

SECTION III

THE NEED FOR COLORADO RIVER WATER IN SAN DIEGO COUNTY

San Diego County is located in a semiarid section of the United States and has so little annual rainfall that the vegetation of the urban and agricultural areas is continuously dependent upon frequent irrigation. The mountain streams of the region in their natural state provide only a limited and extremely variable water supply. In order to offset this extreme variability by conserving the stream flows of wet years for use in the dry years, storage reservoirs have been constructed which have increased the dependable water supply from local sources. The dependable supply or safe yield of a stream is that maximum quantity of water which such a stream with existing storage development would furnish continuously during the driest period of record. The driest period of record for San Diego County occurred from 1895 to 1904. During these nine years the average annual runoff on the San Diego River at El Capitan damsite was only 6,200 acre-feet, or about one-sixth of the 60-year average of 39,900 acre-feet per year for the entire period of record from 1883 to 1943. The maximum annual runoff at this location was 200,400 acre-feet for the year 1915-1916, and the minimum which occurred in 1899-1900 amounted to 980 acre-feet. Other streams of San Diego County being subject to the same climatic conditions experienced like fluctuations. These extreme fluctuations will undoubtedly continue to occur in the future.

Present Local Water Supply

At the present time the safe yield of all developed supplies in the County is estimated at about 96,000 acre-feet. The present annual demand on these supplies is estimated to be 119,000 acre-feet, or about 25 per cent greater than the safe yield. The bulk of the overdraft has occurred in the systems serving metropolitan San Diego, and this overdraft has been rapidly increasing since the beginning of World War II. The result has been to reduce the conserved supplies of water to such an extent that should a period of drastic drought begin in 1947 the demand could not be met with local resources and restrictions on the use of water would be necessary. Water service agencies of the San Diego Metropolitan area now have, in general, not more than about

one year's supply of water in storage. The situation would be more critical except for the fact that in the early years of overdraft San Diego County was favored with a bountiful rainfall. There are now, indications (See Figure 2) that the local climatic cycle is entering a dry phase, lessening the hope that the normally wet season of the coming winter will improve the needed water supplies.

Potential Additional Water Supplies

Additional water supplies can be obtained by either the further development of local resources or by the importation of water from a supply outside the local drainage areas. The further development of local resources requires the creation of additional storage reservoirs by the construction of dams across the streambeds. A period of time which may be as long as ten years is required after completion of construction to permit a favorable climatic cycle to fill the reservoirs and provide stored water for use in periods of drought. Since additional water is needed by Authority members not later than eighteen months hence, these local supplies offer no solution for the present difficulty. Furthermore, the remaining available undeveloped supplies would yield only slightly more than the present deficiency and therefore could at the most only alleviate the present shortage and would not provide a permanent solution to the water problem.

The Colorado River is the only remaining source of water outside San Diego County still available for its use. Annexation to the Metropolitan Water District appears to be the only course which will assure an additional supply to meet the present shortage, and in addition provide for a substantial future County development.

With the extremely limited local water resources there can be only a comparatively small increase in population and irrigated agricultural lands in San Diego County without the importation of Colorado River water. The importation of Colorado River water does not, however, guarantee that all future demands for water can be met. Studies show that with the Colorado River supply fully developed and all local supplies made available there would still be many acres of good agricultural land in the County suited for the raising of high-valued irrigated crops which can never be so utilized because of the lack of water.

Possible Increase in Population

The population of San Diego County has increased at an extremely rapid rate in the last four decades. The population in 1920 was double

that in 1910, and each decade since has seen a substantial rate of increase, the lowest of which was an increase of 35 per cent for the depression decade of 1930-40. In the last six years the rate of increase has again jumped to a rate comparable with that of the early years. The population in 1940 in the incorporated and unincorporated areas of the County is shown in Table 6, together with the per cent increase of each community for these six years.

TABLE 6

POPULATION OF INCORPORATED CITIES—SAN DIEGO COUNTY

	Census of 1940	Census of 1945-46	Per Cent Increase
<i>Incorporated areas</i>			
Chula Vista	5,138	11,081	115
Coronado	6,932	25,382	266
El Cajon	1,471	3,175	116
Escondido	4,560	5,930	30
La Mesa	3,925	6,486	65
National City	10,344	17,654	71
Oceanside	4,651	10,698	130
San Diego	203,341	362,658	78
Total in incorporated areas	240,362	443,064	85
<i>Unincorporated areas</i>	48,986	109,740	124
Total in County	289,348	552,804	91

In compiling the above figures all navy and military personnel permanently stationed at military installations in the County have been included. Those men only temporarily stationed here while in transit or for training, or while their ships are in for stores or repairs have not been included.

An estimate of the probable future increase in population of San Diego County, based on the past population records and on studies of rates of growth of other cities and counties is given in Figure 3. The climate which was responsible to a large degree for the early rapid growth of this area is still a major asset. In addition there has been a large increase in industrial plants and Navy establishments as a result of World War II. Although some decrease in population might be expected during the next few years due to the conversion of war industries to peace time pursuits the basic factors which have caused growth in the past should assure a continued increase in population in

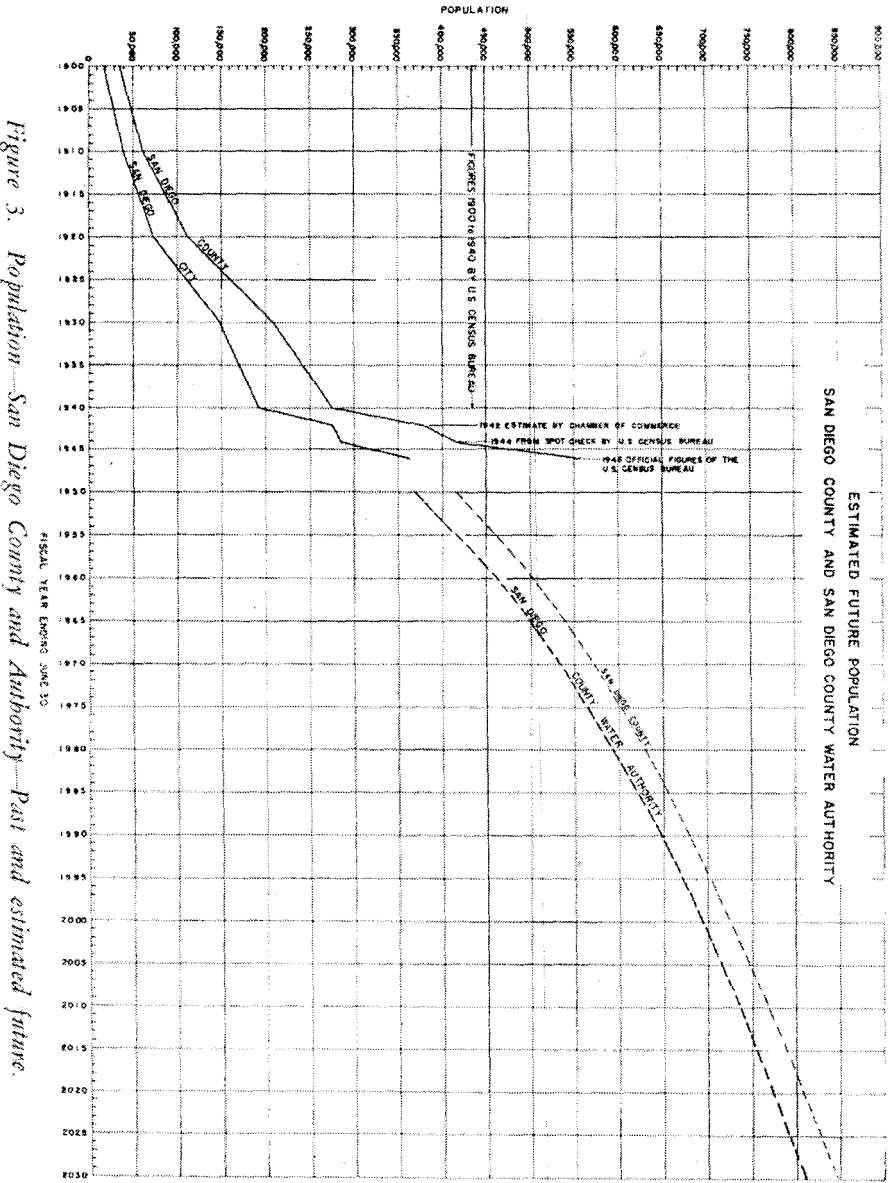


Figure 3. Population—San Diego County and Authority—Past and estimated future.

the next decades. The estimated population in future years as shown indicate a total County population of about 725,000 at the turn of the century, 700,000 of whom would reside in urban areas.

The quantity of water required to sustain this large population has been estimated on the basis of water now used in urban areas. The use of water per capita in urban areas of San Diego County varied in 1945 from a low of 110 g.p.d. to a high of about 150 g.p.d. occurring in San Diego City, due in part to the large water demand by personnel on naval ships and stations in San Diego who were not included in the population figure. An amount of 125 g.p.d. per capita appears to be a good average figure, and has been used for estimating the probable future demand for water by urban populations. Assuming this demand and an urban population of 700,000 people at the turn of the century there would be required to sustain this population about 91,000 acre-feet of water.

Government Needs for Water

The Government demands for water, principally by the Navy, Coast Guard, Marines and Army, have always been large in San Diego. During the recent war the vast expansion of military activity in the County resulted in a rapidly increasing demand until the U. S. military were taking about 38 per cent of all water delivered to the City of San Diego. Under normal rainfall conditions, this sudden and unprecedented demand would have quickly exhausted the supply of water in local reservoirs. Fortunately the heavy draft occurred during a period of above normal runoff from the local watersheds and the war ended before supplies were exhausted, notwithstanding a deficiency of more than 22 m.g.d. in the dependable yield of City reservoirs.

The maximum monthly use of water by the military establishments served by the San Diego City system during this peak demand, excluding that used by war industries and war housing was 17.4 m.g.d. As many of the military and Naval installations constructed during the war have become permanent and a substantial part of the peacetime fleet will be based in San Diego it can be assumed that a large demand for water from this source will continue for many years. Navy personnel and their families in large numbers will make their homes in San Diego County urban areas where their water requirements will be met by the planned importation of Colorado River water. However, the Government may well desire that an additional amount of water equal to the peak war demand should be quickly available to it in case of a future emergency. Any consideration of the future water demands of

San Diego County should therefore include provision for an emergency supply in an amount equal at least to the peak demands of World War II to be available to the Government on short notice.

Possible Increase in Irrigated Land

It has been estimated on the basis of early agricultural surveys in which a classification was made of soils in San Diego County that there are about 240,000 acres of agricultural lands suitable for irrigation. The general location of these lands and the estimated acreage now under irrigation are given in Table 7.

TABLE 7
IRRIGATED ACREAGE—
COASTAL PLAIN AND VALLEYS, SAN DIEGO COUNTY

DRAINAGE BASIN	Estimated in Use	Estimated Ultimate
	1945	Area Irrigable
	Area—Acres	Area—Acres
Arroyo San Mateo & Aliso Canyon	2,930	4,500
Santa Margarita		28,360
San Luis Rey & Loma Alta & Escondido Creek	23,960	118,300
San Dieguito River	5,360	17,060
McGonigle & Rose Canyon	1,210	15,280
San Diego	9,160	38,180
Sweetwater	4,200	6,930
Otay	570	5,000
Tia Juana	3,110	7,040
Totals.....	50,500	240,700

As shown in Table 7 there is estimated to be at present about 50,500 acres under irrigation in the coastal plain and valley areas of San Diego County. Studies by the U. S. Department of Agriculture have shown a total of 240,700 acres of excellent agricultural land in this area if water is available for irrigation. Practically no increase in agricultural land under irrigation has occurred during the past decade, reflecting to a large extent the present nonavailability of water for the opening up of new lands. No estimates are available of what the total area under irrigation would have been at this time, or what it would be in the future, were there an abundance of water available. However, it is possible that the rate of increase might easily approach that which occurred during the decade following World War I when an

increase of 70 per cent in irrigated area occurred in a ten year period.

The availability of water would determine the rate at which land would go under cultivation, but the total ultimate area under irrigation will be determined by the amount of water available. It is apparent that there is not sufficient water to permit irrigation of all suitable agricultural lands.

Possible Balance of Water Supply and Demand

It has been estimated by the State Division of Water Resources in their Report entitled "San Diego Investigation," Bulletin No. 48, that with the complete development of all local sources there would be available a total safe yield of about 160,000 acre-feet annually. Since complete development of all waters is highly improbable a maximum yield of 140,000 acre-feet from local sources is more nearly the maximum amount which could be realized.

The total ultimate available supply of water for San Diego County is therefore estimated to be about as follows:

Colorado River supply	128,000	acre-feet/yr. —	47.8%
Present developed sources	96,000	" " —	35.8%
Additional local sources	44,000	" " —	16.4%

Total available water potentially...268,000 acre-feet/yr. — 100.0%

It has been estimated that the population of San Diego County in the year 2000 will be 725,000. (See Figure 3.) An annual supply of about 90,000 acre-feet of water will be required to sustain this population, leaving a total of 178,000 acre-feet per year potentially available for irrigation of agricultural lands. The average use of water for irrigation on the coastal plain and valleys of San Diego County is 1.3 acre-feet per year. At this rate the 178,000 acre-feet available annually will permit the irrigation of about 140,000 acres of land, leaving about 100,000 acres of irrigable land in the County which cannot be used to their fullest commercial value because of lack of water.

It is quite possible that the population of San Diego County will exceed the 725,000 estimated for the year 2000. Such an increase would require the conversion of some land formerly used for agricultural purposes to urban use, since only such lands will have water available. The use of water per acre for average urban conditions is about equal to the use per acre for irrigation, therefore a changeover from agricultural to urban use is possible without an additional water supply being required.