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DROUGHT '77

DRY YEAR PROGRAM

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STATE WATER RESOURCES CONTROL BOARD
Division of Water Rights

January 1978

WSID CDO/BBID ACL
WSID0076

STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

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SUMMARY

The importance of water was emphasized to all Californians during the 1975-76 water year. A high pressure system persisted off the West Coast for months, preventing Pacific storms from depositing moisture on major areas of the State. As a consequence, the 1975-76 period turned out to be the third driest water year in recorded State history, being surpassed only by the droughts of 1923-24 and 1930-31.

With most of the State's surface reservoirs substantially depleted and meager prospects for normal runoff, Governor Brown - on the last day of 1976 - announced an eight-point drought emergency program. In effect, the emergency program marshaled the resources and personnel of all state agencies in an effort to ease, as much as possible, the social and economic impact on Californians if the drought should continue for a second year. As it developed, 1976-77 became the driest year of record, amply justifying the Governor's foresight.

The State Water Resources Control Board (State Board) role in the emergency program was to develop a program of water conservation in cooperation with the University of California; to determine the quantity of water which could be expected in critically dry areas; and to protect the priority of uses of that limited supply in accordance with the State's water rights law. This was particularly important in the case of agriculture, the State's No. 1 industry. It appeared likely that the available supply of water would not meet the needs of farms and orchards for the full growing season or meet the full demand of municipal and industrial users and instream needs. The State Board was concerned that water users would inadvertently interfere with the water rights of others unless forewarned of the extent of availability of water to them. In addition, the warnings would be conducive to early implementation of conservation measures.

The State Board established the Dry Year Program as a function within its Division of Water Rights (Division). This program, designed to protect and enforce the priorities of users of surface water had four objectives:

1. To identify critical drought-impacted areas in Northern and Central California.
2. To provide information on water conservation and shortage to diverters in these areas.
3. To assure that the limited water supply available would be used in accordance with established rights.
4. To take enforcement action against violations of permit and license conditions, illegal diversions and waste or unreasonable use of water.

The scope of the Dry Year Program was purposely restricted to Northern and Central California, where the impact of the drought was expected to be the most critical. The major emphasis was placed on water diversion for irrigation not only because irrigation is the largest use of water, but also because the Board's program would be of greatest benefit to the irrigators.

The program relied on cooperation from a number of government agencies, principally the Department of Water Resources (Department), United States Bureau of Reclamation (Bureau), Attorney General, and the Central Valley Regional Water Quality Control Board. One person from the Central Valley Regional Board and seven from other divisions of the State Board were added to a nucleus of three engineers from the Division of Water Rights to comprise the Dry Year Team. In addition, the Department provided seven employees under contract to help the Dry Year Team conduct the initial field work of the program. This work consisted of extensive field surveys in the Sacramento River Basin and the Delta Uplands to determine the extent of illegal diversions which may have been occurring. This field work resulted in over 400 investigations.

The Dry Year Program also included the following activities:

- Preparing water conservation guidelines.
- Conducting hydrologic routing of water supplies.
- Sending notices of restricted water supply.
- Conducting investigations of complaints.
- Participating in Dry Year hearings.
- Enforcing water rights priorities.
- Investigating water use.

Two new regulations were developed and adopted by the Board in response to drought conditions. Section 736.1 of Title 23 of the California Administrative Code was adopted on January 20, 1977, giving calendar preference and providing for expeditious hearings in response to drought emergencies. Section 764.20, the so called drought emergency regulation, was adopted on June 2, 1977, providing for reduced water quality in the Delta through retention of a portion of the outflows in upstream reservoirs operated under Board entitlements and requiring Board approval for export from the Delta for essential use other than emergency municipal and domestic supplies.

Hydrologic routing studies were conducted of rivers in the Sacramento-San Joaquin River basins including the Delta. Schedules were prepared, showing the dates diverters would be without water or be required to accept a deficiency in supply.

Nearly 8,700 notices were sent to possible diverters in Northern and Central California. They contained information on the critical water shortage foreseen for 1977 and asked that diverters take all conservation steps possible. They also included specific dates, after which the water supply would be deficient or completely unavailable.

To assist in assuring proper allocation of water supply, the staff of the Division's Complaint and Surveillance Unit was increased. This was done because the number of complaints of possible illegal diversions or violations of permit/license terms nearly tripled in 1977. These complaints were investigated and, whenever an alleged offender refused to abide by findings of the Division, it was recommended that the State Board refer the case to the Attorney General. Frequently, the Dry Year staff suggested an amicable solution for the parties involved in the dispute.

Of 212 complaints received during the 1976-77 water year, 30 required enforcement action. Of the 30 requiring enforcement action, 24 complied with directives from the Division and six were referred to the Attorney General for appropriate action. Although the number of complaints nearly tripled in 1977, it was felt that the number would have been much larger had the Dry Year Program not been in effect.

Under contract with the State Board, the Department conducted an aerial survey and prepared crop maps of the entire Delta Lowlands. Comparing 1977 crop maps with those of 1976 - and those of other prior years if necessary - indicated whether appropriate reductions of water use were made in the Delta during 1977. A second aerial survey of the Delta Lowlands was funded by the Bureau.

The State Board conducted investigations to determine possible waste and unreasonable use of water, and held hearings on two well-publicized incidents. These involved the Mission Viejo Company in Orange County, which desired to fill an artificial lake in connection with a residential development, and Anderson Farms of Yolo County, which wanted to transport groundwater via facilities of the State Water Project to the Berrenda Mesa Water District in Kern County.

The Division of Water Rights believes that the data it provided agricultural diverters made them aware of their responsibility to conserve water for the good of all users and gave them specific guidance for the conduct of their farming operations. Field investigations confirmed that farmers implemented conservation measures by reducing the amount of acreage irrigated, planting crops which required less water and using more efficient methods of irrigation.

The Division staff believes that the Dry Year Program was successful. It is estimated that the 3,820 water conservation notices and the 4,858 water shortage notices sent to water users in the Sacramento-San Joaquin and Delta basins prevented substantial unauthorized diversions, possibly in excess of 100,000 acre-feet. If one acre-foot meets the domestic (residential) needs of five persons for one year then 100,000 acre-feet would serve approximately 500,000 persons for a year. This result was obtained with an expenditure of \$170,000.

The Division plans to ask the State Board to authorize the following tasks, as may be appropriate, in 1978 and future years. Some of these tasks are dependent on forecasted runoff of the Sacramento-San Joaquin River system:

1. Special letters would be sent to Delta diverters found by the 1977 aerial surveys to have continued historic crop patterns without apparent reasonable conservation efforts. The letters would put these diverters

on notice that special surveillance will be undertaken the next year in which a drought occurs and if they are found to be engaging in wasteful or unreasonable diversion the Board intends to take strong enforcement action.

2. Efforts should be made to obtain and evaluate U-2 flight, infrared Ektachrome and satellite photography of the Sacramento Valley as means to investigate water use and identify illegal diverters.
3. Letters forecasting the expected availability of water at various levels of water rights should be sent after receipt of snow survey bulletins which forecast insufficient runoff to meet all demands.
4. An enlarged fact-finding program should be instituted, as soon as water shortages begin to occur, to cover the drought impacted areas more quickly.
5. Staff investigations would immediately follow up cases of possible excessive diversions uncovered by the fact-finding teams, in accordance with existing Board directives.
6. Appropriate enforcement actions would be recommended by staff and taken by the Board.
7. If 1978 or any subsequent year is determined to be a drought year (less than normal rainfall), recipients of 1977 water availability letters would be notified that the notification service will be continued and expanded.
8. The next year with a forecasted runoff below lower quartile the contract for crop maps in the Delta should be renegotiated calling for greater financial participation by the Department, aerial surveys as of about June 1 and August 15, and assistance in forming fact-finding teams.
9. Following completion of the aerial surveys and preparation of crop maps, the Delta crop mapping should be reviewed for compliance with Board directives.

The experience gained through the Dry Year Program has demonstrated the need for the Board to show its presence, even during normal water supply years, if it is to protect the public interest through the State's water rights law. The Division believes that questionable diversion practices have existed for many years prior to the Dry Year Program but it was not until the Board put resources into the field that many of these questionable practices were curtailed. As future water supplies become more scarce, a reality predicted by even the most conservative forecasters, monitoring and enforcement activities such as those provided in the Dry Year Program will become critical to our system of water allocation and management. The Division, therefore, recommends that a Water Management Section be established as an ongoing function

of the Division of Water Rights to continue forecasting the availability of water at various levels of water rights priorities, make follow-up investigations and take enforcement action to assure the use of water in accordance with such priorities. This section would include scattered functions of the Division related to complaints against diversion and data processing.

INTRODUCTION

BACKGROUND

In 1923-24, the previous driest water year of record, the Sacramento-San Joaquin Water Supervision program was instituted by the State to provide the data base needed to allocate the available supply. Over the years this program provided public information as to the water supply and use and was of great assistance to the various interests in evaluating the waters covered by earlier rights and the surpluses available for appropriation. The need for continuing the program decreased with the construction of the State Water Project and the Federal Central Valley Project, which increased the availability of water during the seasons of use.

During recent years, demands on the system have continued to increase because of the irrigation of additional lands required to meet demands for food and fiber. There were also increased water demands for exportation and water quality control. During a normal water year, the increased demands in California are met by overdrafting groundwater to a magnitude of approximately two million acre-feet per year.

Following the record dry water years of 1923-24 and 1930-31, the 1975-76 water year proved to be the third driest water year in the recorded history of California. Most of the surface reservoirs were left in a substantially depleted condition at the end of 1975-76. The 1976-77 water year was threatening to become as dry as the preceding year. On December 31, 1976, Governor Brown announced an eight-point drought emergency program marshaling all State agencies into action to alleviate the effects of the drought if it should continue. The eight-point program is summarized as follows:

1. Activate Drought Information Center.
2. Develop Drought Contingency Plans.
3. Prepare Detailed Water Conservation Guidelines.
4. Encourage Water Exchanges.
5. Provide Emergency Water Supply Loans and Equipment.
6. Extend Disaster Relief.
7. Hold Special Hearing on Delta Water Quality.
8. Establish Commission for Revision of California Water Law.

At that time it appeared to the State Board that if the drought continued, sufficient surface water supplies would not be available to meet irrigation needs throughout the 1976-77 crop growing season. If alternative sources of water such as ground water, purchased or previously stored water were not available to satisfy demands, the State Board was concerned that the farmers would inadvertently interfere with superior water rights.

The State Board anticipated that, as a consequence of two consecutive dry years, there would be an increase in the number of complaints of illegal diversion, regular and temporary water right applications, protests on applications in process, petitions for adjudications, requests to relax permit terms, and public information inquiries. To meet this challenge, the State Board established a Dry Year Program within the Division of Water Rights (Division) in the early part of 1977.

OBJECTIVES

The objectives of the Dry Year Program were to identify critical drought impacted areas in Northern and Central California, to provide information to water users in these areas in regard to water conservation, to assure that the limited supply available was used in accordance with lawful rights, and to take enforcement action against violations of permit and license conditions, illegal diversions and waste or unreasonable use of water.

SCOPE

The scope of Dry Year Program activities was concentrated in the central and northern parts of the State where the impacts of the drought appeared to be the most critical. The program emphasized water conservation and voluntary cooperation of the users. The major emphasis was placed on water diversion for irrigation purposes since the largest use of water in California is for agricultural irrigation.

PROGRAM SUPPORT

The State Water Resources Control Board (State Board) formally approved the 1977 Dry Year Program on February 2, 1977. The amount of work required to carry out the State Board's Dry Year Program would depend considerably upon the Department of Water Resources' (Department) unimpaired runoff forecasts. Under the direction of the Division Chief, Mr. Richard L. Rosenberger, Supervising Engineer Larry C. Spencer of the Application and Permit Section was made responsible for organizing and supervising the work of the Dry Year Team, Supervising Engineer John M. Page of the Permit and License Section supervised the activities of the Complaint Team, and acting Supervising Engineer Walter G. Pettit of the Hearing and Enforcement Section supervised the activities of the Hearing Unit.

DRY YEAR TEAM

The Dry Year Team was generally comprised of one secretary and the following engineers: three each from the Division of Water Rights (Division) and Division of Planning and Research; and one each from the Legal Division and the Central Valley Regional Board. The team worked under the leadership of Murt Lininger of the Division of Water Rights.

The team was responsible for hydrologic routing of forecasted runoffs in the critical areas of Central and Northern California, preparing and mailing water shortage notices to diverters under riparian and appropriative water rights, organizing and directing the fact-finding teams and investigating possible illegal diverters.

The team also received technical assistance and advice from the United States Bureau of Reclamation (Bureau) and the Department for the estimation and location of riparian demand as well as several other related activities.

FACT-FINDING TEAMS

Under an interagency contract of \$80,000 between the State Board and the Department, the Department provided the services of seven of its staff personnel to assist the State Board in identifying illegal diverters. The personnel, as part of the Dry Year Team activities, conducted field investigations of water diversion and use by diverters in the Delta and along the Sacramento and Feather Rivers. Based on preliminary investigation by the teams, follow-up action for some specific cases of possible illegal diversion were pursued by the registered engineers of the Division.

SACRAMENTO-SAN JOAQUIN DELTA CROP MAPPING

As a part of the above contract with the Department, the Department agreed to provide crop maps of the entire Delta Lowlands. The mapping is similar to that conducted by the Department in 1976. Differences between 1976 and 1977 in crop types and acreages will generally be used as a basis of determining whether appropriate reductions in water use were made in 1977.

COMPLAINT TEAM

The Complaint Team was responsible for handling the multitude of complaint letters received from persons alleging interference of their vested rights by other water users. Each complaint received required an investigation and analysis of the situation and enforcement action if a violation was found to have occurred.

Initially, the Complaint Team was comprised of six engineers from the Division's Complaint and Surveillance Unit. However, as the workload increased, additional staff was required until, at times during the months of June, July and August, 1977, up to 20 members of the Division's staff, including several persons on loan from other parts of State and Regional Boards organizations were actively engaged in receiving, processing and resolving complaints.

DIVISION OF WATER RIGHTS STAFF:

The activities of all other sections of the Division were affected severely by the drought. The Division reassigned many of its personnel to match the increased workload of specific units. Although the number of emergency hearings increased, there was not adequate trained staff to supplement the Hearing Unit's workload. As a result, the ability of the Hearing Unit to handle protested application hearings fell off sharply. Moreover, due to reassignments the Hearing Unit lost two experienced staff members; one to lead the Dry Year Team activities, and the other to participate in the Department's Drought Information Center.

PROGRAM OUTPUT

RIVER SYSTEMS STUDIED AND ACTIONS TAKEN

Critical Streams

The agricultural areas threatened with potential drought impacts during the irrigation season of 1977 are shown in Figure 1. Based on this figure and consultation with the Department of Water Resources (Department) staff, the critical streams and associated drought impacts were identified in the State Board Basins of North Coast, San Francisco Bay, Central Coastal, Sacramento River, Delta-Central Sierra, San Joaquin, Tulare Lake, and North Lahontan.

The Dry Year Team compiled a list of significant irrigation appropriative diverters on major streams in each of the above basins. A significant irrigation diverter was defined as any appropriator with a permit or license amount equal to or greater than 0.5 cfs for all basins except Sacramento and San Joaquin. For these two basins the criteria was 3.0 cfs or greater.

Based on information compiled by the Dry Year Team, initial action by the Division of Water Rights (Division) resulted in the sending of three separate water shortage notices on February 11, 1977 to 941 diverters of significant amount of surface water. The first notice with hydrologic data indicating most likely runoff of 35 percent of normal was mailed to diverters in the Central Coast, North Coast, San Francisco Bay, and San Joaquin Basins. The second notice with hydrologic data indicating most likely runoff of 40 percent of normal was mailed to diverters in the Sacramento and South Lahontan Basins. The third notice with hydrologic data indicating most likely runoff of 45 percent of normal was mailed to diverters in the North Lahontan Basin. The above notices also informed the diverters that it was the State Board's intent to contact them again if there is expected to be no water available under their priority of right.

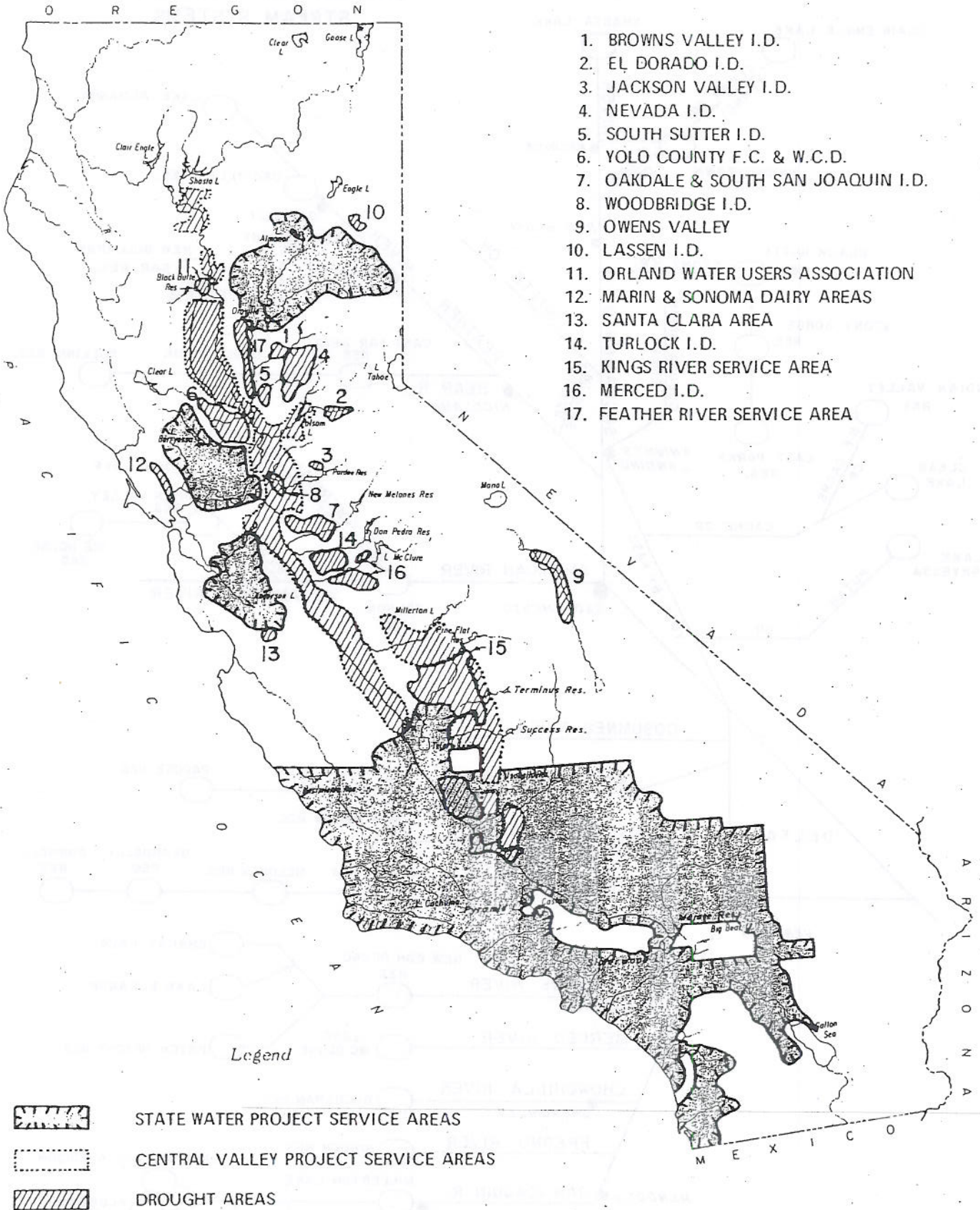
On February 18, 1977 the Division mailed 2,849 water conservation notices to riparian landowners in Sonoma County possibly diverting surface flow and/or underflow of the Russian River.

These notices informed the possible diverters regarding impending water shortages and the degree of seriousness of hydrologic conditions. They were encouraged to plant their crops for conservation of water in accordance with water conservation guidelines sent along with the notice.

Sacramento - San Joaquin Basins

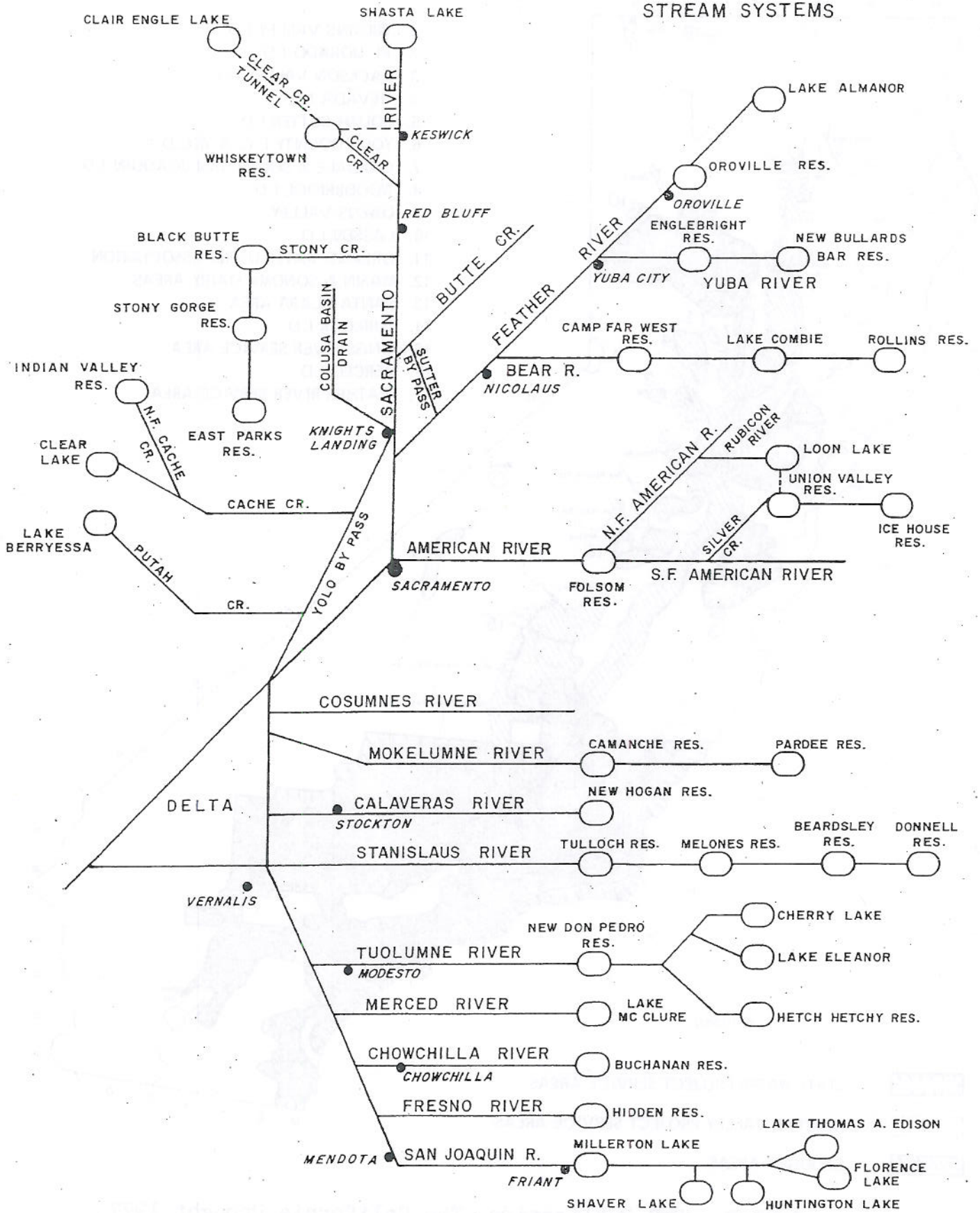
The schematic sketch of the Sacramento-San Joaquin Basins including the Sacramento-San Joaquin Delta is shown in Figure 2. According to the runoff forecasts made by the Department in May of 1977, the water supply ranged from 4 percent of an average flow in the Cosumnes River watershed of the San Joaquin Basin to 43 percent of an average flow in the upper Sacramento River Basin.

DROUGHT IMPACTED AGRICULTURAL AREAS, SUMMER 1977



SOURCE: DWR Publication, The California Drought 1977, An Update February 15, 1977

LINE DIAGRAM OF SACRAMENTO - SAN JOAQUIN STREAM SYSTEMS



The availability of adequate water supply in the Sacramento and San Joaquin River systems controls the success of agriculture in the Central Valley of California and the agricultural related economy of the State. The Department's runoff forecast for the irrigation season of 1977 indicated that the available supply would not meet the irrigation demands of riparian and appropriate water users in the basins and consequently the agricultural related economy of the State was threatened. The maximum effort of the Dry Year Team was concentrated in these areas to assure use of water in accordance with California water right laws, and to conserve and extend available supplies to mitigate drought impacts.

As the water supplies and associated demands in the upper reach of the San Joaquin River from Friant Dam to the confluence of Merced River are controlled and regulated by the United States Bureau of Reclamation (Bureau) under the Central Valley Project, this reach was not considered in the State Board's Dry Year Team activities. The remainder of the San Joaquin Basin, the Sacramento Basin and the Delta were considered as one continuous hydrologic system for analysis of available water supplies to satisfy water demands under different levels of water rights priorities. The water rights, in order of priority, are the riparian, the pre-1914 appropriative, and the post-1914 appropriative.

Riparian Water Rights--

The lands abutting the streams may have a riparian claim to the use of natural flow. The monthly riparian demands were computed from studies made by the Department, the State Board, and the Bureau. In the case of streams for which no study reports were available, the Dry Year Team members computed riparian acreage from assessors' maps obtained from various county assessors. The monthly water demands for irrigating these riparian lands were estimated by making several necessary assumptions. Based on the Department's report, "The Sacramento Valley Water Use Survey, 1977" which showed May of 1976 as the peak diversion month, the peak water demand for 1977 was assumed to occur in May also. For estimating peak demand, it was assumed that 85 percent of riparian lands were irrigated with a water duty of one cfs to 70 acres. It was further assumed that efforts of federal, state, and local agencies would result in 10 percent water conservation. The estimated peak demand of a diverter during May was prorated for other months using assumed monthly demand factors of 0.60, 0.70, 0.95, 0.95, 0.75, and 0.35 for the months of March, April, June, July, August, and September respectively, based on the above report of the Department.

The summation of monthly demands for irrigating riparian acreage in the Sacramento Basin, the San Joaquin Basin and the Delta gave the total water required by months to satisfy the riparian demands. In addition to these demands, the following demands in the Delta were satisfied co-equally with the riparian demands: a) the monthly non-agricultural consumptive uses (native and riparian vegetation, water surface evaporation) as estimated from the Department's report; and b) the Delta outflow index of 3000 cfs for the months of March through May 1977, and 1500 cfs for the months of June through September as obtained from the State-Federal Water Projects Operation Unit (Delta Unit) of the State Board.

The available water supplies to meet riparian demands in a basin consist of natural inflow, return flow as a consequence of using natural supply, and natural accretions from groundwater as appropriate. The riparian water users have no claim to the return flow generated from use of pumped ground water, imported water or stored water.

The natural monthly inflows to the Sacramento-San Joaquin Basins during the irrigation season of 1977 were taken from the Department's runoff forecasts of May 1977. For tributaries in the Sacramento Basin where forecasts were not available, the tributary gaged flows of 1976 were prorated to estimate natural flows available during 1977. Similarly, the 1976 unmeasured accretions as reported in the Department's report were prorated to estimate the 1977 contribution to augment available supplies in the Sacramento Basin. The monthly proration factors were established by dividing the projected 1977 natural flows by 1976 recorded natural flows. The return flows shown in the Department's report, "Sacramento Valley Water Use Survey" dated June 1977 for the Sacramento Basin were mostly from use of ground or stored water and were assumed to be not available to the riparian users. In the San Joaquin Basin, the return flow was assumed to be 20 percent of demand satisfied during March and April, 10 percent during May and June, and 0 percent during July, August, and September.

The summation of natural inflows or prorated gaged flows, prorated natural accretions, and return flows gave the total available supply by months for riparian users in the Sacramento-San Joaquin Basins, including the Delta.

The total riparian demand versus supply in the Sacramento and San Joaquin Basins were compared by months to find out the approximate dates when the riparian diverters had to take a deficiency or completely go without water supplies for satisfying their estimated demands.

In accordance with the above analysis made by the Dry Year Team, the Division notified riparian users of the approximate percentage of availability of a full water supply for the months of May, June, July, and August.

Pre-1914 Appropriative Water Rights--

The Statements of Water Diversion and Use (Statements) on file with the Division were the primary source of estimating pre-1914 demands. These statements are filed by riparian and pre-1914 appropriators pursuant to Water Code Section 5101.

To estimate pre-1914 demands in the middle and lower reaches of the Sacramento-San Joaquin Basins including the Delta, the staff (1) picked statement numbers on appropriate streams from the spot maps maintained with the Division (2) separated statements pertaining to pre-1914 appropriative water rights from statements assumed to be pertaining to riparian users, and (3) computed monthly demands from these statements. For a few diverters, the pre-1914 demands were computed from the Division files and other publications.

The water supply available to satisfy pre-1914 demands is equal to the residual natural supply after riparian demands are satisfied, plus the return flow from use of ground and project (stored or imported) water in the basin. For the middle and lower reaches of the Sacramento Basin, the return flow was determined from studies made by the Department. However, for the San Joaquin Basin, the return flow was estimated by subtracting residual natural supply from prorated gaged flows at gage stations in the vicinity of river mouths or rim of the Delta. The summation of residual natural flow, and return flow gave the total water supply available to satisfy the pre-1914 demands in the Sacramento-San Joaquin Basins including the Delta.

The available water supply was compared with computed demands to establish a time frame by months when the diverters with pre-1914 rights had to take a deficiency or completely go without water supplies for satisfying their estimated demands. In accordance with this time frame established by the Dry Year Team, the Division notified pre-1914 diverters in the Sacramento-San Joaquin Basins regarding the impact of the drought on their share of the available water supplies in relation to a normal year.

Post-1914 Appropriative Water Rights--

The Dry Year Team effort for estimating available supply and demand of diverters under post-1914 water rights was similar to the effort of estimating supply and demand for diverters under pre-1914 water rights. Instead of referring to the statements, the staff referred to the permits and licenses on file with the Division. Furthermore, the estimation of post-1914 demands was done until the residual water supply was completely used by diverters having senior water rights under permits and licenses. For certain streams in the San Joaquin Basin, post-1914 demands were not estimated since the available supply in those streams was completely used by diverters under pre-1914 water rights. The water supplies available in individual streams or in a basin as a whole were compared with corresponding demands of diverters under post-1914 water rights to establish a time frame by months when the diverters had to accept deficiencies or water was no longer available under their priority of right. In accordance with the time frame developed by the Dry Year Team, the Division sent notices to diverters with post-1914 water rights regarding the impact of the drought on their share of available supplies during a normal year.

Action Taken--

Based on the above studies made and the time frame established by the Dry Year Team regarding availability of water supply to satisfy water demands under different levels of water rights priorities, the Division sent several water shortage notices to the diverters. According to the date of notice, following is a brief discussion of notices sent by the Division to the diverters in the Sacramento-San Joaquin Basins including the Delta:

1. On March 29, 1977 the Division sent 311 water shortage notices to permittees and licensees in the Sacramento Basin. Of the 311 notices, 259 notices of unavailability of water were mailed to diverters in the Sacramento Basin upstream of the "I" Street Bridge in Sacramento who did not have contracts of water supply with the Department or the Bureau.

These diverters were informed that water would no longer be available after May 1 or May 15 depending on their priority. The diverters notified were outside the Colusa Basin Drainage Area, and met either of the following criteria: (a) could directly divert from the Sacramento or Feather River, (b) diverted from sources that have hydraulic continuity with either the Sacramento or the Feather River and their diversion amount was greater than 3 cfs.

The remaining 52 water shortage notices were mailed to diverters within the Colusa Basin Drainage Area who did not have contracts with either the Department or the Bureau.

2. On April 18, 1977 the Division mailed 103 water shortage notices to permittees and licensees in the San Joaquin Basin. These were six separate notices, each with a different time frame regarding unavailability of water for direct diversion. Of the 103 notices, 36 notices were sent to diverters (San Joaquin 9, Merced 14, Tuolumne 12, and Calaveras 1) informing them that no surface water supplies were available to them throughout the season. The dates of unavailability of water to the remaining 67 diverters (San Joaquin 1, Merced 1, Stanislaus 18, Calaveras 8, Mokelumne 30, Cosumnes 9) ranged from May 20 to August 1, 1977.
3. On April 22, 1977 the Division mailed 993 water shortage notices to the riparian owners in the Sacramento Basin not having contracts with the Bureau or the Department. Of the 993 notices, 895 notices went to riparian owners on the Sacramento River, 83 notices to riparian owners on the Yuba River, and the remaining 15 notices to riparian owners on the Feather River. These riparian owners were informed that commencing about June 1, only about 50 percent of a full supply of water would be available for irrigation through August.
4. On May 18, 1977 the Division sent 2385 water shortage notices to possible diverters of water from the Sacramento-San Joaquin Delta channels under different levels of water rights. Of the 2385 owners, 2146 were riparians, 235 permittees and licensees, and the remaining four were appropriators with pre-1914 water rights. The riparian owners were informed the natural flow would only supply about 50 percent of the riparian requirements for June through August. The permittees and licensees were informed that commencing about May 1 of this very dry year and lasting until greatly improved water supply conditions return, water in the Delta channels would not be available for diversion under permits or licenses.
5. On May 27, 1977, the Division mailed 1066 water shortage notices to possible diverters in the middle and lower reaches of the San Joaquin Basin under riparian and pre-1914 appropriative water rights. The riparian owners notified were those who had no contract with the Bureau for their water supply. Of the 1066 notices, 37 were sent to water users under pre-1914 water rights and the remaining 1029 notices were sent to water users under riparian water right.

These notices informed the diverters under pre-1914 and post-1914 appropriative water rights regarding predicted hydrologic conditions, and degree of seriousness of these conditions in the area of diversion. The notices also indicated the conditions in the area of diversion. The notices also indicated the time from when the riparian and appropriative diverters had to take a deficiency or completely go without water supplies for satisfying their demands during 1977 irrigation season. The riparian owners were called upon to restrict their water use to assure equitable distribution of available water supplies. Unless water supplies are available from alternate sources, the notices advised the owners under different levels of water rights to conserve water use either by reducing irrigated area or by planting low water use crops. The notices sent to the riparian owners in the Delta emphasized that they had no claim to stored water, return flow therefrom, or return flow from project water released by the Department and/or the Bureau. They were also informed that in order to protect and maintain water quality in accordance with the Interim Delta Water Quality Plan for 1977 adopted by the State Board on February 8, 1977, the maintenance of adequate outflow through release of stored water would be required from the reservoirs of the State Water Project and/or the Central Valley Project.

Furthermore, the notices advised the diverters that in the event of complaints of violation of permit or license terms and conditions, waste and unreasonable use, and illegal diversion, the State Board would investigate and take legal actions as appropriate.

Other Basins

Salinas River--

Information regarding the hydrography of the Salinas River Basin was gathered by the Dry Year Team through the cooperation of the San Luis Obispo County Engineering Department, the Monterey County Flood Control District and the United States Geological Survey.

The Salinas River Basin is located within the Central Coastal Range where there is little or no snow runoff and flows are dependent on precipitation. It was anticipated that extremely low natural flows would be available during the 1977 irrigation season. Therefore, it appeared that agricultural diverters would be dependent on well water or water released from storage. Accordingly, the Division staff felt that no further study was required.

Russian River--

The Dry Year Team initiated an investigation regarding the availability of water to satisfy water right demands along the Russian River. It was determined that natural water supply would not be available during the summer months. Available water during this period would be water released from storage with use determined by ten levels of priorities that are interrelated. The Dry Year Team deemed that in the limited time available it would not be practical to make the necessary studies.

A notice was, however, sent by the Division to possible diverters of Russian River water regarding water conservation for the 1977 irrigation season.

Tulare Lake Basin--

Studies of the Kings, Kaweah, Tule and Kern Rivers were also initiated by the Dry Year Team. After contacting various agencies and water districts in the basin, it was found that basically all the waters of these river systems are claimed under riparian right or pre-1914 appropriative right. It was found that a major portion of the supplies of water in these systems were allocated by court decisions, stipulations and/or agreements through the service of watermasters.

The flows of the Kings River are under the control of a watermaster working for the Kings River Water Association. With the watermaster determining his schedule on the basis of vested rights, the agencies and associations within the Kings River area felt that even in a dry year they had a good control of the flows.

The flows of the Kaweah, Tule, and Kern Rivers are generally controlled under similar operations as those used on the Kings River.

Based on the above study made by the Dry Year Team, the Division decided not to send water shortage notices to the water users in the basin.

Sutter By-Pass--

The Sutter By-Pass is a key part of the Sacramento River Flood Control Project. It conveys the bulk of the flood flows passing down the Sacramento Valley north of Sacramento through the Sutter Basin. Although the Sutter By-Pass was constructed as a flood control system primarily, the levee borrow pits have become facilities of considerable importance to the local farmers during the irrigation season. The farmers in the By-Pass and some of those bordering it do not belong to any of the water districts nor do they have wells and, therefore, must rely on waters available from the borrow pits and tributaries for their water supply.

The Sutter By-Pass consists of an east and a west levee and borrow pits. The east levee and borrow pit was originally constructed in 1924 under the direction of the Reclamation Board and enlarged and improved in 1942 by the U. S. Corps of Engineers. The west levee and borrow pit of the Sutter By-Pass was constructed privately by several reclamation districts (RD 70, 1500, and 1600) and is maintained and operated by them.

For many years the Sutter Maintenance Yard personnel of the Department have been operating the Sutter By-Pass facilities consisting of pumps, weirs, and gates to place any water flowing into the system at the proper location and level for diversion by adjacent landowners for irrigation purposes without regard to water rights, if any, of the various parties. The service is appreciated by the landowners since during normal water supply years, all users are provided water sufficient for their needs.

During the very dry year of 1976, there was insufficient water, and the Sutter Yard personnel did not know how to operate their facilities since they lacked up-to-date knowledge of water right priorities and jurisdiction over water

rights. They asked the State Board for assistance in distributing the water during the 1977 irrigation season when the drought began to intensify.

In addition to the request for assistance from the Department, the State Board received several complaints from licensees in the area alleging illegal diversion of water. The Division responded to the problem by assigning an engineer to work with the water right holders. The engineer worked closely with the Sutter Yard personnel in regulating their facilities to deliver the available water to the diverters, in accordance with the priorities of the appropriative rights.

There were several diverters who had no basis of water right and these people were asked to discontinue pumping. Continuing violations were reported to the State Board for possible prosecution under Water Code Section 1052.

Other Streams--

Brief studies were made by the Dry Year Team of the Cache Creek, Petaluma and Susan River flows. It was found that these streams ran dry in early summer and therefore no further investigations were necessary.

ENFORCEMENT

Fact-Finding Investigations

Under an interagency agreement between the State Board and the Department, a program was established to assign personnel to the field to investigate specific diversions of surface waters. These fact-finding teams investigated appropriative and assumed riparian diverters on the Sacramento River and its main tributaries and appropriative diverters in the Sacramento-San Joaquin Delta Uplands.

The main objective of the fact-finding teams was to attempt to identify diverters who were illegally diverting with respect to their rights or diverters who had no color of right.

The fact-finding teams consisted of personnel from the Department who had limited background on water rights. Therefore, it was important to impress upon them that their responsibilities were only to gather pertinent information regarding the diversions and that water rights determinations would be made by the staff of the Division. They were instructed to refer any questions regarding water rights to the Division staff of the Dry Year Team.

The field efforts involved the inspection of diversion pumps, estimation of irrigated acreage and identification of crops. A complete report was prepared for each inspection providing information on the location of the parcel, location of the pump, pump data, meter readings, acreage irrigated, method of irrigation and crops irrigated. Maps were prepared delineating the lands of known appropriators and assumed riparian parcels. These maps were used by team members during field visits to assist them in locating possible illegal diverters.

Division sent notices to all possible diverters informing them that our fact-finding teams would be in the field to gather data on surface diversions. On the request of the Butte County Supervisors and the Sacramento Valley Landowners Association, representatives of the Division participated in a public meeting held in Chico to inform riparian landowners in Butte, Colusa, Glenn, Shasta, Sutter and Tehama Counties of the purpose of the fact-finding team investigations. Before inspection of any property, permission of the owner was obtained to enter onto his land.

The fact-finding teams made 280 visits to appropriators, assumed riparians and others on the upper Sacramento River and 86 visits to the Delta Uplands. During the initial investigations, the fact-finding team members made every effort to interview the diverter to obtain maximum information for the report.

The Division staff of the Dry Year Team reviewed and analyzed all the initial reports prepared by fact-finding teams and identified 39 diverters with questionable rights or method of use. These 39 diverters were revisited by registered engineers of the Division. The revisits included the investigations of two diverters in the Sutter By-pass who appeared to have no color of right and the flooding of Coney Island in the Delta for possible unreasonable use of water. At present, the State Board has referred two offenders to the Attorney General.

Land Use and Crop Maps

Under the above agreement, the Department also conducted an aerial survey of the Sacramento-San Joaquin Delta to prepare land use and crop maps for the 1977 irrigation season. In the Division staff effort of assessing changes in land and crop use, the Bureau assisted by financing a second flight.

During the aerial survey by the Department, photographs (35 mm slides) were taken along North-South flight lines one mile apart. Projecting the slides on a screen, field and urban boundaries were drawn on 7.5 minute USGS quadrangle maps in their office. The field staff of the Department took the USGS maps into the study area for positive identification of crops and urban boundaries, and the completion of land use and crop maps.

The comparison of the 1977 season land use and crop maps of the Delta Lowland with similar maps of preceding years, particularly those for 1976, indicated how far the farmers in the Delta had changed their land use and cropping schemes. The Department has completed the crop survey in the Delta for 1977 season. The Dry Year Team is now analyzing the maps and the results will be available soon. The effectiveness of the program activities in the Delta area will be directly related to the degree of reduction in cropped area and/or planting of low water use crops (safflower, small grain crops) as against high water use crops (alfalfa, tomato, corn).

Complaints

The drought impacted heavily on the Complaint and Surveillance Unit of the Division. In the past, during the course of normal water years, problems

have occurred between water users and their upstream counterparts. As a result of these problems, occasionally a letter of complaint was received from the injured party requesting the State Board to intercede. Since the incidence of these letters was low, they were routinely handled by the Permit and License Section.

In the fall of 1975, a reorganization of the Permit and License Section brought about the formation of a separate unit entitled the Complaint and Surveillance Unit. The purpose of this unit, staffed with four full-time engineers, was to handle the occasional complaints, but for the most part devote its time to surveillance and enforcement to insure that the terms and conditions under which permits and licenses had been issued were being followed.

As California entered into the drought of 1975-76, the number of complaints was relatively small, numbering 81 for the above water year. However, as the drought continued into 1976-77, the number of complaints received almost tripled to an unprecedented 212 for the water year 1976-77. In the last quarter of the water year 1976-77 alone, 88 complaints were received and processed to various stages of completion.

Examination of the records indicates that the majority of the complaints are received during the period of May to October of each year. The Complaint and Surveillance Unit anticipates that the number of complaints received for the water year 1977-78 may well reach 300 should California again experience a dry or below normal winter.

Most of the complaints received required contact with the complainant and the alleged offender, a field investigation of the problem, staff report of the investigation, letter of finding to the alleged offender and follow-up on any necessary enforcement action. Because of the immediacy and the amount of effort required to resolve each individual complaint during 1977, the staff of the Complaint and Surveillance Unit was increased to six engineers and attempts to continue the surveillance portion of the program were dropped. Additionally, staff from the Permit and License Section were assigned, on an as-needed basis, to the Complaint and Surveillance Unit to aid in handling the increased workload. At times during the months of June, July, and August 1977, up to 20 members of the Division's staff, including several persons on loan from other parts of the State and Regional Board organizations were actively engaged in receiving, processing and resolving complaints.

Actions Taken

The State Board and its Division of Water Rights obtains its investigation, surveillance and enforcement powers from Division 1 (Sections 100, 275) and Division 2 (Sections 1051, 1052) of the California Water Code and the regulations the Board has adopted to implement these statutes (Title 23, Articles 17.3 and 17.4 of the California Administrative Code).

Violation of Permit and License Terms--

Any person affected by a violation of any term or condition of a permit or license may file a complaint with the State Board in accordance with Article

17.3 (Enforcement of terms and conditions) of the California Administrative Code. An investigation of the complaint will be made and if it is found that a violation has occurred, enforcement action will be taken. Noncompliance with the terms or conditions of a permit or license, and/or lack of remedial action as suggested by the Division may result in revocation of the permit or license.

During the 1977 summer season (April to October), about 15 complaints were received alleging violations of the terms of licenses or permits. Investigations of these complaints were conducted and, for the most part, the complaints were found to be unwarranted. In those few cases where a violation was found, corrections were made by the alleged offender upon receipt of the Division's letter of finding and no further action was necessary.

Illegal Diversion--

Complaints of illegal diversion and use of water are investigated and enforcement action may be taken under Sections 1051 and 1052 of the Water Code. If a violation has occurred, the alleged offender is advised by letter of the Division's findings as to what remedial actions are required of him to eliminate the violation. Noncompliance with these requirements result in the State Board referring the matter to the Attorney General's office for prosecution as a trespass against the State.

Approximately 105 complaints were received during the summer of 1977 from people alleging that illegal diversion and use of water by an upstream diverter was interfering with their vested rights. In many of the cases, the investigation revealed that both parties were riparian. Although the State Board does not have jurisdiction to resolve such matters directly, when feasible, the Division suggested a solution to the problem; as would be the case if the State Board had been appointed as a referee if the parties had litigated the matter.

In two separate cases this summer, recently constructed dams were found to be stopping the entire flow of their respective streams. After completion of the investigation, the Division advised the alleged offenders it would be necessary to breach the dams. The alleged offenders, however, refused to remove the dams and the matters were submitted to the State Board recommending that the Attorney General enjoin the illegal storage of water. Court action ensued and the structures were removed.

Waste and Unreasonable Use--

Recent legislative changes to Section 275 of the Water Code, supplemented by Article 17.4 of the Administrative Code, provide for the State Board to investigate and determine the reasonableness of the diversion or use of water. Under these provisions, allegations of waste and unreasonable methods of diversion or use of water under any color or title of right will be investigated and enforcement action may be taken if the use is found to be unreasonable. Noncompliance with the Division's finding and suggested remedial action may result in revocation of a permit or license issued by the State Board or referral to the Attorney General's office for enjoinder of the use, should the color or title of right for use be outside the State Board's jurisdiction.

During the 1977 summer season about 30 such cases alleging waste and unreasonable method of diversion or use of water, were investigated. Because of the second year of drought, and the effect it has had on the groundwater table in most areas, many of the complaints received were alleging excessive and wasteful pumping and irrigation practices by neighboring landowners. In all cases, investigation of the complaints revealed that the alleged offenders were not exceeding the agricultural irrigation practices of the area and that the complainants had very shallow wells (30 to 50 feet deep) that had simply been left high and dry by the dropping of the groundwater table as a result of the aggregate draft of all users during such a dry period.

In another action, the Division determined that the use of riparian water to offset evaporation and seepage losses in storage reservoirs during the present drought was an unreasonable use of water. Violators of this finding were requested to bypass the flow entering their reservoirs. In one case, the Division staff cooperated with the parties to the extent of establishing measuring devices and operating the reservoir during the season on a stipulated drawdown basis in order to keep the peace. To date, all persons requested to bypass flows through their reservoirs have complied and, as a result, no cases have been brought before the State Board.

To summarize the complaint investigation and enforcement component during the past year, it should be noted that 212 letters of complaint were received during the 1976-77 water year (October through September) and about 150 of these were received and processed during the 1977 summer season. About 20 percent of the 150 complaints investigated during the summer required enforcement action and of these, only six of the alleged offenders refused to abide by the finding of the Division. These offenders were recommended to the State Board for referral to the Attorney General. Presently, two cases have had judgements issued by the superior courts and the structures have been removed; one case has had an injunction issued; and three cases are awaiting action by the Attorney General. It is believed that this is the first time since the enactment of the Water Commission Act in 1914 that the State has enforced its jurisdiction to enjoin illegal diverters.

OTHER ACTIVITIES

Water Conservation Guidelines

The Division staff with aid from the University of California at Davis, prepared guidelines for water conservation in irrigation. These guidelines emphasized planting low water use crops; preventing water waste by controlling leaks, conveyance losses and tail water runoff; and promoting an efficient on-farm water use. These guidelines were sent along with the initial notices of water shortages mailed by the Division during February 1977, to irrigation water diverters in the central and northern parts of California including the Russian River Basin.

Prevention of Waste and Unreasonable Use of Water

Under the Dry Year Program activities, the Division staff provided input to the State Board legal staff to prepare guidelines for prevention of waste and unreasonable use of diverted water for urban beneficial uses and irrigation

purposes. These guidelines were included in proposed regulations of the State Board which were subjected to public hearing process by the State Board on July 26, 1977.

The comments and statements received at the public hearing are being reviewed and analyzed by staff of the Legal Division. The adoption of the regulations by the State Board will facilitate enforcement actions against water waste, particularly during a dry year, by Division staff. Until adoption of the proposed regulation by the State Board, the enforcement actions of the Division during 1977 season are based on existing customs and practices of the community as amended for the drought conditions.

Drought Emergency Regulations

The Dry Year Program staff coordinated with the Legal staff and provided input in preparation of a new regulation designed to expedite public hearings in response to drought emergency conditions. This regulation (California Administration Code Section 736.1) was adopted by the State Board on January 20, 1977. The new regulation provides that (a) calendar priority be given to drought related hearings; (b) such hearings can be held on a 7-day notice; (c) specific drought related factors shall be included within the scope of such hearings.

Recognizing that the Delta is the key to water supplies throughout much of California the Board has taken two separate actions this year to relax Delta water quality objectives in response to severe drought conditions. The objectives for the Delta in effect prior to these actions did not have appropriate dry and critical year relaxations. The first action, taken on February 8, was adoption of the Interim Water Quality Control Plan for 1977, which superseded affected Basin Plans to the extent of any conflict, and allowed certain relaxations not previously provided. The second action taken on June 2, was adoption of Emergency Regulations, California Administrative Code Section 764.20. This emergency regulation provides for conservation of water supplies upstream of the Delta and continued protection of the Delta from deep sea water intrusion. It also provides that any export from the Delta for essential uses other than emergency, municipal and domestic supplies shall be made only upon approval of the Board. The regulation will expire at the end of 1977 unless extended by the Board.

Drought Related Hearings

Nine of the 17 hearings scheduled by the Division's Hearing Unit in the February through September period were directly generated by the drought. Two of the most experienced engineers in the five-man unit were detached for other drought related assignments during that period. One man was immediately replaced; the second was replaced midway through the period. From February through July only two hearings not directly related to the drought were held.

Several of the noteworthy cases heard during that period involved the use of water for recreational purposes at Lake Mission Viejo, a complaint involving alleged unreasonable use of groundwater at Escalon, two requests for waiver of fish bypass requirements by the City of Santa Cruz, and a proposed export of Yolo County groundwater to Kern County. The Board was able to act promptly in those cases; in one instance a hearing was held on Tuesday and the Board acted upon the matter on Thursday of the same week.

Public Information

The State Board kept the water users informed about the seriousness of the drought through news releases and participation in the Department's Drought Information Center.

News Releases--

The State Board issued several news releases about the Dry Year Program activities, particularly on shortage of available supplies to satisfy demands under different levels of water rights priorities. The news releases also informed the diverters that fact-finding teams would be visiting the Sacramento River Basin and the Sacramento-San Joaquin Delta to check on water use. The ample publicity given by the news media to the Dry Year Program activities of the State Board helped in acquiring the cooperation of water users to assist in alleviating the impact of the drought on crop production as well as water rights administration.

Drought Information Center--

A representative from the Division was assigned to the Department's Drought Information Center on January 24. The Center was located in the Resources building in Sacramento.

Reports on State drought activities were issued regularly along with recreation reports as Californians were coping with reduced leisure time recreation opportunities. Four telephone lines as well as two toll-free telephone numbers were installed to handle the volume of calls from a concerned public.

Hundreds of calls were received every day from virtually every state as well as many foreign countries. The calls ranged from suggestions for ending the drought to corporation and government officials asking specific questions on various aspects of the drought.

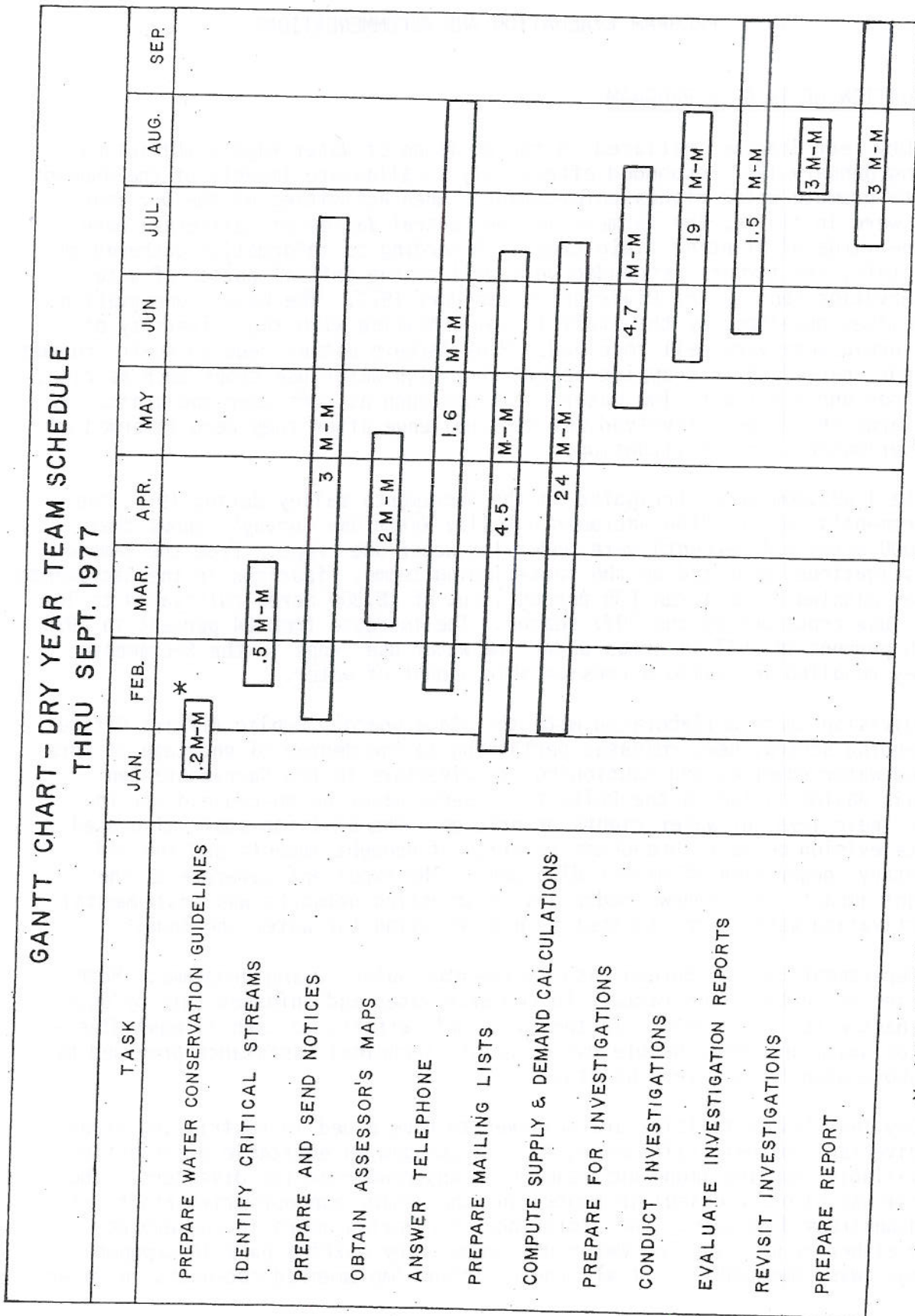
The Center attempted to become a one-stop "shopping center". If the question could not be answered, the caller was transferred to the Division staff with the proper expertise.

The Division's participation in the Center was from the 24th of January through the end of September. During the 19-day run of the State Fair, the Center as well as all of its phone lines was moved to Cal Expo to be the cornerstone of the "H2-Oh" Show. The 140 foot by 40 foot display covered a myriad of water topics including water policy, water rights law and the wet and dry years experienced by Californians.

DRY YEAR TEAM SCHEDULE

The Gantt Chart in Figure 3 shows how 67 man-months were used to accomplish the major tasks undertaken by the Dry Year Team during the 1977 irrigation season. Several other tasks accomplished by the Division staff under the Dry Year Program are not shown in the Gantt Chart. These are the investigation of complaints, development of emergency regulations, and participating in the Department's Drought Information Center, as discussed previously in this chapter.

The expenditure incurred by the Division for the Dry Year Team activities is estimated to be approximately \$170,000. This includes the cost of 67 man-months, travel expenses, and the State Board-Department contract.



TOTAL MAN-MONTHS = 67

* MAN MONTHS

PROGRAM EVALUATION AND RECOMMENDATIONS

EVALUATION OF 1976-77 PROGRAM

The Dry Year Program initiated in the Division of Water Rights (Division) during January 1977 responded effectively to alleviate impacts of the drought and to promote water rights enforcement. When activities of the Dry Year Team were initiated, the farmers in the Central Valley of California were at the verge of planting field crops. According to information gathered by the staff, the farmers responded very well to the initial notice of water conservation sent by the Division in February 1977. The water conservation guidelines developed by the staff in collaboration with the University of California were very well received. Many farmers either reduced their cropped area or changed their cropping scheme from high water use crops such as rice, tomatoes and alfalfa to low water use crops such as safflower and grain. By and large the farmers involved met the challenge after they were informed of the seriousness of the situation.

Of the 1,695,000 acres irrigated in the Sacramento Valley during 1976, the Department's report, "The Sacramento Valley Water Use Survey", shows that 410,000 acres (24 percent) were under low water use crops. From the sample investigations conducted by the fact-finding teams, riparians in the Sacramento Valley planted 6,500 acres (35 percent) out of 18,300 acres cultivated to low water use crops during the 1977 season. The increase from 24 percent in 1976 to 35 percent in 1977 in areas under low water use crops in the Sacramento Valley resulted in saving a considerable amount of water.

The Division staff collaborated with the State Board's Public Affairs Office in sending several news releases pertaining to the degree of shortage of forecasted water supplies and cautioning the diverters in the Sacramento-San Joaquin Basins including the Delta to conserve water or to cease diversion under their level of water rights priorities. The Division staff also used the television media to broadcast severity of drought impacts and invited voluntary cooperation of direct diverters. The excellent coverage of the drought impacts by the news media and broadcasting networks was instrumental in activating water users to assist in alleviating the water shortage.

The Department and the Bureau also implemented water saving programs. Both agencies asked their contractors to conserve water and enforced this by cutting back water allotments. In the Division's efforts to curb illegal diversion or waste and unreasonable use of water, technical assistance provided by the above agencies was very helpful.

The Dry Year Team activities are believed to have aided in restricting riparian diverters to their fair share; this encouraged an equitable distribution of available supplies among upstream and downstream riparian diverters. The program was also successful in protecting the senior appropriative rights of the downstream diverters. The assistance of riparian users in conserving water either by planting low water use crops or by cutting back in cropped acreage, was commendable. If all the riparians implemented cut-backs in water

use as requested in the notice, the Division staff estimates that this may have prevented substantial unauthorized diversion of water possibly in excess of 100,000 acre-feet from June through August of 1977. The conservation of this amount of water is sufficient to meet the domestic needs of over 500,000 people for one year. The above is based in the assumption that one acre-foot will satisfy the domestic needs of five persons for one year. The innovative farmers, particularly those with firm crop production commitments, resorted to pumping groundwater to supplement insufficient available surface water supplies, and/or using more efficient methods of irrigation.

We estimate the cost of the program to be \$170,000. This includes personnel and support cost to the Division and the contract with the Department.

In addition to conserving water, the enforcement activities undertaken by the Division's Complaint and Surveillance Unit and by the Dry Year Team appeared to be very effective in curbing illegal actions of upstream diverters and minimizing filing of complaints by downstream diverters. As the Division made its presence known to the farmers by making frequent field visits, the farmers became aware of the State Board's concern of enforcing water rights. This encouraged the farmers to cooperate with the Division to help alleviate the drought impacts.

Under the Dry Year Team activities, 366 field visits and 39 follow-up investigations were conducted during the latter part of the 1977 irrigation season in the Sacramento Valley, including the Delta, providing additional support to the enforcement program of the Division. Most of the farmers abided by the findings of the Division and curtailed water use in accordance with the Division's water shortage notices. However, actions are in progress to refer two of these cases to the Attorney General.

Throughout the enforcement activities of the Dry Year Team during the unprecedented drought of 1976-77, the complexities and deficiencies of water rights law and institutional constraints became apparent.

The Division also found deficiencies in the water rights law and some institutional constraints which impacted the program. The staff found the lengthy public hearing process now required in enforcing water rights law to be too time consuming, and recommends the Board be granted authority to issue cease and desist orders against illegal diverters while the public hearing process is conducted. Further, the Board should be granted authority to impose fines or administer other enforcement sanctions instead of invoking the only sanction now provided by law - revocation of the diverters permit/license, which is a punishment too severe for the violation in most cases.

The Division also believes that provisions should be included in law which accelerate the filing of statements of use by pre-1914 diverters and riparians. This data would have greatly assisted the work of the Dry Year Program.

Finally, water rights data must be converted to computer storage and retrieval techniques so that information regarding water users with riparian, pre-1914, post-1914 and federal and state project contracts can be displayed in such a way as to have meaning to an effective monitoring and enforcement plan.

RECOMMENDATION FOR FUTURE ACTIVITIES

Based on the above evaluation of the 1976-77 program, the staff recommends the continuation of activities similar to this year's Dry Year Program as an ongoing effort. Continuing the program will give an opportunity to consolidate what has been done during 1976-77 and to fully enforce water rights priorities in future years. The Division staff will actively collaborate with the California Water Rights Law Review Commission to remove deficiencies in the law, particularly those which will promote better administration and enforcement of water rights law for equitable distribution and beneficial use of water throughout the State.

The program team would work on enhancing surveillance and enforcement capabilities of the Division staff by developing a computer storage and retrieval system of all the available water rights related data. In addition, voluminous data collected during the activities of the Dry Year Team of 1977 will be placed in the computer for use by other sections of the Division.

Special efforts should be made by the staff to plan and standardize methodology and procedures to better administer water rights during the normal year and future droughts. The staff should have lead time to plan for the worst on an assumption that the dry conditions of 1976-77 will continue for another year. Even if this assumption is not true, almost every year has several months of deficient flow in many streams. In particular, the runoff during 1977-78 will be used to replenish storage depletions in various reservoirs and water supply deficit leading into 1978 would not be erased. Consequently, the operation of a program similar to this year's Dry Year Program should continue in order to properly administer water rights priorities as needed year after year.

The Division plans to ask the State Board to authorize the following tasks, as may be appropriate, in 1978 and future years. Some of these tasks are dependent on forecasted runoff of the Sacramento-San Joaquin River system:

1. Special letters would be sent to Delta diverters found by the 1977 aerial surveys to have continued historic crop patterns without apparent reasonable conservation efforts. The letters would put these diverters on notice that special surveillance will be undertaken the next year in which a drought occurs and if they are found to be engaging in wasteful or unreasonable diversion the Board intends to take strong enforcement action.
2. Efforts should be made to obtain U-2 flight, infrared Ektachrome and satellite photography of the Sacramento Valley to investigate water use and identify illegal diverters.
3. Letters forecasting the expected availability of water at various levels of water rights should be sent after receipt of the Department's snow survey bulletins which forecast insufficient runoff to meet all demands.

4. An enlarged fact-finding program should be instituted as soon as water shortages begin to occur, to cover the drought impacted areas more quickly.
5. Staff investigations would follow up cases of possible excessive diversion uncovered by the fact-finding teams, in accordance with existing Board directives.
6. Appropriate enforcement action would be recommended by staff and taken by the Board.
7. If 1978 or any subsequent year is determined to be a drought year (less than normal rainfall) recipients of 1977 water availability letters would be notified that the notification service will be continued and expanded.
8. The next year with a forecasted runoff below lower quartile the contract for crop maps in the Delta should be renegotiated calling for greater financial participation by the Department, aerial surveys as of about June 1 and August 15, and assistance in forming fact-finding teams.
9. Delta crop mapping should be reviewed for compliance with State Board directives.
10. If data processing equipment becomes available, efforts should be made to automate routing computations and mailings.

PROPOSED WATER MANAGEMENT SECTION

A Water Management Section should be created in the Division of Water Rights. The Section would be responsible for bringing together scattered functions of the Division related to enforcement of water rights priorities, complaints and investigations and data processing. Following is a brief description of the objective, functions, and organization of the proposed Section.

Objective

The objective of the Section will be to ensure full and equitable distribution of waters of the State so as to protect the public interest and the environment in accordance with water rights priorities.

Typical tasks of the Section will be:

1. To determine the availability of water in all critical areas of California each water year and disseminate this information to water users, as appropriate.

2. To develop an efficient data processing system which can provide an estimate of supply and demand of water for any stream system or area of the State.
3. To provide a qualified full-time investigation team to check that diversions are legal, that water is used beneficially and that waste and unreasonable use of water is prevented.
4. To expedite enforcement actions by preparing the necessary background information and evidence which will stand up in hearings or court actions where water rights law are violated.
5. To provide an efficient index and map system listing up-to-date information on all diverters under their respective method of obtaining water (e.g., riparian, license, pre-1914, contract, well water, etc.). These listings could be recorded for each major river system.
6. To undertake special studies for water use trends, disposition of return flows, conservation methods, assistance to legislative committees studying methods of improving existing laws, to study specific trouble areas such as the Colusa Trough and Sutter By-Pass.
7. To provide coordination with other agencies, divisions, sections and the public.

Functions

The proposed section would complete ongoing activities of the 1977 Dry Year Program and develop long-term programs to handle forecasts of available water supplies for satisfying water rights demand and to investigate complaints. Following is a brief discussion of specific short- and long-term functions of the proposed section.

Short-Term--

1. Complete technical appendix to Drought-77 Report.
2. Determine deficiencies in the previous year's activities.
3. Develop standard methods and procedures for estimating available supplies and demands.
4. Plan and organize activities for the 1977-78 water year.

Long-Term--

1. Complete a comprehensive index of all diverters under riparian and pre-1914 water rights in the State and diverters who use well water, contract water, or combination of water from different sources.

2. Develop models for Colusa Drainage Basin and Sutter By-Pass Basin for prediction of available water supplies.
3. Initiate special studies to determine reservation of jurisdiction, water accretion and depletion, and compliance requirements.
4. Develop and operate a computerized Water Rights Management Control System for storing, retrieving and doing required computations on water right files and data for expediting water rights related water management programs.
5. Develop a qualified investigation team capable of obtaining all the essential information necessary for the management of the State's water and enforcement of water rights priorities.
6. Develop a systematic schedule for visiting diverters and augment existing areas by adding other parts of the State not included in 1977 (San Joaquin System, Russian River).

Organization

The ongoing Dry Year Program should provide a base for the establishment of a Water Management Section dealing with enforcement of water right priorities, data processing system, and complaints and investigations.

The Water Management Section should have three units; Enforcement of Priorities, Complaint and Investigation, and Data Processing. Following is a brief description and responsibilities of these units.

Enforcement of Priorities Unit--

This unit should:

1. Make routing studies following release of each Department snow survey bulletin and notify users from critical streams in California of expected availability of water at various levels of water rights priority.
2. Follow with field visits, particularly on the Sacramento/San Joaquin Rivers and tributaries, and with aerial surveillance of the Delta to ascertain whether diverters use water within their rights.
3. Make recommendations to the Division/State Board against illegal diverters.
4. Maintain surveillance on all reservations of jurisdiction.
5. Investigate and prepare reports on depletions under reservation for upstream use under permits and licenses and interstate compacts.
6. Prepare reports of special studies and activities during the year.

Complaint and Investigation Unit--

This Unit should:

1. Receive and investigate complaints against (1) waste or unreasonable diversion of use of water, (2) illegal diversion, (3) violation of terms of permits or licenses.
2. Prepare reports and take follow-up action to dispose of complaints by (1) dismissal, (2) taking disciplinary action against permittees and licensees, (3) referring cases to the Attorney General.
3. Investigate and take follow-up action to assure compliance with permit/license terms and bring illegal reservoirs into the water rights system.

Data Processing Unit--

This unit should:

1. Develop and operate a computerized Water Rights Management Control (WRMC) system. This system should include all applications, permits, licenses, stockpond certificates, statements of water diversion and use and stipulated or court decreed rights. This data system should be designed to be responsive to reporting and computation requirements of management and all functional units.
2. Guide the activities of Data Management Section personnel (analysts and programmers) working the WRMC system.
3. Coordinate with State Board divisions and other agencies.