 / 0.91	1.7 / 0.04	2 / 0.07	170 / 2.79	1.6 / 0.03	9.5 / 0.27	6.0 / 0.10	0.2 / 0.01	0.05	60		224	27	119	0	DWR
W. Mouser domestic & irrigation	7N/6E-22R1	7-24-59	-	195	8.0	13 / 0.65	11 / 0.87	11 / 0.48	1.8 / 0.05	0 / 0.00	102 / 1.67	1.0 / 0.02	6.8 / 0.19	5.0 / 0.08	0.4 / 0.02	0.0	72		172	23	76	0	USGS
School District domestic	7N/7E-27P1	3-18-59	-	254	8.1	16 / 0.80	10 / 0.82	19 / 0.83	1.1 / 0.03	0 / 0.00	118 / 1.93	0.2 / 0.00	15 / 0.42	6.9 / 0.11	0.2 / 0.01	0.10	60		186	33	81	0	DWR
City of Sacramento municipal	8N/4E-26D1	7-20-59	-	289	8.2	30 / 1.50	14 / 1.18	11 / 0.43	6.2 / 0.16	0 / 0.00	180 / 2.95	1.0 / 0.02	7.8 / 0.22	0.0 / 0.00	0.4 / 0.02	0.1	49		208	14	134	0	USGS
State of California domestic	8N/5E-15H1	7-9-59	70	349											0.0 / 0.00			PO_4 0.15 [d]					USGS
State of California domestic	-15H2	7-9-59	69	285											0.2 / 0.01			PO_4 1.7 [d]					USGS
Haight irrigation	-24M1	7-24-59	-	176	8.0	14 / 0.70	7.5 / 0.62	11 / 0.48	2.3 / 0.06	0 / 0.00	89 / 1.46	3.0 / 0.06	6.8 / 0.19	3.7 / 0.06	0.4 / 0.02	0.0	66		159	26	66	0	USGS
[illegible]. Amaral domestic & irrigation	-30N1	7-20-59	-	272	8.0	24 / 1.20	12 / 1.00	13 / 0.57	3.1 / 0.08	0 / 0.00	131 / 2.15	1.0 / 0.02	18 / 0.51	5.6 / 0.09	0.4 / 0.02	0.0	64		206	20	110	3	USGS
J. A. Selinger domestic	8N/6E-3G	5-21-59	69	140	7.8	16 / 0.80	0.5 / 0.04	11 / 0.48	1.5 / 0.04	0 / 0.00	70 / 1.15	2.3 / 0.05	2.2 / 0.06	6.9 / 0.11	0.1 / 0.00	0.16	35	NH_4 0.0 [d] ClO_4 0.00	110	35	42	0	DWR
		7-9-59	70	134														NH_4 0.1 ClO_4 0.00					USGS
F. Umeda domestic	-21N1	7-24-59	-	156	8.0	13 / 0.65	6.2 / 0.51	9.7 / 0.42	2.8 / 0.07	0 / 0.00	82 / 1.34	1.0 / 0.02	5.5 / 0.16	3.2 / 0.05	0.3 / 0.02	0.0	63		145	25	58	0	USGS
J. Tracy irrigation	9N/7E-2N1	5-21-59	70	225	8.0	15 / 0.75	4.2 / 0.35	22 / 0.96	1.7 / 0.04	0 / 0.00	93 / 1.52	7.4 / 0.15	14 / 0.39	3.1 / 0.05	0.3 / 0.02	0.0	78	NH_4 0.0 [d] ClO_4 0.00	192	46	55	0	DWR
		7-9-59	70	216														NH_4 0.1 ClO_4 0.00					USGS
Hoffhart irrigation	9N/4E-1R1	7-22-59	-	261	8.2	17 / 0.85	11 / 0.87	22 / 0.96	3.0 / 0.08	0 / 0.00	132 / 2.16	3.0 / 0.06	15 / 0.42	1.1 / 0.02	0.4 / 0.02	0.1	75		213	35	86	0	USGS
K. Kimura irrigation	-3L1	10-12-59	-	856	8.5	50 / 2.50	42 / 3.43	88 / 3.83	2.2 / 0.06	[illegible] / 0.47	361 / 5.92	70 / 1.46	65 / 1.83	4.8 / 0.08	0.2 / 0.01	0.37	44		553	39	297	0	DWR
L. M. Smalley irrigation	-27F1	3-4-59	-	779	7.9	45 / 2.2[illegible]	21 / [illegible]	75 / [illegible]	8.7 / 0.22	0 / 0.00	220 / 3.61	1.0 / 0.02	136 / 3.34	0.0 / 0.00	0.2 / 0.01	0.4	43		443	44	197	17	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), Hexavalent Chromium (Cr^{+6}), Ammonium (NH_4), Perchlorates (ClO_4), and Phosphate (PO_4), reported here as 0.0 except as shown.

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm [a]	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					SACRAMENTO COUNTY (Cont.)																	
Citizens Utility Co. municipal	9N/5E-15N1	8-18-59	-	366	8.1	24 / 1.20	15 / 1.26	28 / 1.22	4.6 / 0.12	0 / 0.00	147 / 2.41	6.0 / 0.12	40 / 1.13	1.3 / 0.02	0.4 / 0.02	0.2	76		268	32	123	2	USGS
Citizens Utility Co. municipal	-21E1	8-18-59	-	374	8.1	22 / 1.10	13 / 1.06	34 / 1.48	5.8 / 0.15	0 / 0.00	133 / 2.26	5.0 / 0.10	46 / 1.30	0.1 / 0.00	0.2 / 0.01	0.2	81		275	39	108	0	USGS
O. A. Melby domestic	9N/6E-19P1	8-18-59	-	234	8.0	16 / 0.80	10 / 0.86	14 / 0.61	1.1 / 0.03	0 / 0.00	110 / 1.80	0.8 / 0.02	12 / 0.34	5.0 / 0.08	0.3 / 0.02	0.07	79		192	26	83	0	DWR
J. W. Edwards domestic	-25H1	5-21-59	-	178	7.7	18 / 0.90	5.1 / 0.42	10 / 0.44	1.2 / 0.03	0 / 0.00	92 / 1.51	7.2 / 0.15	2.8 / 0.08	2.8 / 0.04	0.2 / 0.01	0.02	49	NH_4 0.0[d] ClO_4 0.00	141	24	66	0	DWR
		7-9-59	-	168														NH_4 0.1 ClO_4 0.8					USGS
Rancho Cordova Sewage Treatment Plant industrial	-27P1	5-21-59	-	247	7.8	27 / 1.35	5.5 / 0.45	15 / 0.65	2.0 / 0.05	0 / 0.00	128 / 2.10	5.3 / 0.11	6.6 / 0.19	4.3 / 0.07	0.1 / 0.00	0.01	40	NH_4 0.0[d] ClO_4 0.00	169	26	90	0	DWR
		7-9-59	65	241														NH_4 0.4 ClO_4 0.00					USGS
C. O. Kemper domestic	9N/7E-15F1	5-21-59	65	346	8.2	32 / 1.60	16 / 1.30	12 / 0.52	1.2 / 0.03	0 / 0.00	164 / 2.69	8.4 / 0.17	17 / 0.48	6.7 / 0.11	0.1 / 0.00	0.04	53	NH_4 0.0[d] ClO_4 0.00	227	15	145	11	DWR
		7-9-59	65	341														NH_4 0.2 ClO_4 0.00					USGS
Libby McNeill & Libby industrial	-16P1	5-21-59	70	416	7.8	45 / 2.24	18 / 1.46	13 / 0.56	2.2 / 0.06	0 / 0.00	209 / 3.42	13 / 0.27	19 / 0.54	2.5 / 0.04	0.1 / 0.00	0.02	56	NH_4 0.0[d] ClO_4 0.00	272	13	185	14	DWR
Air Products Inc. industrial	-21D1	5-21-59	-	331	7.2	34 / 1.70	11 / 0.92	14 / 0.61	5.0 / 0.13	0 / 0.00	167 / 2.74	13 / 0.27	10 / 0.28	2.4 / 0.04	0.1 / 0.00	0.05	61	NH_4 0.0[d] ClO_4 0.00	232	18	131	0	DWR
		7-9-59	-	321														NH_4 0.2 ClO_4 0.00					USGS
Capitol Dredging Co. domestic	-26H1	5-21-59	66	124	6.7	12 / 0.60	2.2 / 0.18	6.8 / 0.30	0.8 / 0.02	0 / 0.00	38 / 0.62	5.4 / 0.11	4.3 / 0.14	11 / 0.18	0.1 / 0.00	0.04	61	NH_4 0.0[d] ClO_4 0.00	123	27	39	8	DWR
		7-9-59	68	124														NH_4 0.2 ClO_4 0.00					USGS
H. Colliers domestic	-27Q1	5-21-59	74	255	7.6	19 / 0.95	9.1 / 0.75	13 / 0.78	0.6 / 0.02	0 / 0.00	106 / 1.74	19 / 0.40	9.4 / 0.26	6.6 / 0.11	0.2 / 0.01	0.04	54	NH_4 0.0[d] ClO_4 0.00	188	31	85	0	DWR
		7-9-59	70	244														NH_4 0.3 ClO_4 0.00					USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), Hexavalent Chromium (Cr^{+6}), Ammonium (NH_4), Perchlorates (ClO_4), and Phosphate (PO_4), reported here as [illegible] except as shown.

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							SACRAMENTO COUNTY (Cont.)															
Aerojet General Corp. industrial	9N/7E-28B1	5-21-59	68	243	7.7	24 / 1.20	7.5 / 0.62	14 / 0.61	2.3 / 0.06	0 / 0.00	142 / 2.33	1.0 / 0.02	5.3 / 0.15	0.6 / 0.01	0.2 / 0.01	0.04	68	NH_4 0.0 [d] ClO_4 0.00	193	24	91	0	DWR
		7-9-59	69	234														NH_4 0.4 ClO_4 0.00					USGS
Aerojet General Corp. industrial	-28K1	5-21-59	69	242	7.1	24 / 1.20	7.3 / 0.60	14 / 0.61	2.3 / 0.06	0 / 0.00	138 / 2.26	1.0 / 0.02	5.5 / 0.16	0.3 / 0.01	0.2 / 0.01	0.03	74	NH_4 0.0 [d] ClO_4 0.00	197	25	90	0	DWR
		7-9-59	70	240														NH_4 0.2 ClO_4 0.4					USGS
J. A. Rodgers domestic	-32E1	5-21-59	66	149	7.4	13 / 0.65	6.0 / 0.49	6.0 / 0.26	0.6 / 0.02	0 / 0.00	65 / 1.06	4.4 / 0.09	3.4 / 0.10	10 / 0.16	0.1 / 0.00	0.02	53	NH_4 0.0 [d] ClO_4 0.00	128	18	57	4	DWR
		7-9-59	69	143														NH_4 0.2 ClO_4 0.00					USGS
B. Petruci domestic	-33E1	5-21-59	-	593	7.0	63 / 3.14	32 / 2.61	13 / 0.56	1.3 / 0.03	0 / 0.00	322 / 5.28	8.1 / 0.17	31 / 0.87	0.3 / 0.00	0.0 / 0.00	0.02	44	NH_4 0.0 [d] ClO_4 0.00	351	9	288	24	DWR
		7-9-59	65	612														NH_4 0.1 ClO_4 0.00					USGS
Westby domestic	10N/4E-23A1	7-22-59	-	505	8.2	37 / 1.35	21 / 1.75	40 / 1.74	2.2 / 0.06	0 / 0.00	207 / 3.39	15 / 0.31	54 / 1.52	0.1 / 0.00	0.4 / 0.02	0.1	55		327	32	180	10	USGS
									SOLANO COUNTY														
City of Rio Vista municipal	4N/3E-31F2	5-18-59	-	755	8.2	17 / 0.85	15 / 1.25	134 / 5.83	1.4 / 0.04	0 / 0.00	335 / 5.49	34 / 0.71	58 / 1.64	7.1 / 0.11	0.4 / 0.02	1.3	31	Fe 2.2 (total)	463	73	105	0	DWR
		10/1/59	-	806	8.6	13 / 0.65	18 / 1.47	152 / 6.61	1.7 / 0.04	13 / 0.43	324 / 5.31	36 / 0.75	68 / 1.92	25 / 0.40	0.4 / 0.02	1.2	32		519	75	106	0	DWR
stock	5N/1E-1N1	5-18-59	64	1,740	8.2	40 / 2.00	61 / 5.01	269 / 11.70	0.7 / 0.02	0 / 0.00	520 / 8.52	144 / 3.00	257 / 7.25	0.7 / 0.01	1.3 / 0.07	1.7	23	Fe 0.10 (total)	1,050	62	351	0	DWR
		10-1-59	62	1,720	8.8	33 / 1.65	67 / 5.54	262 / 11.40	0.7 / 0.02	33 / 1.10	450 / 7.38	142 / 2.96	248 / 6.99	0.9 / 0.01	1.7 / 0.09	1.3	25		1,040	61	360	0	DWR
California Packing Corp. domestic	5N/2E-25K	5-18-59	64	1,430	8.4	66 / 3.29	110 / 9.08	141 / 6.13	1.7 / 0.04	39 / 1.30	1,000 / 16.39	22 / 0.46	12 / 0.34	2.5 / 0.04	0.4 / 0.02	0.84	49	Fe 0.69 (total)	937	33	619	0	DWR

a Determined by addition of constituents.
b. Gravimetric determination.
c Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), Hexavalent Chromium (Cr^{+6}), Ammonium (NH_4), Perchlorates (ClO_4), and Phosphate (PO_4), reported here as [illegible] except as shown.

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
									SOLANO COUNTY (Cont.)														
California Packing Corp. domestic	5N/2E-25K	10-1-59	-	-1,500	8.9	35 / 1.75	74 / 6.10	252 / 10.96	1.9 / 0.05	90 / 3.00	852 / 13.96	55 / 1.14	20 / 0.56	0.6 / 0.01	0.4 / 0.02	1.2	33		982	58	393	0	DWR
Southern Pacific Railroad industrial	6N/1E-19L1	5-18-59	-	909	7.9	94 / 4.69	26 / 2.18	69 / 3.00	0.4 / 0.01	0 / 0.00	367 / 6.02	91 / 1.89	56 / 1.58	20 / 0.32	0.4 / 0.02	0.48	4.5	Fe 0.26 (total)	542	30	344	43	DWR
Wilson irrigation	-20N1	5-18-59	64	791	7.3	76 / 3.79	25 / 2.04	58 / 2.52	0.6 / 0.02	0 / 0.00	339 / 5.56	75 / 1.56	42 / 1.18	8.1 / 0.13	0.5 / 0.03	0.23	30	Fe 4.0 (total)	482	30	292	14	DWR
Friddy irrigation	6N/2E-20H2	5-18-59	64	987	7.9	56 / 2.79	64 / 5.24	58 / 2.52	0.6 / 0.02	0 / 0.00	409 / 6.70	53 / 1.10	91 / 2.57	8.3 / 0.13	0.3 / 0.02	0.24	32	Fe 0.11 (total)	564	24	402	67	DWR
Pacific Gas & Electric municipal	6N/1W-23L	5-18-59	68	585	7.6	50 / 2.50	21 / 1.70	45 / 1.96	0.9 / 0.02	0 / 0.00	287 / 4.70	49 / 1.02	15 / 0.42	3.2 / 0.05	0.3 / 0.02	0.19	41	Fe 0.26 (total)	366	32	210	0	DWR
H. West domestic and stock	7N/1E-7A4	5-18-59	66	559	8.0	43 / 2.14	36 / 2.93	26 / 1.13	1.1 / 0.03	0 / 0.00	339 / 5.56	9.9 / 0.21	14 / 0.39	4.9 / 0.08	0.1 / 0.00	0.27	42	Fe 0.02 (total)	343	18	254	0	DWR
O. H. Timm irrigation	-13B1	5-19-59	64	1,150	8.0	76 / 3.79	100 / 8.24	40 / 1.74	1.6 / 0.04	0 / 0.00	707 / 11.59	38 / 0.79	32 / 0.90	25 / 0.40	0.1 / 0.00	0.72	39	Fe 2.4 (total)	700	12	602	22	DWR
A. Yolo irrigation	-31M2	5-18-59	70	671	7.5	54 / 2.69	22 / 1.81	57 / 2.48	2.9 / 0.07	0 / 0.00	329 / 5.39	12 / 0.25	39 / 1.10	17 / 0.27	0.1 / 0.00	0.07	52	Fe 0.64 (total)	418	35	225	0	DWR
M. Joy irrigation	-36C1	5-19-59	64	929	8.3	45 / 2.24	71 / 5.87	60 / 2.61	0.8 / 0.02	4 / 0.13	493 / 8.08	62 / 1.29	37 / 1.04	7.4 / 0.12	0.3 / 0.02	0.42	36	Fe 0.08 (total)	566	24	406	0	DWR
T. Rose irrigation	7N/2E-34C2	5-19-59	69	730	8.4	38 / 1.90	56 / 4.61	45 / 1.96	1.0 / 0.02	6 / 0.20	404 / 6.62	35 / 0.73	24 / 0.68	3.7 / 0.06	0.1 / 0.00	0.54	31	Fe 0.45 (total)	440	23	326	0	DWR
T. F. Glide irrigation	8N/1E-25D1	6-10-59	66	1,020	7.9	67 / 3.34	79 / 6.47	49 / 2.13	1.5 / 0.04	0 / 0.00	592 / 9.70	53 / 1.10	31 / 0.87	13 / 0.21	0.3 / 0.02	0.65	37		622	18	491	6	DWR
R. Shulze irrigation	-26F1	6-10-59	64	742	7.9	56 / 2.79	44 / 3.66	46 / 2.00	1.0 / 0.02	0 / 0.00	432 / 7.08	38 / 0.79	15 / 0.42	10 / 0.16	0.4 / 0.02	0.62	38		461	24	323	0	DWR
E. L. Dexter irrigation	8N/1W-23A1	5-18-59	65	524	8.3	43 / 2.14	26 / 2.14	31 / 1.35	0.9 / 0.02	6 / 0.20	265 / 4.34	25 / 0.52	21 / 0.59	4.4 / 0.07	0.3 / 0.02	0.59	35	Fe 0.08	323	24	214	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					SAN JOAQUIN VALLEY (5-22) SAN JOAQUIN COUNTY																	
California Water Service Co. municipal	1N/6E-3H3	9-1-59	71	638	8.0	22 / 1.10	9.5 / 0.78	97 / 4.22	1.0 / 0.02	0 / 0.00	172 / 2.82	0.2 / 0.00	118 / 3.33	0.6 / 0.01	0.2 / 0.01	0.55	34		367	69	94	0	DWR
California Water Service Co. municipal	-4D1	9-1-59	-	566	8.0	10 / 0.50	3.9 / 0.32	111 / 4.83	1.3 / 0.03	0 / 0.00	216 / 3.54	0.3 / 0.01	76 / 2.14	0.3 / 0.00	0.1 / 0.00	0.61	60		370	85	41	0	DWR
City of Stockton irrigation	-4J1	9-1-59	68	602	7.9	16 / 0.80	4.6 / 0.38	107 / 4.65	0.9 / 0.02	0 / 0.00	197 / 3.23	1.5 / 0.03	93 / 2.62	0.4 / 0.01	0.1 / 0.00	0.45	43		364	79	59	0	DWR
Fiberboard Products industrial	-10P1	9-1-59	68	2,570	7.9	105 / 5.24	47 / 3.85	350 / 15.22	3.9 / 0.10	0 / 0.00	167 / 2.74	0.0 / 0.00	768 / 21.66	1.1 / 0.02	0.1 / 0.00	0.35	54		1,410	62	455	318	DWR
Fiberboard Products industrial	-10P2	9-1-59	68	1,920	8.1	64 / 3.19	30 / 2.50	286 / 12.44	3.5 / 0.09	0 / 0.00	190 / 3.11	0.3 / 0.01	544 / 15.34	1.6 / 0.02	0.1 / 0.00	0.86	59		1,080	68	285	129	DWR
California Water Service Co. municipal	-14P1	9-1-59	72	410	7.9	11 / 0.55	2.3 / 0.19	78 / 3.39	1.2 / 0.03	0 / 0.00	189 / 3.10	0.0 / 0.00	39 / 1.10	0.4 / 0.01	0.2 / 0.01	0.58	62		288	81	37	0	DWR
irrigation	1N/7E-11J1	5-20-59	66	265	7.7	20 / 1.00	9.5 / 0.78	16 / 0.70	3.4 / 0.09	0 / 0.00	128 / 2.10	4.0 / 0.08	9.9 / 0.28	3.3 / 0.05	0.3 / 0.02	0.10	68		193	27	89	0	DWR
Linden Water Service municipal	2N/3E-15L1	5-20-59	-	208	7.8	20 / 1.00	6.3 / 0.52	9.5 / 0.41	5.3 / 0.14	0 / 0.00	114 / 1.87	3.6 / 0.07	4.0 / 0.11	2.6 / 0.04	0.2 / 0.01	0.21	57		165	20	76	0	DWR
F. D. Benedetti domestic & irrigation	2N/9E-7G1	5-21-59	66	243	7.4	23 / 1.15	8.6 / 0.71	10 / 0.44	1.3 / 0.03	0 / 0.00	105 / 1.72	16 / 0.33	8.1 / 0.23	3.6 / 0.06	0.1 / 0.00	0.09	43		170	19	93	7	DWR
		6-4-59	66	233	6.9	23 / 1.15	8.6 / 0.71	9.5 / 0.41	1.0 / 0.02	0 / 0.00	102 / 1.67	16 / 0.33	7.4 / 0.21	4.2 / 0.07	0.1 / 0.00	0.12	48		168	18	93	9	DWR
G. Barbero domestic & irrigation	3N/6E-27B1	4-16-59	63	734	7.3	54 / 2.69	23 / 1.87	78 / 3.39	2.3 / 0.06	0 / 0.00	416 / 6.82	29 / 0.60	8.4 / 0.24	23 / 0.37	0.3 / 0.02	0.31	59		481	42	228	0	DWR
R. Nichols irrigation	5N/5E-33J1	4-15-59	60	365	7.7	9.4 / 0.47	4.7 / 0.39	67 / 2.91	1.2 / 0.03	0 / 0.00	218 / 3.57	0.0 / 0.00	9.2 / 0.26	0.9 / 0.01	0.2 / 0.01	0.98	35		236	76	43	0	DWR
A. T. Sims irrigation	5N/8E-31J1	4-24-59	70	184	7.2	12 / 0.60	6.3 / 0.52	14 / 0.61	2.8 / 0.07	0 / 0.00	88 / 1.44	4.1 / 0.08	5.9 / 0.17	3.8 / 0.06	0.3 / 0.02	0.25	38		130	34	56	0	DWR
irrigation	1S/9E-8H1	5-6-59	70	225	7.9	15 / 0.75	6.9 / 0.57	16 / 0.70	3.2 / 0.08	0 / 0.00	88 / 1.44	10 / 0.21	11 / 0.31	6.6 / 0.11	0.3 / 0.02	0.15	79		191	33	66	0	DWR
A. Dusina domestic	2S/4E-1P1	4-21-59	-	633	8.1	29 / 1.45	8.6 / 0.71	88 / 3.83	1.1 / 0.03	0 / 0.00	106 / 1.74	136 / 2.83	49 / 1.38	5.4 / 0.09	0.2 / 0.01	0.82	25		395	64	108	21	DWR
H. C. Jepson domestic & irrigation	-36P1	3-20-59	-	1,241	8.0	76 / 3.79	35 / 2.88	128 / 5.57	4.5 / 0.12	0 / 0.00	178 / 2.92	273 / 5.68	128 / 3.61	11 / 0.18	0.0 / 0.00	5.0	21		768	45	334	138	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							SAN JOAQUIN COUNTY (Cont.)															
West Side Irrig. Dist. irrigation	2S/5E-29D1	4-21-59	-	2,130	7.6	125 6.24	90 7.43	135 8.05	2.3 0.06	0 0.00	430 7.05	194 4.04	367 10.35	32 0.52	0.2 0.01	1.5	44		1,250	37	684	331	DWR
West Side Irrig. Dist. irrigation	-32R1	4-22-59	-	1,050	7.6	66 3.29	30 2.48	102 4.44	3.5 0.09	0 0.00	238 3.40	88 1.83	148 4.17	21 0.34	0.2 0.01	0.95	30		607	43	289	94	DWR
State of Calif. domestic & irrigation	2S/6E-20J4	4-22-59	-	706	7.9	30 1.50	12 1.02	103 4.48	2.3 0.06	0 0.00	157 2.57	168 3.50	35 0.99	0.9 0.01	0.2 0.01	0.71	40		469	63	126	0	DWR
L. Huck domestic	3S/5E-8L1	4-22-59	-	893	7.7	73 3.64	23 1.89	75 3.26	3.0 0.08	0 0.00	170 2.79	118 2.46	96 2.71	46 0.74	0.2 0.01	1.0	43		567	37	277	138	DWR
Gerlach irrigation	-14D1	4-22-59	-	1,230	7.6	90 4.49	30 2.44	121 5.26	2.4 0.06	0 0.00	168 2.75	161 3.35	182 5.13	51 0.82	0.1 0.00	0.78	28		749	43	347	209	DWR
James Clayton Co. irrigation	-24F1	4-10-59	-	1,690	7.6	155 7.73	47 3.86	172 7.48	3.0 0.08	0 0.00	153 2.51	538 11.20	143 4.30	93 1.50	0.3 0.02	0.57	28		1,250	39	580	455	DWR
Banta Carbona Irr. Dist. irrigation	3S/6E-7F1	4-9-59	-	1,520	7.7	94 4.69	28 2.32	196 8.53	2.6 0.07	0 0.00	320 5.24	172 3.58	235 6.63	16 0.26	0.2 0.01	1.8	38		941	55	351	89	DWR
Boltzent & Williamson irrigation	-16L1	4-10-59	-	716	7.7	55 2.74	22 1.84	63 2.74	2.3 0.06	0 0.00	197 3.23	151 3.14	37 1.04	4.2 0.07	0.2 0.01	0.56	30		462	37	229	67	DWR
W. L. Reece irrigation	-17D1	4-10-59	-	850	7.6	62 3.09	26 2.16	79 3.44	2.6 0.07	0 0.00	177 2.90	203 4.23	54 1.52	8.2 0.13	0.2 0.01	0.51	28		550	39	263	118	DWR
								STANISLAUS COUNTY															
A. Groves irrigation	1N/10E-15D1	10-59	-	300	8.0	25 1.25	13 1.03	17 0.74	1.9 0.05	0 0.00	144 2.36	7.0 0.15	14 0.39	4.8 0.08	0.3 0.02	0.1	56		210	24	114	0	USGS
J. Demartini irrigation	1S/11E-36E1	10-59	-	157	8.0	9.6 0.48	8.3 0.68	8.4 0.37	3.5 0.09	0 0.00	76 1.25	10 0.21	6 0.17	0.4 0.01	0.0 0.00	0.0	35		113	23	58	0	USGS
A. Ramirez irrigation	2S/10E-10D1	10-59	-	140	7.6	12 0.60	5.6 0.46	7.7 0.33	2.3 0.06	0 0.00	82 1.34	3.0 0.06	1.5 0.04	1.1 0.02	0.2 0.01	0.0	64		137	23	53	0	USGS
Oakdale Land Co. irrigation	-27G	10-59	-	61.1	7.5	6.4 0.32	2.9 0.24	2.1 0.09	1.0 0.03	0 0.00	34 0.56	0.0 0.00	5.0 0.14	0.2 0.00	0.0 0.00	0.0	12		47	13	28	0	USGS
F. Giambanco industrial	-36N1	10-59	-	288	8.0	23 1.15	11 0.91	19 0.83	2.9 0.07	0 0.00	130 2.13	5.0 0.10	18 0.51	7.3 0.12	0.2 0.01	0.0	52		202	28	103	0	USGS
irrigation	3S/7E-13A	8-10-59	68	594	7.6	51 2.54	23 1.88	38 1.65	3.7 0.09	0 0.00	304 4.98	13 0.27	25 0.70	15 0.24	0.1 0.00	0.13	51		369	27	221	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							STANISLAUS COUNTY (Cont.)															
irrigation	3S/7E-24J	8-10-59	66	635	7.6	44 / 2.20	15 / 1.26	77 / 3.35	2.7 / 0.07	0 / 0.00	353 / 5.78	17 / 0.35	18 / 0.51	10 / 0.16	0.2 / 0.01	0.19	52		410	49	173	0	DWR
J. F. Gardner domestic	-33O1	10-59	-	445	8.0	39 / 1.95	16 / 1.31	33 / 1.44	2.2 / 0.06	0 / 0.00	208 / 3.41	15 / 0.31	33 / 0.93	1.9 / 0.03	0.2 / 0.01	0.1	22		264	30	163	0	USGS
irrigation and stock	3S/8E-6M	8-10-59	67	604	7.9	31 / 1.55	31 / 2.53	50 / 2.18	4.4 / 0.11	0 / 0.00	326 / 5.34	15 / 0.31	24 / 0.68	9.8 / 0.16	0.1 / 0.00	0.14	57		382	34	204	0	DWR
irrigation	-9C	8-10-59	67	441	8.1	36 / 1.80	21 / 1.72	27 / 1.17	4.1 / 0.10	0 / 0.00	234 / 3.84	12 / 0.25	10 / 0.28	17 / 0.27	0.2 / 0.01	0.09	58		300	24	176	0	DWR
irrigation	-20J	8-10-59	72	533	7.7	51 / 2.54	21 / 1.76	32 / 1.39	2.1 / 0.05	0 / 0.00	270 / 4.42	14 / 0.29	16 / 0.45	29 / 0.47	0.2 / 0.01	0.12	55		353	24	215	0	DWR
irrigation	-23E	8-10-59	68	504	7.7	47 / 2.34	16 / 1.23	34 / 1.48	2.2 / 0.06	0 / 0.00	214 / 3.51	29 / 0.60	19 / 0.54	28 / 0.45	0.3 / 0.02	0.10	52		333	29	181	6	DWR
irrigation	3S/9E-6R	8-10-59	63	452	7.8	38 / 1.90	17 / 1.40	29 / 1.26	2.3 / 0.07	0 / 0.00	186 / 3.05	23 / 0.48	15 / 0.42	40 / 0.64	0.2 / 0.01	0.09	60		316	27	165	13	DWR
irrigation & drainage	16F	8-10-59	-	771	7.8	52 / 2.59	27 / 2.25	74 / 3.22	3.8 / 0.10	0 / 0.00	372 / 6.10	34 / 0.71	35 / 0.99	28 / 0.45	0.2 / 0.01	0.14	61		498	39	242	0	DWR
Atlas Olympia Co. irrigation	3S/10E-13A1	10-59	-	58.7	7.4	5.8 / 0.29	3.0 / 0.25	2.5 / 0.11	0.3 / 0.02	0 / 0.00	32 / 0.52	2.4 / 0.05	2.2 / 0.06	0.3 / 0.00	0.0 / 0.00	0.0	12		45	17	26	0	USGS
V. A. Hedden domestic & irrigation	3S/11E-9D1	10-59	-	292	8.0	20 / 1.00	11 / 0.94	20 / 0.87	3.5 / 0.09	0 / 0.00	122 / 2.00	6.0 / 0.12	22 / 0.62	4.4 / 0.07	0.2 / 0.01	0.0	79		226	30	97	0	USGS
H. E. Ketcham	3S/12E-26P1	10-59	-	4,110	7.0	340 / 16.97	37 / 3.03	458 / 19.92	34 / 0.87	0 / 0.00	84 / 1.38	23 / 0.48	1,390 / 39.20	1.6 / 0.03	0.5 / 0.03	0.4	75		2,400	49	1,000	931	USGS
Baranchi irrigation	4S/6E-11M	7-29-59	66	1,120	8.0	104 / 5.19	29 / 2.38	81 / 3.52	3.0 / 0.08	0 / 0.00	194 / 3.18	122 / 2.54	175 / 4.94	25 / 0.40	0.1 / 0.00	0.56	25		660	32	379	220	DWR
I. Russel irrigation	-12N	7-29-59	69	1,250	8.1	88 / 4.39	35 / 2.88	121 / 5.26	3.0 / 0.08	0 / 0.00	214 / 3.51	166 / 3.41	186 / 5.24	28 / 0.45	0.3 / 0.02	4.1	29		765	42	364	189	DWR
J. J. Raspo irrigation	4S/6E-15E1	10-59	-	564	8.0	45 / 2.25	16 / 1.29	51 / 2.22	1.9 / 0.05	0 / 0.00	153 / 2.51	79 / 1.64	42 / 1.18	22 / 0.35	0.3 / 0.02	0.4	29		362	38	177	52	USGS
Jones irrigation	4S/7E-8L	7-30-59	68	1,150	7.6	70 / 3.49	40 / 3.26	113 / 4.92	1.4 / 0.04	0 / 0.00	222 / 3.64	191 / 3.98	142 / 4.00	3.6 / 0.06	0.4 / 0.02	2.2	27		700	42	338	156	DWR
W. Stanislaus Irr. Dist. drainage	-8Q1	7-30-59	66	1,000	8.1	53 / 2.64	33 / 2.73	105 / 4.57	1.0 / 0.02	0 / 0.00	191 / 3.13	155 / 3.23	120 / 3.38	14 / 0.22	0.4 / 0.02	2.0	28		605	46	269	112	DWR
W. Stanislaus Irr. Dist. irrigation	-16E1	7-30-59	66	1,760	8.3	95 / 4.74	68 / 5.63	181 / 7.87	1.1 / 0.03	6 / 0.20	245 / 4.02	286 / 5.95	284 / 8.01	18 / 0.29	0.5 / 0.03	0.58	33		1,090	43	519	307	DWR

a Determined by addition of constituents.
b. Gravimetric determination.
c Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Mineral constituents in parts per million / equivalents per million

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
	MDB&M							STANISLAUS COUNTY (Cont.)															
W. Stanislaus Irr. Dist. irrigation	4S/7E-17K1	7-30-59	65	1,620	8.1	102 / 5.09	52 / 4.32	158 / 6.87	1.6 / 0.04	0 / 0.00	258 / 4.23	184 / 3.83	288 / 8.12	22 / 0.35	0.4 / 0.02	0.58	28		964	42	471	259	DWR
W. Stanislaus Irr. Dist. irrigation	-18A1	7-30-59	64	1,540	8.1	91 / 4.54	48 / 3.93	162 / 7.05	1.5 / 0.04	0 / 0.00	279 / 4.57	196 / 4.08	245 / 6.91	18 / 0.29	0.3 / 0.02	2.8	26		928	45	424	195	DWR
W. W. Crawford irrigation	-22E1	8-13-59	68	1,342	8.3	59 / 2.94	80 / 6.61	105 / 4.57	2.3 / 0.06	3 / 0.09	232 / 3.80	241 / 5.02	178 / 5.02	18 / 0.29	0.3 / 0.02	0.64	29		830	32	478	284	DWR
W. W. Cox irrigation	-26R	7-30-59	65	1,320	8.4	52 / 2.59	105 / 8.64	77 / 3.35	2.0 / 0.05	12 / 0.40	367 / 6.02	168 / 3.50	161 / 4.54	15 / 0.24	0.1 / 0.00	0.63	28		802	23	562	241	DWR
H. Ellery irrigation	-28H1	7-30-59	67	1,320	8.2	57 / 2.84	84 / 6.93	94 / 4.09	2.1 / 0.05	0 / 0.00	222 / 3.64	244 / 5.08	174 / 4.91	28 / 0.45	0.2 / 0.01	0.97	30		823	29	489	307	DWR
W. Stanislaus Irr. Dist. domestic	-30L1	7-30-59	-	1,020	8.3	58 / 2.89	26 / 2.16	125 / 5.44	2.4 / 0.06	3 / 0.10	218 / 3.57	192 / 4.00	72 / 2.03	55 / 0.89	0.1 / 0.00	1.7	25		667	52	253	69	DWR
F. Azevedo irrigation	-34D1	8-13-59	68	1,150	8.2	45 / 2.24	79 / 6.49	76 / 3.31	2.3 / 0.06	0 / 0.00	260 / 4.26	166 / 3.46	139 / 3.92	24 / 0.39	0.1 / 0.00	0.59	28		688	27	437	224	DWR
F. Cox irrigation	-34J1	7-30-59	68	1,220	8.3	36 / 1.80	86 / 7.07	84 / 3.65	2.3 / 0.06	4 / 0.13	300 / 4.92	90 / 1.87	196 / 5.53	16 / 0.26	0.2 / 0.01	0.52	27		690	29	444	191	DWR
irrigation	4S/8E-5L	8-10-59	67	830	7.1	63 / 3.14	11 / 0.92	38 / 3.83	3.5 / 0.09	0 / 0.00	268 / 4.39	3.3 / 0.07	118 / 3.33	10 / 0.16	0.2 / 0.01	0.25	50		479	48	203	0	DWR
irrigation	-6L2	8-10-59	68	906	7.6	50 / 2.50	18 / 1.50	121 / 5.26	3.6 / 0.09	0 / 0.00	375 / 6.15	15 / 0.31	93 / 2.62	12 / 0.19	0.3 / 0.02	0.38	54		551	56	200	0	DWR
Turlock Irr. Dist. drainage	-24A1	8-19-59	66	667	8.2	43 / 2.15	15 / 1.21	74 / 3.22	3.7 / 0.09	0 / 0.00	191 / 3.13	11 / 0.23	104 / 2.93	12 / 0.19	0.1 / 0.01	0.1	52	Al 0.08 d	409	48	168	11	USGS
Turlock Irr. Dist. drainage	-27L1	8-11-59	66	1,500	7.8	66 / 3.29	17 / 1.37	234 / 10.18	5.6 / 0.14	0 / 0.00	244 / 4.00	74 / 1.54	335 / 9.45	6.2 / 0.10	0.1 / 0.01	0.4	39	Al 0.07 d Zn 0.01	897	68	233	33	USGS
Turlock Irr. Dist. drainage	4S/9E-20A1	8-19-59	68	530	8.0	42 / 2.10	13 / 1.06	53 / 2.31	3.4 / 0.09	0 / 0.00	204 / 3.34	17 / 0.35	47 / 1.33	19 / 0.31	0.1 / 0.01	0.0	55	Al 0.15 d Zn 0.01	350	42	158	0	USGS
Turlock Irr. Dist drainage	-25A1	9-9-59	68	413	7.9	32 / 1.60	13 / 1.04	34 / 1.48	2.3 / 0.06	0 / 0.00	160 / 2.62	18 / 0.37	23 / 0.65	29 / 0.47	0.2 / 0.01	0.0	53	Al 0.12 d	284	35	132	1	USGS
Turlock Irr. Dist. drainage	30R1	8-19-59	66	611	8.0	48 / 2.40	12 / 1.00	72 / 3.13	4.3 / 0.11	0 / 0.00	292 / 4.79	18 / 0.37	38 / 1.07	15 / 0.24	0.2 / 0.01	0.0	49	Al 0.08 d Cu 0.01	400	47	170	0	USGS
Johnson Bros. irrigation	4S/10E-1D1	10-59	-	349	7.9	16 / 0.80	5.4 / 0.44	46 / 2.00	8.0 / 0.20	0 / 0.00	113 / 1.85	1.0 / 0.02	53 / 1.49	0.1 / 0.00	0.3 / 0.02	0.3	65		251	58	62	0	USGS
J. W. Short irrigation	4S/11E-5M1	10-59	-	370	7.9	4.4 / 0.22	1.2 / 0.10	74 / 3.22	6.4 / 0.16	0 / 0.00	96 / 1.57	4.0 / 0.08	68 / 1.92	0.3 / 0.00	0.3 / 0.02	0.2	74		280	87	16	0	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm a	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							STANISLAUS COUNTY (Cont.)															
Turlock Irr. Dist. drainage	4S/11E-21D1	10-9-59	67	163	7.6	13 / 0.65	4.6 / 0.38	15 / 0.65	3.1 / 0.08	0 / 0.00	92 / 1.51	2.8 / 0.06	2.9 / 0.08	3.9 / 0.06	0.2 / 0.01	0.0	55	Al 0.05 As 0.01[d] Cu 0.01	146	37	51	0	USGS
H. O. Wood irrigation	5S/7E-1M1	7-30-59	64	1,220	8.6	45 / 2.24	99 / 8.17	65 / 2.33	2.0 / 0.05	17 / 0.57	334 / 5.47	131 / 2.73	156 / 4.40	14 / 0.22	0.2 / 0.01	0.54	26		720	21	521	219	DWR
A. Gaspar irrigation	-3N	8-13-59	69	1,380	8.3	53 / 2.64	84 / 6.87	101 / 4.39	2.6 / 0.07	4 / 0.13	204 / 3.34	126 / 2.62	267 / 7.53	10 / 0.16	0.2 / 0.01	0.46	25		773	31	476	302	DWR
H. A. Raines irrigation	-9H1	8-13-59	70	1,600	8.0	51 / 2.54	73 / 5.99	168 / 7.31	2.8 / 0.07	0 / 0.00	163 / 2.67	219 / 4.56	305 / 8.60	3.9 / 0.06	0.2 / 0.01	0.57	21		924	46	427	293	DWR
C. Zacharius irrigation	-23B	7-29-59	72	1,340	8.3	63 / 3.14	67 / 5.53	117 / 5.09	2.8 / 0.07	3 / 0.10	192 / 3.15	238 / 4.96	197 / 5.56	14 / 0.22	0.1 / 0.00	0.36	28		825	37	434	271	DWR
Bizzanelli domestic	-35G	7-29-59	-	862	8.0	62 / 3.09	33 / 2.68	65 / 2.33	2.4 / 0.06	0 / 0.00	218 / 3.57	48 / 1.00	117 / 3.30	39 / 0.63	0.6 / 0.03	0.27	34		508	33	289	110	DWR
Turlock Irr. Dist. drainage	5S/8E-1R1	8-20-59	67	903	8.3	42 / 2.10	10 / 0.85	128 / 5.57	6.4 / 0.16	4 / 0.13	220 / 3.61	27 / 0.56	162 / 4.57	3.5 / 0.06	0.1 / 0.01	0.2	49	Al 0.73 Zn 0.01[d] Mn 0.01 As 0.01	540	64	147	0	USGS
T & T Ranch irrigation	-8G1	10-59	-	1,710	8.2	95 / 4.74	98 / 8.06	156 / 6.79	3.0 / 0.08	0 / 0.00	359 / 5.88	390 / 8.12	175 / 4.94	8.7 / 0.14	0.3 / 0.02	0.7	34		1,140	35	640	346	USGS
Y. Puch domestic & irrigation	-27M1	10-59	-	1,340	8.2	88 / 4.39	56 / 4.61	137 / 5.96	1.8 / 0.05	0 / 0.00	200 / 3.28	470 / 9.79	48 / 1.35	8.7 / 0.14	0.6 / 0.03	0.5	29		939	40	450	286	USGS
Turlock Irr. Dist. irrigation	5S/9E-9A1	9-8-59	69	576	8.0	41 / 2.05	14 / 1.17	53 / 2.31	1.8 / 0.05	0 / 0.00	286 / 4.69	10 / 0.21	23 / 0.65	5.5 / 0.09	0.2 / 0.01	0.0	58	Al 0.11 As 0.13[d] Cu 0.01	348	41	161	29	USGS
B. Ellis drainage	-13G1	10-9-59	66	518	7.5	46 / 2.30	14 / 1.18	51 / 2.22	2.3 / 0.06	0 / 0.00	273 / 4.47	9.0 / 0.19	26 / 0.73	9.3 / 0.15	0.1 / 0.01	0.0	55	Al 0.07[d] Cu 0.01	347	39	174	0	USGS
Turlock Irr. Dist. irrigation	5S/10E-4F1	10-12-59	66	492	8.1	43 / 2.15	16 / 1.31	43 / 1.87	2.3 / 0.06	0 / 0.00	245 / 4.02	16 / 0.33	18 / 0.51	25 / 0.40	0.2 / 0.01	0.0	58	Al 0.06[d] As 0.01	342	35	173	0	USGS
Turlock Irr. Dist. irrigation	-28H1	10-9-59	66	599	7.6	50 / 2.50	14 / 1.18	59 / 2.57	2.1 / 0.05	0 / 0.00	306 / 5.02	16 / 0.33	21 / 0.59	22 / 0.35	0.2 / 0.01	0.1	54	Al 0.09 As 0.01[d] Zn 0.02	389	41	184	0	USGS
Turlock Irr. Dist. irrigation	-30F1	10-9-59	66	840	7.8	59 / 2.94	16 / 1.34	109 / 4.74	3.2 / 0.08	0 / 0.00	371 / 6.08	59 / 1.23	49 / 1.38	24 / 0.39	0.1 / 0.01	0.2	54	Al 0.14[d] Cu 0.01	556	52	214	0	USGS
Turlock Irr. Dist. irrigation	5S/11E-7P1	10-9-59	65	464	7.3	45 / 2.25	16 / 1.34	27 / 1.17	1.5 / 0.04	0 / 0.00	219 / 3.59	21 / 0.44	13 / 0.37	32 / 0.52	0.2 / 0.01	0.0	65	Al 0.11[d] Cr^{+6} 0.03	329	24	179	0	USGS
R. Perkins irrigation	5S/12E-6D1	10-59	-	179	7.9	12 / 0.60	3.9 / 0.32	18 / 0.78	2.9 / 0.07	0 / 0.00	82 / 1.34	4.0 / 0.08	6.5 / 0.18	6.8 / 0.11	0.4 / 0.02	0.0	66		160	44	46	0	USGS
J. W. Campbell irrigation	6 S/9E-18F	7-29-59	-	625	7.8	55 / 2.74	26 / 2.18	40 / 1.74	1.6 / 0.04	0 / 0.00	268 / 4.39	81 / 1.69	15 / 0.42	9.6 / 0.15	0.3 / 0.02	0.36	25		386	26	246	26	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					STANISLAUS COUNTY (Cont.)																	
Central Calif. Irr. Dist. irrigation	7S/8E-12P1	7-29-59	-	858	7.8	66 / 3.29	38 / 3.12	59 / 2.57	2.4 / 0.06	0 / 0.00	294 / 4.82	92 / 1.92	70 / 1.97	12 / 0.19	0.3 / 0.02	0.34	22		506	28	321	80	DWR
Central Calif. Irr. Dist.	-23R1	7-29-59	-	1,520	8.0	76 / 3.79	55 / 4.56	138 / 6.00	3.6 / 0.09	0 / 0.00	192 / 3.15	104 / 2.16	313 / 8.97	8.1 / 0.13	0.3 / 0.02	0.49	34		831	42	418	261	DWR
						MERCED COUNTY																	
Turlock Irr. Dist. irrigation	5S/11E-29F1	10-9-59	67	303	7.4	24 / 1.20	9.5 / 0.78	23 / 1.00	1.8 / 0.05	0 / 0.00	118 / 1.93	19 / 0.40	10 / 0.28	21 / 0.34	0.1 / 0.01	0.0	72	Al 0.03 [d] Zn 0.01	238	33	99	2	USGS
W. S. Batterman irrigation	5S/12E-31G1	6-12-59	69	186	7.8	19 / 0.95	0.1 / 0.01	18 / 0.78	1.9 / 0.05	0 / 0.00	84 / 1.38	2.6 / 0.05	4.7 / 0.13	11 / 0.18	0.2 / 0.01	0.11	37		136	44	48	0	DWR
Turlock Irr. Dist. irrigation	6S/10E-2H1	9-8-59	68	441	8.0	41 / 2.05	14 / 1.16	35 / 1.52	2.5 / 0.06	0 / 0.00	222 / 3.64	13 / 0.27	19 / 0.54	14 / 0.23	0.2 / 0.01	0.0	73	Al 0.11 [d] Cu 0.01	321	32	161	0	USGS
Turlock Irr. Dist. irrigation	-24L1	10-9-59	67	410	8.0	25 / 1.25	6.0 / 0.49	61 / 2.65	2.6 / 0.07	0 / 0.00	185 / 3.03	16 / 0.33	34 / 0.96	1.2 / 0.02	0.2 / 0.01	0.0	37	Al 0.04 [d] Zn 0.01	274	59	87	0	USGS
Turlock Irr. Dist. irrigation	-28K1	10-2-59	66	729	8.2	33 / 1.65	11 / 0.88	100 / 4.35	2.8 / 0.07	0 / 0.00	307 / 5.03	22 / 0.46	56 / 1.58	8.0 / 0.13	0.2 / 0.01	0.1	37	Al 0.08 [d] Cu 0.01	421	63	126	0	USGS
Turlock Irr. Dist. drainage	6S/11E-3B1	9-9-59	65	569	8.2	45 / 2.25	14 / 1.13	54 / 2.36	1.9 / 0.05	0 / 0.00	233 / 3.82	34 / 0.71	28 / 0.79	35 / 0.56	0.2 / 0.01	0.1	63	Al 0.11 Zn 0.06 [d] Cu 0.01	390	41	169	0	USGS
Turlock Irr. Dist. drainage	-9C1	9-14-59	67	416	8.0	38 / 1.90	10 / 0.86	34 / 1.48	2.9 / 0.07	0 / 0.00	163 / 2.67	30 / 0.62	16 / 0.45	26 / 0.42	0.2 / 0.01	1.0	60	Al 0.07 [d] Cu 0.01	298	34	138	4	USGS
Turlock Irr. Dist. drainage	-10J1	10-8-59	68	314	7.8	28 / 1.40	6.8 / 0.56	26 / 1.13	1.4 / 0.04	0 / 0.00	110 / 1.80	18 / 0.37	9.4 / 0.27	35 / 0.56	0.2 / 0.01	0.0	55	Al 0.09 As 0.01 [d] Cu 0.01	234	36	93	8	USGS
irrigation	-27K1	7-6-59	67	198	7.9	14 / 0.70	4.6 / 0.38	20 / 0.87	4.0 / 0.10	0 / 0.00	86 / 1.41	15 / 0.31	5.0 / 0.14	9.6 / 0.15	0.4 / 0.02	0.0	59	Al 0.08 [d] Cu 0.01	174	42	54	0	USGS
irrigation	-36P1	7-6-59	66	301	8.0	22 / 1.10	8.3 / 0.68	28 / 1.22	3.9 / 0.10	0 / 0.00	124 / 2.03	17 / 0.35	11 / 0.31	19 / 0.31	0.2 / 0.01	0.0	66	Al 0.05 [d]	236	39	89	0	USGS
A. Ferrari irrigation	6S/12E-7C1	6-12-59	70	162	7.7	14 / 0.70	0.0 / 0.00	18 / 0.78	3.0 / 0.08	0 / 0.00	74 / 1.21	0.2 / 0.00	7.6 / 0.21	3.9 / 0.06	0.1 / 0.00	0.12	40		123	50	35	0	DWR
C. Roberts domestic	-8D1	6-11-59	-	307	7.4	26 / 1.30	5.4 / 0.44	26 / 1.13	1.5 / 0.04	0 / 0.00	93 / 1.52	11 / 0.23	21 / 0.59	36 / 0.58	0.2 / 0.01	0.13	35		203	39	87	11	DWR
C. Roberts domestic	-8D2	6-12-59	-	131	7.3	11 / 0.55	0.4 / 0.03	16 / 0.70	1.4 / 0.04	0 / 0.00	62 / 1.02	0.0 / 0.00	4.4 / 0.12	5.5 / 0.09	0.2 / 0.01	0.13	28		97	53	29	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

ANALYSES OF GROUND WATER

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Mineral constituents are given in parts per million / equivalents per million.

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
	MDB&M					MERCED COUNTY (Cont.)																	
C. W. Magneson domestic	6S/12E-9D1	6-11-59	70	271	7.6	25 / 1.25	4.5 / 0.37	24 / 1.04	1.6 / 0.04	0 / 0.00	141 / 2.31	2.1 / 0.04	6.5 / 0.18	8.7 / 0.14	0.1 / 0.00	0.12	35		178	38	81	0	DWR
irrigation	-21N1	5-27-59	67	214	7.3	15 / 0.75	7.1 / 0.58	19 / 0.83	4.3 / 0.11	0 / 0.00	94 / 1.54	15 / 0.31	7.3 / 0.21	7.2 / 0.12	0.2 / 0.01	0.0	60	Al 0.01 As 0.01[d] Cu 0.01	181	37	66	0	USGS
irrigation	-23H1	5-26-59	66	197	7.9	17 / 0.85	6.9 / 0.57	12 / 0.52	1.9 / 0.05	0 / 0.00	63 / 1.03	20 / 0.42	4.8 / 0.14	21 / 0.34	0.1 / 0.01	0.0	65	Al 0.06[d]	180	26	71	19	USGS
irrigation	6S/13E-6N1	7-7-59	65	158	6.6	13 / 0.65	3.4 / 0.28	13 / 0.57	1.7 / 0.04	0 / 0.00	56 / 0.92	5.0 / 0.10	5.6 / 0.16	19 / 0.31	0.2 / 0.01	0.2	39	Al 0.02[d] Fe 0.62 (dis.)	129	37	47	1	USGS
irrigation	-31F1	7-7-59	66	253	8.0	26 / 1.30	6.6 / 0.54	16 / 0.70	1.6 / 0.04	0 / 0.00	107 / 1.75	8.0 / 0.17	11 / 0.31	22 / 0.35	0.2 / 0.01	0.0	71	Al 0.04[d] Cu 0.02	215	27	92	4	USGS
Gustine Drainage Dist. irrigation	7S/9E-32H1	7-30-59	-	981	7.9	69 / 3.44	36 / 2.99	87 / 3.78	1.8 / 0.05	0 / 0.00	250 / 4.10	217 / 4.52	55 / 1.55	11 / 0.18	0.3 / 0.02	0.55	26		627	37	322	117	DWR
irrigation	7S/11E-4M1	7-6-59	65	469	8.3	26 / 1.30	5.0 / 0.41	79 / 3.44	6.8 / 0.17	8 / 0.27	213 / 3.49	16 / 0.33	31 / 0.87	9.8 / 0.16	0.4 / 0.02	0.0	48	Al 0.05 As 0.01[d] Pb 0.01	335	65	86	0	USGS
irrigation	-14G1	6-18-59	66	479	8.2	39 / 1.95	12 / 0.99	53 / 2.31	4.0 / 0.10	0 / 0.00	264 / 4.33	11 / 0.23	12 / 0.34	21 / 0.34	0.4 / 0.02	0.0	69	Al 0.07[d]	351	43	147	0	USGS
irrigation	7S/12E-1Q1	7-30-59	67	344	7.2	32 / 1.60	6.7 / 0.55	31 / 1.35	2.2 / 0.06	0 / 0.00	135 / 2.21	23 / 0.48	19 / 0.54	12 / 0.19	0.2 / 0.01	0.0	75	Al 0.14[d]	268	38	107	0	USGS
irrigation	-3F1	7-8-59	66	230	7.1	19 / 0.95	6.2 / 0.51	18 / 0.78	1.9 / 0.05	0 / 0.00	75 / 1.23	21 / 0.44	6.8 / 0.19	22 / 0.35	0.2 / 0.01	0.6	68	Fe 0.01 (dis.)[d] Al 0.17 Cu 0.01	201	34	73	11	USGS
irrigation	-8E1	6-15-59	66	435	8.0	40 / 2.00	14 / 1.16	31 / 1.35	2.6 / 0.07	0 / 0.00	197 / 3.23	17 / 0.35	14 / 0.39	37 / 0.60	0.2 / 0.01	0.0	68	Al 0.07[d]	321	29	158	0	USGS
irrigation	-19A1	6-16-59	-	300	7.7	30 / 1.50	7.8 / 0.64	23 / 1.00	5.8 / 0.15	0 / 0.00	167 / 2.74	7.6 / 0.16	5.9 / 0.17	6.7 / 0.11	0.1 / 0.01	0.0	60	Al 0.06[d]	229	30	107	0	USGS
irrigation	-22H1	6-16-59	66	347	8.0	33 / 1.65	12 / 1.01	25 / 1.09	3.6 / 0.09	0 / 0.00	192 / 3.15	11 / 0.23	7.2 / 0.20	10 / 0.16	0.1 / 0.01	0.0	68	Al 0.04[d]	265	28	133	0	USGS
irrigation	7S/13E-4P1	5-13-59	66	300	7.7	26 / 1.30	9.1 / 0.75	25 / 1.09	4.1 / 0.10	0 / 0.00	142 / 2.33	9.0 / 0.19	9.8 / 0.28	15 / 0.24	0.1 / 0.01	0.0	65	Al 0.03[d]	233	34	103	0	USGS
irrigation	-19H1	6-16-59	66	284	8.0	30 / 1.50	9.0 / 0.74	16 / 0.70	3.3 / 0.08	0 / 0.00	142 / 2.33	9.6 / 0.20	6.5 / 0.18	15 / 0.24	0.1 / 0.01	0.0	69	Al 0.03[d]	228	23	112	0	USGS
irrigation	-22C1	7-8-59	65	380	7.5	37 / 1.35	15 / 1.23	24 / 1.04	3.5 / 0.09	0 / 0.00	204 / 3.34	9.4 / 0.20	14 / 0.39	11 / 0.18	0.1 / 0.01	0.0	62	Al 0.04[d] Cu 0.01	277	25	154	0	USGS
irrigation	7S/14E-9R1	7-9-59	66	243	7.4	16 / 0.80	11 / 0.89	19 / 0.83	2.5 / 0.06	0 / 0.00	117 / 1.92	4.6 / 0.10	12 / 0.34	7.5 / 0.12	0.0 / 0.00	0.0	66	Al 0.01[d] As 0.03	197	32	85	0	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

ANALYSES OF GROUND WATER

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Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
						Mineral constituents in parts per million / equivalents per million																	
MERCED COUNTY (Cont.)																							
irrigation	7S/14E-28J1	7-14-59	67	450	7.6	36 / 1.80	17 / 1.36	36 / 1.57	3.9 / 0.10	0 / 0.00	260 / 4.26	8.0 / 0.17	9.3 / 0.26	5.4 / 0.09	0.1 / 0.01	0.0	64	Fe 0.01 (dis.)[d] As 0.01 Al 0.12 Zn 0.02	308	33	158	0	USGS
irrigation	-31M1	7-8-59	65	632	7.7	62 / 3.09	25 / 2.04	53 / 2.31	3.3 / 0.08	0 / 0.00	360 / 5.90	25 / 0.52	25 / 0.70	7.5 / 0.12	0.0 / 0.00	0.0	62	Al 0.25[d]	440	31	256	0	USGS
irrigation	7S/15E-18K	7-13-59	68	278	7.4	22 / 1.10	10 / 0.82	18 / 0.78	6.4 / 0.16	0 / 0.00	142 / 2.33	11 / 0.23	11 / 0.31	4.5 / 0.07	0.1 / 0.01	0.0	71	Fe 0.02 (dis.)[d] Al 0.04	224	27	96	0	USGS
irrigation	-30E1	7-13-59	66	756	8.2	68 / 3.39	33 / 2.70	52 / 2.26	2.9 / 0.07	5 / 0.17	322 / 5.28	94 / 1.96	15 / 0.42	32 / 0.52	0.1 / 0.01	0.0	50	Al 0.16 Zn 0.01[d] Pb 0.02	511	27	304	32	USGS
irrigation	-34R1	7-21-59	66	294	8.1	24 / 1.20	11 / 0.88	23 / 1.00	4.3 / 0.11	0 / 0.00	147 / 2.41	9.4 / 0.20	11 / 0.31	8.6 / 0.14	0.1 / 0.01	0.0	51	Al 0.02[d]	214	31	104	0	USGS
Gustine Drainage Dist. irrigation	8S/9E-16E1	7-30-59	-	837	8.2	58 / 2.89	31 / 2.58	78 / 3.39	1.3 / 0.03	0 / 0.00	310 / 5.08	113 / 2.35	47 / 1.32	11 / 0.18	0.5 / 0.03	0.56	26		518	38	274	20	DWR
irrigation	8S/14E-2D1	7-27-59	68	292	7.7	21 / 1.05	8.4 / 0.69	28 / 1.22	3.5 / 0.09	0 / 0.00	155 / 2.54	7.0 / 0.15	7.5 / 0.21	5.1 / 0.08	0.1 / 0.01	0.0	39	Al 0.04[d]	196	40	87	0	USGS
irrigation	-24A1	7-23-59	65	297	8.1	21 / 1.05	12 / 1.01	24 / 1.04	8.8 / 0.23	0 / 0.00	168 / 2.75	8.6 / 0.18	8.5 / 0.24	4.1 / 0.07	0.1 / 0.01	0.0	70	Al 0.04[d]	240	31	103	0	USGS
irrigation	8S/16E-17P1	7-23-59	65	319	7.7	30 / 1.50	13 / 1.10	18 / 0.78	4.3 / 0.11	0 / 0.00	178 / 2.92	11 / 0.23	5.6 / 0.16	2.7 / 0.04	0.1 / 0.01	0.0	49	Al 0.05[d]	222	22	130	0	USGS
Gustine Drainage Dist. irrigation	9S/9E-5B1	7-29-59	-	885	8.1	59 / 2.94	32 / 2.61	90 / 3.92	1.5 / 0.04	0 / 0.00	376 / 6.16	72 / 1.50	61 / 1.72	11 / 0.18	0.4 / 0.02	0.80	27		540	41	278	0	DWR
Central Calif. Irr. Dist. irrigation	-21F1	7-29-59	-	782	8.2	34 / 1.70	26 / 2.12	92 / 4.00	1.7 / 0.04	0 / 0.00	251 / 4.11	52 / 1.08	88 / 2.48	10 / 0.16	0.3 / 0.02	1.6	27		456	51	191	0	DWR
State of Calif. irrigation	9S/10E-36R1	8-4-59	-	785	8.2	54 / 2.69	34 / 2.76	58 / 2.52	2.3 / 0.06	0 / 0.00	215 / 3.52	121 / 2.52	74 / 2.09	0.0 / 0.00	0.2 / 0.01	0.52	38		488	31	273	97	DWR
Miller & Lux irrigation	9S/13E-31D1	8-4-59	-	814	7.9	55 / 2.74	15 / 1.22	92 / 4.00	1.2 / 0.03	0 / 0.00	260 / 4.26	17 / 0.35	124 / 3.50	0.5 / 0.01	0.2 / 0.01	0.04	55		488	50	198	0	DWR
Central Calif. Irr. Dist. irrigation	10S/10E-28D1	7-30-59	-	586	8.1	49 / 2.44	25 / 2.06	35 / 1.52	2.5 / 0.06	0 / 0.00	235 / 3.85	42 / 0.87	42 / 1.18	11 / 0.18	0.3 / 0.02	0.46	37		360	25	225	32	DWR
Bisigwani Bros.	10S/12E-6K1	8-4-59	-	708	7.3	29 / 1.45	12 / 1.01	98 / 4.26	1.7 / 0.04	0 / 0.00	170 / 2.79	54 / 1.12	103 / 2.90	0.0 / 0.00	0.02 / 0.01	0.25	29		411	63	123	0	DWR
San Louis Canal Co. irrigation	-25L	8-4-59	-	848	7.8	41 / 2.04	13 / 1.04	113 / 4.92	2.1 / 0.05	0 / 0.00	158 / 2.59	54 / 1.12	151 / 4.26	0.6 / 0.01	0.2 / 0.01	0.20	32		485	61	154	24	DWR
Central Calif. Irr. Dist. irrigation	-27K1	8-3-59	-	1,790	7.9	84 / 4.19	38 / 3.12	222 / 9.65	3.9 / 0.10	0 / 0.00	196 / 3.21	101 / 2.10	422 / 11.90	0.6 / 0.01	0.1 / 0.00	0.48	32		1,000	56	366	205	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

ANALYSES OF GROUND WATER

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Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					MERCED COUNTY (Cont.)																	
Central Calif. Irr. Dist. irrigation	10S/12E-35K1	8-3-59	-	2,120	8.0	86 / 4.29	42 / 3.42	278 / 12.09	4.7 / 0.12	0 / 0.00	180 / 2.95	119 / 2.48	526 / 14.83	0.0 / 0.00	0.2 / 0.01	0.60	32		1,180	60	386	238	DWR
R. Lindman irrigation	11S/10E-23K1	7-30-59	-	4,070	8.1	221 / 11.03	177 / 14.54	447 / 19.44	4.2 / 0.11	0 / 0.00	167 / 2.74	948 / 19.74	755 / 21.29	107 / 1.72	0.3 / 0.02	2.5	20		2,760	43	1,280	1,140	DWR
Sam Hamburg Farms	12S/11E-3C1	7-31-59	-	1,680	8.1	63 / 3.14	36 / 2.93	257 / 11.18	2.9 / 0.07	0 / 0.00	201 / 3.29	525 / 10.93	117 / 3.30	0.8 / 0.01	0.3 / 0.02	3.1	33		1,140	64	304	139	DWR
						MADERA COUNTY																	
R. Jessup irrigation	9S/15E-24F1	7-21-59	72	221	7.3	22 / 1.10	4.1 / 0.34	17 / 0.74	2.3 / 0.06	0 / 0.00	92 / 1.51	0.0 / 0.00	22 / 0.62	3.3 / 0.05	0.1 / 0.01	0.0	76	Al 0.03[d]	192	33	72	0	USGS
City of Chowchilla municipal	9S/16E-30C1	7-21-59	-	203	7.9	19 / 0.95	3.0 / 0.25	17 / 0.74	3.2 / 0.08	0 / 0.00	86 / 1.41	1.0 / 0.02	20 / 0.56	2.0 / 0.03	0.1 / 0.01	0.0	77		184	37	60	0	USGS
O. L. Baker irrigation	-35N1	7-21-59	-	319	8.1	32 / 1.60	6.3 / 0.52	26 / 1.13	2.3 / 0.06	0 / 0.00	142 / 2.33	6.0 / 0.12	24 / 0.68	7.7 / 0.12	0.1 / 0.01	0.0	51	Fe 0.01 (dis.)[d] Al 0.02 Zn 0.01	225	34	106	0	USGS
Red Top Ranch irrigation	10S/14E-8B1	7-21-59	67	532	7.6	60 / 2.99	11 / 0.93	40 / 1.74	4.5 / 0.12	0 / 0.00	264 / 4.33	5.0 / 0.10	32 / 0.90	14 / 0.23	0.0 / 0.00	0.0	69	Al 0.07[d] Cu 0.01	366	30	196	0	USGS
E. Hughes irrigation	-24B1	7-21-59	68	746	7.5	78 / 3.89	15 / 1.23	44 / 1.91	5.5 / 0.14	0 / 0.00	181 / 2.97	7.0 / 0.15	134 / 3.78	9.6 / 0.15	0.1 / 0.01	0.0	71	Al 0.04[d] Cu 0.01	453	27	256	103	USGS
H. Probert irrigation	10S/15E-31A1	7-21-59	70	496	8.0	48 / 2.40	11 / 0.91	31 / 1.35	4.0 / 0.10	0 / 0.00	155 / 2.54	6.0 / 0.12	73 / 2.06	5.8 / 0.09	0.1 / 0.01	0.0	75	Al 0.11[d] Cu 0.02	330	28	166	39	USGS
H. Wilson irrigation	10S/16E-24H1	7-21-59	-	229	7.9	20 / 1.00	6.3 / 0.52	16 / 0.70	2.2 / 0.06	0 / 0.00	86 / 1.41	6.0 / 0.12	14 / 0.39	20 / 0.32	0.1 / 0.01	0.0	78	Fe 0.01 (dis.)[d]	205	31	76	5	USGS
W. Haynes irrigation	-30K	8-10-59	71	235	7.8	26 / 1.30	5.6 / 0.46	24 / 1.04	2.3 / 0.06	0 / 0.00	118 / 1.93	4.4 / 0.09	24 / 0.68	9.1 / 0.15	0.2 / 0.01	0.0	43	Al 0.30 Zn 0.02[d] Cu 0.03	197	36	88	0	USGS
Madera Country Club domestic & irrigation	10S/17E-25N1	7-21-59	66	238	7.9	19 / 0.95	5.5 / 0.45	19 / 0.83	2.8 / 0.07	0 / 0.00	92 / 1.51	9.0 / 0.19	17 / 0.48	12 / 0.19	0.3 / 0.02	0.0	79	Al 0.12 Zn 0.04[d] Cu 0.03	209	36	70	0	USGS
Red Top Ranch irrigation	11S/14E-1A1	7-21-59	68	739	7.9	69 / 3.44	18 / 1.44	52 / 2.26	5.0 / 0.13	0 / 0.00	214 / 3.51	14 / 0.29	119 / 3.36	5.0 / 0.08	0.0 / 0.00	0.0	71	Al 0.03[d]	458	31	244	69	USGS
O. D. Turnbrow irrigation	-5B1	8-12-59	-	313	7.4	28 / 1.40	5.6 / 0.46	24 / 1.04	3.0 / 0.08	0 / 0.00	101 / 1.66	3.0 / 0.06	44 / 1.24	2.9 / 0.05	0.0 / 0.00	0.0	77	Fe 0.01 (dis.)[d] Al 0.01 Cu 0.01	238	35	93	10	USGS
G. D. Turnbrow irrigation	-16A1	7-21-59	70	420	7.5	38 / 1.90	8.5 / 0.70	32 / 1.39	3.8 / 0.10	0 / 0.00	122 / 2.00	8.0 / 0.17	58 / 1.64	11 / 0.18	0.0 / 0.00	0.0	78	Al 0.04[d] Cu 0.01	297	34	130	30	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm [a]	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M								MADERA COUNTY (Cont.)														
H. B. Shein irrigation	11S/15E-23L1	7-21-59	68	365	8.2	33 1.65	10 0.84	31 1.35	3.1 0.08	0 0.00	171 2.80	5.0 0.10	38 1.07	5.6 0.09	0.1 0.01	0.0	7.0	Al 0.12[d] Cu 0.02	217	34	124	0	USGS
Red Top Ranch irrigation	-29H1	7-21-59	72	424	8.0	48 2.40	4.9 0.40	35 1.52	2.8 0.07	0 0.00	193 3.16	7.0 0.15	36 1.02	2.7 0.04	0.1 0.01	0.1	78	Al 0.05[d]	310	35	140	0	USGS
City of Madera municipal	11S/17E-25B1	7-23-59	72	200	7.4	14 0.70	5.1 0.42	21 0.91	3.1 0.08	0 0.00	84 1.38	6.0 0.12	18 0.51	1.4 0.02	0.1 0.01	0.0	64	Fe 0.01 (dis.)[d] Al 0.01 Cu 0.01	174	43	56	0	USGS
Santa Fe R. R. domestic	11S-18E-17H1	7-23-59	76	220	7.9	19 0.95	4.0 0.33	21 0.91	3.1 0.08	0 0.00	101 1.66	3.0 0.06	16 0.45	1.7 0.03	0.1 0.01	0.0	62	Fe 0.02 (dis.)[d] Al 0.02 Cu 0.01 Zn 0.13	180	40	64	0	USGS
W. Jay domestic	-20E1	7-23-59	75	188	7.7	13 0.65	4.0 0.33	17 0.74	4.8 0.12	0 0.00	76 1.25	1.0 0.02	16 0.45	3.2 0.05	0.1 0.01	0.0	73	Fe 0.01 (dis.)[d] Al 0.01 Cu 0.01 Zn 0.15	169	40	49	0	USGS
East Side Ranch irrigation	12S/14E-34H1	7-21-59	68	279	7.8	1.6 0.08	0.5 0.04	64 2.78	1.1 0.03	0 0.00	119 1.95	16 0.33	25 0.70	0.2 0.00	0.6 0.03	0.3	56	Al 0.17[d] Cu 0.02	224	95	6	0	USGS
Red Top Ranch irrigation	12S/15E-4K1	7-21-59	70	455	8.1	44 2.20	11 0.90	32 1.39	3.4 0.09	0 0.00	158 2.59	9.0 0.19	64 1.80	1.4 0.02	0.1 0.01	0.0	79	Al 0.06[d]	322	30	155	25	USGS
Red Top Ranch irrigation	-22F1	7-21-59	70	329	8.1	30 1.50	5.4 0.44	34 1.48	2.4 0.06	0 0.00	157 2.57	7.0 0.15	27 0.76	1.2 0.02	0.1 0.01	0.0	72	Fe 0.02 (dis.)[d] Zn 0.01	256	43	97	0	USGS
W. Gillis irrigation	-27G1	7-21-59	71	333	8.0	28 1.40	4.4 0.36	36 1.57	3.6 0.09	0 0.00	149 2.44	7.0 0.15	32 0.90	1.2 0.02	0.1 0.01	0.0	79	Al 0.02[d]	264	46	88	0	USGS
R. Spomer irrigation	12S/16E-25P1	7-23-59	72	243	8.0	20 1.00	5.8 0.48	25 1.09	2.0 0.05	0 0.00	121 1.98	1.0 0.02	18 0.51	1.0 0.02	0.2 0.01	0.0	84	Al 0.07[d]	217	42	74	0	USGS
G. Wear irrigation	12S/17E-5R1	7-23-59	71	194	7.8	15 0.75	4.0 0.33	17 0.74	3.5 0.09	0 0.00	79 1.29	5.0 0.10	18 0.51	2.6 0.04	0.1 0.01	0.0	69	Fe 0.01 (dis.)[d] Al 0.03	173	39	54	0	USGS
S. Thomas irrigation	-7F1	7-23-59	70	525	8.1	52 2.59	12 1.01	41 1.78	6.4 0.16	0 0.00	196 3.21	55 1.15	36 1.02	2.1 0.03	0.2 0.01	0.1	77	Al 0.04[d]	379	32	180	19	USGS
Libbie Ranch irrigation	-24A1	8-19-59	68	235	7.8	21 1.05	6.2 0.51	15 0.65	4.4 0.11	0 0.00	105 1.72	4.0 0.08	14 0.39	4.4 0.07	0.2 0.01	0.0	64	Al 0.09[d] Cu 0.01	185	23	78	0	USGS
Mordecai irrigation	12S/18E-7L1	7-23-59	69	211	8.0	18 0.90	5.8 0.48	16 0.70	4.4 0.11	0 0.00	102 1.67	5.0 0.10	10 0.28	4.0 0.06	0.1 0.01	0.0	65	Al 0.03[d] Cu 0.01	178	32	69	0	USGS
Iverson & Carlton irrigation	-14J1	7-23-59	72	290	7.7	21 1.05	6.9 0.57	23 1.00	3.9 0.10	0 0.00	77 1.26	10 0.21	29 0.82	21 0.34	0.1 0.01	0.0	80	Fe 0.01 (dis.)[d] Al 0.04 Cu 0.01	233	37	81	18	USGS
E. Jones irrigation	12S/19E-32B1	7-23-59	71	173	7.8	14 0.70	4.4 0.36	14 0.61	3.7 0.09	0 0.00	79 1.29	4.0 0.08	7.2 0.20	8.8 0.14	0.1 0.01	0.0	54	Fe 0.01(dis.)[d] Al 0.02 Cu 0.01	149	35	53	0	USGS
Columbia Canal Co. irrigation	13S/15E-22J1	7-16-59	-	179	7.5	0.6 0.03	0.1 0.01	41 1.78	0.7 0.02	0 0.00	97 1.59	1.0 0.02	7.2 0.20	0.0 0.00	0.2 0.01	0.09	32		131	97	2	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	UDB&M							MADERA COUNTY (Cont.)															
Columbia Canal Co. irrigation	13S/15E-25C1	7-16-59	-	153	7.7	4.8 / 0.24	0.0 / 0.00	27 / 1.17	1.1 / 0.03	0 / 0.00	75 / 1.23	1.0 / 0.02	6.3 / 0.13	0.6 / 0.01	0.1 / 0.00	0.09	34		113	81	12	0	DWR
H. O. Nelsil irrigation	13S/16E-2C1	7-23-59	71	230	7.9	23 / 1.15	6.0 / 0.49	30 / 1.30	2.5 / 0.06	0 / 0.00	142 / 2.33	3.0 / 0.06	18 / 0.51	1.3 / 0.02	0.1 / 0.01	0.0	83	Fe 0.01 (dis.)[d] Al 0.03 Zn 0.01	237	43	82	0	USGS
G. Roberts irrigation	13S/17E-5P1	7-23-59	72	252	7.9	22 / 1.10	2.7 / 0.22	28 / 1.22	2.3 / 0.06	0 / 0.00	111 / 1.82	5.0 / 0.10	23 / 0.65	2.5 / 0.04	0.1 / 0.01	0.0	81	Al 0.11 [d]	222	47	66	0	USGS
									FRESNO COUNTY														
Dos Palos Drainage Dist. drainage	11S/12E-13J1	8-3-59	-	1,900	7.3	100 / 4.99	55 / 4.54	203 / 8.83	4.5 / 0.12	0 / 0.00	197 / 3.23	117 / 2.44	443 / 12.19	1.0 / 0.02	0.2 / 0.01	0.35	30		1,050	48	477	315	DWR
Central Calif. Irr. Dist. irrigation	11S/13E-17F1	8-3-59	-	1,240	8.1	40 / 2.00	20 / 1.68	181 / 7.87	2.3 / 0.06	0 / 0.00	183 / 3.00	79 / 1.64	250 / 7.05	0.7 / 0.01	0.2 / 0.01	0.60	30		695	68	184	34	DWR
Miller & Lux Corp. irrigation	-36B1	8-3-59	-	1,060	8.0	34 / 1.70	6.1 / 0.50	181 / 7.87	2.1 / 0.05	0 / 0.00	147 / 2.41	92 / 1.92	204 / 5.75	1.4 / 0.01	0.2 / 0.01	0.30	51		643	79	110	0	DWR
Red Fern Ranch	12S/13E-9C1	8-3-59	-	3,330	8.1	155 / 7.73	25 / 7.85	564 / 24.53	4.4 / 0.11	0 / 0.00	206 / 3.38	1190 / 24.73	434 / 12.24	1.8 / 0.03	0.3 / 0.02	6.5	23		2,530	61	780	611	DWR
J. J. Indart irrigation	12S/14E-29B1	8-3-59	-	1,190	7.7	44 / 2.20	30 / 2.48	150 / 6.52	3.5 / 0.09	0 / 0.00	116 / 1.90	153 / 3.13	217 / 6.12	2.8 / 0.04	0.2 / 0.01	0.47	42		700	58	234	139	DWR
Las Deltas Mutual Water Co. irrigation	13S/14E-15D1	7-14-59	75	2,410	7.8	34 / 1.70	4.6 / 0.38	516 / 22.45	2.3 / 0.07	0 / 0.00	202 / 3.31	635 / 13.22	300 / 8.46	0.9 / 0.01	0.4 / 0.02	1.2	48		1,640	91	104	0	DWR
		8-13-59	77	2,400	8.1	35 / 1.75	5.0 / 0.41	491 / 21.36	3.2 / 0.08	0 / 0.00	203 / 3.33	581 / 12.10	284 / 8.01	0.3 / 0.00	0.4 / 0.02	1.2	51		1,550	90	108	0	DWR
domestic & irrigation	-34N1	8-14-59	76	4,850	8.0	230 / 11.48	176 / 14.49	672 / 29.23	9.2 / 0.24	0 / 0.00	232 / 3.80	1460 / 30.40	772 / 21.77	9.1 / 0.15	0.2 / 0.01	2.5	49		3,490	53	1300	1110	DWR
Locke Bros. irrigation	13S/15E-18L1	8-3-59	-	389	7.7	10 / 0.50	2.7 / 0.22	67 / 2.91	1.5 / 0.04	0 / 0.00	109 / 1.79	20 / 0.42	50 / 1.41	0.3 / 0.00	0.6 / 0.03	0.22	40		246	79	36	0	DWR
Pappas & Co. irrigation	14S/13E-12N1	7-14-59	76	1,290	8.1	20 / 1.00	4.4 / 0.36	262 / 11.40	3.5 / 0.09	0 / 0.00	261 / 4.28	293 / 6.10	90 / 2.54	1.7 / 0.03	0.5 / 0.03	1.4	49		854	89	68	0	DWR
Employees Enterprise irrigation	-21N1	7-14-59	88	2,210	8.2	71 / 3.54	73 / 6.01	342 / 14.88	4.2 / 0.11	0 / 0.00	246 / 4.03	818 / 17.03	123 / 3.47	0.2 / 0.00	0.4 / 0.02	3.0	43		1,600	61	478	276	DWR

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b. Gravimetric determination.
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d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					FRESNO COUNTY (Cont.)																	
Employees Enterprise irrigation	14S/13E-22N1	7-14-59	88	1,880	7.8	53 / 2.64	43 / 3.53	317 / 13.79	3.8 / 0.10	0 / 0.00	223 / 3.65	634 / 13.20	103 / 2.90	1.2 / 0.02	0.2 / 0.02	2.0	44		1,310	69	309	126	DWR
Pilibos Bros. irrigation	-25N1	7-14-59	89	2,150	8.2	58 / 2.89	37 / 3.06	383 / 16.66	3.4 / 0.09	0 / 0.00	187 / 3.06	657 / 13.68	197 / 5.56	7.0 / 0.11	0.6 / 0.03	2.5	47		1,480	73	298	145	DWR
Pappas & Company irrigation	14S/14E-9M1	7-14-59	82	3,520	7.7	80 / 3.99	22 / 1.80	642 / 27.93	4.3 / 0.11	0 / 0.00	180 / 2.95	487 / 10.14	752 / 21.21	1.7 / 0.03	0.4 / 0.02	1.5	45		2,120	82	290	142	DWR
Vista Del Llanoys domestic & irrigation	-11N1	7-14-59	74	5,990	7.4	246 / 12.28	205 / 16.89	882 / 38.37	11 / 0.28	0 / 0.00	260 / 4.26	1740 / 36.23	951 / 26.82	2.3 / 0.04	0.2 / 0.01	2.5	48		4,220	56	1,460	1,250	DWR
Wm. Giacone irrigation	-17Q1	7-14-59	80	2,400	8.1	139 / 6.94	80 / 6.55	294 / 12.79	9.8 / 0.25	0 / 0.00	235 / 3.85	787 / 16.38	232 / 6.54	4.5 / 0.07	0.2 / 0.01	2.2	56		1,720	48	675	482	DWR
Murietta Farms irrigation	-28E1	8-14-59	80	1,600	8.2	65 / 3.24	36 / 2.99	238 / 10.35	5.0 / 0.13	0 / 0.00	236 / 3.87	518 / 10.78	81 / 2.28	2.5 / 0.04	0.4 / 0.02	2.1	47		1,110	62	312	118	DWR
Murietta Farms irrigation	-33N1	7-14-59	80	1,770	8.2	100 / 4.99	78 / 6.38	196 / 8.53	4.9 / 0.12	0 / 0.00	224 / 3.67	665 / 13.84	90 / 2.54	2.0 / 0.03	0.5 / 0.03	3.0	45		1,290	43	569	385	DWR
Dept. Fish & Game domestic	14S/15E-28L1	7-14-59	-	1,460	7.9	31 / 1.55	6.2 / 0.51	278 / 12.09	4.0 / 0.10	0 / 0.00	189 / 3.10	434 / 9.04	85 / 2.40	1.2 / 0.02	0.4 / 0.02	1.7	72		1,010	85	103	0	DWR
L. A. Jones irrigation	-31N1	7-14-59	76	2,130	8.1	31 / 1.55	31 / 2.55	398 / 17.31	2.3 / 0.06	0 / 0.00	191 / 3.13	676 / 14.07	161 / 4.54	1.8 / 0.03	0.9 / 0.05	2.7	54		1,450	81	205	48	DWR
Employees Enterprise irrigation	15S/12E-1N1	7-14-59	82	4,080	8.2	118 / 5.89	74 / 6.08	755 / 32.84	9.0 / 0.23	0 / 0.00	217 / 3.56	1625 / 33.83	271 / 7.64	16 / 0.26	0.7 / 0.04	4.4	44		3,040	73	599	421	DWR
Employees Enterprise irrigation	15S/13E-5R1	8-14-59	90	1,610	8.1	58 / 2.89	46 / 3.80	242 / 10.53	4.2 / 0.11	0 / 0.00	196 / 3.21	570 / 11.87	68 / 1.92	4.0 / 0.06	0.5 / 0.03	2.3	42		1,130	61	335	174	DWR
F. A. Yearout irrigation	15S/14E-36Q2	8-13-59	85	3,520	8.0	307 / 15.32	122 / 10.05	372 / 16.18	10 / 0.25	0 / 0.00	216 / 3.54	1330 / 27.69	403 / 11.36	4.8 / 0.08	0.1 / 0.00	1.7	41		2,700	39	1,270	1,093	DWR
Pucheu irrigation	15S/15E-20N2	7-14-59	80	1,350	8.1	48 / 2.40	6.1 / 0.50	246 / 10.70	2.5 / 0.06	0 / 0.00	180 / 2.95	414 / 8.62	75 / 2.12	2.6 / 0.04	0.6 / 0.03	1.7	48		932	78	145	0	DWR
Reese Bros. irrigation	-25N1	7-14-59	74	2,570	8.1	183 / 9.13	125 / 10.27	257 / 11.18	4.9 / 0.12	0 / 0.00	160 / 2.62	1130 / 23.53	161 / 4.54	2.0 / 0.03	0.6 / 0.03	1.6	36		1,980	36	971	840	DWR
Reese Bros. irrigation	-27N1	7-14-59	74	1,690	8.2	126 / 6.29	98 / 8.09	127 / 5.52	3.8 / 0.10	0 / 0.00	178 / 2.92	741 / 15.43	62 / 1.75	2.2 / 0.04	0.4 / 0.02	0.77	43		1,290	28	720	574	DWR
Reese Bros. irrigation	-35N1	7-14-59	74	1,770	8.0	127 / 6.34	107 / 8.84	123 / 5.35	3.5 / 0.09	0 / 0.00	153 / 2.51	778 / 16.20	71 / 2.00	1.4 / 0.02	0.4 / 0.02	1.0	40		1,330	26	760	635	DWR
irrigation	15S/16E-7Q1	7-14-59	72	2,050	8.0	81 / 4.04	17 / 1.43	335 / 14.57	10 / 0.26	0 / 0.00	198 / 3.24	642 / 13.37	142 / 4.00	1.0 / 0.02	0.4 / 0.02	0.91	73		1,400	72	274	112	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							FRESNO COUNTY (Cont.)															
irrigation	15S/16E-7Q1	8-13-59	70	2,050	8.0	84 / 4.19	18 / 1.44	354 / 15.40	19 / 0.49	0 / 0.00	196 / 3.21	686 / 14.28	132 / 3.72	2.9 / 0.05	0.2 / 0.02	0.79	72		1,460	72	282	121	DWR
Edmund Juste irrigation	15S/17E-1H1	7-13-59	70	648	7.6	62 / 3.09	18 / 1.49	32 / 1.39	9.6 / 0.24	0 / 0.00	182 / 2.98	28 / 0.58	81 / 2.28	12 / 0.19	0.2 / 0.01	0.09	73		406	22	229	80	DWR
James Irr. Dist. irrigation	-3R1	7-13-59	72	640	7.9	46 / 2.30	3.2 / 0.26	75 / 3.26	6.0 / 0.15	0 / 0.00	173 / 2.92	17 / 0.35	95 / 2.68	3.0 / 0.05	0.2 / 0.01	0.09	56		389	55	128	0	DWR
James Irr. Dist. irrigation	-10R1	7-13-59	72	2,480	7.6	192 / 9.58	29 / 2.39	231 / 10.05	15 / 0.38	0 / 0.00	112 / 1.84	12 / 0.25	712 / 20.08	4.4 / 0.07	0.2 / 0.01	0.17	61		1,310	45	599	507	DWR
domestic	-11F1	7-13-59	105	495	7.7	41 / 2.04	9.7 / 0.80	41 / 1.78	3.6 / 0.09	0 / 0.00	146 / 2.39	19 / 0.40	68 / 1.91	0.0 / 0.00	0.1 / 0.00	0.02	34		288	38	142	22	DWR
Seaboard Oil Co. domestic	-13R1	7-13-59	-	583	7.4	36 / 1.80	7.0 / 0.58	65 / 2.82	6.8 / 0.17	0 / 0.00	134 / 2.20	4.4 / 0.09	105 / 2.95	3.8 / 0.06	0.3 / 0.02	0.01	70		364	52	119	10	DWR
Seaboard Oil Co. domestic & industrial	-14G1	7-13-59	105	645	7.4	13 / 0.65	2.6 / 0.21	112 / 4.87	4.0 / 0.10	0 / 0.00	133 / 2.18	4.3 / 0.09	127 / 3.58	0.3 / 0.00	0.4 / 0.02	0.01	60		390	80	43	0	DWR
Signal Oil Co. domestic	-15B1	7-13-59	-	666	7.2	47 / 2.34	6.8 / 0.56	72 / 3.13	6.4 / 0.16	0 / 0.00	144 / 2.36	26 / 0.54	113 / 3.19	3.1 / 0.05	0.2 / 0.01	0.06	64		410	50	145	27	DWR
Nobel irrigation	-15F1	7-13-59	71	763	7.3	21 / 1.05	2.1 / 0.17	128 / 5.57	5.0 / 0.13	0 / 0.00	166 / 2.72	22 / 0.46	132 / 3.72	2.5 / 0.04	0.4 / 0.02	0.37	65		460	80	61	0	DWR
Nobel irrigation	-15H1	7-13-59	72	1,090	7.4	10 / 0.50	1.0 / 0.08	222 / 9.66	4.4 / 0.11	0 / 0.00	248 / 4.06	26 / 0.54	198 / 5.58	0.7 / 0.01	0.6 / 0.03	2.0	61		648	93	29	0	DWR
James Irr. Dist. irrigation	-22R1	7-13-59	72	544	7.5	27 / 1.35	1.1 / 0.09	81 / 3.52	1.7 / 0.04	0 / 0.00	143 / 2.42	10 / 0.21	84 / 2.37	1.3 / 0.02	0.3 / 0.02	0.10	51		330	70	72	0	DWR
James Irr. Dist. irrigation	-27H2	7-13-59	72	434	7.3	6.0 / 0.30	0.2 / 0.02	94 / 4.09	3.6 / 0.09	0 / 0.00	137 / 2.24	27 / 0.56	59 / 1.66	1.6 / 0.02	0.5 / 0.03	0.41	65		324	91	16	0	DWR
James Irr. Dist. irrigation	-34A1	7-13-59	74	490	7.5	6.4 / 0.32	0.5 / 0.04	96 / 4.18	3.5 / 0.09	0 / 0.00	153 / 2.51	24 / 0.50	54 / 1.52	0.5 / 0.01	0.2 / 0.01	0.43	63		324	90	18	0	DWR
James Irr. Dist. irrigation	-34J1	7-13-59	70	402	7.6	6.0 / 0.30	0.7 / 0.06	77 / 3.35	2.5 / 0.06	0 / 0.00	140 / 2.29	12 / 0.25	44 / 1.24	0.5 / 0.01	0.6 / 0.03	0.26	60		272	89	18	0	DWR
James Irr. Dist. irrigation	15S/18E-15G1	7-13-59	74	346	8.1	25 / 1.25	4.7 / 0.39	35 / 1.52	6.5 / 0.17	0 / 0.00	142 / 2.33	6.4 / 0.13	27 / 0.76	8.3 / 0.13	0.2 / 0.01	0.09	70		253	46	32	0	DWR
James Irr. Dist. irrigation	-20G1	7-13-59	74	402	8.1	22 / 1.10	2.7 / 0.22	53 / 2.30	7.0 / 0.18	0 / 0.00	143 / 2.34	9.2 / 0.19	43 / 1.21	5.5 / 0.09	0.3 / 0.02	0.06	64		277	60	66	0	DWR
James Irr. Dist. irrigation	-20N1	7-13-59	74	315	7.8	6.8 / 0.34	0.2 / 0.02	59 / 2.57	4.6 / 0.12	0 / 0.00	126 / 2.06	3.1 / 0.06	30 / 0.85	2.8 / 0.04	0.4 / 0.02	0.07	67		236	84	18	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							FRESNO COUNTY (Cont.)															
Wm. Deal irrigation	16S/14E-10Q1	7-15-59	88	1,540	8.6	88 4.39	23 1.92	213 9.43	3.1 0.08	8 0.27	111 1.82	608 12.66	42 1.18	0.3 0.01	0.3 0.02	1.9	30		1,080	60	316	213	DWR
F. A. Yearout irrigation	16S/15E-8N1	7-13-59	90	1,460	8.4	80 3.99	65 5.32	150 6.52	3.3 0.08	8 0.27	180 2.95	533 11.10	57 1.61	1.8 0.03	0.3 0.02	1.1	37		1,020	41	466	305	DWR
Vista Del Llano irrigation	-25Q1	7-15-59	78	1,780	8.8	105 5.24	92 7.53	164 7.13	3.7 0.09	12 0.40	160 2.62	720 14.99	77 2.17	3.9 0.06	0.2 0.01	1.3	37		1,290	36	639	489	DWR
Gragnani Bros. irrigation	16S/16E-6N1	7-15-59	76	4,000	7.8	272 13.57	139 11.41	518 22.53	4.6 0.12	0 0.00	161 2.64	1,800 37.48	268 7.56	0.4 0.01	0.2 0.01	3.0	28		3,110	47	1,250	1,120	DWR
Rabb Bros. irrigation	-9N1	7-15-59	78	1,610	8.0	105 5.24	29 2.39	218 9.48	4.1 0.10	0 0.00	152 2.49	607 12.64	84 2.37	1.0 0.02	0.3 0.02	1.5	46		1,170	55	382	257	DWR
Vista Del Llano irrigation	-20N1	7-15-59	75	1,920	8.6	129 6.44	130 10.66	127 5.52	3.4 0.09	14 0.47	176 2.88	835 17.38	57 1.61	33 0.53	0.3 0.02	0.98	48		1,460	24	856	690	DWR
Vista Del Llano irrigation	17S/16E-13E1	7-15-59	33	1,410	8.6	32 1.60	8.5 0.70	265 11.53	1.5 0.04	8 0.27	88 1.44	451 9.39	90 2.54	1.8 0.03	0.7 0.04	1.9	24		927	83	115	31	DWR
Harnish Bros. irrigation	-24N1	8-14-59	79	1,530	8.0	112 5.59	27 2.20	196 8.53	3.2 0.08	0 0.00	122 2.00	619 12.89	53 1.49	0.4 0.01	0.2 0.01	1.2	26		1,100	52	390	290	DWR
H. W. Davenport irrigation	17S/17E-23Q1	7-15-59	76	1,260	8.8	66 3.29	22 1.82	178 7.74	1.9 0.05	11 0.37	116 1.90	450 9.37	47 1.32	0.2 0.00	0.2 0.01	0.81	26		860	60	256	143	DWR
Y. Raceburn irrigation	-25N1	7-15-59	76	1,290	8.7	69 3.44	22 1.81	178 7.74	1.9 0.05	6 0.20	117 1.92	464 9.66	47 1.32	0.6 0.01	0.3 0.02	0.79	25		872	59	263	156	DWR
H. W. Davenport irrigation	-27R1	7-15-59	76	1,410	8.8	33 4.39	32 2.68	175 7.61	2.3 0.06	10 0.33	100 1.64	541 11.26	54 1.52	0.3 0.01	0.2 0.01	0.85	26		979	52	354	256	DWR
Errateberry irrigation	17S/13E-35Q1	7-15-59	74	1,320	8.9	55 2.74	8.3 0.68	238 10.35	1.3 0.03	20 0.67	294 4.82	294 6.12	79 2.23	0.6 0.01	0.7 0.04	1.4	20		862	75	171	0	DWR
irrigation	18S/16E-24N1	7-16-59	94	2,860	7.7	112 5.59	3.4 0.28	451 19.62	3.6 0.09	0 0.00	64 1.05	252 5.25	669 18.86	0.5 0.01	0.4 0.02	1.6	26		1,550	77	294	242	DWR
F. C. Diener irrigation	18S/17E-13N1	7-16-59	80	1,100	7.9	23 1.15	0.4 0.03	203 8.83	1.0 0.02	0 0.00	108 1.77	253 5.27	104 2.93	0.5 0.01	0.4 0.02	1.5	22		662	88	59	0	DWR
F. C. Diener irrigation	-13Q1	7-16-59	81	1,110	7.6	35 1.75	10 0.87	185 8.05	1.6 0.04	0 0.00	83 1.36	406 8.45	32 0.90	1.5 0.02	0.2 0.01	1.2	18		732	75	131	63	DWR
Benson irrigation	-30P1	7-16-59	90	2,580	7.4	56 2.79	4.5 0.37	451 19.62	2.4 0.06	0 0.00	106 1.74	208 4.33	583 16.44	1.0 0.02	0.3 0.02	1.5	28		1,390	86	158	71	DWR
Calfax irrigation	-33N1	7-16-59	84	3,560	7.6	79 3.94	37 3.05	585 25.45	4.0 0.10	0 0.00	168 2.75	328 6.83	787 22.19	4.5 0.07	0.2 0.01	1.8	31		1,940	78	350	212	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER
1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					FRESNO COUNTY (Cont.)																	
Giffen, Inc. irrigation	19S/17E-13N1	7-16-59	80	1,370	8.0	64 / 3.19	60 / 4.92	150 / 6.52	3.0 / 0.08	0 / 0.00	158 / 2.59	517 / 10.76	51 / 1.44	1.2 / 0.02	0.2 / 0.01	1.0	30		956	44	406	276	DWR
Giffen, Inc. irrigation	-34N1	7-16-59	80	1,670	8.2	101 / 5.04	86 / 7.11	154 / 6.70	3.9 / 0.10	0 / 0.00	172 / 2.82	632 / 14.20	77 / 2.17	3.2 / 0.05	0.4 / 0.02	1.0	29		1,220	35	608	467	DWR
Boston Land Co. irrigation	19S/18E-23D2	7-15-59	88	1,590	8.9	24 / 1.20	4.4 / 0.36	322 / 14.01	1.4 / 0.04	13 / 0.43	226 / 3.70	156 / 3.25	234 / 8.01	0.5 / 0.01	0.7 / 0.04	1.7	25		944	90	78	0	DWR
Boston Land Co. irrigation	-28E1	7-16-59	88	1,970	7.8	32 / 1.60	17 / 1.40	362 / 15.75	2.8 / 0.07	0 / 0.00	273 / 4.47	190 / 3.96	355 / 10.01	2.9 / 0.05	0.4 / 0.02	1.5	26		1,120	84	150	0	DWR
Allen irrigation	20S/15E-25D2	7-17-59	70	2,210	7.8	90 / 4.49	118 / 9.69	234 / 10.18	4.1 / 0.10	0 / 0.00	207 / 3.39	783 / 16.30	164 / 4.62	10 / 0.16	0.5 / 0.03	2.0	33		1,540	42	710	540	DWR
irrigation	-26M1	7-17-59	70	2,200	8.3	88 / 4.39	121 / 9.97	226 / 9.83	4.4 / 0.11	8 / 0.27	229 / 3.75	726 / 15.12	135 / 3.31	76 / 1.22	0.5 / 0.03	1.6	25		1,520	40	718	517	DWR
Shell Oil Co. industrial	20S/16E-4F1	7-16-59	82	1,870	7.9	67 / 3.34	30 / 2.43	300 / 13.05	2.6 / 0.07	0 / 0.00	85 / 1.39	657 / 13.68	128 / 3.61	1.0 / 0.02	0.4 / 0.02	1.6	14		1,240	69	239	219	DWR
Giffen, Inc. irrigation	20S/17E-9R1	7-16-59	78	2,640	8.0	164 / 8.18	158 / 13.00	242 / 10.53	5.4 / 0.14	0 / 0.00	156 / 2.56	1220 / 25.40	116 / 3.27	58 / 0.94	0.4 / 0.02	0.90	31		2,070	33	1,060	932	DWR
Paul Kucher Ranch irrigation	-11N2	7-16-59	78	1,460	8.0	67 / 3.34	69 / 5.67	156 / 6.79	3.2 / 0.08	0 / 0.00	177 / 2.90	570 / 11.87	46 / 1.30	2.5 / 0.04	0.3 / 0.02	0.35	30		1,030	43	451	306	DWR
Vernor Thomas Ranch domestic & irrigation	-36D1	7-16-59	77	1,310	7.9	74 / 3.69	49 / 4.06	133 / 6.00	2.2 / 0.06	0 / 0.00	129 / 2.11	521 / 10.85	32 / 0.90	18 / 0.29	0.2 / 0.01	0.65	30		928	43	388	282	DWR
Boston Land Co. irrigation	20S/18E-24D1	7-16-59	72	1,930	8.0	17 / 0.85	7.2 / 0.59	383 / 16.66	2.0 / 0.05	0 / 0.00	326 / 5.34	79 / 1.64	391 / 11.03	0.5 / 0.01	0.5 / 0.03	1.7	29		1,070	92	72	0	DWR
						TULARE COUNTY																	
J. Aguiar domestic	17S/23E-8L1	9-28-59	69	1,050	8.0	86 / 4.29	25 / 2.05	95 / 4.13	3.2 / 0.08	0 / 0.00	363 / 5.95	60 / 1.25	107 / 3.02	47 / 0.76	0.0 / 0.00	0.1	57	Al 0.10[d] Cu 0.01	659	39	317	19	USGS
B. F. Weber domestic & irrigation	17S/25E-34	8-6-59	76	546	8.4	46 / 2.30	22 / 1.82	37 / 1.61	2.5 / 0.06	9 / 0.30	234 / 3.84	17 / 0.35	34 / 0.96	17 / 0.27	0.2 / 0.01	0.04	54		354	28	206	0	DWR
A. Castro domestic	13S/24E-19M1	9-28-59	70	221	8.1	18 / 0.90	0.5 / 0.04	34 / 1.43	0.6 / 0.02	0 / 0.00	128 / 2.10	5.0 / 0.10	4.5 / 0.13	1.2 / 0.02	0.0 / 0.00	0.0	22	Al 0.03[d] Cu 0.01	149	61	47	0	USGS
Jinett Bros. domestic	19S/23E-24G1	6-24-59	70	250	8.2	35 / 1.75	2.1 / 0.17	13 / 0.56	0.4 / 0.01	0 / 0.00	131 / 2.15	5.6 / 0.12	6.1 / 0.17	4.9 / 0.08	0.1 / 0.00	0.04	23		154	22	96	0	DWR

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b. Gravimetric determination.
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d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm a	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by c
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M								TULARE COUNTY (Cont.)														
Pacific States irrigation	19S/24E-22C1	8-6-59	-	289	8.2	37 1.85	0.0 0.00	26 1.13	1.0 0.02	0 0.00	145 2.38	9.0 0.19	3.0 0.22	9.7 0.16	0.1 0.00	0.04	22		184	38	89	0	DWR
J. Lewis domestic	19S/25E-31J1	6-25-59	63	196	3.0	26 1.30	2.4 0.20	9.8 0.43	1.2 0.03	0 0.00	111 1.82	2.3 0.05	2.2 0.06	1.4 0.02	0.1 0.00	0.04	20		119	22	75	0	DWR
City of Exeter municipal	19S/26 E-3K1	6-25-59	-	475	8.4	38 1.90	13 1.10	39 1.70	2.5 0.06	4 0.13	187 3.06	18 0.37	36 1.02	11 0.18	0.4 0.02	0.07	24		288	36	150	0	DWR
R. Montgomery irrigation	-26M1	6-25-59	75	432	8.2	14 0.70	10 0.86	62 2.70	1.8 0.05	0 0.00	166 2.72	14 0.29	36 1.02	11 0.18	0.2 0.01	0.14	17		248	63	78	0	DWR
A. W. Furze irrigation	20S/26E-5R1	7-6-59	70	1,303	8.0	73 3.64	68 5.59	84 3.65	4.4 0.11	0 0.00	275 4.51	62 1.29	242 6.82	13 0.21	0.2 0.01	0.11	46		728	28	462	236	DWR
C. R. Meyers	-9Q	7-6-59	-	519	7.8	26 1.30	17 1.40	50 2.18	1.6 0.04	0 0.00	126 2.06	38 0.79	62 1.75	18 0.29	0.2 0.01	0.11	21		296	44	135	32	DWR
Rogers Farms irrigation	-20	7-6-59	-	454	8.2	34 1.70	12 0.96	36 1.57	2.9 0.07	0 0.00	147 2.41	24 0.50	36 1.02	26 0.42	0.2 0.01	0.09	46		289	36	133	13	DWR
H. G. Carr	20S/27E-17D1	9-28-59	-	1,160	7.9	85 4.24	37 3.08	85 3.70	6.0 0.15	0 0.00	180 2.95	45 0.94	230 6.49	34 0.55	0.0 0.00	0.1	43	Al 0.11 d Cu 0.01	654	33	366	218	USGS
J. G. Scott domestic & irrigation	22S/25E-22A	3-9-59	72	258	7.9	20 1.00	1.4 0.12	32 1.39	1.9 0.05	0 0.00	130 2.13	8.1 0.17	9.0 0.25	4.0 0.06	0.1 0.00	0.07	22		162	54	56	0	DWR
		7-7-59	72	260	8.1	21 1.05	0.8 0.07	34 1.48	1.9 0.05	0 0.00	132 2.16	6.7 0.14	8.9 0.25	4.0 0.06	0.1 0.00	0.07	22		164	56	56	0	DWR
J. Pemberton domestic	22S/27E-11C1	7-14-59	82	472	8.5	47 2.34	19 1.60	27 1.17	2.3 0.06	7 0.23	256 4.20	10 0.21	11 0.31	9.2 0.15	0.2 0.01	0.10	29		288	23	197	0	DWR
T. Kirksey irrigation	23S/25E-9F1	8-6-59	72	240	8.0	19 0.95	0.8 0.07	30 1.30	0.6 0.02	0 0.00	94 1.54	11 0.23	16 0.45	4.4 0.07	0.3 0.02	0.06	40		168	56	51	0	DWR
R. Bruke irrigation	23S/27E-21H1	7-14-59	92	616	8.2	7.9 0.39	0.1 0.01	121 5.26	2.2 0.06	0 0.00	141 2.31	47 0.98	82 2.31	1.3 0.02	1.0 0.05	0.64	44		376	92	20	0	DWR
F. Mitchell irrigation	24S/23E-8D	7-7-59	78	543	8.4	16 0.80	4.1 0.34	88 3.83	3.4 0.09	5 0.17	201 3.29	2.5 0.05	62 1.75	0.2 0.00	0.9 0.05	0.23	35		316	76	57	0	DWR
M. Hall irrigation	24S/25E-23H1	8-59	75	438	8.2	42 2.10	8 0.68	31 1.35	2.2 0.06	0 0.00	138 2.26	22 0.46	24 0.68	51 0.82	0.2 0.01	0.05	42		290	32	139	26	DWR
M. Gutinich irrigation	24S/27E-32P1	7-14-59	84	456	8.2	4.8 0.24	0.0 0.00	95 4.13	1.7 0.04	0 0.00	171 2.80	34 0.71	31 0.87	2.0 0.03	0.7 0.04	0.31	63		316	94	10	0	DWR

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d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm[a]	Per cent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C ppm	Analyzed by[c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							KINGS COUNTY															
R. Hollsten domestic	17S/22E-2H	8-20-59	65	138	7.4	15 0.75	5.5 0.45	4.3 0.19	1.3 0.03	0 0.00	68 1.11	9.0 0.19	3.5 0.10	4.0 0.07	0.0 0.00	0.0	33	Fe 0.04 (dis.)[d] Cu 0.04 Zn 1.2	109	13	60	4	USGS
H. I. Brown irrigation	18S/19E-6G1	8-31-59	68	1,240	8.3	32 1.60	7.2 0.59	234 10.18	0.8 0.02	4 0.13	301 4.93	212 4.41	100 2.82	1.0 0.02	1.0 0.05	1.1	24	Fe 0.04 (dis.)[d] Cu 0.04 Al 0.11 Zn 0.02	765	82	109	0	USGS
W. Verboan irrigation	18S/21E-14F1	9-5-59	66	296	8.1	37 1.85	5.5 0.45	19 0.83	1.0 0.03	0 0.00	120 1.97	32 0.67	16 0.45	0.8 0.01	0.0 0.00	0.0	34	Fe 0.01 (dis.)[d] Al 0.02 Cu 0.01	204	26	115	17	USGS
U. S. Navy irrigation	19S/19E-30B2	7-16-59	86	1,220	8.0	33 1.65	1.3 0.11	234 10.18	1.0 0.02	0 0.00	276 4.52	224 4.66	95 2.68	0.7 0.01	0.6 0.03	3.0	25		754	85	88	0	DWR
Serpe domestic	19S/20E-33A1	8-31-59	73	544	8.0	4.0 0.20	0.0 0.00	125 5.44	0.6 0.02	0 0.00	300 4.92	0.0 0.00	32 0.90	2.5 0.04	0.6 0.03	1.1	27	Fe 0.18 (dis.)[d] Cu 0.04 Al 0.45 Zn 0.08	341	96	10	0	USGS
Griswold irrigation	19S/21E-3B1	9-1-59	-	312	8.0	7.5 0.37	1.6 0.13	63 2.74	0.4 0.01	0 0.00	171 2.80	14 0.29	6.1 0.17	0.9 0.01	0.6 0.03	0.3	31	Fe 0.04 (dis.)[d] Al 0.04 Cu 0.04 Zn 0.02	209	84	25	0	USGS
Manzanillo Ranch irrigation and stock	19S/23E-8H1	8-27-59	76	130	7.7	3.2 0.16	0.00 0.00	25 1.09	0.3 0.01	0 0.00	66 1.08	3.0 0.06	3.0 0.08	0.1 0.00	0.3 0.02	0.0	22	Fe 0.03 (dis.)[d]	90	87	8	0	USGS
C. Urton domestic & irrigation	20S/20E-1CL1	8-31-59	72	848	8.0	8.0 0.40	1.2 0.10	187 8.13	2.0 0.05	0 0.00	486 7.97	13 0.27	2.5 0.07	6.0 0.10	0.4 0.02	1.3	51	Fe 0.19 (dis.)[d] Al 0.52 Cu 0.07 Zn 0.02	512	94	25	0	USGS
E. A. Peters domestic	20S/21E-12A1	8-19-59	72	867	8.0	67 3.34	12 1.02	100 4.34	0.4 0.01	0 0.00	296 4.85	27 0.56	125 3.52	0.6 0.01	0.2 0.01	0.2	29	Fe 0.02 (dis.)[d] Al 0.03 Cu 0.02 Zn 0.01	507	50	218	0	USGS
J. Hahsey domestic	20S/22E-1A1	8-10-59	70	202	7.8	13 0.65	0.1 0.01	32 1.39	0.3 0.01	0 0.00	102 1.67	7.0 0.15	6.5 0.18	3.5 0.06	0.0 0.00	0.0	17	Fe 0.01 (dis.)[d] Al 0.05 Cu 0.02	129	67	33	0	USGS
E. H. Aldrin irrigation	21S/18E-17M1	8-5-59	77	1,170	7.9	87 4.34	36 2.94	124 5.39	2.6 0.07	0 0.00	110 1.80	474 9.87	32 0.90	6.2 0.10	0.1 0.01	0.4	29	Fe 0.01 (dis.)[d] Al 0.11 Cu 0.02 Zn 0.02	845	42	364	274	USGS
J. B. Boyott irrigation and stock	21S/22E-13G1	8-10-59	67	287	7.9	19 0.95	2.1 0.17	44 1.91	0.3 0.01	0 0.00	140 2.29	11 0.23	14 0.39	0.9 0.01	0.1 0.01	0.1	23	Fe 0.01 (dis.)[d] Al 0.01 Cu 0.02	184	63	56	0	USGS
F. Kietkeuk domestic	21S/22E-22M2	8-10-59	73	1,080	7.8	34 1.70	6.3 0.52	202 8.79	1.2 0.03	0 0.00	434 7.11	3.0 0.06	150 4.23	0.7 0.01	0.1 0.01	0.3	26	Fe 0.13 (dis.)[d] Al 0.19 Mn 0.14 Cu 0.01	638	80	111	0	USGS
W. F. Pronty irrigation	22S/19E-20N	8-20-59	79	1,030	8.2	14 0.70	2.2 0.18	239 10.40	2.8 0.07	0 0.00	368 6.03	49 1.02	140 3.95	0.0 0.00	0.3 0.02	1.0	36	Al 0.15 Zn 0.03[d] Mn 0.08	665	92	44	0	USGS
Southlake Farms domestic & irrigation	23S/21E-18D1	8-20-59	70	11,600	7.9	61 3.04	216 17.86	2,330 101.36	25 0.64	0 0.00	1,820 29.83	21 0.44	3,230 91.09	2.2 0.04	0.0 0.00	6.9	76	Fe 0.13 (dis.)[d] Al 0.93 Cu 0.03 Zn 0.02	6,870	85	1,040	0	USGS

a. Determined by addition of constituents.
b. Gravimetric determination.
c Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

32505-E-G 6-61 500 SPO

QUALITY OF GROUND WATERS IN CALIFORNIA

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							KINGS COUNTY (Cont.)															
Hacienda Ranch Co. irrigation	24S/22E-27D1	2-17-59	78	518	8.5	18 / 0.90	4.6 / 0.38	95 / 4.13	3.4 / 0.09	11 / 0.37	258 / 4.23	1.0 / 0.02	32 / 0.90	0.0 / 0.00	0.7 / 0.04	0.4	42	Fe 0.07 (dis.)	335	75	64	0	USGS
		8-24-59	80	578	7.9	21 / 1.05	3.0 / 0.25	100 / 4.35	5.0 / 0.13	0 / 0.00	237 / 3.83	0.0 / 0.00	68 / 1.92	0.0 / 0.00	1.0 / 0.05	0.2	36	Fe 0.08 (dis.) [d] Al 0.14 Mn 0.11 Zn 0.03	351	75	65	0	USGS
	SBB&M								KERN COUNTY														
Tejon Ranch domestic	11N/18W-14M1	5-15-59	-	561	7.9	69 / 3.44	15 / 1.24	29 / 1.26	2.8 / 0.07	0 / 0.00	273 / 4.47	48 / 1.00	15 / 0.42	7.7 / 0.12	0.3 / 0.02	0.39	30		351	21	234	10	DWR
Tejon Ranch domestic & irrigation	11N/19W-25F1	5-15-59	68	568	7.6	64 / 3.19	15 / 1.25	37 / 1.61	2.7 / 0.07	0 / 0.00	262 / 4.29	51 / 1.06	20 / 0.56	6.6 / 0.11	0.6 / 0.03	0.43	27		353	26	222	7	DWR
W. O. Fry irrigation	11N/20W-8R1	5-15-59	74	1,570	7.8	149 / 7.44	48 / 3.93	132 / 5.74	7.3 / 0.19	0 / 0.00	155 / 2.54	640 / 13.32	55 / 1.55	8.9 / 0.14	0.8 / 0.04	0.56	31		1,150	33	569	442	DWR
Kern Rock Co. industrial	-25K1	5-15-59	68	2,280	7.7	240 / 11.98	64 / 5.30	214 / 9.31	12 / 0.31	0 / 0.00	116 / 1.90	1,100 / 22.90	63 / 1.78	45 / 0.72	0.7 / 0.04	0.52	24		1,820	35	865	770	DWR
R. A. Hildebrand irrigation	12N/19W-33R1	5-14-59	72	365	8.0	28 / 1.40	8.5 / 0.70	37 / 1.61	3.2 / 0.08	0 / 0.00	168 / 2.75	32 / 0.67	9.1 / 0.26	2.8 / 0.04	0.5 / 0.03	0.41	20		224	42	105	0	DWR
Park Bros. irrigation	12N/21W-33N1	5-15-59	76	1,710	7.9	190 / 9.48	56 / 4.64	116 / 5.05	9.8 / 0.25	0 / 0.00	128 / 2.10	752 / 15.66	43 / 1.21	40 / 0.64	1.2 / 0.06	0.49	24		1,300	26	707	602	DWR
	MDB&M																						
K. K. Ranch irrigation	25S/18E-2N2	7-13-59	71	4,500	7.6	172 / 8.58	260 / 21.42	620 / 26.97	4.0 / 0.01	0 / 0.00	392 / 6.42	1,900 / 39.56	320 / 9.02	21 / 0.34	0.6 / 0.03	5.3	39		3,530	47	1,500	1,180	USGS
Gilland Oil Co. industrial	-3N2	7-13-59	71	3,580	7.9	231 / 11.53	212 / 17.47	298 / 12.96	6.0 / 0.15	0 / 0.00	241 / 3.95	987 / 20.55	560 / 15.79	18 / 0.29	0.4 / 0.02	2.3	38		2,470	31	1,450	1,252	USGS
stock	-5J1	7-17-59	-	1,360	8.2	75 / 3.74	55 / 4.53	150 / 6.52	2.1 / 0.05	0 / 0.00	259 / 4.24	369 / 7.68	97 / 2.74	6.1 / 0.10	0.4 / 0.02	1.4	24		907	44	414	202	DWR
K. K. Ranch irrigation	25S/19E-6D2	7-13-59	80	3,900	7.9	153 / 7.63	178 / 14.61	527 / 22.92	22.0 / 0.56	0 / 0.00	271 / 4.44	1,340 / 27.90	443 / 12.49	6.9 / 0.11	0.4 / 0.02	2.7	71		2,880	50	1,110	888	USGS
K. K. Ranch irrigation	-7F1	7-13-59	77	5,200	7.6	169 / 8.43	262 / 21.57	784 / 34.10	17.6 / 0.45	0 / 0.00	470 / 7.70	2,140 / 44.55	425 / 11.98	11 / 0.18	0.5 / 0.03	7.2	72		4,120	53	1,500	1,115	USGS
Tulare Gun Club irrigation	25S/23E-11J1	5-4-59	72	172	8.7	0.0 / 0.00	0.0 / 0.00	36 / 1.57	0.6 / 0.02	9 / 0.30	59 / 0.97	8.1 / 0.17	5.6 / 0.16	0.2 / 0.00	0.7 / 0.04	0.19	28		117	99	0	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Hexavalent Chromium (Cr^{+6}), reported here as 0.0 except as shown.

Mineral constituents in parts per million / equivalents per million (each cell: ppm / epm)

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
						KERN COUNTY (Cont.)																	
	MDB&M																						
G. Fiarini irrigation	25S/24E-27R1	6-15-59	70	614	7.7	70 / 3.49	1.6 / 0.13	50 / 2.18	0.6 / 0.02	0 / 0.00	81 / 1.33	153 / 3.18	33 / 0.93	26 / 0.42	0.0 / 0.00	0.06	55		429	37	191	115	DWR
irrigation	25S/25E-4Q1	7-14-59	72	343	7.9	32 / 1.60	3.6 / 0.30	28 / 1.22	2.1 / 0.05	0 / 0.00	128 / 2.10	20 / 0.42	16 / 0.45	12 / 0.19	0.2 / 0.01	0.07	69		246	38	95	0	DWR
Mid State Hort. Co. irrigation	25S/26E-1R1	6-3-59	76	328	7.9	16 / 0.80	0.7 / 0.06	49 / 2.13	2.9 / 0.07	0 / 0.00	106 / 1.74	24 / 0.50	20 / 0.56	14 / 0.22	0.2 / 0.01	0.17	25		204	70	43	0	DWR
M. Caratan irrigation	-16J1	6-3-59	76	363	7.9	18 / 0.90	2.2 / 0.18	51 / 2.22	2.1 / 0.05	0 / 0.00	108 / 1.77	36 / 0.75	20 / 0.55	14 / 0.22	0.3 / 0.02	0.10	52		249	66	54	0	DWR
	26S/18E-1A1	6-9-59	74	4,510	7.8	69 / 3.44	75 / 6.15	715 / 31.10	3.2 / 0.08	0 / 0.00	393 / 6.44	160 / 3.33	1,080 / 30.46	0.8 / 0.01	0.2 / 0.01	1.9	33		2,330	76	480	158	DWR
E. Still irrigation	-23M2	6-9-59	76	2,520	8.3	20 / 1.00	169 / 13.88	312 / 13.57	2.5 / 0.06	4 / 0.13	203 / 3.33	897 / 18.68	214 / 6.03	27 / 0.44	0.5 / 0.03	1.6	45		1,790	48	745	572	DWR
R. Heitzig irrigation	26S/24E-3R1	6-3-59	76	188	9.2	4.4 / 0.22	0.0 / 0.00	34 / 1.48	0.4 / 0.01	13 / 0.43	35 / 0.57	22 / 0.46	7.6 / 0.21	3.0 / 0.05	0.4 / 0.02	0.07	26		128	86	11	0	DWR
Tidewater Oil Co. industrial	27S/20E-34G1	6-9-59	-	4,840	8.1	17 / 0.85	22 / 1.85	1,050 / 45.68	32 / 0.82	0 / 0.00	881 / 14.44	472 / 9.83	892 / 25.15	7.6 / 0.12	0.3 / 0.02	6.4	62		2,990	93	135	0	DWR
E. A. Meyer irrigation	27S/22E-2Q2	5-19-59	76	2,620	7.9	86 / 4.29	0.1 / 0.01	455 / 19.79	1.5 / 0.04	0 / 0.00	77 / 1.26	71 / 1.48	741 / 20.90	2.9 / 0.05	1.4 / 0.07	0.73	25		1,420	32	215	152	DWR
		6-9-59	76	2,610	7.4	15 / 0.75	38 / 3.15	452 / 19.66	1.5 / 0.04	0 / 0.00	60 / 0.98	9.9 / 0.21	792 / 22.33	0.9 / 0.01	1.2 / 0.06	0.68	22		1,360	83	195	146	DWR
Houchins Farms irrigation	-21P1	6-15-59	68	2,480	7.7	173 / 8.63	12 / 1.00	344 / 14.96	1.5 / 0.04	0 / 0.00	159 / 2.61	419 / 8.72	477 / 13.45	1.2 / 0.02	0.2 / 0.01	0.84	23		1,530	61	482	352	DWR
		8-21-59	67	2,470	8.1	156 / 7.78	18 / 1.53	357 / 15.53	1.6 / 0.04	0 / 0.00	142 / 2.33	394 / 8.20	514 / 14.49	1.0 / 0.02	0.2 / 0.01	1.3	21		1,515	61	466	350	DWR
A. Palla irrigation	-28G2	5-19-59	68	2,110	8.0	139 / 6.94	1.3 / 0.11	314 / 13.66	1.4 / 0.04	0 / 0.00	116 / 1.90	481 / 10.01	312 / 8.80	1.6 / 0.02	0.3 / 0.02	0.56	22		1,330	66	353	258	DWR
		7-14-59	68	2,130	7.8	142 / 7.08	7.2 / 0.59	300 / 13.05	1.7 / 0.04	0 / 0.00	154 / 2.52	469 / 9.76	290 / 8.18	12 / 0.19	0.2 / 0.01	0.77	22		1,320	63	384	258	DWR
R. Neumand irrigation	27S/23E-27J1	6-3-59	76	253	9.0	3.2 / 0.16	0.0 / 0.00	48 / 2.09	0.2 / 0.00	17 / 0.57	30 / 0.49	15 / 0.31	30 / 0.35	0.8 / 0.01	0.4 / 0.02	0.27	24		154	93	8	0	DWR
Berling Bros. irrigation	27S/24E-5R1	6-[illegible]-59	76	158	8.2	4.2 / 0.21	0.1 / 0.01	27 / 1.17	0.5 / 0.01	0 / 0.00	58 / 0.95	12 / 0.25	5.8 / 0.16	2.8 / 0.04	0.2 / 0.01	0.08	21		102	84	11	0	DWR
Kern County Land Co. irrigation	27S/25E-5R1	6-29-59	72	317	7.9	32 / 1.60	2.2 / 0.18	29 / 1.26	1.8 / 0.05	0 / 0.00	128 / 2.10	17 / 0.35	9.6 / 0.27	22 / 0.35	0.1 / 0.00	0.04	28		205	41	89	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M							KERN COUNTY (Cont.)															
C. West	27S/26E-27R1	6-22-59	74	703	7.9	81 / 4.04	14 / 1.13	29 / 1.26	3.0 / 0.08	0 / 0.00	123 / 2.02	37 / 0.77	119 / 3.36	18 / 0.29	0.2 / 0.01	0.05	33		394	19	259	158	DWR
E. West irrigation	27S/27E-29J1	6-3-59	-	1,470	8.0	123 / 6.14	21 / 1.73	147 / 6.39	3.4 / 0.09	0 / 0.00	213 / 3.49	103 / 2.14	297 / 8.38	9.0 / 0.14	0.2 / 0.01	0.55	37		846	44	394	219	DWR
Houchin Ranch irrigation	28S/22E-4A1	5-21-59	69	2,430	7.7	110 / 5.49	10 / 0.82	418 / 18.18	1.4 / 0.04	0 / 0.00	58 / 0.95	550 / 11.45	426 / 12.01	0.3 / 0.00	0.3 / 0.02	0.82	17		1,562	74	316	268	DWR
		6-4-59	68	2,440	7.5	95 / 4.74	6.0 / 0.49	435 / 18.92	1.3 / 0.03	0 / 0.00	60 / 0.98	518 / 10.78	439 / 12.38	1.5 / 0.02	0.2 / 0.01	0.89	19		1,550	78	262	213	DWR
Bluemoon Farms domestic	-10R1	6-5-59	69	1,100	8.0	34 / 1.70	29 / 2.33	156 / 6.79	1.2 / 0.03	0 / 0.00	188 / 3.08	252 / 5.25	89 / 2.51	0.8 / 0.01	0.4 / 0.02	0.50	25		670	62	204	50	DWR
		8-4-59	67	1,080	8.3	70 / 3.49	0.4 / 0.03	169 / 7.35	1.0 / 0.02	0 / 0.00	228 / 3.74	232 / 4.83	80 / 2.26	2.7 / 0.04	0.3 / 0.02	0.41	24		692	67	176	0	DWR
Houchin Ranch domestic & irrigation	-26J1	6-5-59	68	1,500	7.7	122 / 6.09	37 / 3.02	165 / 7.18	2.7 / 0.07	0 / 0.00	290 / 4.75	430 / 8.95	93 / 2.62	1.1 / 0.02	0.7 / 0.04	0.59	35		1,030	44	456	218	DWR
		8-3-59	68	1,540	8.2	108 / 5.39	48 / 3.98	172 / 7.48	2.7 / 0.07	0 / 0.00	288 / 4.72	451 / 9.39	98 / 2.76	1.0 / 0.02	0.6 / 0.03	0.78	32		1,056	44	468	233	DWR
Houchin Ranch domestic & irrigation	-36N1	6-5-59	-	655	8.1	39 / 1.95	1.3 / 0.11	102 / 4.44	0.6 / 0.02	0 / 0.00	219 / 3.59	95 / 1.98	34 / 0.96	0.7 / 0.01	0.2 / 0.01	0.34	18		399	68	103	0	DWR
Crawford irrigation	28S/23E-25P1	6-3-59	72	346	8.0	11 / 0.55	0.4 / 0.03	57 / 2.48	0.2 / 0.00	0 / 0.00	49 / 0.80	52 / 1.08	38 / 1.07	3.8 / 0.06	0.3 / 0.02	0.30	18		205	81	29	0	DWR
W. Issac domestic & irrigation	28S/25E-17L1	6-22-59	74	198	8.0	9.2 / 0.46	0.2 / 0.02	32 / 1.39	0.7 / 0.02	0 / 0.00	88 / 1.44	11 / 0.23	7.4 / 0.21	2.2 / 0.04	0.2 / 0.01	0.14	21		127	74	24	0	DWR
S. A. Camp irrigation	28S/26E-11A1	6-8-59	78	477	8.2	26 / 1.30	1.0 / 0.08	60 / 2.61	1.1 / 0.03	0 / 0.00	56 / 0.92	51 / 1.06	68 / 1.92	5.3 / 0.08	0.2 / 0.01	0.03	18		259	65	69	23	DWR
Kern County Land Co. irrigation	-30A1	6-22-59	74	886	7.8	59 / 2.94	40 / 3.27	58 / 2.52	2.6 / 0.07	0 / 0.00	85 / 1.39	251 / 5.22	72 / 2.03	12 / 0.19	0.0 / 0.00	0.08	20		557	29	311	241	DWR
Houchin Ranch irrigation	29S/23E-24H1	6-5-59	-	240	8.3	6.3 / 0.31	0.4 / 0.03	44 / 1.91	0.3 / 0.01	3 / 0.10	66 / 1.08	31 / 0.64	16 / 0.45	0.1 / 0.00	0.3 / 0.02	0.12	17		150	84	17	0	DWR
		8-3-59	66	345	8.0	17 / 0.85	0.1 / 0.01	53 / 2.30	0.3 / 0.01	0 / 0.00	86 / 1.41	59 / 1.23	18 / 0.51	0.4 / 0.01	0.3 / 0.02	0.10	18		208	72	43	0	DWR
B. Curtis irrigation	29S/25E-10N1	6-8-59	72	354	7.8	36 / 1.80	1.7 / 0.14	29 / 1.26	1.1 / 0.03	0 / 0.00	81 / 1.33	36 / 0.75	37 / 1.04	3.4 / 0.05	0.2 / 0.01	0.13	21		206	39	97	31	DWR
M. F. Grimes irrigation	29S/26E-35K1	6-5-59	-	1,570	7.7	77 / 3.84	15 / 1.27	210 / 9.14	2.3 / 0.06	0 / 0.00	155 / 2.54	31 / 0.64	384 / 10.83	17 / 0.27	0.3 / 0.02	2.6	29		844	64	256	129	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated.
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm[a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by[c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					KERN COUNTY (Cont.)																	
D. C. McCan	29S/28E-12E1	6-5-59	-	421	7.0	22 1.10	0.7 0.06	66 2.87	2.7 0.07	0 0.00	165 2.70	47 0.98	16 0.45	1.7 0.03	0.1 0.00	0.28	27		264	70	58	0	DWR
California Water Service Co. municipal	-31F1	7-7-59	72	692	7.4	72 3.59	18 1.46	40 1.74	3.7 0.09	0 0.00	214 3.51	72 1.50	62 1.75	7.6 0.12	0.2 0.01	0.22	31		412	25	253	78	DWR
Kern Growers Exchange domestic & irrigation	-36J1	6-14-59	-	3,520	7.3	468 23.35	93 7.62	188 8.18	12 0.31	0 0.00	153 2.51	942 19.61	524 14.78	172 2.77	0.1 0.00	0.22	29		2,500	21	1,550	1,425	DWR
Kern Oil Co. domestic & irrigation	29S/29E-34N1	6-5-59	-	658	7.6	34 1.70	3.9 0.32	108 4.70	2.6 0.07	0 0.00	345 5.65	0.0 0.00	45 1.27	0.3 0.00	0.0 0.00	0.45	31		395	69	101	0	DWR
P. Dadini domestic	30S/23E-1C1	5-18-59	72	469	7.7	6.8 0.34	0.0 0.00	82 3.57	0.2 0.00	0 0.00	43 0.70	18 0.37	100 2.82	2.0 0.03	0.7 0.04	0.44	19		250	91	17	0	DWR
State of California irrigation & stock	30S/24E-14H1	6-4-59	72	943	8.0	121 6.04	0.1 0.01	83 3.61	1.4 0.04	0 0.00	142 2.33	301 6.27	42 1.18	0.4 0.01	0.1 0.00	0.28	21		640	37	303	187	DWR
Kern County Land Co. domestic & stock	30S/27E-21D1	6-5-59	-	438	7.8	43 2.14	9.7 0.80	30 1.30	1.8 0.05	0 0.00	173 2.84	35 0.73	20 0.56	5.8 0.09	0.3 0.02	0.24	30		261	30	147	5	DWR
C. Samuels domestic & irrigation	30S/28E-11R2	5-14-59	-	698	8.2	48 2.40	27 2.20	55 2.39	4.8 0.12	0 0.00	222 3.64	94 1.96	54 1.52	3.1 0.05	0.3 0.02	0.30	26		422	34	230	48	DWR
Douglas Oil Co. industrial	-25A1	6-4-59	76	506	8.0	49 2.44	9.2 0.76	45 1.96	4.4 0.11	0 0.00	246 4.03	37 0.77	17 0.48	1.3 0.02	0.4 0.02	0.23	26		310	37	160	0	DWR
T. Fanella domestic	30S/29E-5D2	5-14-59	-	1,810	7.7	181 9.03	42 3.44	131 5.70	7.7 0.20	0 0.00	182 2.98	189 3.93	293 8.26	181 2.92	0.1 0.00	0.44	27		1,140	31	624	475	DWR
E. Trossler irrigation	-15G1	6-4-59	72	634	7.6	64 3.19	14 1.19	47 2.04	3.5 0.09	0 0.00	252 4.13	65 1.35	40 1.13	0.4 0.01	0.3 0.02	0.39	25		384	31	219	12	DWR
H. Porter irrigation	-2CA1	5-14-59	72	722	7.8	71 3.54	20 1.63	46 2.00	4.3 0.11	0 0.00	239 3.92	74 1.54	50 1.41	28 0.45	0.5 0.03	0.24	28		440	27	259	63	DWR
F. Alexis domestic & irrigation	-27J1	5-14-59	66	879	7.8	82 4.09	29 2.40	56 2.44	6.6 0.17	0 0.00	262 4.29	84 1.75	53 1.49	87 1.40	0.4 0.02	0.31	29		555	27	325	110	DWR
C. Rey irrigation	31S/24E-28B1	6-29-59	74	5,880	7.6	529 26.40	119 9.76	762 33.15	11 0.28	0 0.00	97 1.59	2,200 45.80	760 21.43	11 0.18	1.1 0.06	3.7	57		4,500	48	1,810	1,730	DWR
Houchin Farms irrigation	31S/25E-25H1	5-18-59	72	446	8.1	19 0.95	0.4 0.03	74 3.22	1.6 0.04	0 0.00	115 1.88	95 1.98	6.1 0.17	1.5 0.02	3.4 0.17	0.40	45		302	76	49	0	DWR
		6-4-59	74	435	7.9	16 0.80	0.5 0.04	78 3.39	1.2 0.03	0 0.00	108 1.77	95 1.98	6.1 0.17	1.1 0.02	4.5 0.24	0.56	36		292	80	42	0	DWR
Palm Dairy domestic	31S/28E-7R3	6-5-59	-	544	8.0	52 2.59	5.5 0.45	55 2.39	1.7 0.04	0 0.00	207 3.39	63 1.31	27 0.76	0.7 0.01	0.4 0.02	0.23	28		336	44	152	0	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

ANALYSES OF GROUND WATER

1959

Owner and use	State well number and other number	Date sampled	Temp in °F	Specific conductance (micromhos at 25° C)	pH	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Other constituents[d]	Total dissolved solids in ppm [a]	Percent sodium	Hardness as $CaCO_3$ Total ppm	Hardness as $CaCO_3$ N.C. ppm	Analyzed by [c]
						Mineral constituents in parts per million / equivalents per million																	
	MDB&M					KERN COUNTY (Cont.)																	
E. Yaksitch irrigation	31S/29E-17E1	5-14-59	72	604	8.1	57 / 2.84	11 / 0.88	54 / 2.35	4.0 / 0.10	0 / 0.00	222 / 3.64	73 / 1.52	31 / 0.87	10 / 0.16	0.3 / 0.02	0.45	29		379	38	186	4	DWR
Los Angeles Athletic Club irrigation	32S/27E-6D1	6-4-59	-	399	8.0	11 / 0.55	0.1 / 0.01	74 / 3.22	1.1 / 0.03	0 / 0.00	124 / 2.03	69 / 1.44	9.9 / 0.28	0.5 / 0.01	2.6 / 0.14	0.35	31		260	84	28	0	DWR
		8-23-59	74	389	8.1	10 / 0.50	1.0 / 0.08	73 / 3.18	0.9 / 0.02	0 / 0.00	126 / 2.06	62 / 1.29	9.6 / 0.27	0.4 / 0.01	2.5 / 0.13	0.36	35		257	84	29	0	DWR
H. M. Harford domestic & irrigation	32S/28E-12F1	6-23-59	72	402	8.0	26 / 1.30	6.1 / 0.50	50 / 2.18	2.1 / 0.05	0 / 0.00	162 / 2.66	41 / 0.85	16 / 0.45	0.9 / 0.01	0.7 / 0.04	0.19	18		241	54	90	0	DWR
C. B. Dickey irrigation	32S/29E-11R1	5-14-59	72	1,970	7.8	136 / 6.79	8.3 / 0.68	257 / 11.18	4.5 / 0.12	0 / 0.00	156 / 2.56	131 / 2.73	473 / 13.34	18 / 0.29	0.7 / 0.04	1.4	24		1,130	60	374	246	DWR

a. Determined by addition of constituents.
b. Gravimetric determination.
c. Analysis by U.S. Geological Survey, Quality of Water Branch (U.S.G.S.), Pacific Chemical Consultants (P.C.C.), or State Department of Water Resources (D.W.R.), as indicated
d. Iron (Fe), Aluminum (Al), Arsenic (As), Copper (Cu), Lead (Pb), Manganese (Mn), Zinc (Zn), and Chromium (Cr).

QUALITY OF GROUND WATERS IN CALIFORNIA
RADIOASSAY OF GROUND WATER
1959

Well number	Date sampled	Gross activity[a]	Date analyzed
SAN FRANCISCO BAY REGION NO. 2			
PITTSBURG PLAIN (2-4)			
MDB&M			
2N/1E-7R1	7/8/59	6.35 ± 3.65	11/5/59
2N/2E-20A1	7/8/59	8.91 ± 3.72	11/5/59
CLAYTON VALLEY (2-5)			
1N/1W-4A1	7/7/59	7.03 ± 3.45	11/5/59
2N/1W-31D1	7/7/59	3.40 ± 3.35	11/5/59
-32Q1	7/7/59	3.20 ± 3.40	11/5/59
2N/2W-13P1	7/8/59	3.89 ± 3.60	11/5/59
-36J1	7/7/59	7.35 ± 3.42	11/5/59
YGNACIO VALLEY (2-6)			
1N/1W-7K1	7/8/59	5.59 ± 3.52	11/5/59
-29G1	7/8/59	3.40 ± 3.50	11/5/59
1N/2W-11N1	7/8/59	2.70 ± 3.42	11/5/59
-13P1	7/8/59	7.57 ± 3.45	11/5/59
2N/2W-27R1	7/8/59	5.81 ± 3.53	11/5/59
-36E1	7/7/59	0.0 ± 3.22	11/5/59
SANTA CLARA VALLEY (2-9) EAST BAY AREA			
4S/1W-21M1	9/4/59	2.5 ± 3.8	11/27/59
-21P1	9/4/59	3.5 ± 3.8	11/27/59

a – Micromicrocuries per liter

Well number	Date sampled	Gross activity[a]	Date analyzed
CENTRAL VALLEY REGION NO. 5			
REDDING BASIN (5-6)			
MDB&M			
29N/4W-2M1	7/13/59	3.32 ± 2.97	11/6/59
-6N1	7/14/59	2.29 ± 3.61	11/9/59
30N/3W-4M1	7/13/59	1.70 ± 3.50	11/6/59
-34D1	7/13/59	7.03 ± 3.07	11/6/59
30N/4W-1E1	7/13/59	2.44 ± 3.59	11/6/59
-16H	7/13/59	7.91 ± 3.40	11/6/59
-25N1	7/13/59	2.15 ± 3.50	11/6/59
30N/5W-15R1	7/13/59	5.16 ± 3.50	11/6/59
-17R1	7/13/59	8.17 ± 3.53	11/6/59
31N/3W-7K1	7/14/59	10.35 ± 3.30	11/9/59
-12E1	7/14/59	0.00 ± 2.97	11/9/59
-29P1	8/12/59	4.11 ± 2.60	11/20/59
31N/4W-5F1	7/14/59	7.20 ± 3.52	11/6/59
-7A1	7/14/59	0.19 ± 3.05	11/9/59
-15B1	7/14/59	0.34 ± 3.06	11/9/59
-16Q1	7/14/59	2.10 ± 3.10	11/9/59
31N/5W-13D1	7/14/59	4.40 ± 3.85	11/9/59
-25K1	7/13/59	5.10 ± 3.46	11/6/59
32N/3W-17E2	7/14/59	3.88 ± 3.13	11/9/59
-20P1	7/14/59	6.78 ± 3.24	11/9/59

a — Micromicrocuries per liter

Well number	Date sampled	Gross activity[a]	Date analyzed
REDDING BASIN (5-6) (Cont.)			
MDB&M			
32N/3W-32J2	7/14/59	6.66 ± 3.24	11/9/59
32N/4W-14F2	7/14/59	9.70 ± 3.33	11/9/59
-20G2	7/14/59	0.00 ± 3.64	11/9/59
-34P1	7/14/59	0.00 ± 2.94	11/9/59
32N/5W-26M1	7/14/59	2.18 ± 3.50	11/9/59
SACRAMENTO VALLEY (5-21)			
Colusa County			
13N/1E-22H1	6/18/59	5.73 ± 3.65	11/5/59
13N/1W-7A1	6/18/59	3.00 ± 3.26	11/6/59
-8B1	6/18/59	5.44 ± 3.40	11/5/59
-15N1	6/24/59	1.44 ± 3.70	11/6/59
-35Q1	6/18/59	2.63 ± 3.53	11/6/59
13N/2W-10G1	6/17/59	0.00 ± 3.20	11/5/59
-10M1	6/17/59	2.01 ± 3.45	11/5/59
-22G1	6/17/59	0.00 ± 3.10	11/5/59
-29R1	6/17/59	5.53 ± 3.40	11/5/59
14N/1E-18A1	6/18/59	7.97 ± 3.66	11/6/59
14N/1W-2D1	6/18/59	0.71 ± 3.20	11/6/59
-12A1	6/17/59	0.00 ± 3.28	11/5/59
14N/2W-12H2	6/18/59	1.10 ± 3.52	11/5/59
-29J1	6/17/59	0.00 ± 3.25	11/5/59

a – Micromicrocuries per liter

Well number	Date sampled	Gross activity[a]	Date analyzed
Colusa County (Cont.)			
MDB&M			
14N/3W-12L1	6/24/59	2.44 ± 3.72	11/6/59
15N/2W-32R1	6/17/59	1.36 ± 3.35	11/5/59
15N/3W-25P1	6/17/59	11.72 ± 3.55	11/5/59
16N/1W-29J1	6/23/59	7.37 ± 3.38	11/6/59
16N/2W-4H1	6/18/59	4.99 ± 3.68	11/6/59
-35B1	6/17/59	0.00 ± 3.20	11/5/59
16N/3W-9N1	6/18/59	1.44 ± 3.70	11/6/59
17N/1W-20N1	6/18/59	5.08 ± 3.40	11/5/59
17N/2W-12C1	6/18/59	0.22 ± 2.85	11/5/59
17N/3W-33R1	6/18/59	2.64 ± 3.53	11/6/59
Yuba County			
13N/5E-4B	8/19/59	4.71 ± 2.55	11/20/59
14N/4E-7M1	8/6/59	0.00 ± 2.40	11/20/59
-22H1	8/4/59	0.00 ± 2.40	11/20/59
14N/5E-15C1	8/4/59	0.00 ± 2.36	11/20/59
-16C1	8/4/59	1.22 ± 2.45	11/20/59
-21G	8/7/59	3.43 ± 2.84	11/20/59
-32J	8/4/59	4.17 ± 2.80	11/20/59
15N/5E-19N1	8/4/59	10.10 ± 2.94	11/20/59
16N/3E-11N1	8/6/59	4.28 ± 2.80	11/20/59
16N/4E-9D1	8/4/59	4.34 ± 2.80	11/20/59

a — Micromicrocuries per liter

RADIOASSAY OF GROUND WATER

1959

Well number	Date sampled	Gross activity[a]	Date analyzed
		Stanislaus County	
MDB&M			
7S/8E-12P1	6/11/59	2.74 ± 3.60	6/19/59
		Merced County	
7S/11E-4M1	7/6/59	6.49 ± 3.32	2/4/60
		Fresno County	
15S/17E-1H1	7/13/59	0.00 ± 3.65	11/9/59
-3R1	7/13/59	16.77 ± 3.96	11/9/59
-10R1	7/13/59	6.66 ± 3.73	11/9/59
-11P1	7/13/59	10.69 ± 3.83	11/9/59
-13R1	7/13/59	3.63 ± 3.82	11/9/59
-14G1	7/13/59	8.45 ± 3.80	11/9/59
-15B1	7/13/59	9.47 ± 4.15	11/9/59
-15F1	7/13/59	2.95 ± 3.96	11/9/59
-15H1	7/13/59	8.23 ± 4.15	11/9/59
-22R1	7/13/59	7.91 ± 4.15	11/9/59
-27H2	7/13/59	8.93 ± 3.86	11/9/59
-34A1	7/13/59	9.53 ± 3.89	11/9/59
-34J1	7/13/59	13.63 ± 3.96	11/9/59
15S/18E-16G1	7/13/59	6.30 ± 3.32	11/9/59
-20G1	7/13/59	3.32 ± 3.66	11/9/59
-20N1	7/13/59	1.61 ± 3.62	11/9/59

a – Micromicrocuries per liter

RADIOASSAY OF GROUND WATER
1959

Well number	Date sampled	Gross activity[a]	Date analyzed
Tulare County			
MDB&M			
17S/25E-34	8/6/59	2.4 ± 3.7	12/1/59
19S/23E-24G1	6/24/59	5.8 ± 3.7	12/3/59
19S/24E-22C1		1.4 ± 3.7	12/1/59
19S/25E-31J1	6/25/59	2.9 ± 3.6	12/3/59
19S/26E-3K1		0.0	12/1/59
-26M1	6/25/59	4.0 ± 3.6	12/3/59
20S/26E-5R1	7/6/59	21.2 ± 4.0	12/3/59
-9Q		4.8 ± 3.8	12/1/59
-20		0.0	12/1/59
22S/25E-22A	7/7/59	3.8 ± 3.6	12/3/59
22S/27E-11C1	7/14/59	16.1 ± 3.9	12/3/59
23S/25E-9F1	8/6/59	2.7 ± 3.7	12/1/59
23S/27E-21H	7/14/59	6.0 ± 3.6	12/3/59
24S/23E-8D	7/7/59	7.3 ± 3.7	12/3/59
24S/25E-23H1		2.2 ± 3.7	12/1/59
24S/27E-32P1	7/14/59	1.2 ± 3.5	12/3/59

a – Micromicrocuries per liter

QUALITY OF GROUND WATERS IN CALIFORNIA
RADIOASSAY OF GROUND WATER
1959

Well number	Date sampled	Gross activity[a]	Date analyzed
	Kings County		
MDB&M			
24S/22E-27D1	2/17/59	0.15 ± 3.81	5/15/59
	Kern County		
27S/22E-2Q2	5/1/59	0.0	12/3/59
-21P1	8/21/59	0.9 ± 3.7	12/3/59
-28G2	5/19/59	3.6 ± 3.8	12/3/59
28S/22E-4A1	8/21/59	4.0 ± 3.6	12/3/59
-10R1	8/4/59	2.6 ± 3.7	12/3/59
-26J1	8/3/59	3.5 ± 3.6	12/3/59
-36N1	9/3/59	8.0 ± 3.9	12/3/59
29S/23E-24H1	8/3/59	4.2 ± 3.8	12/3/59
30S/23E-1C1	5/18/59	11.2 ± 3.9	12/3/59
31S/25E-25H1	5/18/59	12.9 ± 4.0	12/3/59
32S/27E-6D1	8/21/59	1.3 ± 3.6	12/3/59

a – Micromicrocuries per liter