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Water Use by Manufacturing Industries In California 1979

Bulletin 124-3
May 1982

ON THE COVER. A western paper mill in full operation. Our 1979 survey shows that water use in the pulp and paper industry has declined by more than 45 percent over the past decade

Department of
Water Resources

Bulletin 124-3

Water Use by Manufacturing Industries In California 1979

May 1982

Huey D. Johnson
Secretary for Resources

The Resources Agency

Edmund G. Brown Jr.
Governor

State of California

Ronald B. Robie
Director

Department of Water Resources

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FOREWORD

Bulletin 124-3 presents the results of a statewide survey of 1979 water use by California manufacturing industries. The Department of Water Resources conducted the survey in 1980, with the cooperation of and financial participation by the U. S. Geological Survey. A prior survey covering calendar year 1970 was reported in Bulletin 124-2 in 1977.

Knowledge of the water intake requirements of manufacturing industries is invaluable in water management studies. Bulletin 124-3 contains the latest water intake and use data, which the Department has collected and processed for use by planners and all interested parties throughout California.

The 1979 survey revealed that California manufacturing industries use more than 1.13 million cubic dekametres (0.918 million acre-feet) of fresh water per year. This represents about 2 percent of the 52 million cubic dekametres (42 million acre-feet) of fresh water used annually in California, or about 16 percent of the total annual urban fresh water use of 7 million cubic dekametres (5.8 million acre-feet). In keeping with the practice of the American Water Works Association, the water use data in this bulletin are presented in megalitres (millions of litres) and million gallons. (1 megalitre = 1 cubic dekametre = 0.8107 acre-feet = 0.26417 million gallons.)

The survey also revealed that total manufacturing water use has declined slightly since 1970, although the number of industrial plants (about 33,000 today) has increased some 4,000. The rates of water use by the various major industries have changed somewhat, with most industries now using less water.

This slightly lower water use may be attributed in large part to the increasingly stringent environmental requirements for improved water quality resulting from the federal Clean Water Act (Public Law 92-500). Current waste discharge controls have induced many industries to treat and reuse waste water. This practice, along with other water conservation measures, has enabled many industries to reduce their use of fresh water.

Ronald B. Robie, Director
Department of Water Resources
The Resources Agency
State of California

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Photographs

The photographs in this bulletin are by the Division of Planning, Water Conservation and Use Section.

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The California Water Commission serves as a policy advisory body to the Director of Water Resources on all California water resources matters. The nine-member citizen Commission provides a water resources forum for the people of the State, acts as a liaison between the legislative and executive branches of State Government and coordinates Federal, State, and local water resources efforts.

ACKNOWLEDGMENT

The Department and the U. S. Geological Survey express sincere appreciation for the effort and assistance extended by California manufacturers in providing data contained in this report.

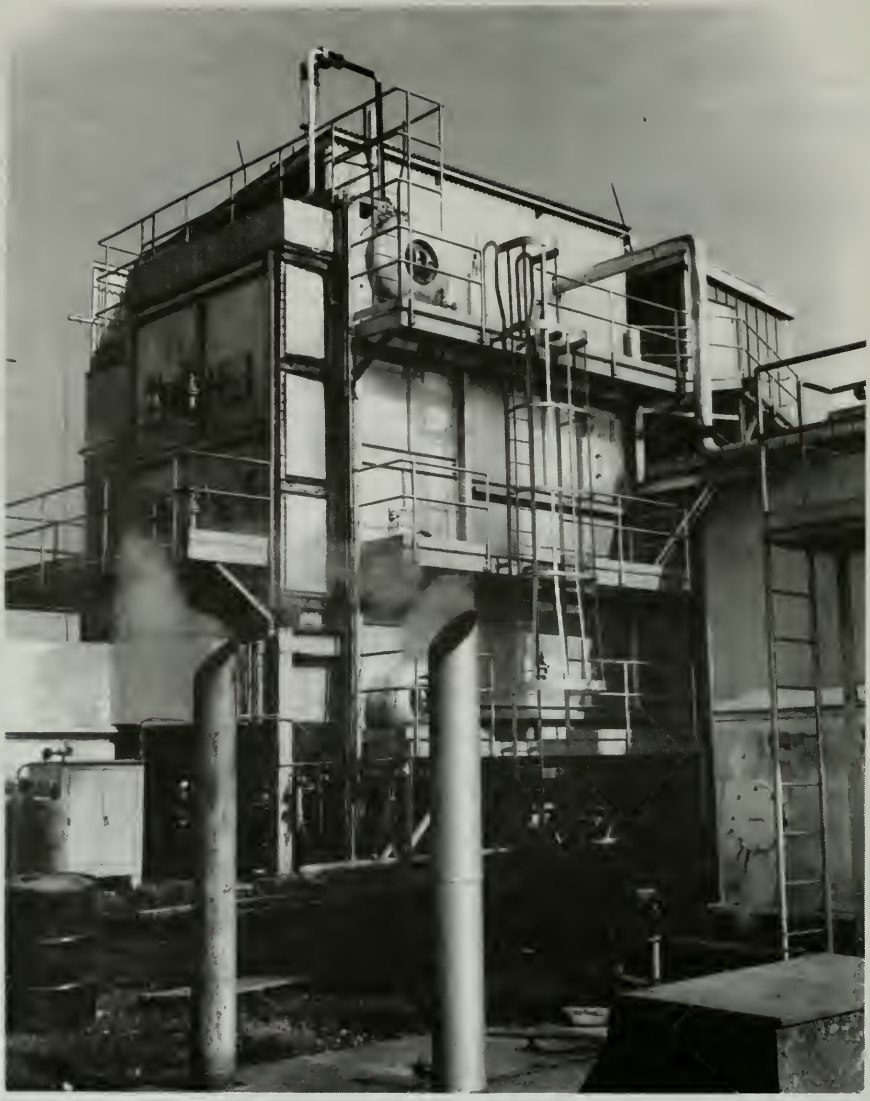
Special acknowledgement is also extended to the California Manufacturers Association for encouraging the cooperation of its membership.

.*.*.*.*.*.*.*.*.*.*.*.

The survey of 1979 industrial water use reported in this bulletin is the third such study made by the Department of Water Resources. The Department conducted its first survey in 1960, and published the results in Bulletin 124, Water Use by Manufacturing Industries in California 1957-1959 (April 1964). The second survey was conducted in 1971, and the results were published in Bulletin 124-2, Water Use by Manufacturing Industries in California - 1970 (March 1977).

CONVERSION FACTORS

Quantity	To Convert from Metric Unit	To Customary Unit	Multiply Metric Unit By	To Convert to Metric Unit Multiply Customary Unit By
Length	millimetres (mm)	inches (in)	0.03937	25.4
	centimetres (cm) for snow depth	inches (in)	0.3937	2.54
	metres (m)	feet (ft)	3.2808	0.3048
	kilometres (km)	miles (mi)	0.62139	1.6093
Area	square millimetres (mm^2)	square inches (in^2)	0.00155	645.16
	square metres (m^2)	square feet (ft^2)	10.764	0.092903
	hectares (ha)	acres (ac)	2.4710	0.40469
	square kilometres (km^2)	square miles (mi^2)	0.3861	2.590
Volume	litres (L)	gallons (gal)	0.26417	3.7854
	megalitres	million gallons (10^6 gal)	0.26417	3.7854
	cubic metres (m^3)	cubic feet (ft^3)	35.315	0.028317
	cubic metres (m^3)	cubic yards (yd^3)	1.308	0.76455
	cubic dekametres (dam^3)	acre-feet (ac-ft)	0.8107	1.2335
Flow	cubic metres per second (m^3/s)	cubic feet per second (ft^3/s)	35.315	0.028317
	litres per minute (L/min)	gallons per minute (gal/min)	0.26417	3.7854
	litres per day (L/day)	gallons per day (gal/day)	0.26417	3.7854
	megalitres per day (ML/day)	million gallons per day (mgd)	0.26417	3.7854
	cubic dekametres per day (dam^3/day)	acre-feet per day (ac-ft/day)	0.8107	1.2335
Mass	kilograms (kg)	pounds (lb)	2.2046	0.45359
	megagrams (Mg)	tons (short, 2,000 lb)	1.1023	0.90718
Velocity	metres per second (m/s)	feet per second (ft/s)	3.2808	0.3048
Power	kilowatts (kW)	horsepower (hp)	1.3405	0.746
Pressure	kilopascals (kPa)	pounds per square inch (psi)	0.14505	6.8948
	kilopascals (kPa)	feet head of water	0.33456	2.989
Specific Capacity	litres per minute per metre drawdown	gallons per minute per foot drawdown	0.08052	12.419
Concentration	milligrams per litre (mg/L)	parts per million (ppm)	1.0	1.0
Electrical Conductivity	microsiemens per centimetre (uS/cm)	micromhos per centimetre	1.0	1.0
Temperature	degrees Celsius (°C)	degrees Fahrenheit (°F)	(1.8 × °C)+32	(°F−32)/1.8



A waste-burning boiler producing steam for use in processing at a plant near Rocklin, Placer County

CHAPTER I
INTRODUCTION

Bulletin 124-3, the third Department of Water Resources report on manufacturing water use, presents the results of a statewide survey of industrial water use conducted in 1980. The first survey, conducted in 1960, was reported in Bulletin 124 in 1964; the second survey, conducted in 1971, was reported in Bulletin 124-2 in 1977. The 1979 survey was conducted (in 1980) to determine rates of industrial water use, quantities of water recycled by industry, and quantities of waste water discharged.

Manufacturing water use, which is second to domestic use, accounts for about 20 percent of all urban uses. A significant part of this is self-supplied, resulting in substantial water use that is not reported in water agency records. Therefore, these special surveys are conducted to obtain valid information on industrial water requirements to assist in water planning for the future.

The source of water for most city-located or small facilities is the local water service agency. Larger users, especially those located outside of urban areas--canneries, refineries, and pulp and lumber mills, for example--tend to develop their own supplies from wells or from local stream diversions.

The cost of water remains relatively insignificant in relation to other manufacturing expenses, and is not an appreciable deterrent to use. This observation from limited survey data appears to be borne out in a National Water Commission report[1/*], which states that the costs of water supply for industry are usually less than 2 percent of production costs. These costs have since risen somewhat but not as sharply as the costs of discharging large volumes of untreated wastes. New federal and state controls have caused waste-discharge costs to accelerate, and thus the incentive to conserve water has risen significantly. Dischargers must pay the cost of treatment in public treatment facilities and must provide their own waste water treatment when discharging to navigable receiving waters or to areas where ground water might become contaminated.

Thus, where substantial quantities of water are required for processing, water conservation becomes essential. As a result, more and more industries have begun to reuse their original supplies. Although the number of manufacturing plants has increased during the past decade, net industrial water demands** have not increased proportionately.

Manufacturing-plant water intake depends on such factors as the quality and type of raw material, the design of a plant, and the introduction of more efficient industrial processes. For those reasons, two plants manufacturing identical products may require substantially different quantities of water per unit of product. For example, lumber mills once depended on mill ponds for log immersion. Today, however, many mills have replaced ponds with an apparatus that sprinkles decks of logs, thus protecting their quality with a minimum

---

* A numbered list of references is presented in Appendix A.

** The total water required for industrial use minus industrial reuse.

of water use. To further reduce intake requirements, much of the intake water is diverted to a sump and reused. This process change resulted in a significant reduction in water use by the lumber industry between 1960 and 1970.

Today, industrialists are looking even more closely at the potential for reusing effluent that would normally be discharged, as well as at outside sources of reclaimed water. The following remarks from a recent water-reuse conference[2/] indicate the close scrutiny given to the costs of waste water treatment and the quality of reusable water:

1. The results of pilot studies at a fruit processing plant (Snokist Growers) brought these comments:

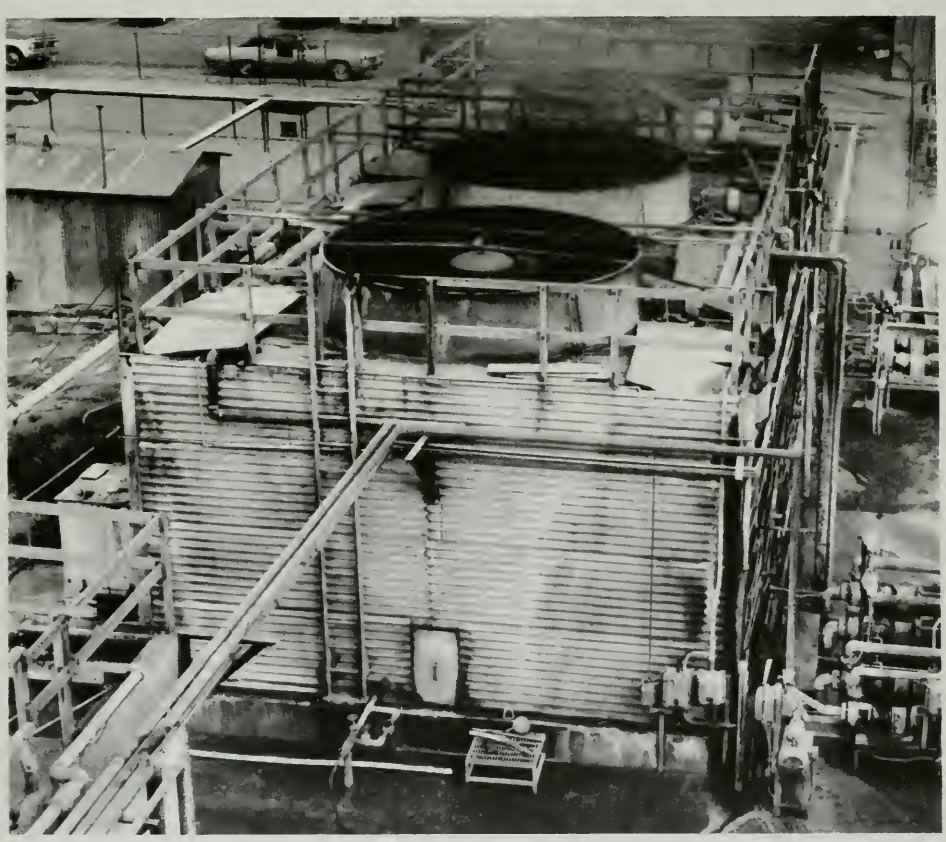
> ". . . the reclamation/reuse system is not economically justifiable at Snokist Growers based on the cost of water alone; however, reclamation/reuse may be justified in order to achieve wasteload reduction requirements for future permits. It could be economically justifiable in some cases where water costs are much higher than Snokist's groundwater withdrawal system.
>
> ". . . based on this study, neither the quality nor the safety of the final product is adversely affected by the use of reclaimed processing wastewater.
>
> ". . . The reclaimed wastewater is suitable for full-scale continuous use for initial raw product conveying, washdown of equipment in the initial processing areas of the cannery, floor and gutter washdown, and direct-contact container cooling when the quality is maintained.
>
> ". . . Snokist Growers can reduce its effluent emission rate by more than 50 percent by using its reclaimed wastewater for initial product conveying, container cooling and floor and gutter wash."

2. A representative of the pulp and paper industry (Simpson Paper Company) had this to say:

> ". . . reductions in water usage in paper mills are largely brought about mechanically, by such things as substituting high-pressure, low-volume sprays for high-volume showers; separating process water according to solids content; with greater direct reuse of the higher solids waters; use of spent cooling water in place of fresh water; (and) use of filters and sedimentation devices to clarify process waters for reuse.
>
> ". . . several mills, including all of those operated by Simpson Paper Company, have developed beneficial uses for their treated wastewater, mostly in agricultural operations."

3. A representative of the petroleum refining industry (Shell Oil Co.) said:

> ". . . The area for which there is considerable interest . . . is using reclaimed wastewater for cooling tower makeup (water). The incentives for doing this generally fall into two categories. First, there is reduction in cost of effluent treating. The second incentive has been to supplement the water supply in areas of the arid southwest, where development of additional fresh water is very expensive. In the latter case, wastewater from municipal plants is usually the proposed source."



Cooling towers in which waste water is treated at 5 300 litres (1,400 gallons) per minute at a plant in Fresno

Figure 1

MANUFACTURING CLASSIFICATIONS

Major Group Number	Classification
20	Food and kindred products
21	Tobacco manufacturers
22	Textile mill products
23	Apparel and other finished products made from fabrics and similar materials
24	Lumber and wood products, except furniture
25	Furniture and fixtures
26	Paper and allied products
27	Printing, publishing, and allied industries
28	Chemicals and allied products
29	Petroleum refining and related industries
30	Rubber and miscellaneous plastic products
31	Leather and leather products
32	Stone, clay, glass, and concrete products
33	Primary metal industries
34	Fabricated metal products, ordnance, machinery, and transportation equipment
35	Machinery, except electrical
36	Electrical machinery, equipment, and supplies
37	Transportation equipment
38	Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks
39	Miscellaneous manufacturing industries

(As listed under "Division D, Manufacturing", in the Standard Industrial Classification Manual (1972), Executive Office of the President, Bureau of the Budget, Office of Statistical Standards.)

Summary of Survey Procedures

In cooperation with the U. S. Geological Survey, the Department of Water Resources (DWR) conducted the survey to examine:

1. total annual and monthly quantities of water taken into manufacturing plants (called water intake);

2. the extent to which manufacturers use reclaimed water; and

3. quantities of water discharged.

The data gathered from the manufacturing groups shown in Figure 1 are intended to provide a uniform base from which public agencies and other organizations that distribute water can evaluate current water-use practices and plan for future manufacturing industrial water needs.

To poll the manufacturing industry, the Department obtained from Dun & Bradstreet a selective list of firms that could provide site-specific data.

Because only a portion of the manufacturing firms were surveyed, some basis for expanding the sample data was needed to determine total manufacturing water use. This required a complete statewide list of manufacturing plants, which the Department also obtained from Dun & Bradstreet. To file the data obtained from the survey, the Department used the Standard Industrial Classification (SIC) Code, along with Dun & Bradstreet's account-numbering system.

The California Manufacturing Association published advance notice of the survey, and DWR mailed some 7,000 questionnaires during April 1980; in June 1980, forms were sent to the companies not responding to the first mailing.

The tables in Chapter IV summarize the water use data reported from the survey questionnaire. Tables 6 and 7 present estimated total fresh water use, which was derived by expanding the survey data by a process described in Chapter II.

Summary of Findings

1. This bulletin reports the results of a survey of annual industrial water use. The largest group of plants responding to the survey reported that they use from 3.8 to 38 megalitres (1 million to 10 million gallons) of water per year.

2. Completed or partially completed questionnaires were received from about 3,000 companies, which reported using about 55 percent of the estimated 1.1 million megalitres (300 billion gallons) of the fresh water intake.

3. Responses to the survey varied significantly from plant to plant; generally, large firms, or those in which water is important to operation of the plant, provided the most complete and useful data.

4. In general, the survey revealed a significant increase in water recycling. According to the state Office of Recycling (of the State Water Resources Control Board), the reason for this increased recycling is probably the increasing cost of both water supply and effluent disposal. On the other hand, not

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all plants in which cooling and processing are major functions have initiated sophisticated recycling techniques, and almost no plants reuse water when water is used for employee needs only or when cooling and processing are only a small part of total use. (Water reuse in air conditioning units may be an exception.)

5. Los Angeles County is still first among counties, with a total annual fresh water use of 337 000 megalitres (89 billion gallons) and in total number of manufacturing plants. Contra Costa County is second, with an annual use of 110 000 megalitres (29 billion gallons).

6. Plants with high water requirements are often located near bays, estuaries and on the ocean, where large quantities of brackish water are available for cooling. Most of these are in Contra Costa County; a smaller number are in Los Angeles, Monterey, Alameda, and San Mateo Counties.

7. In addition to the total estimated 1 133 000 megalitres (300 billion gallons) of fresh water used by manufacturing industries, considerable quantities of brackish water are also used. In the analysis of the data, it was not feasible to estimate the total amount of brackish water required; however, brackish water comprised 37 percent of the reported total water intake by the manufacturing industry; reclaimed water use is still less than 1 percent.*

8. Process water use is now the major application in manufacturing, followed closely by cooling.

9. During the 9-year period from 1970 through 1979, recirculation changed from about 6.7 times to about 8 times.

10. The consumptive use of water varies considerably among plants. The discharge-intake ratios vary from slightly more than 0.25 to over 0.94.

---

* See Chapter V, p. 81.

The Sacramento-San Joaquin Delta near Antioch, where brackish water is available for cooling and other industrial uses

This sugar beet mill near Woodland, in Yolo County, supplies its own water. Note the deep-well pump in the foreground.

11. About 58 percent of the fresh water supply was reported to have been purchased from water service agencies and the remaining 42 percent was self-produced, principally from wells located at plant sites.

12. In 1979, some 33,000 manufacturing plants with five or more employees operated in California. Results of the 1979 survey indicate that about 1 133 megalitres (300 billion gallons) of fresh water per year is required to supply the needs of these plants.

13. Manufacturing water use has declined slightly between 1970 and 1979, although some major industry groups have increased water use.

14. Results of the survey indicate that the industrial sector uses about 18 percent of the State's total urban fresh water. This level of consumption is about the same as that revealed by the 1971 survey, but considerably below the 30 percent requirement determined from the survey covering 1957 through 1959.

15. Most plants require water only for sanitation and drinking; others use large quantities of water in the manufacturing process.

16. More than 275,000 megalitres (73 billion gallons) of fresh water are estimated to be required by the major user group, the food industry (SIC 20).

17. Second in line is petroleum refining, which uses 184 000 megalitres (49 billion gallons), followed by lumber and wood products with 123 000 megalitres (32 billion gallons); paper and allied products, with 115 000 megalitres (30 billion gallons); chemicals with 103 000 megalitres (27 billion gallons); stone, clay and glass, with 63 000 megalitres (17 billion gallons); and primary metals, with 52 000 megalitres (14 billion gallons).

18. The greatest single change in total fresh water use occurred in the pulp and paper industry, in which intake requirements decreased from 211 000 megalitres (56 billion gallons) in 1970, to 115 000 megalitres (30 billion gallons) in 1979.

Steam rising from the processing of cottonseed for extraction of cottonseed oil at a plant in Fresno

CHAPTER II
SURVEY PROCEDURES

During the survey, DWR contacted all water-intensive* industries classified as active manufacturers in California during 1979. Names and addresses of these manufacturers, along with employment statistics, were obtained from Dun & Bradstreet, who supplied name, plant identification and employment data by county for the 1979 calendar year; and the Standard Industrial Classification (SIC)[3/] code number assigned to each plant. In selecting only water-intensive plants, DWR reduced the mailing list from more than 60,000 plants to 6,900 by excluding certain industries and plants with a limited number of employees. The survey procedure is described in more detail under "Preparation of the Mailing List" (below). DWR estimated that the plants surveyed used most of the water delivered to manufacturing industries in California.

Of the 6,900-plus questionnaires mailed, about 3,600, or 52 percent, were returned with useful information. The responses provided the basic data from which DWR computed statewide estimates of manufacturing water use.

Figure 2 shows the flow of activities from initial concept through development of the survey questions, mailing of the questionnaires, receiving the returned questionnaires, and sorting them for edit.

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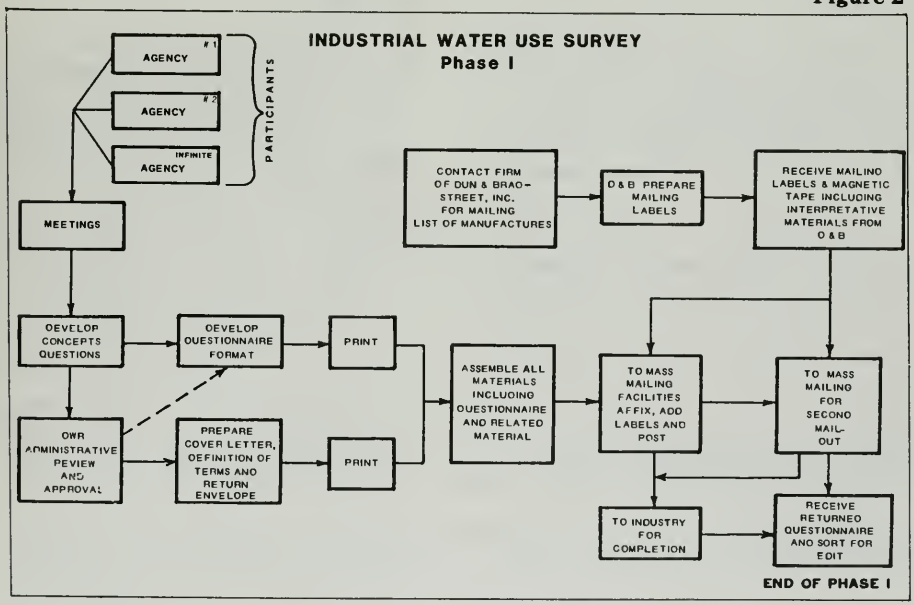
* Industries requiring large quantities of water.

Figure 2



Preparation of the Mailing List

Instructions for ordering the mailing list (see Appendix G) based the selection of industries on (1) quantities of water used for cooling and processing, and (2) the number of employees in those and other industries. Selected for contact among the various industrial groups were all food-processing plants (SIC 20) and plating works (SIC 3471) because most of those industries use a great deal of water, regardless of plant size. Questionnaires were also sent to such water-intensive industries as paper and pulp manufacturers (SIC 26); lumber mills (SIC 2421); chemical plans (SIC 28); petroleum refiners (SIC 29); rubber and plastic manufacturers (SIC 30); primary metals plants (SIC 33); coating and engraving plants (SIC 3479); and jewelery manufacturers (SIC 391). To provide a realistic sampling of those eight industries, DWR restricted the mailing list to plants employing no fewer than 25. Most, but not all other, industry groups were considered less water-intensive; therefore, contacts in those industries were limited to plants employing 500 or more.

Qualification of the Data

Experience with previous surveys and studies by Dun & Bradstreet showed that plants with fewer than five persons usually require a minimum amount of water--generally for employee sanitation use. To reduce an excessive amount of computer time, DWR based the expansion of the reported data on all industries employing five or more.

According to Dun & Bradstreet, in 1979 there were 22,949 small plants with fewer than five employees. Those plants, with 45,900 workers, were arbitrarily assigned 45 gallons per day per worker for sanitary and miscellaneous uses. The 1 800 megalitres (470 million gallons) estimated to have been used annually by this group of employees is not included in the total fresh water use shown in Tables 6 and 7. DWR estimated this quantity to be less than 1 percent of the total statewide manufacturing fresh-water-intake requirement.

The following compilation shows the estimated distribution of manufacuring plants based on the number of persons employed in actual manufacturing work (i.e., excluding locations where only office work is performed):

	Number of Employees							
	0-4*	5-9	10-14	15-19	20-99	100+	N/A**	Total
No. of plants	22,949	12,512	6,214	3,230	12,205	3,953	1,560	62,623
% of total	37	20	10	59	19	6	2	100

* Estimated distribution of 0-4 groups: 0-2 $\cong$ 7,000 firms; 3-4 $\cong$ 16,000 firms.

** Not available.

Sampling

To determine industrial water use, DWR had to establish representative rates of water use for various industrial groups in specific areas, i.e., industrial use in a county or basin. Because the California Water Code does not require the reporting of water withdrawals by all water users, DWR devised other techniques to estimate industrial water intake. Accordingly, DWR used a sampling procedure in which all readily accessible data are gathered and computed to represent a specific industry group. In this process, the weight of each responding industry is considered according to the number of persons employed. DWR assumed the unit employee use (expressed in gallons per employee working day), averaged from replies from a particular county or basin, to be typical of an entire industry group. When data were not received from certain industry groups in a particular county, DWR used the average statewide figure for that industry to expand the data.

This was not a random sampling as defined statistically*, and the data reported could be somewhat biased by the information supplied by the volunteer respondents. Strict statistical sampling requires that each entity selected must contribute data and that no part of the data be withheld. In practice, however, that level of response is impossible to achieve. When response is voluntary, data are invariably withheld by certain manufacturers because some want to keep certain data confidential and some are merely indifferent.

In this survey, DWR used all returned data that appeared to be valid. However, the quality of the calculated unit-employee-use data depends on an acceptable level of response for each industry group. And, as mentioned, where data from certain industry groups were deficient or missing, DWR substituted statewide averages.

Data Processing and Analysis Techniques

The flow diagram for Phase II (Figure 3) shows the computer processing tasks, beginning with the data edit and terminating with printed tables. The visual, or manual, edit shown in Phase I is required to recognize and remove obvious illogical answers and verbiage that cannot be processed by computer. The computer edit was used to compare unit values of employee water use (see Table 7), with the values derived from our 1971 survey as reported in Bulletin 124-2, 1977.

Computation of Daily Unit Employee Use

To compute daily unit employee water use, DWR divided annual intake water (Item 1 on the questionnaire, Appendix B) by the annual average number of employees; the quotient obtained was then further divided by the number of working days in a year:

$$\text{water intake} \div \text{no. of employees} \div 225$$

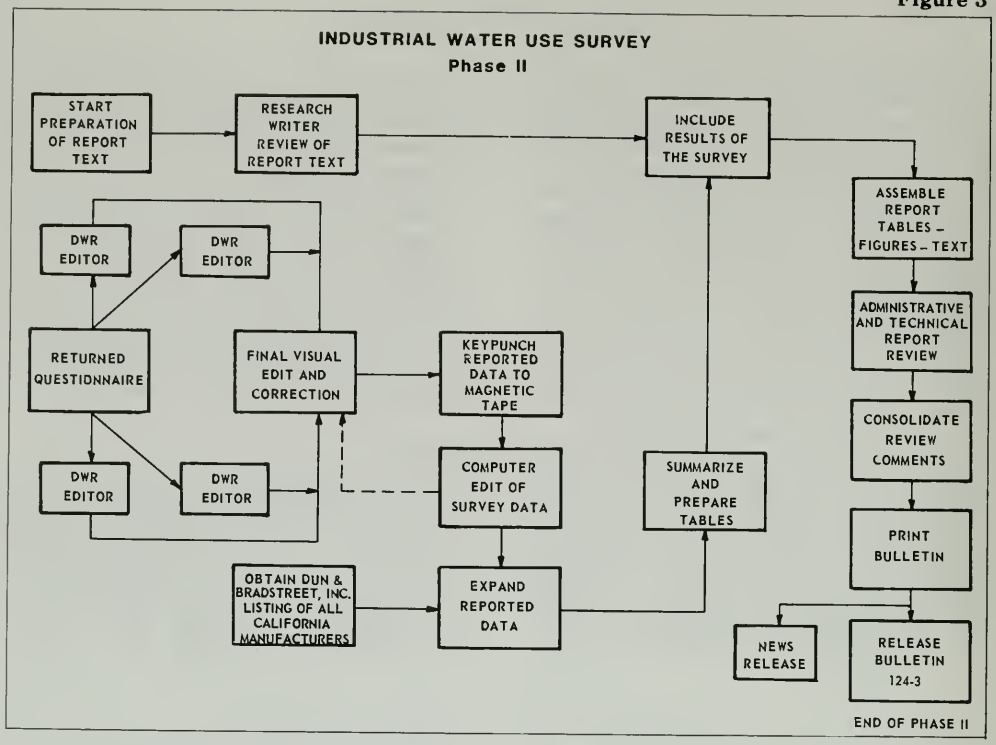
The number of working days (225) was derived by subtracting weekends, vacation, sick leave, and holidays from 365:

$$365 - (2 \times 52) - (15 + 12 + 9) = 225$$

Daily unit employee water use was thus computed for each plant and compared to

* In a random sample, every element of a "population" (in this case, every industry in a given county or basin) has an equal chance of being included in the sample.

Figure 3



the values derived from the previous survey. Differences of 10 times, 100 times, or 1,000 times determined during the computer edit were flagged, and corrections were made where needed. Questionable values were compared with the data on the original questionnaire. Significant differences between the two surveys usually resulted from incorrect entries of units of water intake (e.g., cubic feet instead of million gallons, etc.). Smaller differences were attributed to incorrect factor conversions or other arithmetic errors by respondents.

Before beginning the computer edit, DWR transferred the data from returned questionnaires to magnetic tape and verified it. The tape was formatted to accommodate summaries of the reported data and expansion of the data to estimated totals for each industry group and for each county.

Expanding the Data

Since only partial response to the survey was achieved, some basis for expanding the sample was needed to determine total water use. The basis selected was employment. Using employment data for all industries, as compiled by Dun & Bradstreet, DWR calculated a unit rate of water use per employee. The rate was applied to all persons known to be working in a specific industry in a specific county. The unit rate calculated for each industry group was then multiplied by the number of employees in the group.

DWR assumed that this method would provide the most accurate measure of water use for a given industry group;

for purposes of the survey, use was assumed to be relative to the size of the labor force. In other words, DWR considered water use proportional to the number of persons employed in each industry group, based on the quantity calculated for each employee.

On the other hand, classifying industries as high or low water-using is misleading, because there is no clear distinction between those having high water requirements and those requiring relatively little water. Per-employee rates of use may vary greatly--from plants that require large quantities of water for processing, cooling, and other major manufacturing uses to plants that use water for drinking and sanitation only. Thus, a large plant with many workers, in which water is used mainly for employee accommodation, may be viewed as a high water user, even though no water is used for manufacturing processes or cooling. Other nonprocessing uses include fire protection, landscape irrigation, cleaning and flushing, and dust control.

To expand the survey data to reflect statewide water use, DWR followed this procedure:

1. A unit employee use value for each industrial group, as defined by the four-digit SIC code, was calculated for each county by dividing the total water intake for all responding plants by the total average annual employment in the responding plants.

2. The quotient obtained was then divided by the average number of working days of the year to obtain unit employee water use per working day.

3. The quantities of water required by all industries of a specific four-digit SIC industrial group in a county was then computed by multiplying the calculated employee unit water use by the total number of employees known to be working in that industrial group.*

Special Problems

Many plants manufacture a variety of products, each of which is identified by the appropriate Standard Industrial Classification (SIC) number. For this study, the major product a plant manufactures determines the SIC code number assigned to it. There are also industries in which manufacturing is a secondary activity; these, too, have been included in the survey. When one company operates several plants, each has been assigned a code number to identify the principal product it manufactures. The structure of the SIC system is described in Appendix D.

Many manufacturing industries have sales offices, warehouses, and other business outlets that do not fit the manufacturing classification. To establish unit water use per employee, such facilities were eliminated from the "manufacturing complex", and those working there were omitted from the total number of employees.

Small plants that share space in large buildings are also a special problem. Often, one master meter serves the entire structure, and water use records for single users cannot be separated from the record of total water use. Such data were eliminated from the survey.

The difference in estimated total fresh water use between Tables 6 and 7 resulted from the method of expanding the survey data. Table 6 was expanded, where possible, from data provided at

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* For this survey, the data were not expanded on the basis of total industrial employment. As explained on page 10, plants with fewer than five employees were excluded.

the 3 and 4 digit Standard Industrial Classification level within each county. Only when no such data were available were statewide 3 and 4 digit employee unit use values used for expansion. In Table 7, however, only average statewide employee unit use values, at the 3 and 4 digit SIC values, were used for expansion.

Replies to the questionnaires were received with varying degrees of success. Questions relating to quantity of product were poorly answered, whereas questions on water use and sources were, for the most part, well answered. Some responses were inadequate because the questions were misunderstood or misinterpreted; where such responses could be clarified by telephone, they have been included in this bulletin. Responses to questions on products manufactured, in relation to water used, and questions on future water requirements and future production were deleted from this report because the information was considered inadequate.

CHAPTER III
GEOGRAPHIC DISTRIBUTION OF CALIFORNIA MANUFACTURING

In many respects, California manufacturing tends to be regionalized; i.e., certain classes of industry are centered in certain areas of the state. For example, lumber mills are principally located in the North Coastal area, oil refineries tend to center in the San Francisco Bay and Los Angeles metropolitan areas, and food processing plants are most prevalent in the Central Valley. The following overview of California manufacturing indicates the principal types of industry located in the eight regions of California shown in Figure 4.

North Coast

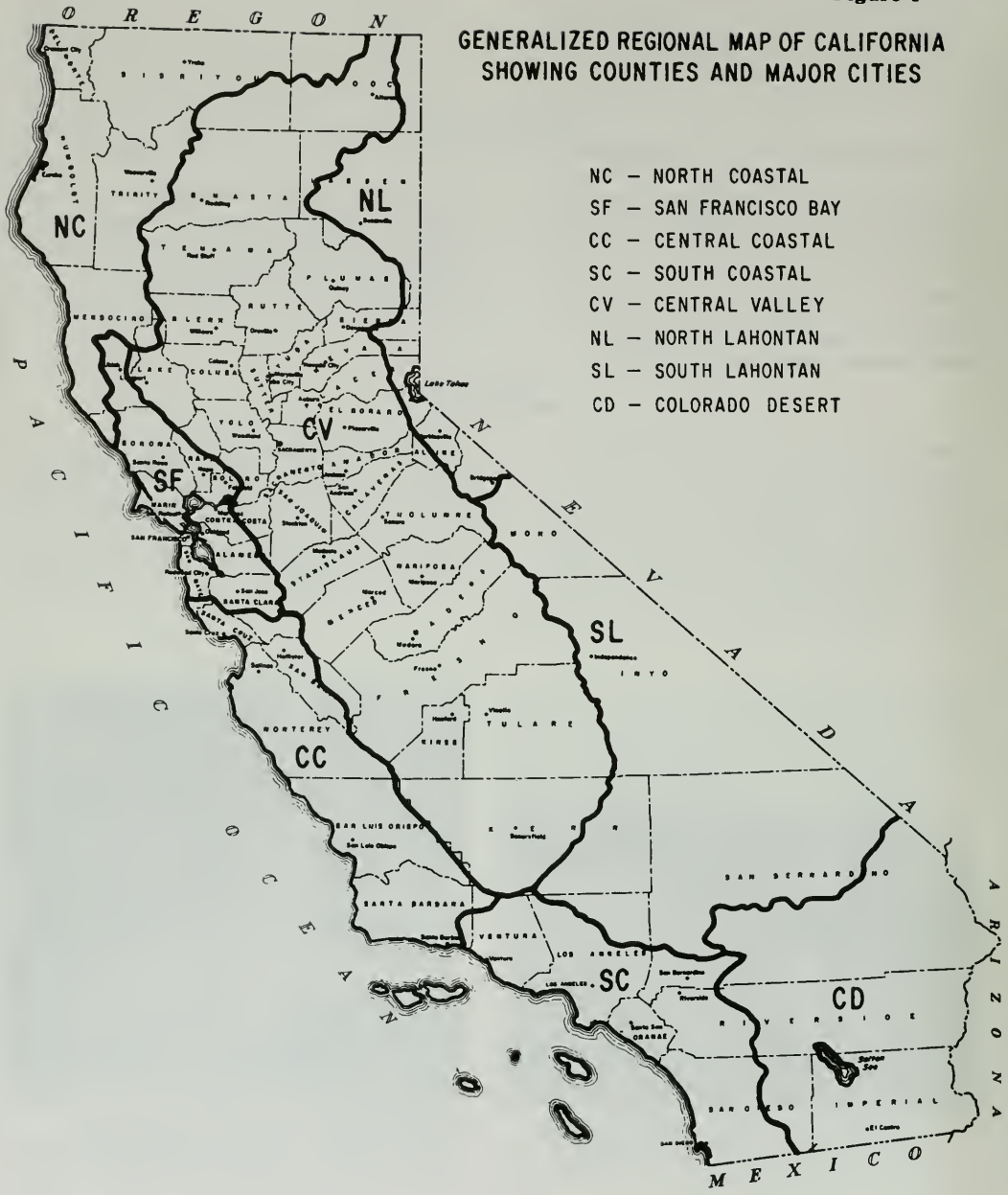
Lumbering and wood products are the principal industries in the North Coastal area. Two large pulp mills are located on the Humboldt County coast, and numerous lumber mills are situated throughout the north coastal counties, including Humboldt, Del Norte, Trinity, and Mendocino. The North Coast has long been the center of California's lumber industry. However, the recent slowdown in home construction has resulted in a severe slump in demand for lumber, forcing a number of mills to close and bringing unemployment to a large number of timber and mill workers.

A lumber mill pond, where logs are immersed to preserve wood quality

Sprinkling log decks to preserve wood quality. Water is recirculated from a return-flow ditch (foreground)

Figure 4

GENERALIZED REGIONAL MAP OF CALIFORNIA
SHOWING COUNTIES AND MAJOR CITIES



Nine counties front on San Francisco Bay. Manufacturing, however, is more heavily concentrated in the south and east bay counties of San Francisco, San Mateo, Santa Clara, Alameda, and Contra Costa, although it is beginning to expand into the north bay counties of Solano, Napa, Sonoma, and Marin.

A number of factors have contributed to the growth and diversification of manufacturing in the bay area, including a temperate climate that permits year-around operation, water, rail, air, and highway transportation, a sea port, adequate service by public utilities, and a large labor force. The population has grown from about 1.5 million in 1940 to 5.2 million in 1980, an increase of 356 percent.

Each part of the San Francisco Bay area has certain characteristics that set it apart from neighboring communities. In many respects, the San Francisco Bay metropolitan region is the hub of the area, much as Los Angeles is the manufacturing center in Southern California. Manufacturing is important to the San Francisco economy, as measured by a census of industrial employment and payroll. Some 900 manufacturing units are located in San Francisco County, and space for additional development is limited.

San Mateo County, just south of San Francisco, has experienced a modest increase in population and manufacturing over the past 10 years. Many of the newer manufacturing plants are located in industrial parks, i.e., areas zoned for manufacturing and similar industries, and generally fall into the lower water-using category. Manufacturers of electronic and scientific instruments, and the like, are commonly found here. The acreage used for that purpose, and that zoned for future use, has increased many fold over the past 30 years.

The population of Santa Clara County, site of the now-famous "Silicon Valley" and its thriving electronics industry, is now the fourth largest among California counties.* With a 1980 census of 1,295,000 residents, Santa Clara County now ranks ahead of Alameda County (1,105,000). The population of Santa Clara County has grown by 166,000 since 1970, an increase of almost 16 percent.

The industrially used land appears continuous throughout San Mateo and Santa Clara Counties, with much the same type of manufacturing in each. However, water demands in Santa Clara County are considerably larger, due to its larger manufacturing complex and its numerous long-established food plants and their high water requirements.

Since little room remains for industrial expansion in northern Santa Clara County, electronics manufacturers are looking at other parts of the State. Hewlett-Packard has recently opened a branch plant northeast of Sacramento, near Roseville in Placer County. The company now employs about 700 but expects to have about 20,000 employees by year 2000. Other electronics firms are expected to construct plants in this same area, which may eventually develop into another "Silicon Valley".

Manufacturing in the Oakland metropolitan area, which includes the highly industrialized city of Emeryville, has been established for many years. There are slightly more than 1,500 manufacturing plants in Alameda County, where some twenty-two industrial tracts and parks have been developed recently.

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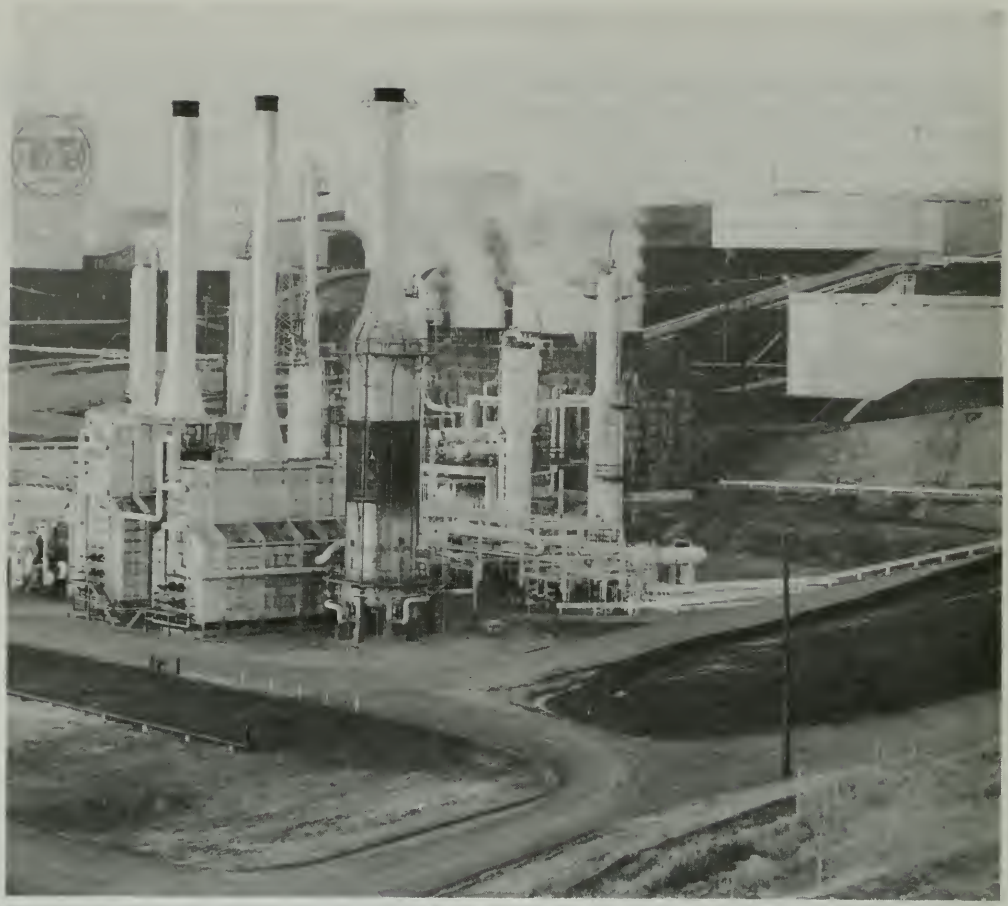
* The three largest are Los Angeles (7.5 million), Orange (1.9 million), and San Diego (1.8 million).



Gasoline cracking plant near Rodeo in Contra Costa County

Manufacturing in Alameda County is highly diversified, and many plants use large quantities of water for their operations. Contra Costa County also has a number of diverse manufacturing establishments. Among them are major petroleum refineries with exceptionally high water needs, a large part of which are met with brackish supplies from the south shores of San Pablo and Suisun bays.

Some industrial expansion is occurring in the north bay counties of Marin, Sonoma, Napa, and Solano, although they are not so heavily industrialized as the south- and east-bay counties described in the preceding paragraphs. Some older types of manufacturing, including wineries in Napa and Sonoma counties, have been in existence for many years.

Manufacturing is otherwise concentrated in and about the cities of Benicia, Vallejo, Napa, San Rafael, and Fairfield. New and diverse companies, such as the new Anheuser-Busch plant near Fairfield, are now becoming established in those areas.

Central Coast

In the northern Central Coastal area, a number of food processors operate in or near Hollister and Gilroy. These include canneries and dehydrators. Other food processors, including producers of frozen vegetables, are located on or near the coast, near Santa Cruz, Watsonville, Moss Landing, and Salinas. A number of major wineries are now located in the fertile Salinas Valley. Several wineries have also located in San Luis Obispo County.

Petroleum storage is significant south of the city of San Luis Obispo and that industry continues to enlarge. Storage and refining of oil products will probably increase if plans for a deep-water mooring off Morro Bay are realized.

Industry in the Santa Maria Valley consists of food processing plants (washing, packing, and sugar beet processing). Although still important, the food industry has declined slightly since 1970. The number of electronics plants is increasing, however. Continued growth of the latter will probably depend on the level of activity at Vandenberg Air Force Base Missile Test Center. Also increasing in the Santa Maria Valley are plants producing machinery and machine parts.

In Santa Barbara County, food processing plants, along with petroleum, ordnance, and electrical industries, dominate the industrial scene. Research and development facilities are also important here. The largest future in industry in the area appears to center on the petroleum industry, including new offshore wells and refineries. However, the electronics and other light industries are increasing near the city of Santa Barbara.

This fine mist of water is provided to cool live poultry before processing.

Industry in the Santa Clara River Valley area consists of petroleum, food processing, extraction of sand and gravel, and research and development. Oil well fields are extensive, along with refineries; in light of the fuel shortage, this industry should continue to flourish. All types of vegetables and field crops are processed here; sugar beets are refined, and lima beans are frozen and packaged. Recent years have also seen a rapid increase in light manufacturing plants in the Oxnard Plain and the Newhall-Valencia areas.

Los Angeles County is the industrial center of California. Its highly diversified industrial activities include petroleum refining, chemicals, light manufacturing, paper, foundries, aerospace, shipyards, canneries, and other food processing industries. Of the 33,120 manufacturing plants (with five or more employees) in California, almost one-half, or 15,285, are in Los Angeles County.

As in other areas, the petroleum industry is expected to grow. Some industrial areas, particularly some of the older light manufacturing areas, are run down and have a high vacancy factor. In many cases this has been caused by a movement of industry to industrial parks in suburban areas. Efforts are now underway to redevelop blighted industrial areas.

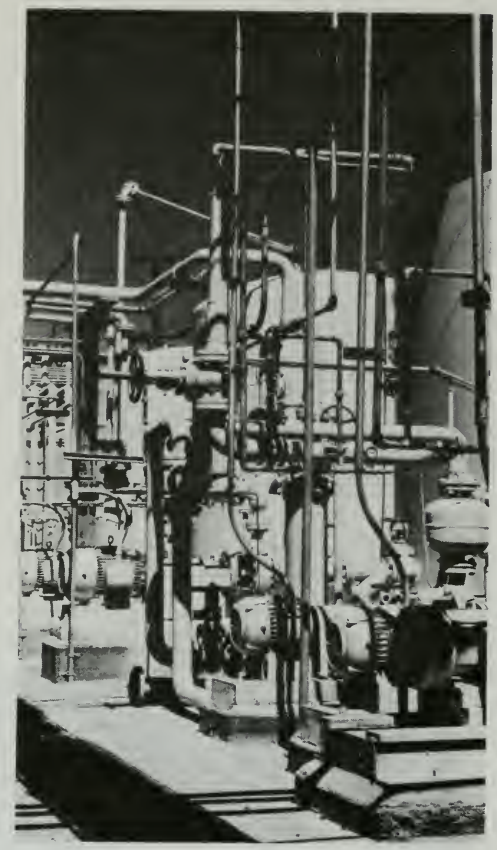
The coastal strip of Orange County is another area of rapid light-industrial growth. Heavy industry in the Santa Ana basin is best illustrated by Kaiser

Large quantities of water are used during the refining of crude oil. Then the used water is mixed with chemicals in the pond (right foreground) so that it can be reused.

Steel in Fontana. The Kaiser plant has received worldwide attention because of its efficient use of water in manufacturing steel. Portland cement plants are also extensive, along with sand and gravel operations. A few wineries are located in the basin, along with food processors serving the citrus industry.

Chemical plants, including air reduction, are also important here, along with petroleum wells and refineries, clay mining for bricks, railroad repair and switchyards, aerospace, food processing, extensive light manufacturing, and research and development. The Santa Ana basin has grown rapidly over the years, and industry has greatly increased. Large industrial parks are numerous, and industrial growth has kept pace with population growth.

Along the coastal strip of San Diego County, one of the most rapidly developing Southern California areas, major industrial activity is centered on electronics, medical health and life sciences, food processing, oceanography, apparel manufacturing, and research and development. Salt evaporation ponds are still located in San Diego Bay, and mining is still important in some of the rural areas. Extensive areas zoned for industrial parks are filling rapidly with enterprises devoted to research and development, food processing, and light manufacturing. The port facilities continue to thrive, and shipbuilding seems to be increasing of late.



Water is used extensively in this closed system of a chemical plant. Courtesy of Dow Chemical Co.

South Lahontan

Industrial development in the Mono-Owens Valley is sparse. It consists primarily of the mining of tungsten, talc, pumice, and other minerals, including salt extraction from evaporation ponds. Mining predominates in the desert regions (although it is not included in the tables in Chapter IV). Manufacturing growth is not anticipated.

Some research and development are conducted at the Naval Weapons Center at China Lake. In the same area, south of Little Lake, is a large lumber mill, where stacked logs are sprayed continuously to reduce fire hazard and preserve wood quality. The logs are sprinkled constantly to maintain the high humidity required to prevent a blue fungus from spreading throughout the wood and to prevent the wood from drying and splitting.

The Antelope Valley has a thriving

aircraft industry, along with Portland cement and chemical plants. Mining is still important in the valley also. Antelope Valley is also the center of large concentrations of sands and gravels--still untapped but with great potential considering the probable need for construction.

The manufacturing of Portland cement is a thriving industry in the Mojave River area. Other industries include mining, and sand and gravel extraction. The area also has extensive military-storage and distribution facilities. In general, however, an extensive growth of industrial development is not expected.

Colorado Desert

Industry in the Twenty-Nine Palms-Lanfair area is relatively minor, with limited mining and salt extraction from chloride deposits. Iron-ore mines are extensive throughout this area, although most are small operations. Some mining is carried out in the Colorado River area, along with ornamental rock quarrying.

In the Coachella Valley, the food processing industry is important. Fresh produce is washed, packed, and shipped to many areas throughout the United States. The valley has a potential for growth of light industry, which could be stimulated by the rapid urban development between Palm Springs and Indio.

The Imperial Valley has extensive produce-processing plants, including large sugar beet refineries. There are canneries, freezing plants, cotton gin mills, and food processing plants. In addition, there are a number of salt works and a chemical plant that produces agricultural chemicals.

Central Valley

Water used in the processing of sausage links at a Sacramento plant

Numerous industries in the Central Valley use large quantities of water. These comprise principally plants processing agricultural products--sugar, fruits, vegetables, and nuts--and meat and dairy products. Other industries, for example, manufacturers of agricultural implements, use smaller quantities of water. Along with food processing, the Sacramento Valley has a large wood products industry, including a paper mill at Anderson and numerous lumber mills near Anderson and Red Bluff.

In Sacramento and San Joaquin counties alone, there are some 770 manufacturing plants. Manufacturing in the Sacramento Valley is quite diversified, whereas San Joaquin Valley industry, particularly near Fresno and Stockton, is oriented more directly toward food production and processing, i.e., processing of farm products or production of farm implements, fertilizers, and other products needed for farming.

Lumbering is the main industry in the Central Valley foothills, although it is relatively minor compared with other types of manufacturing on the valley floor.

Olives are conveyed through this processing plant near Lindsay (Tulare County) by flume.

Sugar beets are flumed into this processing plant near Woodland.

Industry in the Delta is almost entirely related to agriculture, including production, processing, and packaging of many diverse food products. Agriculture itself is located in the rich delta area of the Sacramento and San Joaquin rivers, extending eastward to the Sierra foothills.

North Lahontan

With the exception of a limited amount of lumbering in the Susanville area, very little manufacturing is carried out in the North Lahontan area, a small region in northeastern California. The area, which includes the Lake Tahoe Basin, is mainly devoted to recreation.

Lumber is the main industry in the North Lahontan Basin.

CHAPTER IV
DATA ANALYSIS

The tables of data, and the analyses of those data in this chapter, are based on responses submitted by California manufacturers to a survey questionnaire (shown in Appendix B). The data were used as the basis for estimates of total water use and other related elements in each industrial sector.

The tables are arranged similarly to those in Bulletin 124-2, "Water Use by Manufacturing Industries in California, 1970". In the current survey, however, fewer small plants were contacted, and much of the "no response" was due to the limited contact with certain industrial groups (see Appendix G). Known low water-using industry groups were contacted only if employment was significantly high; therefore responses were understandably low or missing from:

- Textile Mill Products--Standard Industrial Classification (SIC) 22;
- Apparel and Other Textile Products--SIC 23;
- Furniture and Fixtures--SIC 25;
- Printing and Publishing--SIC 27; and
- The SIC 34 through 39 major industry groups (with some exceptions).

In those 10 industry groups, questionnaires were sent to large firms (500 or more employees) only, thus excluding many of them from the survey. In the low water-using groups, the principal use for water is for employee sanitation, air conditioning, and landscape maintenance; therefore, little if any change (from 1970) in the low water-using groups was expected. In other industrial groups known to be more water-intensive, questionnaires were sent to all plants with more than 25 employees. And, questionnaires were sent to all plants manufacturing food and kindred products and to plating and polishing firms, which are known from previous surveys to be highly water-intensive.

The 1979 survey revealed that an increasing number of diversified manufacturing plants have located throughout northern California in the less-populated counties. Dun's Marketing Division of Dun & Bradstreet, Inc. shows a fairly large growth in the number of plants by 1979 (33,100 plants with more than four employees), compared with the State Employment Development figure of about 30,000 plants used in the 1971 survey.

Reported Range of Water Use (Table 1)

Table 1 shows the range of water use for all reporting groups. Almost 3,000 reporting plants contributed to this table, i.e., more than 40 percent of all plants contacted in the survey. Units of "million gallons" are arranged exponentially, from plants using less than 378 500 litres (100,000 gallons) of fresh, brackish, and reclaimed water, to those using more than 3 785 megalitres (1 billion gallons) annually. Of the nearly 3,000 plants reporting, 23 used an estimated 43 percent of the total manufacturing water intake. The largest group of plants responding to the survey used between 3.8 megalitres and 38 megalitres (1 million to 10 million gallons) of water annually. For the most part,

only the larger water-using plants were contacted; therefore, the data are skewed, and the information in Table 1 provides only an indication of range of water use.

Column 1 (in Table 1) includes the number of plants using less than 378 500 litres (100,000 gallons), and column 5 includes the number of plants using between 378.5 megalitres and 3.79 gigalitres (100 million and 1 billion gallons) per year.* For calculation purposes, a midpoint value of 2 097 megalitres (554 million gallons) was assumed to be the annual gross intake of each of the plants falling within the range of this column.

At the low water-using end of the range, about one-third of the responding plants use less than 1 percent of the total water intake reported; 36 percent (the largest single category) use 2 percent; 22 percent use 12 percent; 8 percent use 43 percent; and fewer than 2 percent of all plants responding to the survey use 42 percent of the entire water intake.

Reported Annual Water Intake (Tables 2 and 3)

Tables 2 and 3 show reported water intake. Data are related to Industry Group in Table 2, while Table 3 presents water intake by county. (Table 3 also shows company self-produced water by source, i.e., wells or streams.)

Quality of data varied among the responses received, and this was reflected in the expanded Tables 6 and 7. Where responses were minimal, or reported data were based on estimates of flow into and out of the plant, as was frequently the case in Northern California counties, more variation between the 1971 and 1979 surveys was found. The greatest variation was found in some of the counties where lumbering is the major industrial activity.

Tables 2 and 3 also identify the types of industries and the geographic locations in which brackish and reclaimed water are currently used. In Contra Costa County and many coastal counties, for instance, water reaching brackish levels is partly, or totally, sea water. In counties affected by San Francisco Bay salinity levels, water quality varies throughout the year, depending on ocean tides and the flow of fresh water from the Sacramento and San Joaquin Rivers. The reporting of brackish water use in these counties may be somewhat inaccurate, however, because salt levels must be constantly monitored; since salt content may not affect plant operation, many companies simply ignore it.

In other counties not bordering San Francisco Bay or the ocean, wells may produce water approaching brackish levels when connate (highly saline) aquifers are tapped. Other wells have become brackish from intruding sea water due to overpumping of fresh-water aquifers. For that matter, saline wells may be found in almost any part of California.

Brackish and reclaimed water use is shown as reported in Tables 2 and 3 only. No attempt was made to expand the data (as was done for fresh water in Tables 6 and 7), because the brackish water data were limited and many plant operators had difficulty identifying the brackish levels designated for this survey.

Brackish water use is understandably high in some counties, because industries with high requirements for cooling often locate near the coast,

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* 1 megalitre = 1 million litres; 1 gigalitre = 1 billion litres.

where ample water is available for cooling. Brackish water use is also reported in a number of inland counties. In many cases, this water may be pumped from brackish wells with a dissolved salt content exceeding 1 000 milligrams per litre (mg/l).

New programs to reclaim domestic sewage and industrial effluents are increasing (see Chapter 5), and reclaimed water is expected to increasingly supplement fresh water. Eventually, industries in or near metropolitan centers will be able to meet a significant part of their water requirements with reclaimed water.

The "Total Intake" column in Tables 2 and 3 sums all reported sources and qualities of intake supplies. The statewide fresh water intake is about 63 percent of total industrial water use.

Reported Annual Water Intake by Type of Use (Table 4)

Table 4 reports data on types of water use, which are shown as "Cooling," "Processing", and "Sanitary and Miscellaneous". (See Appendix C for definitions of those categories.) Because cooling and processing represent more than 95 percent of all industrial water use, all other uses, including employee-sanitary, air conditioning, landscaping, fire protection, aesthetics, and other minor uses, were combined. As shown in Table 4, 49 percent of fresh intake water is used for cooling and a like amount is used for processing. The somewhat larger quantities used for processing, as compared with the 1971 survey, is probably due in part to more complete reporting of lumber industry mill-pond use, which is essentially a once-through application.

As discussed in Chapter II (under "Qualification of the Data"), 45,900 employees in 22,949 small plants were not included in the survey. DWR estimated that those employees use about 1.6 gigalitres (415 million gallons) per year for sanitary and miscellaneous uses. Therefore, that quantity should be added to the fresh water use totals shown in Tables 6 and 7.

Reported Water Recirculation and Discharge (Table 5)

Table 5 reports quantities of water recirculated and discharged. The loss of water to the atmosphere and water incorporated into the product vary greatly among different plants. Those using water mainly for employee comfort may discharge almost as much water as is received as intake unless air-conditioning evaporation losses are high. Elsewhere, where recycling is extensive, or where processing and cooling are important uses, the discharge-intake ratio (the proportion of intake water discharged as effluent) is understandably lower.

Discharge-Intake Ratio

The statewide weighted discharge-intake ratio for all industrial groups, based on the data in columns 7 and 9, is 0.71. The rates vary among major industry groups from slightly more than 0.25 to more than 0.94. The range between individual plants is even wider. Where water quality is not impaired during processing, as in certain electronic-component plants, or where water can be treated economically, plants with a high discharge-intake ratio appear to have a high potential for water reuse.

Recirculation

According to the data from plants supplying recirculation information, the overall value is now 8, somewhat higher than that reported in 1971, but not as

high as expected. The statewide recirculation rate would probably have risen higher except for (1) some larger lumber producers that still use a once-through operation (for mill ponds), and (2) plants that do not require water for cooling, processing, or air-conditioning. Major industries reporting high recycling rates are paper mills, petroleum refining, rubber and plastic products, primary metals, and electrical and electronic equipment. Except for primary metals, each has increased its recirculation considerably. Recirculation in the food industry remained about the same.

Estimated Total Annual Fresh Water Use (Tables 6 and 7)

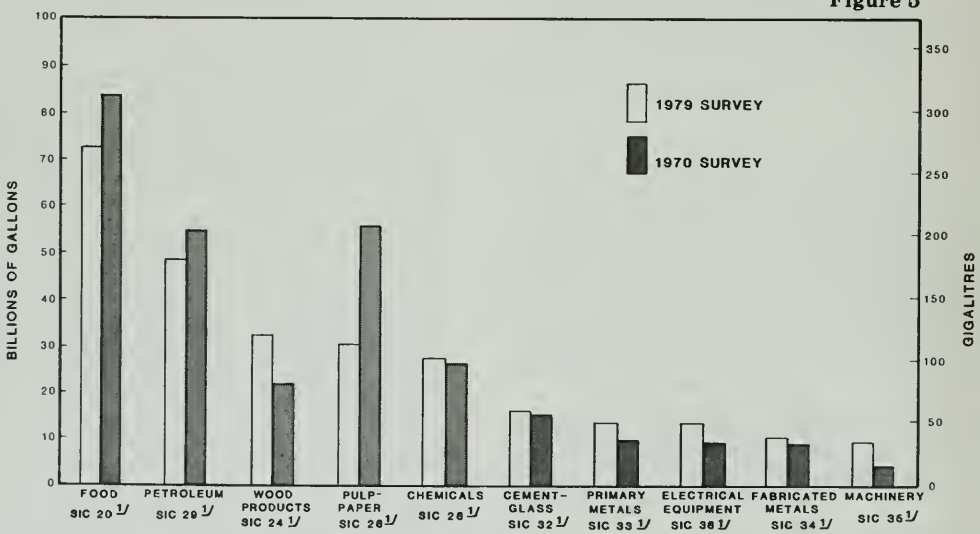
Tables 6 and 7 present estimated total fresh water use by county and by industry group, respectively. Table 6 shows estimated total water use by county and industry group, based on expansion of the data reported in Tables 2 and 3. Table 7 presents estimated total water use by major industry groups and includes unit water use per employee, from which the estimates of total water use were computed. As shown in Table 7, estimated statewide manufacturing water use is 1 135 gigalitres (300 billion gallons) per year, down slightly from 1970, although there are more plants now than in 1970.

According to the 1979 survey, the ten leading industrial groups in order of volume of water used (Figure 5) are:

1. Food and kindred products;
2. Petroleum refining;
3. Lumber and Wood products;
4. Pulp and Paper;
5. Chemicals;
6. Stone, Clay, and Glass products;
7. Primary Metals;
8. Electrical equipment;
9. Fabricated Metals; and
10. Machinery.

Each of those groups uses more than 37 gigalitres (10 billion gallons) of

Figure 5



1/ Standard Industrial Classification

ESTIMATED TOTAL ANNUAL WATER USE BY MAJOR WATER-USING MANUFACTURING INDUSTRIES

fresh water annually. Several changes in ranking have occurred since the 1971 survey, which showed the order to be:

1. Food and kindred products;
2. Pulp and Paper;
3. Petroleum refining;
4. Chemicals;
5. Lumber and Wood products;
6. Stone, Clay, and Glass products;
7. Primary Metals;
8. Transportation equipment;
9. Fabricated Metals; and
10. Electrical equipment.

Plumas County showed an unexpected high rate of use for the lumber industry (SIC 242). One Plumas County mill diverts water from the Feather River into a mill pond to maintain the required water quality for return flow to the river. This particular mill, along with a few other lumber mills in Northern California, still uses ponds to store and preserve logs. However, some of those high-water-using mills did not participate in the 1971 survey, resulting in the lower values reported in Bulletin 124-2.

The manufacturers of Sugar and Confectionary Products (SIC 206) continue to use large quantities of fresh water (more than 26.5 gigalitres [7 billion gallons]). This use may decline slightly, however, if a large Monterey County sugar beet plant closes down, as expected. Water use by this subgroup has already declined by almost 50 percent over the past ten years. Other large water-using industry groups include meat and dairy products, beverages, and miscellaneous food products.

The difference in the estimated total fresh water use in Tables 6 and 7 resulted from the method of expanding respondent survey data. Table 6 was expanded, where possible, from data provided at the 3- and 4-digit Standard Industrial Classification level within each county. Only where no such data were available were statewide 3- and 4-digit employee unit-use values used for expansion. In Table 7, however, only average statewide employee unit-use values, at the 3- and 4-digit SIC levels, were used for expansion.

Estimated water intake by the major industry groups is summarized in the following paragraphs and shown in detail in Table 7.

Food and Kindred Products (SIC 20)

The food industry continues to lead all others in water-intake requirements (Figure 5 and Table 7), although it has lowered those requirements about 42 gigalitres (11 billion gallons) during the past decade. The federal Clean Water Act of 1972 (Public Law 92-500) has contributed significantly to this reduction: PL 92-500 requires that volumes of waste discharge be reduced and that waste effluents be treated before they are discharged into public sewers or public waterways.

Almost all industry groups (or subgroups) of the major industries producing food and kindred products consume large quantities of water and, in particular, high-quality potable water. The annual water use of 114 gigalitres (30 billion gallons) for preservation of fruits and vegetables (SIC 203) exceeds that of any other subgroup by more than 3 to 1. The totals, however, are somewhat lower than those shown by the 1971 survey, because of the more stringent discharge controls discussed in the preceding paragraph.

Water recycling in the fruit and vegetable preservation industry is limited by stringent water quality standards, which require that fresh intake water of drinking water standards be used for the washing, cooling and other treatment of foodstuffs. Lower-quality water may be used, however, for noncontact uses, such as floor washing and employee sanitation needs.

Petroleum Refining and Related Industries (SIC 29)

Petroleum refining remains in second place among all users. As a whole, the industry requires about 185 gigalitres (49 billion gallons) annually, down slightly since 1970 despite the increased demand for U. S. manufactured petroleum products. The decline in water use can probably be attributed to increased efficiency. The ranking of the industry in total water use is due in part to the demand for motor fuel and fuel for electric power plants in California, and elsewhere in the nation for furnaces and transportation equipment.

The increased demand for petroleum products may also be stimulated by the need for the raw product in the manufacture of synthetic fabrics and in the plastics industry. In the total petroleum industry, however, water use for petroleum refining far exceeds that for other petroleum products and that of all other industries, except for food products.

Lumber and Wood Products (SIC 24)

Water use by Lumber and Wood Products industry appears to have risen excessively, despite the declining home construction throughout the State in the 1970's, especially in the latter part of the decade. By deleting the disproportionate reported amount of water use in Plumas County for mill ponds, 12 billion litres (3.3 billion gallons), a more realistic and acceptable rate of use is indicated for this industry group, ranking between Chemicals (SIC 28) and Pulp mills (SIC 26). Again, the responsible factors appear to be the slowdown in the building trade and the newer practice of sprinkling log decks in lieu of using mill ponds for storing and preserving log quality.

Lumber mills still dominate the wood products industry as a whole, but mills vary considerably in rate of water use (see SIC 24, Table 6) for the various counties in Northern California. Where logs are stored over impervious soil, return flow systems are used to recycle intake water many times, thus reducing make-up water requirements.

Respondents continued to interpret the term "water use" differently. Water use defined as intake water (see definition of terms) rather than consumptive use, or gross use (see definition of terms), is most easily understood, but "flow-through" water into, and out of, ponds is considered "water use" by some respondents (very close to total streamflow). As mentioned previously, the 1971 survey contained no returns showing exceptionally high use; therefore, the current increase in rate of use was based on values submitted by a different set of respondents. As a result of log-deck sprinkling (resulting in a reduced "in stream" type of mill pond use), construction decline, and possibly other factors, water use in the Lumber and Wood Products industry has remained essentially the same.

Paper and Allied Products (SIC 26)

Water use in the Paper and Allied Products industry has declined about 45 percent over the past 10 years, possibly because of reduced tree felling and the stringent discharge controls required under PL 92-500. Along with the lumber industry, pulp and paper manufacturing is mainly responsible for the high water use in northwestern California, although use rates there have also declined significantly since 1970, probably because of the new discharge controls and, more pertinently, the general economic slowdown.

The pulp industry depends heavily on forest operations; consequently, with the general shutdown of mills and reduction of tree felling, the availability of raw material for pulp has been limited. Mills in northern

California account for most of the water used by the pulp industry.

Large quantities of water are also used for manufacturing paper products and reconstituting pulp and paper from discarded paper products. Most of the firms that remanufacture paper products are located in central and southern California, although a large paper manufacturing plant is located in Contra Costa County adjacent to the upper San Francisco Bay estuary, from which relatively fresh water is available for some plant functions.

Chemicals and Allied Products (SIC 28)

Water intake by the Chemical Industry varies greatly. Its products and processes are so diverse that use rates vary from small quantities for employee use to large quantities for complex processes. The chemical industry ranks fifth in water use among all industrial groups, although use rates have increased slightly since the 1971 survey. Any large reductions expected due to the PL 92-500 discharge constraints apparently had already occurred before 1970, because pre-1970 water use by the chemical industry was much greater. Because the new discharge constraints had been foreseen, increased recycling and more advanced treatment of sewage effluents were begun before PL 92-500 became effective. Among the chemical subgroups, water use for the production of inorganic chemicals still ranks highest, with an annual intake rate of 29 gigalitres (8 billion gallons), more than twice the rate of use of other groups.

Stone, Clay, Glass, and Concrete Products (SIC 32)

The Industry Group producing stone, clay, and glass products (SIC 32) remains in sixth place among water-using industries and shows only a slight increase in use since 1970. Within the industry subgroups, firms producing hydraulic cement and cement products remain the highest users. The almost level rate of use between 1970 and 1979 may again be a reflection of the slowing of the economy, especially in the building industry, where housing construction declined significantly during the late 1960's and early 1970's. Firms producing glass and a variety of nonmetallic mineral products use less water than those producing cement, but still use more than 11.4 gigalitres (3 billion gallons) annually.

Primary Metals (SIC 33)

The Primary Metals industry also continues to rank the same in water use as in 1970 (seventh place among industries). Water use in the primary metals industry as a whole has increased 32 percent, principally because of an increase in basic steel production (SIC 331), which increased 39 percent within the major industry subgroups. The industry now uses about 53 gigalitres (14 billion gallons) annually. Uncertainty about future production of steel products in San Bernardino County may reduce water use there in future years.

Water use for secondary smelting and refining of nonferrous metals has increased substantially. These industries recover nonferrous metals and alloys from new and used scrap and dross. The increase may be due, in part, to an increasing effort to salvage aluminum containers and other waste products that can be reclaimed economically.

Electrical Machinery and Supplies (SIC 36)

The industry producing electrical and electronic machinery, equipment, and supplies now ranks eighth in water use, more than a twofold increase over the last decade. This industry includes firms manufacturing all types of electrical ware but, most importantly, electronic items required for radio, television, and other communication equipment. This increased use was

expected, because of the explosive growth of the electronics industry, which produces semiconductors and accessories used in computers, remote sensing devices, and other sophisticated electronic devices.

The use of high-quality fresh water now averages about 11.5 gigalitres (3 billion gallons) in "Silicon Valley" plants in Santa Clara County, which produce semiconductors and other solid-state devices. Employee water use is also quite high throughout the electronic industry in the Santa Clara Valley. However, many of these plants, which had been discharging large quantities of waste water after a single use, are now treating and recycling their waste water for both employee and other uses.

Metal Products (SIC 34) and Machinery (SIC 35)

The large number of plants and employees in the industries producing metal products (SIC 34) and machinery (SIC 35) is responsible for the traditionally high water use by these industry groups. The increased water use for the production of office and computing machines (SIC 357), special industrial machinery (SIC 355), and construction machinery (SIC 353) ranges from two to five times the 1970 use rate. Large quantities of water are also used for manufacturing coating and engraving products (SIC 3471); and cutlery, hand tools and hardware (SIC 342).

Part of this increased water use is due to the large growth of those industry groups. For example, the industries producing semiconductors, electronic components, and accessories (SIC 367), office and computing machines (SIC 357), and communication equipment (SIC 366) employ more than 100,000 people per industry group.

Ranking of Water Use Among the Top Ten Industrialized Counties

The ranking of water use among the major industrialized counties has followed a similar sequential pattern over the past nine years (Figure 6 and Table 6). Los Angeles County continues to lead all other counties, with an annual use rate of 337 gigalitres (89 billion gallons), more than three times the rate of use in Contra Costa County, which ranks as number two, with 110 gigalitres (29 billion gallons). Third in water use is Humboldt County, with an annual rate of 76 gigalitres (gl) (20 billion gallons--bg), followed by:

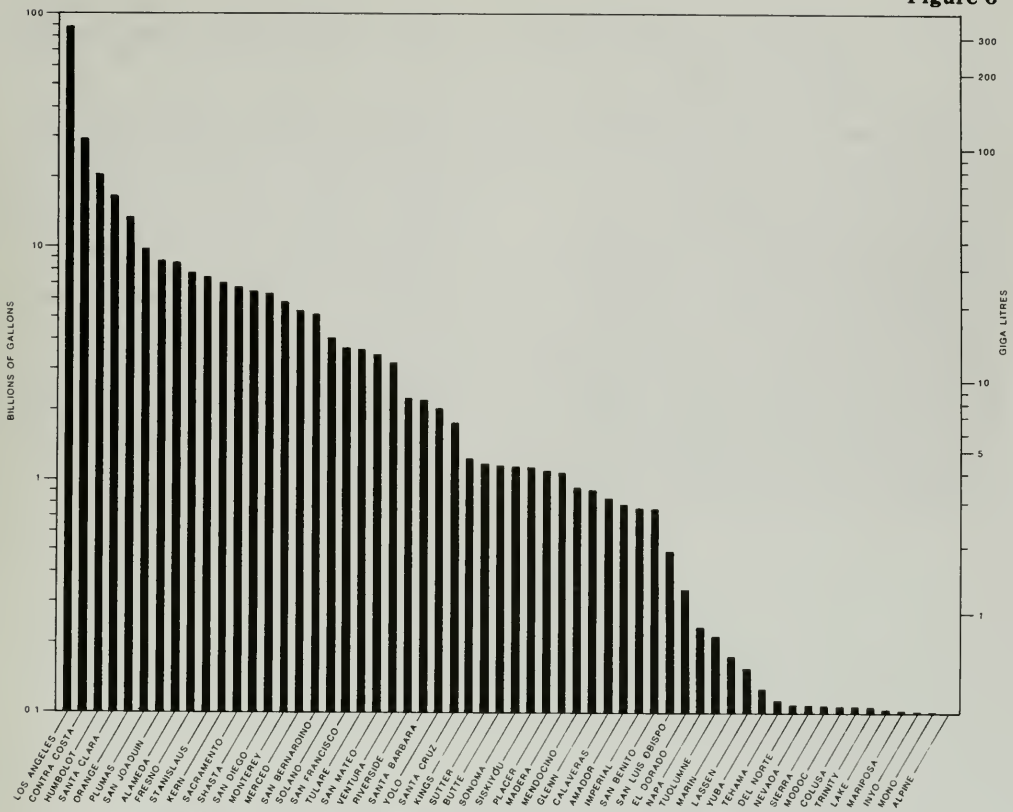
4. Santa Clara, 62 gl (16 bg);
5. Orange, 51 gl (13 bg);
6. Plumas, 37 gl (10 bg);
7. San Joaquin, 33 gl (9 bg);
8. Alameda, 32 gl (8 bg);
9. Fresno, 29 gl (7.7 bg); and
10. Stanislaus, 28 gl (7.5 bg).

Estimated annual fresh water use in all 56 counties is shown in Figure 6 and Table 6.

Changes in Industrial Water Use

Between 1970 and 1979, industrial water use has increased noticeably in some of the less densely populated counties--e.g, Amador, Butte, Calaveras, Colusa, Madera, Merced, Nevada, Placer, Plumas, and Yuba--in which the population, along with industrial activity, has grown over the past ten years. In most counties where total industrial water use decreased over the ten years--Contra Costa, El Dorado, Humboldt, Marin, Napa, Riverside,

Figure 6



ESTIMATED TOTAL ANNUAL FRESH WATER USE BY COUNTY - 1980

San Bernardino, San Joaquin, San Mateo, Stanislaus, Yolo, and San Francisco--the decrease may be attributed to a general economic decline, the constraints of the Clean Water Act (PL 92-500), and reduced construction activity (particularly home construction).

Variances in Reported Data

Some of the noticeable variances between the data in this report and those in Bulletin 124-2 may have resulted from inadequate 1970 employment data. In Bulletin 124-2, a number of employees were inadvertently assigned to the "wrong" counties, i.e., they were reported as working in the county where a company was headquartered, instead of in the county where they were actually working. Thus, because total water use in a given county is based on the total number of workers in that county, some of the calculations in Bulletin 124-2 were based on erroneous employment data, although most of the earlier data was corrected. In the 1979 survey, the places of employment for all employees were derived from more accurate data.

Two other noticeable variations between Bulletin 124-2 and this report resulted from the grouping of the data in the earlier report. For example, in Bulletin 124-2, "boiler-feed water" and "processing water" were reported as separate uses; in this bulletin, both are combined and reported as "processing". In addition, in Bulletin 124-2, total water use was divided into "cooling", "processing", "boiler feed", "air conditioning", "sanitary", and "other". In this bulletin, only three categories are shown: "cooling", "processing" (which includes boiler-feed water), and "sanitary and miscellaneous", which includes sanitation and drinking water, fire protection, dust suppression, air conditioning, and aesthetics. These six categories were consolidated under "sanitary and miscellaneous", because they constitute only a small percentage of total industrial water use.

The data in Tables 2 and 4, which report total annual water intake by various industry groups, are also slightly inconsistent, because the data on which each table is based are somewhat different in a number of instances. Table 2 shows total water use data supplied by respondents. Table 4, however, shows total water use based on summations of "cooling", "processing", and "sanitary and miscellaneous". Because some respondents did not separate their responses into those three categories (but reported total use only), the totals shown in the two tables vary somewhat.

TABLES 1 THROUGH 7 FOLLOW

TABLE 1

RANGE OF REPORTED ANNUAL WATER USE BY INDUSTRY GROUP IN 1979

IN MILLONS OF GALLONS

1 MILLION GALLONS =3.7854 MEGALITRES

SIC CODE	INDUSTRY GROUP	TOTAL NO. OF PLANTS	PLANTS REPORTING WATER INTAKE						
			TOTAL	GROSS INTAKE IN MILLION GALLONS PER YEAR					
				UNDER 0.1	0.1 - 1	1 -10	10 -100	100 -1000	OVER 1000
201	MEAT PRODUCTS	234	95	8	16	38	28	5	0
202	DAIRY PRODUCTS	147	69	7	16	11	21	14	0
203	PRESERVED FRUITS AND VEGETABLES	323	196	8	33	43	51	58	3
204	GRAIN MILL PRODUCTS	179	92	18	34	27	12	1	0
205	BAKERY PRODUCTS	266	100	16	41	31	9	3	0
206	SUGAR AND CONFECTIONARY PRODUCTS	80	44	9	11	10	7	6	1
207	FATS AND OILS	61	29	2	2	10	14	1	0
208	BEVERAGES	322	206	40	43	60	51	12	0
209	MISC. FOODS AND KINDRED PRODUCTS	389	174	22	48	64	26	14	0
20	FOOD AND KINDRED PRODUCTS	2001	1005	130	244	294	219	114	4
212	CIGARS	2	0	0	0	0	0	0	0
213	CHEWING AND SMOKING TOBACCO	1	0	0	0	0	0	0	0
21	TOBACCO MANUFACTURES	3	0	0	0	0	0	0	0
221	WEAVING MILLS, COTTON	62	0	0	0	0	0	0	0
222	WEAVING MILLS, SYNTHETICS	47	0	0	0	0	0	0	0
223	WEAVING AND FINISHING MILLS, WOOL	3	0	0	0	0	0	0	0
224	NARROW FABRIC MILLS	10	0	0	0	0	0	0	0
225	KNITTING MILLS	101	0	0	0	0	0	0	0
226	TEXTILE FINISHING, EXCEPT WOOL	52	0	0	0	0	0	0	0
227	FLOOR COVERING MILLS	77	0	0	0	0	0	0	0
228	YARN AND THREAD MILLS	20	0	0	0	0	0	0	0
229	MISCELLANEOUS TEXTILE GOODS	82	1	0	1	0	0	0	0
22	TEXTILE MILL PRODUCTS	454	1	0	1	0	0	0	0
231	MEN'S AND BOYS' SUITS AND COATS	51	0	0	0	0	0	0	0
232	MEN'S AND BOYS' FURNISHINGS	313	0	0	0	0	0	0	0
233	WOMEN'S AND MISSES' OUTERWEAR	1275	0	0	0	0	0	0	0
234	WOMEN'S AND CHILDREN'S UNDERGARMENTS	40	0	0	0	0	0	0	0
235	HATS, CAPS, AND MILLINERY	20	0	0	0	0	0	0	0
236	CHILDREN'S OUTERWEAR	47	0	0	0	0	0	0	0
237	FUR GOODS	9	0	0	0	0	0	0	0
238	MISCELLANEOUS APPAREL AND ACCESSORIES	102	0	0	0	0	0	0	0
239	MISC. FABRICATED TEXTILE PRODUCTS	595	3	0	2	1	0	0	0
23	APPAREL AND OTHER TEXTILE PRODUCTS	2452	3	0	2	1	0	0	0
241	LOGGING CAMPS & LOGGING CONTRACTORS	153	0	0	0	0	0	0	0
242	SAWMILLS AND PLANING MILLS	214	56	0	16	15	15	8	2
243	MILLWORK, PLYWOOD & STRUCTURAL MEMBERS	713	1	1	0	0	0	0	0
244	WOODEN CONTAINERS	161	0	0	0	0	0	0	0
245	WOOD BUILDINGS & MOBILE HOMES	134	0	0	0	0	0	0	0
249	MISCELLANEOUS WOOD PRODUCTS	306	7	0	2	3	2	0	0
24	LUMBER AND WOOD PRODUCTS	1681	64	1	18	18	17	8	2

TABLE 1 (CONTINUED)

RANGE OF REPORTED ANNUAL WATER USE BY INDUSTRY GROUP IN 1979

IN MILLONS OF GALLONS

1 MILLION GALLONS =3.7854 MEGALITRES

SIC CODE	INDUSTRY GROUP	TOTAL NO. OF PLANTS	PLANTS REPORTING WATER INTAKE						
			TOTAL	GROSS INTAKE IN MILLION GALLONS PER YEAR					
				UNDER 0.1	0.1 - 1	1 -10	10 -100	100 -1000	OVER 1000
251	HOUSEHOLD FURNITURE	875	2	0	1	1	0	0	0
252	OFFICE FURNITURE	142	0	0	0	0	0	0	0
253	PUBLIC BUILDING & RELATED FURNITURE	47	2	0	0	0	2	0	0
254	PARTITIONS AND FIXTURES	262	3	0	1	0	2	0	0
259	MISCELLANEOUS FURNITURE AND FIXTURES	152	2	0	2	0	0	0	0
25	FURNITURE AND FIXTURES	1478	9	0	4	1	4	0	0
261	PULP MILLS	3	3	0	0	0	0	1	2
262	PAPER MILLS, EXCEPT BUILDING PAPER MILLS	27	12	1	1	1	3	4	2
263	PAPERBOARD MILLS	15	8	1	0	2	2	2	1
264	MISC. CONVERTED PAPER PRODUCTS	280	73	2	31	33	6	0	1
265	PAPERBOARD CONTAINERS AND BOXES	205	71	2	23	27	16	3	0
266	BUILDING PAPER AND BOARD MILLS	16	6	0	1	2	2	1	0
26	PAPER AND ALLIED PRODUCTS	546	173	6	56	65	29	11	6
271	NEWSPAPERS	466	0	0	0	0	0	0	0
272	PERIODICALS	335	0	0	0	0	0	0	0
273	BOOKS	278	0	0	0	0	0	0	0
274	MISCELLANEOUS PUBLISHING	179	0	0	0	0	0	0	0
275	COMMERCIAL PRINTING	1795	5	0	2	1	2	0	0
276	MANIFOLD BUSINESS FORMS	60	0	0	0	0	0	0	0
277	GREETING CARD PUBLISHING	23	0	0	0	0	0	0	0
278	BLANKBOOKS AND BOOKBINDING	124	2	0	1	1	0	0	0
279	PRINTING TRADE SERVICES	199	0	0	0	0	0	0	0
27	PRINTING AND PUBLISHING	3457	7	0	3	2	2	0	0
281	INDUSTRIAL INORGANIC CHEMICALS	193	46	0	10	13	15	8	0
282	PLASTICS MATERIALS AND SYNTHETICS	151	52	0	15	23	13	1	0
283	DRUGS	182	43	4	13	15	9	2	0
284	SOAP, CLEANERS, AND TOILET GOODS	313	56	0	17	25	11	3	0
285	PAINTS AND ALLIED PRODUCTS	177	52	2	20	24	6	0	0
286	INDUSTRIAL ORGANIC CHEMICALS	56	11	0	1	5	2	3	0
287	AGRICULTURAL CHEMICALS	106	23	0	5	10	4	4	0
289	MISCELLANEOUS CHEMICAL PRODUCTS	249	59	2	15	25	14	3	0
28	CHEMICALS AND ALLIED PRODUCTS	1427	342	8	96	140	74	24	0
291	PETROLEUM REFINING	82	28	1	0	3	11	4	9
295	PAVING AND ROOFING MATERIALS	67	18	0	1	7	8	2	0
299	MISC. PETROLEUM AND COAL PRODUCTS	49	8	0	2	4	2	0	0
29	PETROLEUM AND COAL PRODUCTS	198	54	1	3	14	21	6	9
301	TIRES AND INNER TUBES	26	8	0	4	1	1	2	0
302	RUBBER & PLASTICS FOOTWEAR	5	1	0	0	1	0	0	0
303	RECLAIMED RUBBER	7	2	0	1	1	0	0	0

TABLE 1 (CONTINUED)

RANGE OF REPORTED ANNUAL WATER USE BY INDUSTRY GROUP IN 1979

IN MILLONS OF GALLONS

1 MILLION GALLONS =3.7854 MEGALITRES

SIC CODE	INDUSTRY GROUP	TOTAL NO. OF PLANTS	PLANTS REPORTING WATER INTAKE						
			TOTAL	GROSS INTAKE IN MILLION GALLONS PER YEAR					
				UNDER 0.1	0.1 - 1	1 -10	10 -100	100 -1000	OVER 1000
304	RUBBER & PLASTICS HOSE & BELTING	12	2	0	1	0	1	0	0
306	FABRICATED RUBBER PRODUCTS, NEC	176	44	2	16	19	7	0	0
307	MISCELLANEOUS PLASTICS PRODUCTS	1156	211	11	109	75	14	2	0
30	RUBBER & MISC. PLASTICS PRODUCTS	1382	268	13	131	97	23	4	0
311	LEATHER TANNING AND FINISHING	23	7	0	1	0	5	1	0
313	BOOT & SHOE CUT STOCK & FINDINGS	7	0	0	0	0	0	0	0
314	FOOTWEAR, EXCEPT RUBBER	60	0	0	0	0	0	0	0
315	LEATHER GLOVES & MITTENS	4	0	0	0	0	0	0	0
316	LUGGAGE	32	0	0	0	0	0	0	0
317	HANDBAGS AND PERSONAL LEATHER GOODS	89	0	0	0	0	0	0	0
319	LEATHER GOODS, NEC	36	1	0	1	0	0	0	0
31	LEATHER AND LEATHER PRODUCTS	251	8	0	2	0	5	1	0
321	FLAT GLASS	25	4	0	1	1	1	1	0
322	GLASS AND GLASSWARE, PRESSED OR BLOWN	87	14	0	3	5	5	1	0
323	PRODUCTS OF PURCHASED GLASS	157	18	0	6	6	6	0	0
324	CEMENT, HYDRAULIC	22	11	0	0	0	3	8	0
325	STRUCTURAL CLAY PRODUCTS	66	23	0	8	10	5	0	0
326	POTTERY AND RELATED PRODUCTS	138	13	0	3	5	5	0	0
327	CONCRETE, GYPSUM, AND PLASTER PRODUCTS	475	88	0	13	51	19	5	0
328	CUT STONE AND STONE PRODUCTS	64	4	1	2	1	0	0	0
329	MISC. NONMETALLIC MINERAL PRODUCTS	211	52	5	18	14	12	3	0
32	STONE, CLAY, & GLASS PRODUCTS	1245	227	6	54	93	56	18	0
331	BLAST FURNACE AND BASIC STEEL PRODUCTS	152	41	1	10	15	12	2	1
332	IRON AND STEEL FOUNDRIES	107	29	0	7	14	7	1	0
333	PRIMARY NONFERROUS METALS	26	7	0	1	2	4	0	0
334	SECONDARY NONFERROUS METALS	47	18	1	6	5	5	1	0
335	NONFERROUS ROLLING AND DRAWING	117	35	0	11	12	9	3	0
336	NONFERROUS FOUNDRIES	258	62	0	36	22	2	2	0
339	MISCELLANEOUS PRIMARY METAL PRODUCTS	88	17	1	5	11	0	0	0
33	PRIMARY METAL INDUSTRIES	795	209	3	76	81	39	9	1
341	METAL CANS & SHIPPING CONTAINERS	66	6	0	1	4	0	1	0
342	CUTLERY, HAND TOOLS, AND HARDWARE	304	8	0	2	1	3	2	0
343	PLUMBING AND HEATING, EXCEPT ELECTRIC	153	2	0	1	0	1	0	0
344	FABRICATED STRUCTURAL METAL PRODUCTS	1243	8	0	1	2	5	0	0
345	SCREW MACHINE PRODUCTS, BOLTS, ETC.	174	7	0	0	3	0	0	0
346	METAL FORGINGS & STAMPINGS	295	2	0	1	0	1	0	0
347	METAL SERVICES, NEC	640	286	27	64	144	51	0	0
348	ORDNANCE AND ACCESSORIES, NEC	31	4	0	0	3	0	1	0
349	MISC. FABRICATED METAL PRODUCTS	559	5	0	1	4	0	0	0
34	FABRICATED METAL PRODUCTS	3465	324	27	71	161	61	4	0

TABLE 1 (CONTINUED)

RANGE OF REPORTED ANNUAL WATER USE BY INDUSTRY GROUP IN 1979

IN MILLONS OF GALLONS

1 MILLION GALLONS =3.7854 MEGALITRES

SIC CODE	INDUSTRY GROUP	TOTAL NO. OF PLANTS	PLANTS REPORTING WATER INTAKE						
			TOTAL	GROSS INTAKE IN MILLION GALLONS PER YEAR					
				UNDER 0.1	0.1 - 1	1 -10	10 -100	100 -1000	OVER 1000
351	ENGINES AND TURBINES	47	3	0	0	0	2	1	0
352	FARM AND GARDEN MACHINERY	185	1	0	0	1	0	0	0
353	CONSTRUCTION AND RELATED MACHINERY	334	9	0	1	5	3	0	0
354	METALWORKING MACHINERY	616	10	1	3	4	2	0	0
355	SPECIAL INDUSTY MACHINERY	373	0	0	0	0	0	0	0
356	GENERAL INDUSTRIAL MACHINERY	489	11	0	0	6	4	1	0
357	OFFICE AND COMPUTING MACHINES	550	34	0	1	11	19	3	0
358	REFRIGERATION AND SERVICE MACHINERY	258	2	0	1	1	0	0	0
359	MISC. MACHINERY, EXCEPT ELECTRICAL	2499	11	2	5	4	0	0	0
35	MACHINERY, EXCEPT ELECTRICAL	5342	81	3	11	32	30	5	0
361	ELECTRIC DISTRIBUTING EQUIPMENT	130	1	0	0	1	0	0	0
362	ELECTRICAL INDUSTRIAL APPARATUS	226	3	0	0	0	3	0	0
363	HOUSEHOLD APPLIANCES	70	2	0	0	0	2	0	0
364	ELECTRIC LIGHTING AND WIRING EQUIPMENT	343	10	0	2	5	2	1	0
365	RADIO AND TV RECEIVING EQUIPMENT	281	5	0	0	2	3	0	0
366	COMMUNICATION EQUIPMENT	536	27	0	0	7	14	6	0
367	ELECTRONIC COMPONENTS AND ACCESSORIES	1407	39	0	2	11	19	7	0
369	MISC. ELECTRICAL EQUIPMENT & SUPPLIES	226	3	0	0	1	2	0	0
36	ELECTRIC AND ELECTRONIC EQUIPMENT	3219	90	0	4	27	45	14	0
371	MOTOR VEHICLES AND EQUIPMENT	580	15	0	2	4	5	3	0
372	AIRCRAFT THEIR PARTS	336	21	0	0	5	12	4	0
373	SHIP AND BOAT BUILDING AND REPAIRING	228	6	0	0	1	3	2	0
374	RAILROAD EQUIPMENT	11	0	0	0	0	0	0	0
375	MOTORCYCLES, BICYCLES, AND PARTS	97	0	0	0	0	0	0	0
376	GUIDED MISSELS, SPACE VEHICLES, & PARTS	17	4	0	0	0	0	3	1
379	MISCELLANEOUS TRANSPORTATION EQUIPMENT	165	0	0	0	0	0	0	0
37	TRANSPORTATION EQUIPMENT	1434	46	0	2	10	21	12	1
381	ENGINEERING & SCIENTIFIC INSTRUMENTS	156	4	0	0	2	1	1	0
382	MEASURING & CONTROLLING INSTRUMENTS	501	11	0	2	3	6	0	0
383	OPTICAL INSTRUMENTS AND LENSES	123	2	0	0	1	1	0	0
384	MEDICAL INSTRUMENTS AND SUPPLIES	327	7	0	0	6	1	0	0
385	OPHTHALMIC GOODS	76	1	0	0	1	0	0	0
386	PHOTOGRAPHIC EQUIPMENT AND SUPPLIES	160	0	0	0	0	0	0	0
387	WATCHES, CLOCKS, AND WATCHCASES	34	0	0	0	0	0	0	0
38	INSTRUMENTS AND RELATED PRODUCTS	1377	25	0	2	13	9	1	0
391	JEWELRY, SILVERWARE, AND PLATED WARE	240	14	1	9	4	0	0	0
393	MUSICAL INSTRUMENTS	49	1	0	0	1	0	0	0
394	TOYS AND SPORTING GOODS	425	9	0	3	5	1	0	0
395	PENS, PENCILS, OFFICE AND ART MATERIALS	92	0	0	0	0	0	0	0
396	COSTUME JEWELRY AND NOTIONS	110	3	0	2	1	0	0	0
399	MISCELLANEOUS MANUFACTURES	826	5	0	0	2	3	0	0
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	1742	32	1	14	13	4	0	0
	T O T A L	33119	2968	199	794	1062	659	231	23

TABLE 2

REPORTED ANNUAL INTAKE BY INDUSTRY GROUP IN 1979

IN MILLIONS OF GALLONS

1 MILLION GALLONS = 3.7854 MEGALITRES

SIC CODE	INDUSTRY GROUP	NUMBER OF EMPLOYEES		FRESH WATER		RECLAIMED WATER	BRACKISH WATER	TOTAL INTAKE WATER
		TOTAL	REPORTING 1/	PURCHASED	SELF PRODUCED			
201	MEAT PRODUCTS	19281	9442	2342.	276.	0.	196.	2814.
202	DAIRY PRODUCTS	7977	4238	1222.	2900.	0.	1.	4122.
203	PRESERVED FRUITS AND VEGETABLES	46769	35757	7680.	14645.	1.	173.	22501.
204	GRAIN MILL PRODUCTS	8375	4993	562.	184.	0.	62.	808.
205	BAKERY PRODUCTS	21549	7499	1026.	17.	0.	0.	1043.
206	SUGAR AND CONFECTIONARY PRODUCTS	7465	5469	880.	4328.	0.	10240.	15447.
207	FATS AND OILS	2695	2644	367.	303.	0.	0.	670.
208	BEVERAGES	19652	12975	3000.	2890.	0.	4.	5894.
209	MISC. FOODS AND KINDRED PRODUCTS	25393	14332	3962.	1465.	5.	2050.	7481.
20	FOOD AND KINDRED PRODUCTS	159156	97349	21041.	27009.	6.	12728.	60785.
212	CIGARS	13	0	0.	0.	0.	0.	0.
213	CHEWING AND SMOKING TOBACCO	300	0	0.	0.	0.	0.	0.
21	TOBACCO MANUFACTURES	313	0	0.	0.	0.	0.	0.
221	WEAVING MILLS, COTTON	1077	0	0.	0.	0.	0.	0.
222	WEAVING MILLS, SYNTHETICS	740	0	0.	0.	0.	0.	0.
223	WEAVING AND FINISHING MILLS, WOOL	60	0	0.	0.	0.	0.	0.
224	NARROW FABRIC MILLS	296	0	0.	0.	0.	0.	0.
225	KNITTING MILLS	5967	0	0.	0.	0.	0.	0.
226	TEXTILE FINISHING, EXCEPT WOOL	1414	0	0.	0.	0.	0.	0.
227	FLOOR COVERING MILLS	5600	0	0.	0.	0.	0.	0.
228	YARN AND THREAD MILLS	1926	0	0.	0.	0.	0.	0.
229	MISCELLANEOUS TEXTILE GOODS	3404	88	0.	0.	0.	0.	0.
22	TEXTILE MILL PRODUCTS	20484	88	0.	0.	0.	0.	0.
231	MEN'S AND BOYS' SUITS AND COATS	3753	0	0.	0.	0.	0.	0.
232	MEN'S AND BOYS' FURNISHINGS	15436	0	0.	0.	0.	0.	0.
233	WOMEN'S AND MISSES' OUTERWEAR	49959	0	0.	0.	0.	0.	0.
234	WOMEN'S AND CHILDREN'S UNDERGARMENTS	4104	0	0.	0.	0.	0.	0.
235	HATS, CAPS, AND MILLINERY	719	0	0.	0.	0.	0.	0.
236	CHILDREN'S OUTERWEAR	1985	0	0.	0.	0.	0.	0.
237	FUR GOODS	172	0	0.	0.	0.	0.	0.
238	MISCELLANEOUS APPAREL AND ACCESSORIES	3182	0	0.	0.	0.	0.	0.
239	MISC. FABRICATED TEXTILE PRODUCTS	20017	332	2.	0.	0.	0.	2.
23	APPAREL AND OTHER TEXTILE PRODUCTS	99327	332	2.	0.	0.	0.	2.
241	LOGGING CAMPS & LOGGING CONTRACTORS	3571	0	0.	0.	0.	0.	0.
242	SAWMILLS AND PLANING MILLS	18499	8596	587.	12767.	98.	212.	13665.
243	MILLWORK, PLYWOOD & STRUCTURAL MEMBERS	21294	32	0.	0.	0.	0.	0.
244	WOODEN CONTAINERS	4600	0	0.	0.	0.	0.	0.
245	WOOD BUILDINGS & MOBILE HOMES	7383	0	0.	0.	0.	0.	0.
249	MISCELLANEOUS WOOD PRODUCTS	8356	288	19.	97.	0.	36.	152.
24	LUMBER AND WOOD PRODUCTS	63703	8916	606.	12865.	99.	248.	13817.

1/ NUMBER OF EMPLOYEES IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 2 (CONTINUED)

REPORTED ANNUAL INTAKE BY INDUSTRY GROUP IN 1979

IN MILLIONS OF GALLONS

1 MILLION GALLONS = 3.7854 MEGALITRES

SIC CODE	INDUSTRY GROUP	NUMBER OF EMPLOYEES		FRESH WATER		RECLAIMED WATER	BRACKISH WATER	TOTAL INTAKE WATER
		TOTAL	REPORTING 1/	PURCHASED	SELF PRODUCED			
251	HOUSEHOLD FURNITURE	37424	148	2.	0.	0.	0.	2.
252	OFFICE FURNITURE	7570	0	0.	0.	0.	0.	0.
253	PUBLIC BUILDING & RELATED FURNITURE	3729	1497	59.	0.	0.	0.	59.
254	PARTITIONS AND FIXTURES	8526	762	49.	0.	0.	0.	49.
259	MISCELLANEOUS FURNITURE AND FIXTURES	4924	170	1.	0.	0.	0.	1.
25	FURNITURE AND FIXTURES	62173	2577	112.	0.	0.	0.	112.
261	PULP MILLS	470	1055	16917.	650.	0.	165.	17732.
262	PAPER MILLS, EXCEPT BUILDING PAPER MILLS	4312	3262	2294.	5069.	193.	0.	7555.
263	PAPERBOARD MILLS	3291	2085	1577.	2580.	0.	2000.	6157.
264	MISC. CONVERTED PAPER PRODUCTS	14729	7469	2028.	63.	0.	3880.	5971.
265	PAPERBOARD CONTAINERS AND BOXES	15081	7867	588.	352.	0.	2.	942.
266	BUILDING PAPER AND BOARD MILLS	896	802	103.	96.	0.	0.	199.
26	PAPER AND ALLIED PRODUCTS	38779	22540	23508.	8810.	193.	6047.	38558.
271	NEWSPAPERS	39464	0	0.	0.	0.	0.	0.
272	PERIODICALS	10240	0	0.	0.	0.	0.	0.
273	BOOKS	11347	0	0.	0.	0.	0.	0.
274	MISCELLANEOUS PUBLISHING	8868	0	0.	0.	0.	0.	0.
275	COMMERCIAL PRINTING	40902	2137	23.	20.	0.	0.	42.
276	MANIFOLD BUSINESS FORMS	4423	0	0.	0.	0.	0.	0.
277	GREETING CARD PUBLISHING	523	0	0.	0.	0.	0.	0.
278	BLANKBOOKS AND BOOKBINDING	3855	285	2.	0.	0.	0.	2.
279	PRINTING TRADE SERVICES	3323	0	0.	0.	0.	0.	0.
27	PRINTING AND PUBLISHING	122945	2422	25.	20.	0.	0.	44.
281	INDUSTRIAL INORGANIC CHEMICALS	11739	5124	2297.	1084.	0.	3764.	7145.
282	PLASTICS MATERIALS AND SYNTHETICS	9591	4576	1279.	21.	0.	103.	1403.
283	DRUGS	20668	8323	1390.	1.	0.	108.	1499.
284	SOAP, CLEANERS, AND TOILET GOODS	15736	6540	781.	752.	0.	249.	1783.
285	PAINTS AND ALLIED PRODUCTS	7831	3960	239.	0.	0.	1.	240.
286	INDUSTRIAL ORGANIC CHEMICALS	2230	823	481.	370.	0.	0.	851.
287	AGRICULTURAL CHEMICALS	7008	3150	1197.	544.	0.	0.	1742.
289	MISCELLANEOUS CHEMICAL PRODUCTS	9010	3656	986.	260.	0.	185.	1432.
28	CHEMICALS AND ALLIED PRODUCTS	83813	36152	8650.	3033.	0.	4416.	16099.
291	PETROLEUM REFINING	17170	8842	17266.	6256.	0.	50862.	74383.
295	PAVING AND ROOFING MATERIALS	4073	1510	327.	633.	1.	275.	1237.
299	MISC. PETROLEUM AND COAL PRODUCTS	1697	434	106.	3.	0.	0.	109.
29	PETROLEUM AND COAL PRODUCTS	22940	10786	17699.	6892.	1.	51137.	75729.
301	TIRES AND INNER TUBES	3264	3787	9.	373.	0.	0.	382.
302	RUBBER & PLASTICS FOOTWEAR	99	885	3.	0.	0.	0.	3.
303	RECLAIMED RUBBER	450	269	3.	0.	0.	0.	3.

1/ NUMBER OF EMPLOYEES IN THE SURVEY.

NOTE : ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 2 (CONTINUED)

REPORTED ANNUAL INTAKE BY INDUSTRY GROUP IN 1979

IN MILLIONS OF GALLONS
1 MILLION GALLONS = 3.7854 MEGALITRES

SIC CODE	INDUSTRY GROUP	NUMBER OF EMPLOYEES		FRESH WATER		RECLAIMED WATER	BRACKISH WATER	TOTAL INTAKE WATER
		TOTAL	REPORTING 1/	PURCHASED	SELF PRODUCED			
304	RUBBER & PLASTICS HOSE & BELTING	781	82	22.	22.	0.	0.	44.
306	FABRICATED RUBBER PRODUCTS, NEC	10345	5213	303.	0.	0.	0.	303.
307	MISCELLANEOUS PLASTICS PRODUCTS	48503	19523	833.	238.	0.	1.	1071.
30	RUBBER & MISC. PLASTICS PRODUCTS	63442	28759	1173.	632.	0.	1.	1805.
311	LEATHER TANNING AND FINISHING	1406	794	160.	70.	0.	0.	230.
313	BOOT & SHOE CUT STOCK & FINDINGS	204	0	0.	0.	0.	0.	0.
314	FOOTWEAR, EXCEPT RUBBER	6703	0	0.	0.	0.	0.	0.
315	LEATHER GLOVES & MITTENS	107	0	0.	0.	0.	0.	0.
316	LUGGAGE	1401	0	0.	0.	0.	0.	0.
317	HANDBAGS AND PERSONAL LEATHER GOODS	3524	0	0.	0.	0.	0.	0.
319	LEATHER GOODS, NEC	1330	7	0.	0.	0.	0.	0.
31	LEATHER AND LEATHER PRODUCTS	14675	801	160.	70.	0.	0.	230.
321	FLAT GLASS	1852	1301	81.	796.	0.	0.	877.
322	GLASS AND GLASSWARE, PRESSED OR BLOWN	9216	5346	171.	189.	0.	0.	360.
323	PRODUCTS OF PURCHASED GLASS	5880	2009	131.	0.	0.	0.	131.
324	CEMENT, HYDRAULIC	3426	3064	730.	2498.	41.	58.	3327.
325	STRUCTURAL CLAY PRODUCTS	2730	1575	126.	40.	2.	2.	170.
326	POTTERY AND RELATED PRODUCTS	6521	2293	126.	0.	0.	0.	126.
327	CONCRETE, GYPSUM, AND PLASTER PRODUCTS	23042	6152	661.	1571.	2.	16.	2250.
328	CUT STONE AND STONE PRODUCTS	1048	178	7.	0.	0.	0.	7.
329	MISC. NONMETALLIC MINERAL PRODUCTS	10981	7069	537.	647.	0.	3.	1188.
32	STONE, CLAY, & GLASS PRODUCTS	64696	28987	2570.	5743.	44.	79.	8435.
331	BLAST FURNACE AND BASIC STEEL PRODUCTS	23247	9382	3275.	90.	0.	4635.	8001.
332	IRON AND STEEL FOUNDRIES	9852	3499	158.	260.	0.	0.	419.
333	PRIMARY NONFERROUS METALS	964	1276	177.	0.	0.	0.	177.
334	SECONDARY NONFERROUS METALS	2537	1228	82.	735.	0.	11882.	12699.
335	NONFERROUS ROLLING AND DRAWING	12410	8621	591.	151.	6.	0.	748.
336	NONFERROUS FOUNDRIES	26367	10748	442.	0.	0.	0.	443.
339	MISCELLANEOUS PRIMARY METAL PRODUCTS	2654	956	41.	0.	0.	1.	42.
33	PRIMARY METAL INDUSTRIES	78031	35710	4767.	1237.	6.	16517.	22527.
341	METAL CANS & SHIPPING CONTAINERS	8977	1957	176.	0.	0.	0.	176.
342	CUTLERY, HAND TOOLS, AND HARDWARE	23830	4706	440.	0.	0.	0.	440.
343	PLUMBING AND HEATING, EXCEPT ELECTRIC	9175	1311	69.	0.	0.	0.	69.
344	FABRICATED STRUCTURAL METAL PRODUCTS	43937	6432	206.	42.	0.	0.	248.
345	SCREW MACHINE PRODUCTS, BOLTS, ETC.	10396	1106	10.	0.	0.	0.	10.
346	METAL FORGINGS & STAMPINGS	12141	249	15.	0.	0.	0.	15.
347	METAL SERVICES, NEC	17374	9490	1740.	1.	0.	1.	1742.
348	ORDNANCE AND ACCESSORIES, NEC	2677	1659	409.	0.	0.	0.	409.
349	MISC. FABRICATED METAL PRODUCTS	23344	873	23.	0.	0.	0.	23.
34	FABRICATED METAL PRODUCTS	151851	27783	3087.	42.	0.	1.	3131.

1/ NUMBER OF EMPLOYEES IN THE SURVEY.
NOTE : ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 2 (CONTINUED)

REPORTED ANNUAL INTAKE BY INDUSTRY GROUP IN 1979

IN MILLIONS OF GALLONS
1 MILLION GALLONS = 3.7854 MEGALITRES

SIC CODE	INDUSTRY GROUP	NUMBER OF EMPLOYEES		FRESH WATER		RECLAIMED WATER	BRACKISH WATER	TOTAL INTAKE WATER
		TOTAL	REPORTING 1/	PURCHASED	SELF PRODUCED			
351	ENGINES AND TURBINES	9006	6625	303.	51.	0.	0.	354.
352	FARM AND GARDEN MACHINERY	6455	689	7.	0.	0.	0.	7.
353	CONSTRUCTION AND RELATED MACHINERY	22882	5156	181.	0.	0.	0.	181.
354	METALWORKING MACHINERY	19291	1914	54.	0.	0.	0.	54.
355	SPECIAL INDUSTY MACHINERY	12823	0	0.	0.	0.	0.	0.
356	GENERAL INDUSTRIAL MACHINERY	28789	5612	167.	471.	0.	0.	638.
357	OFFICE AND COMPUTING MACHINES	119759	52838	1048.	443.	0.	0.	1491.
358	REFRIGERATION AND SERVICE MACHINERY	9519	122	1.	0.	0.	0.	1.
359	MISC. MACHINERY, EXCEPT ELECTRICAL	48452	589	12.	0.	0.	0.	12.
35	MACHINERY, EXCEPT ELECTRICAL	276576	73545	1773.	965.	0.	0.	2739.
361	ELECTRIC DISTRIBUTING EQUIPMENT	8429	265	4.	0.	0.	0.	4.
362	ELECTRICAL INDUSTRIAL APPARATUS	18902	2023	56.	0.	0.	0.	55.
363	HOUSEHOLD APPLIANCES	6511	2110	59.	0.	0.	0.	69.
364	ELECTRIC LIGHTING AND WIRING EQUIPMENT	25306	4015	244.	0.	0.	0.	245.
365	RADIO AND TV RECEIVING EQUIPMENT	18803	2410	103.	0.	0.	0.	103.
366	COMMUNICATION EQUIPMENT	123559	55084	1355.	79.	0.	1.	1435.
367	ELECTRONIC COMPONENTS AND ACCESSORIES	157854	51864	2209.	27.	22.	5.	2263.
369	MISC. ELECTRICAL EQUIPMENT & SUPPLIES	12486	2055	65.	0.	0.	0.	65.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	371850	119826	4105.	106.	22.	7.	4240.
371	MOTOR VEHICLES AND EQUIPMENT	39772	15375	538.	68.	0.	2.	608.
372	AIRCRAFT THE PARTS	78326	37349	919.	104.	0.	58.	1080.
373	SHIP AND BOAT BUILDING AND REPAIRING	30778	21435	1137.	0.	0.	3331.	4468.
374	RAILROAD EQUIPMENT	633	0	0.	0.	0.	0.	0.
375	MOTORCYCLES, BICYCLES, AND PARTS	3417	0	0.	0.	0.	0.	0.
376	GUIDED MISSILS, SPACE VEHICLES, & PARTS	47310	40245	2101.	0.	0.	0.	2101.
379	MISCELLANEOUS TRANSPORTATION EQUIPMENT	5819	0	0.	0.	0.	0.	0.
37	TRANSPORTATION EQUIPMENT	206055	114404	4694.	172.	0.	3391.	8257.
381	ENGINEERING & SCIENTIFIC INSTRUMENTS	18436	2709	407.	0.	0.	0.	407.
382	MEASURING & CONTROLLING INSTRUMENTS	37406	9472	226.	58.	0.	0.	284.
383	OPTICAL INSTRUMENTS AND LENSES	6627	1429	56.	0.	0.	0.	55.
384	MEDICAL INSTRUMENTS AND SUPPLIES	21713	4977	62.	0.	0.	0.	62.
385	OPHTHALMIC GOODS	4557	778	3.	0.	0.	0.	3.
386	PHOTOGRAPHIC EQUIPMENT AND SUPPLIES	7347	0	0.	0.	0.	0.	0.
387	WATCHES, CLOCKS, AND WATCHCASES	820	0	0.	0.	0.	0.	0.
38	INSTRUMENTS AND RELATED PRODUCTS	96906	19365	754.	58.	0.	0.	811.
391	JEWELRY, SILVERWARE, AND PLATED WARE	4628	756	21.	0.	0.	0.	22.
393	MUSICAL INSTRUMENTS	4130	727	4.	0.	0.	0.	4.
394	TOYS AND SPORTING GOODS	16180	3421	51.	0.	0.	0.	51.
395	PENS, PENCILS, OFFICE AND ART MATERIALS	4116	0	0.	0.	0.	0.	0.
396	COSTUME JEWELRY AND NOTIONS	3130	165	1.	0.	0.	0.	2.
399	MISCELLANEOUS MANUFACTURES	30684	8825	121.	0.	0.	0.	121.

1/ NUMBER OF EMPLOYEES IN THE SURVEY.
NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 2 (CONTINUED)

REPORTED ANNUAL INTAKE BY INDUSTRY GROUP IN 1979

IN MILLIONS OF GALLONS

1 MILLION GALLONS = 3.7854 MEGALITRES

SIC CODE	INDUSTRY GROUP	NUMBER OF EMPLOYEES		FRESH WATER		RECLAIMED WATER	BRACKISH WATER	TOTAL INTAKE WATER
		TOTAL	REPORTING 1/	PURCHASED	SELF PRODUCED			
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	62868	13894	199.	0.	0.	0.	200.
	EMPLOYEE TOTAL	2026608	644236					
	MILLION GALLONS TOTAL			94924.	67654.	372.	94573.	257522.
	ACRE FEET TOTAL			291311.	207623.	1141.	290232.	790307.
	MEGALITRES TOTAL			359329.	256100.	1407.	357999.	974835.

1/ NUMBER OF EMPLOYEES IN THE SURVEY.

NOTE : ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 3

REPORTED ANNUAL INDUSTRIAL WATER INTAKE BY COUNTY IN 1979

IN MILLONS OF GALLONS
1 MILLION GALLONS = 3.7854 MEGALITRES

COUNTY	NUMBER OF EMPLOYEES		FRESH WATER				RECLAIMED WATER	BRACKISH WATER	TOTAL WATER INTAKE
	TOTAL	REPORTING 1/	PURCHASED	SELF PRODUCED		TOTAL			
				WELLS	STREAMS				
AMADOR	994	839	526.	1.	0.	528.	0.	0.	528.
BUTTE	4423	1003	203.	432.	0.	635.	0.	0.	635.
CALAVERAS	451	281	512.	188.	120.	820.	0.	0.	820.
COLUSA	305	254	40.	3.	0.	43.	0.	0.	43.
CONTRA COSTA	30229	13378	16995.	166.	2100.	19262.	6.	58809.	78076.
DEL NORTE	1351	379	0.	8.	7.	15.	0.	0.	15.
EL DORADO	1122	360	92.	6.	0.	98.	53.	0.	151.
FRESNO	23187	6537	971.	3324.	0.	4295.	0.	30.	4325.
GLENN	1285	510	21.	428.	0.	449.	0.	0.	449.
HUMBOLDT	8561	2507	16943.	108.	734.	17785.	0.	166.	17951.
IMPERIAL	1815	547	43.	180.	0.	223.	0.	0.	223.
INYO	71	67	0.	2.	0.	2.	0.	0.	2.
KERN	11210	4816	455.	3730.	45.	4230.	42.	28.	4300.
KINGS	2941	1162	261.	370.	0.	631.	0.	0.	631.
LAKE	197	5	0.	0.	0.	0.	0.	0.	0.
LASSEN	583	50	0.	15.	0.	15.	0.	0.	15.
MADERA	2707	1549	1.	856.	0.	857.	46.	4.	906.
MARIN	4576	256	6.	0.	1.	8.	0.	0.	8.
MARIPOSA	73	0	0.	0.	0.	0.	0.	0.	0.
MENDOCINO	3805	1218	44.	312.	218.	574.	0.	157.	731.
MERCED	9452	4030	1250.	1770.	0.	3019.	0.	0.	3019.
MODOC	228	33	0.	2.	0.	2.	0.	0.	2.
MONO	56	20	0.	0.	0.	0.	0.	0.	0.
MONTEREY	7463	4096	88.	2479.	0.	2568.	0.	11882.	14449.
NAPA	3324	2004	42.	101.	0.	144.	0.	0.	144.
NEVADA	1674	962	35.	1.	2.	38.	0.	0.	38.
ORANGE	239061	72133	4735.	162.	0.	4897.	1.	1.	4900.
PLACER	3244	999	356.	116.	59.	531.	0.	0.	531.
PLUMAS	793	646	0.	29.	9773.	9802.	0.	3.	9804.
RIVERSIDE	27118	4864	518.	120.	0.	638.	2.	15.	654.
SACRAMENTO	19550	9288	1350.	3710.	0.	5061.	0.	0.	5061.
SAN BENITO	1766	1024	129.	286.	0.	415.	0.	25.	441.
SAN BERNARDINO	38259	6541	632.	1754.	0.	2385.	0.	26.	2411.
SAN JOAQUIN	20263	10689	2389.	4927.	0.	7317.	0.	1761.	9078.
SAN LUIS OBISPO	3510	783	11.	177.	0.	188.	0.	0.	188.
SAN MATEO	38924	16089	1193.	13.	0.	1206.	0.	1.	1207.
SANTA BARBARA	20179	4980	203.	636.	0.	839.	0.	2562.	3401.
SANTA CLARA	244248	116729	4501.	4653.	85.	9239.	22.	10.	9271.
SANTA CRUZ	10224	5292	369.	1028.	82.	1479.	0.	32.	1511.
SHASTA	4669	1542	42.	5614.	49.	5705.	0.	23.	5728.
SIERRA	197	0	0.	0.	0.	0.	0.	0.	0.
SISKIYOU	2522	987	41.	77.	512.	629.	0.	22.	652.
SOLANO	14695	11146	3420.	230.	0.	3651.	0.	3331.	6982.
SONOMA	14561	6551	244.	244.	63.	551.	0.	3.	553.
STANISLAUS	17118	9409	1186.	3466.	68.	4721.	2.	175.	4897.
SUTTER	3214	948	188.	140.	0.	327.	0.	0.	327.
TEHAMA	1809	182	27.	4.	12.	43.	0.	0.	43.
TRINITY	295	146	1.	2.	7.	9.	0.	0.	9.
TULARE	10721	3575	1741.	1334.	0.	3075.	0.	0.	3075.

1/ NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.
NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 3 (CONTINUED)

REPORTED ANNUAL INDUSTRIAL WATER INTAKE BY COUNTY IN 1979

IN MILLONS OF GALLONS

1 MILLION GALLONS = 3.7854 MEGALITRES

COUNTY	NUMBER OF EMPLOYEES		FRESH WATER				RECLAIMED WATER	BRACKISH WATER	TOTAL WATER INTAKE
	TOTAL	REPORTING	PURCHASED	SELF PRODUCED		TOTAL			
				WELLS	STREAMS				
TUOLUMNE	886	460	122.	4.	0.	125.	0.	0.	125.
VENTURA	25331	6657	953.	408.	0.	1361.	0.	94.	1455.
YOLO	5043	2423	51.	1354.	390.	1795.	0.	0.	1795.
YUBA	957	132	3.	2.	0.	5.	0.	0.	5.
ALAMEDA	76630	24138	2813.	1476.	41.	4329.	0.	279.	4608.
LOS ANGELES	908810	223770	25069.	6698.	0.	31767.	198.	14666.	46631.
SAN FRANCISCO	43281	6480	588.	97.	0.	685.	0.	0.	685.
SAN DIEGO	106047	48470	3521.	42.	0.	3563.	0.	469.	4032.
EMPLOYEE TOTAL	2026508	644236							
MILLION GALLONS TOTAL			94924.	53286.	14368.	162578.	372.	94573.	257522.
ACRE FEET TOTAL			291311.	163530.	44093.	498934.	1141.	290232.	790307.
MEGALITRES TOTAL			359329.	201713.	54388.	615430.	1407.	357999.	974836.

REPORTED ANNUAL WATER INTAKE BY TYPE OF USE AND INDUSTRY GROUP IN 1979

SIC CODE	INDUSTRY GROUP	NUMBER OF EMPLOYEES		WATER INTAKE (million gallons)				WATER INTAKE (megalitres)			
		TOTAL	REPORTING[1]	COOLING	PROCESSING	SANITARY	TOTAL	COOLING	PROCESSING	SANITARY	TOTAL
201	MEAT PRODUCTS	19281	9442	328.	2207.	169.	2703.	1241.	8353.	639.	10234.
202	DAIRY PRODUCTS	7977	4238	1032.	2938.	77.	4046.	3906.	11120.	291.	15317.
203	PRESERVED FRUITS AND VEGETABLES	46769	35757	3611.	18010.	555.	22176.	13670.	68174.	2101.	83945.
204	GRAIN MILL PRODUCTS	8375	4993	96.	513.	46.	655.	364.	1943.	174.	2480.
205	BAKERY PRODUCTS	21549	7499	27.	552.	97.	677.	104.	2090.	367.	2561.
206	SUGAR AND CONFECTIONARY PRODUCTS	7465	5469	9648.	5485.	66.	15199.	36522.	20763.	251.	57535.
207	FATS AND OILS	2695	2644	150.	442.	37.	669.	719.	1675.	141.	2534.
208	BEVERAGES	19652	12975	1573.	2947.	203.	4724.	5956.	11157.	769.	17882.
209	MISC. FOODS AND KINDRED PRODUCTS	25393	14332	3280.	3379.	140.	6798.	12415.	12791.	529.	25735.
20	FOOD AND KINDRED PRODUCTS	159156	97349	19785.	36473.	1390.	57648.	74895.	138065.	5262.	218222.
212	CIGARS	13	0	0.	0.	0.	0.	0.	0.	0.	0.
213	CHEWING AND SMOKING TOBACCO	300	0	0.	0.	0.	0.	0.	0.	0.	0.
21	TOBACCO MANUFACTURES	313	0	0.	0.	0.	0.	0.	0.	0.	0.
221	WEAVING MILLS, COTTON	1077	0	0.	0.	0.	0.	0.	0.	0.	0.
222	WEAVING MILLS, SYNTHETICS	740	0	0.	0.	0.	0.	0.	0.	0.	0.
223	WEAVING AND FINISHING MILLS, WOOL	60	0	0.	0.	0.	0.	0.	0.	0.	0.
224	NARROW FABRIC MILLS	298	0	0.	0.	0.	0.	0.	0.	0.	0.
225	KNITTING MILLS	5967	0	0.	0.	0.	0.	0.	0.	0.	0.
226	TEXTILE FINISHING, EXCEPT WOOL	1414	0	0.	0.	0.	0.	0.	0.	0.	0.
227	FLOOR COVERING MILLS	5600	0	0.	0.	0.	0.	0.	0.	0.	0.
228	YARN AND THREAD MILLS	1926	0	0.	0.	0.	0.	0.	0.	0.	0.
229	MISCELLANEOUS TEXTILE GOODS	3404	88	0.	0.	0.	0.	0.	0.	1.	1.
22	TEXTILE MILL PRODUCTS	20484	88	0.	0.	0.	0.	0.	0.	1.	1.
231	MEN'S AND BOYS' SUITS AND COATS	3753	0	0.	0.	0.	0.	0.	0.	0.	0.
232	MEN'S AND BOYS' FURNISHINGS	15436	0	0.	0.	0.	0.	0.	0.	0.	0.
233	WOMEN'S AND MISSES' OUTERWEAR	49959	0	0.	0.	0.	0.	0.	0.	0.	0.
234	WOMEN'S AND CHILDREN'S UNDERGARMENTS	4104	0	0.	0.	0.	0.	0.	0.	0.	0.
235	HATS, CAPS, AND MILLINERY	719	0	0.	0.	0.	0.	0.	0.	0.	0.
236	CHILDREN'S OUTERWEAR	1985	0	0.	0.	0.	0.	0.	0.	0.	0.
237	FUR GOODS	172	0	0.	0.	0.	0.	0.	0.	0.	0.
238	MISCELLANEOUS APPAREL AND ACCESSORIES	3182	0	0.	0.	0.	0.	0.	0.	0.	0.
239	MISC. FABRICATED TEXTILE PRODUCTS	20017	332	0.	0.	2.	2.	0.	0.	7.	7.
23	APPAREL AND OTHER TEXTILE PRODUCTS	99327	332	0.	0.	2.	2.	0.	0.	7.	7.
241	LOGGING CAMPS & LOGGING CONTRACTORS	3571	0	0.	0.	0.	0.	0.	0.	0.	0.
242	SAWMILLS AND PLANING MILLS	18495	8596	3713.	9584.	81.	13379.	14057.	36281.	307.	50645.
243	MILLWORK, PLYWOOD & STRUCTURAL MEMBERS	21294	32	0.	0.	0.	0.	0.	0.	0.	0.
244	WOODEN CONTAINERS	4600	0	0.	0.	0.	0.	0.	0.	0.	0.
245	WOOD BUILDINGS & MOBILE HOMES	7383	0	0.	0.	0.	0.	0.	0.	0.	0.
249	MISCELLANEOUS WOOD PRODUCTS	8356	288	71.	77.	4.	152.	268.	292.	15.	574.
24	LUMBER AND WOOD PRODUCTS	63707	8916	3784.	9661.	85.	13531.	14325.	36572.	322.	51219.

[1] NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 4 (CONTINUED)

REPORTED ANNUAL WATER INTAKE BY TYPE OF USE AND INDUSTRY GROUP IN 1979

SIC CODE	INDUSTRY GROUP	NUMBER OF EMPLOYEES		WATER INTAKE (million gallons)				WATER INTAKE (megalitres)			
		TOTAL	REPORTING 1/	COOLING	PROCESSING	SANITARY	TOTAL	COOLING	PROCESSING	SANITARY	TOTAL
251	HOUSEHOLD FURNITURE	37424	148	0.	0.	1.	1.	0.	0.	3.	3.
252	OFFICE FURNITURE	7570	0	0.	0.	0.	0.	0.	0.	0.	0.
253	PUBLIC BUILDING & RELATED FURNITURE	3729	1497	10.	43.	6.	59.	38.	163.	22.	222.
254	PARTITIONS AND FIXTURES	8526	762	5.	0.	0.	6.	21.	0.	1.	22.
259	MISCELLANEOUS FURNITURE AND FIXTURES	4924	170	0.	0.	1.	1.	0.	0.	5.	5.
25	FURNITURE AND FIXTURES	62173	2577	15.	43.	8.	67.	59.	163.	30.	252.
261	PULP MILLS	470	1055	5484.	12226.	23.	17732.	20759.	46279.	85.	67123.
262	PAPER MILLS, EXCEPT BUILDING PAPER MILLS	4312	3262	213.	6520.	32.	6864.	805.	25058.	121.	25984.
263	PAPERBOARD MILLS	3291	2085	4323.	1772.	16.	6112.	16365.	6709.	62.	23136.
264	MISC. CONVERTED PAPER PRODUCTS	14729	7469	3957.	1922.	78.	5956.	14978.	7275.	294.	22547.
265	PAPERBOARD CONTAINERS AND BOXES	15081	7867	107.	555.	60.	722.	406.	2100.	228.	2734.
266	BUILDING PAPER AND BOARD MILLS	896	802	12.	177.	7.	197.	47.	671.	27.	745.
26	PAPER AND ALLIED PRODUCTS	38779	22540	14095.	23271.	216.	37583.	53360.	88092.	817.	142269.
271	NEWSPAPERS	39464	0	0.	0.	0.	0.	0.	0.	0.	0.
272	PERIODICALS	10240	0	0.	0.	0.	0.	0.	0.	0.	0.
273	BOOKS	11347	0	0.	0.	0.	0.	0.	0.	0.	0.
274	MISCELLANEOUS PUBLISHING	8868	0	0.	0.	0.	0.	0.	0.	0.	0.
275	COMMERCIAL PRINTING	40902	2137	22.	4.	4.	30.	82.	16.	15.	114.
276	MANIFOLD BUSINESS FORMS	4423	0	0.	0.	0.	0.	0.	0.	0.	0.
277	GREETING CARD PUBLISHING	523	0	0.	0.	0.	0.	0.	0.	0.	0.
278	BLANKBOOKS AND BOOKBINDING	3855	285	0.	0.	2.	2.	0.	0.	6.	6.
279	PRINTING TRADE SERVICES	3323	0	0.	0.	0.	0.	0.	0.	0.	0.
27	PRINTING AND PUBLISHING	122945	2422	22.	4.	6.	32.	82.	16.	21.	120.
281	INDUSTRIAL INORGANIC CHEMICALS	11739	5124	4410.	2183.	43.	6635.	16693.	8262.	162.	25117.
282	PLASTICS MATERIALS AND SYNTHETICS	9591	4576	202.	217.	35.	454.	765.	822.	132.	1718.
283	DRUGS	20668	8323	287.	908.	83.	1278.	1088.	3437.	313.	4838.
284	SOAP, CLEANERS, AND TOILET GOODS	15738	6540	776.	579.	48.	1403.	2938.	2192.	182.	5312.
285	PAINTS AND ALLIED PRODUCTS	7831	3960	81.	97.	38.	216.	305.	369.	145.	819.
286	INDUSTRIAL ORGANIC CHEMICALS	2230	823	178.	439.	12.	629.	675.	1662.	44.	2381.
287	AGRICULTURAL CHEMICALS	7008	3150	977.	584.	39.	1600.	3700.	2210.	148.	6058.
289	MISCELLANEOUS CHEMICAL PRODUCTS	9010	3656	255.	872.	38.	1165.	967.	3301.	143.	4410.
28	CHEMICALS AND ALLIED PRODUCTS	83813	36152	7167.	5879.	335.	13381.	27131.	22254.	1268.	50654.
291	PETROLEUM REFINING	17170	8842	60233.	9954.	139.	70325.	228009.	37679.	524.	266212.
295	PAVING AND ROOFING MATERIALS	4073	1510	161.	1049.	19.	1229.	611.	3970.	70.	4651.
299	MISC. PETROLEUM AND COAL PRODUCTS	1697	434	65.	38.	4.	107.	245.	145.	15.	406.
29	PETROLEUM AND COAL PRODUCTS	22940	10786	60459.	11041.	161.	71661.	228865.	41794.	610.	271269.
301	TIRES AND INNER TUBES	3264	3787	73.	184.	52.	309.	277.	697.	196.	1171.
302	RUBBER & PLASTICS FOOTWEAR	99	885	0.	0.	3.	3.	0.	1.	12.	13.
303	RECLAIMED RUBBER	450	269	2.	0.	1.	3.	9.	0.	3.	13.

1/ NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 4 (CONTINUED)

REPORTED ANNUAL WATER INTAKE BY TYPE OF USE AND INDUSTRY GROUP IN 1979

SIC CODE	INDUSTRY GROUP	NUMBER OF EMPLOYEES		WATER INTAKE (million gallons)				WATER INTAKE (megalitres)			
		TOTAL	REPORTING[1]	COOLING	PROCESSING	SANITARY	TOTAL	COOLING	PROCESSING	SANITARY	TOTAL
304	RUBBER & PLASTICS HOSE & BELTING	781	82	37.	6.	1.	44.	139.	23.	4.	166.
306	FABRICATED RUBBER PRODUCTS, NEC	10345	5213	97.	121.	35.	253.	366.	458.	134.	958.
307	MISCELLANEOUS PLASTICS PRODUCTS	48503	18523	600.	177.	113.	890.	2273.	671.	426.	3370.
30	RUBBER & MISC. PLASTICS PRODUCTS	63442	28759	809.	489.	205.	1503.	3064.	1850.	776.	5690.
311	LEATHER TANNING AND FINISHING	1406	794	14.	130.	9.	153.	51.	493.	36.	580.
313	BOOT & SHOE CUT STOCK & FINDINGS	204	0	0.	0.	0.	0.	0.	0.	0.	0.
314	FOOTWEAR, EXCEPT RUBBER	6703	0	0.	0.	0.	0.	0.	0.	0.	0.
315	LEATHER GLOVES & MITTENS	107	0	0.	0.	0.	0.	0.	0.	0.	0.
316	LUGGAGE	1401	0	0.	0.	0.	0.	0.	0.	0.	0.
317	HANDBAGS AND PERSONAL LEATHER GOODS	3524	0	0.	0.	0.	0.	0.	0.	0.	0.
319	LEATHER GOODS, NEC	1330	7	0.	0.	0.	0.	0.	0.	0.	0.
31	LEATHER AND LEATHER PRODUCTS	14675	801	14.	130.	10.	153.	51.	493.	36.	581.
321	FLAT GLASS	1852	1301	28.	438.	9.	476.	106.	1659.	35.	1801.
322	GLASS AND GLASSWARE, PRESSED OR BLOWN	9216	5346	13.	34.	14.	62.	51.	130.	54.	235.
323	PRODUCTS OF PURCHASED GLASS	5880	2009	22.	24.	9.	56.	83.	92.	36.	211.
324	CEMENT, HYDRAULIC	3426	3064	1031.	1753.	38.	2822.	3902.	6635.	144.	10681.
325	STRUCTURAL CLAY PRODUCTS	2730	1575	31.	112.	14.	158.	118.	425.	54.	597.
326	POTTERY AND RELATED PRODUCTS	6521	2293	9.	63.	10.	82.	32.	240.	38.	311.
327	CONCRETE, GYPSUM, AND PLASTER PRODUCTS	23042	6152	168.	6903.	49.	7120.	636.	26131.	185.	26952.
328	CUT STONE AND STONE PRODUCTS	1048	178	0.	5.	1.	7.	0.	21.	5.	25.
329	MISC. NONMETALLIC MINERAL PRODUCTS	10981	7069	92.	823.	49.	964.	347.	3117.	186.	3649.
32	STONE, CLAY, & GLASS PRODUCTS	64696	28987	1393.	10157.	195.	11745.	5274.	38450.	736.	44461.
331	BLAST FURNACE AND BASIC STEEL PRODUCTS	23247	9382	5801.	2007.	83.	7891.	21961.	7597.	313.	29871.
332	IRON AND STEEL FOUNDRIES	9852	3499	215.	157.	38.	410.	815.	596.	142.	1553.
333	PRIMARY NONFERROUS METALS	964	1276	53.	103.	21.	176.	200.	390.	78.	667.
334	SECONDARY NONFERROUS METALS	2537	1228	1693.	10974.	13.	12681.	6410.	41541.	51.	48002.
335	NONFERROUS ROLLING AND DRAWING	12413	8621	220.	321.	47.	588.	833.	1215.	179.	2227.
336	NONFERROUS FOUNDRIES	26367	10748	55.	130.	81.	266.	209.	490.	306.	1006.
339	MISCELLANEOUS PRIMARY METAL PRODUCTS	2654	956	10.	23.	8.	40.	38.	86.	29.	153.
33	PRIMARY METAL INDUSTRIES	78031	35710	8048.	13714.	290.	22053.	30466.	51915.	1098.	83479.
341	METAL CANS & SHIPPING CONTAINERS	8977	1957	5.	0.	19.	24.	20.	0.	71.	90.
342	CUTLERY, HAND TOOLS, AND HARDWARE	23830	4706	44.	175.	34.	253.	167.	663.	129.	959.
343	PLUMBING AND HEATING, EXCEPT ELECTRIC	9175	1311	8.	0.	1.	8.	28.	0.	3.	31.
344	FABRICATED STRUCTURAL METAL PRODUCTS	43937	6432	48.	66.	18.	132.	181.	250.	68.	498.
345	SCREW MACHINE PRODUCTS, BOLTS, ETC.	10396	1106	2.	4.	4.	10.	8.	14.	15.	38.
346	METAL FORGINGS & STAMPINGS	12141	249	7.	0.	1.	8.	27.	0.	2.	29.
347	METAL SERVICES, NEC	17374	9490	120.	1129.	67.	1315.	453.	4274.	252.	4980.
348	ORDNANCE AND ACCESSORIES, NEC	2677	1659	84.	6.	2.	92.	316.	23.	7.	347.
349	MISC. FABRICATED METAL PRODUCTS	23344	873	8.	9.	4.	21.	32.	33.	15.	80.
34	FABRICATED METAL PRODUCTS	151851	27783	326.	1389.	148.	1863.	1233.	5258.	561.	7052.

[1] NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 4 (CONTINUED)

REPORTED ANNUAL WATER INTAKE BY TYPE OF USE AND INDUSTRY GROUP IN 1979

SIC CODE	INDUSTRY GROUP	NUMBER OF EMPLOYEES		WATER INTAKE (million gallons)				WATER INTAKE (megalitres)			
		TOTAL	REPORTING[1]	COOLING	PROCESSING	SANITARY	TOTAL	COOLING	PROCESSING	SANITARY	TOTAL
351	ENGINES AND TURBINES	9006	6625	20.	229.	73.	321.	74.	866.	274.	1215.
352	FARM AND GARDEN MACHINERY	6455	689	1.	0.	6.	7.	5.	0.	22.	27.
353	CONSTRUCTION AND RELATED MACHINERY	22882	5156	10.	40.	47.	97.	37.	152.	177.	366.
354	METALWORKING MACHINERY	19291	1914	9.	1.	8.	19.	34.	6.	32.	72.
355	SPECIAL INDUSTY MACHINERY	12823	0	0.	0.	0.	0.	0.	0.	0.	0.
356	GENERAL INDUSTRIAL MACHINERY	28789	5612	37.	502.	21.	560.	141.	1900.	79.	2120.
357	OFFICE AND COMPUTING MACHINES	119759	52838	234.	456.	426.	1117.	886.	1726.	1614.	4227.
358	REFRIGERATION AND SERVICE MACHINERY	9519	122	0.	0.	1.	1.	0.	1.	4.	5.
359	MISC. MACHINERY, EXCEPT ELECTRICAL	48452	589	2.	2.	7.	12.	7.	9.	28.	44.
35	MACHINERY, EXCEPT ELECTRICAL	276976	73545	313.	1231.	589.	2133.	1184.	4660.	2231.	8076.
361	ELECTRIC DISTRIBUTING EQUIPMENT	8429	265	2.	0.	2.	4.	9.	0.	6.	15.
362	ELECTRICAL INDUSTRIAL APPARATUS	18902	2023	12.	2.	15.	28.	44.	7.	57.	107.
363	HOUSEHOLD APPLIANCES	6511	2110	14.	18.	15.	47.	54.	69.	55.	178.
364	ELECTRIC LIGHTING AND WIRING EQUIPMENT	25306	4015	21.	205.	17.	243.	80.	775.	66.	920.
365	RADIO AND TV RECEIVING EQUIPMENT	18803	2410	9.	22.	14.	44.	29.	85.	52.	165.
366	COMMUNICATION EQUIPMENT	123559	55084	372.	233.	221.	826.	1407.	882.	837.	3125.
367	ELECTRONIC COMPONENTS AND ACCESSORIES	157854	51864	297.	571.	192.	1060.	1126.	2161.	726.	4013.
369	MISC. ELECTRICAL EQUIPMENT & SUPPLIES	12486	2055	9.	11.	25.	43.	30.	40.	93.	163.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	371850	119826	734.	1062.	500.	2295.	2778.	4018.	1891.	8688.
371	MOTOR VEHICLES AND EQUIPMENT	39772	15375	87.	240.	32.	360.	330.	910.	123.	1362.
372	AIRCRAFT THEI PARTS	78326	37349	165.	195.	193.	553.	623.	738.	732.	2094.
373	SHIP AND BOAT BUILDING AND REPAIRING	30778	21435	1731.	2420.	236.	4387.	6554.	9159.	893.	16606.
374	RAILROAD EQUIPMENT	633	0	0.	0.	0.	0.	0.	0.	0.	0.
375	MOTORCYCLES, BICYCLES, AND PARTS	3417	0	0.	0.	0.	0.	0.	0.	0.	0.
376	GUIDED MISSELS, SPACE VEHICLES, & PARTS	47310	40245	613.	692.	105.	1410.	2319.	2620.	397.	5336.
379	MISCELLANEOUS TRANSPORTATION EQUIPMENT	5819	0	0.	0.	0.	0.	0.	0.	0.	0.
37	TRANSPORTATION EQUIPMENT	206055	114404	2595.	3547.	567.	6709.	9825.	13427.	2145.	25397.
381	ENGINEERING & SCIENTIFIC INSTRUMENTS	18436	2709	225.	144.	29.	399.	855.	546.	111.	1512.
382	MEASURING & CONTROLLING INSTRUMENTS	37406	9472	63.	105.	48.	216.	238.	397.	183.	818.
383	OPTICAL INSTRUMENTS AND LENSES	6627	1429	4.	26.	26.	56.	15.	99.	98.	212.
384	MEDICAL INSTRUMENTS AND SUPPLIES	21713	4977	15.	18.	26.	58.	56.	67.	98.	221.
385	OPHTHALMIC GOODS	4557	778	0.	0.	3.	3.	0.	0.	12.	12.
386	PHOTOGRAPHIC EQUIPMENT AND SUPPLIES	7347	0	0.	0.	0.	0.	0.	0.	0.	0.
387	WATCHES, CLOCKS, AND WATCHCASES	820	0	0.	0.	0.	0.	0.	0.	0.	0.
38	INSTRUMENTS AND RELATED PRODUCTS	96906	19365	307.	293.	133.	733.	1163.	1109.	502.	2775.
391	JEWELRY, SILVERWARE, AND PLATED WARE	4629	756	2.	16.	3.	22.	8.	61.	13.	82.
393	MUSICAL INSTRUMENTS	4130	727	0.	0.	4.	4.	0.	1.	15.	16.
394	TOYS AND SPORTING GOODS	16180	3421	17.	4.	11.	31.	63.	15.	40.	118.
395	PENS, PENCILS, OFFICE AND ART MATERIALS	4116	0	0.	0.	0.	0.	0.	0.	0.	0.
396	COSTUME JEWELRY AND NOTIONS	3130	165	0.	1.	1.	2.	0.	3.	2.	6.
398	MISCELLANEOUS MANUFACTURES	30684	8825	58.	14.	36.	108.	220.	52.	137.	409.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	62868	13894	77.	35.	55.	167.	291.	131.	208.	631.
	TOTAL	2026609	644236	119946.	118419.	4894.	243259.	454047.	448270.	18526.	920843.

[1] NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 5

REPORTED ANNUAL FRESH WATER INTAKE, RECIRCULATION, AND DISCHARGE IN 1979

IN MILLIONS OF GALLONS
1 MILLION GALLONS = 3.7854 MEGALITRES

SIC CODE	INDUSTRY GROUP	TOTAL NO. OF EMPLOYEES	RECIRCULATION					DISCHARGE		
			EMPLOYEE REPORTING 1/	INTAKE	RECYCLED	GROSS USE	RECYCLE RATE	EMPLOYEE REPORT	INTAKE	WATER DISCHARGE
201	MEAT PRODUCTS	19281	4374	1569.	2033.	3602.	2.	9442	2620.	2196.
202	DAIRY PRODUCTS	7977	2765	3050.	2890.	5940.	2.	4238	4122.	3431.
203	PRESERVED FRUITS AND VEGETABLES	46769	30364	20762.	28668.	49430.	2.	35757	22327.	18631.
204	GRAIN MILL PRODUCTS	8375	2227	486.	520.	1006.	2.	4993	746.	483.
205	BAKERY PRODUCTS	21549	2825	280.	969.	1249.	4.	7499	1043.	432.
206	SUGAR AND CONFECTIONARY PRODUCTS	7465	4720	5148.	12353.	17500.	3.	5204	4106.	2692.
207	FATS AND OILS	2695	2144	385.	1662.	2047.	5.	2644	670.	358.
208	BEVERAGES	19652	8208	4036.	5621.	9657.	2.	12975	5890.	4211.
209	MISC. FOODS AND KINDRED PRODUCTS	25393	3960	2957.	5109.	8066.	3.	14332	5431.	3973.
20	FOOD AND KINDRED PRODUCTS	159156	61587	38673.	59824.	98497.	3.	97084	46956.	36472.
212	CIGARS	13	0	0.	0.	0.	0.	0	0.	0.
213	CHEWING AND SMOKING TOBACCO	300	0	0.	0.	0.	0.	0	0.	0.
21	TOBACCO MANUFACTURES	313	0	0.	0.	0.	0.	0	0.	0.
221	WEAVING MILLS, COTTON	1077	0	0.	0.	0.	0.	0	0.	0.
222	WEAVING MILLS, SYNTHETICS	740	0	0.	0.	0.	0.	0	0.	0.
223	WEAVING AND FINISHING MILLS, WOOL	60	0	0.	0.	0.	0.	0	0.	0.
224	NARROW FABRIC MILLS	296	0	0.	0.	0.	0.	0	0.	0.
225	KNITTING MILLS	5967	0	0.	0.	0.	0.	0	0.	0.
226	TEXTILE FINISHING, EXCEPT WOOL	1414	0	0.	0.	0.	0.	0	0.	0.
227	FLOOR COVERING MILLS	5600	0	0.	0.	0.	0.	0	0.	0.
228	YARN AND THREAD MILLS	1926	0	0.	0.	0.	0.	0	0.	0.
229	MISCELLANEOUS TEXTILE GOODS	3404	88	0.	6.	6.	18.	88	0.	0.
22	TEXTILE MILL PRODUCTS	20484	88	0.	6.	6.	18.	88	0.	0.
231	MEN'S AND BOYS' SUITS AND COATS	3753	0	0.	0.	0.	0.	0	0.	0.
232	MEN'S AND BOYS' FURNISHINGS	15436	0	0.	0.	0.	0.	0	0.	0.
233	WOMEN'S AND MISSES' OUTERWEAR	49959	0	0.	0.	0.	0.	0	0.	0.
234	WOMEN'S AND CHILDREN'S UNDERGARMENTS	4104	0	0.	0.	0.	0.	0	0.	0.
235	HATS, CAPS, AND MILLINERY	719	0	0.	0.	0.	0.	0	0.	0.
236	CHILDREN'S OUTERWEAR	1985	0	0.	0.	0.	0.	0	0.	0.
237	FUR GOODS	172	0	0.	0.	0.	0.	0	0.	0.
238	MISCELLANEOUS APPAREL AND ACCESSORIES	3182	0	0.	0.	0.	0.	0	0.	0.
239	MISC. FABRICATED TEXTILE PRODUCTS	20017	231	1.	0.	1.	1.	332	2.	2.
23	APPAREL AND OTHER TEXTILE PRODUCTS	99327	231	1.	0.	1.	1.	332	2.	2.
241	LOGGING CAMPS & LOGGING CONTRACTORS	3571	0	0.	0.	0.	0.	0	0.	0.
242	SAWMILLS AND PLANING MILLS	18499	5489	13153.	15220.	28372.	2.	8596	13453.	8735.
243	MILLWORK, PLYWOOD & STRUCTURAL MEMBERS	21294	0	0.	0.	0.	0.	32	0.	0.
244	WOODEN CONTAINERS	4600	0	0.	0.	0.	0.	0	0.	0.
245	WOOD BUILDINGS & MOBILE HOMES	7383	0	0.	0.	0.	0.	0	0.	0.
249	MISCELLANEOUS WOOD PRODUCTS	8356	271	113.	78.	191.	2.	288	116.	18.
24	LUMBER AND WOOD PRODUCTS	63703	5760	13266.	15297.	28563.	2.	8916	13569.	8753.

1/ NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 5 (CONTINUED)

REPORTED ANNUAL FRESH WATER INTAKE, RECIRCULATION, AND DISCHARGE IN 1979

IN MILLIONS OF GALLONS
1 MILLION GALLONS = 3.7854 MEGALITRES

SIC CODE	INDUSTRY GROUP	TOTAL NO. OF EMPLOYEES	RECIRCULATION					DISCHARGE		
			EMPLOYEE REPORTING 1/	INTAKE	RECYCLED	GROSS USE	RECYCLE RATE	EMPLOYEE REPORT	INTAKE	WATER DISCHARGE
251	HOUSEHOLD FURNITURE	37424	0	0.	0.	0.	0.	148	2.	2.
252	OFFICE FURNITURE	7570	0	0.	0.	0.	0.	0	0.	0.
253	PUBLIC BUILDING & RELATED FURNITURE	3729	392	43.	0.	43.	1.	1497	59.	45.
254	PARTITIONS AND FIXTURES	8526	722	49.	114.	163.	3.	762	49.	42.
259	MISCELLANEOUS FURNITURE AND FIXTURES	4924	91	1.	0.	1.	1.	170	1.	1.
25	FURNITURE AND FIXTURES	62173	1205	93.	114.	207.	2.	2577	112.	90.
261	PULP MILLS	470	1055	17567.	112800.	130367.	7.	1055	17567.	17020.
262	PAPER MILLS, EXCEPT BUILDING PAPER MILLS	4312	2999	7533.	86570.	94103.	12.	3262	7556.	7256.
263	PAPERBOARD MILLS	3291	1176	4070.	27525.	31595.	8.	2085	4157.	3673.
264	MISC. CONVERTED PAPER PRODUCTS	14729	3553	2003.	15280.	17282.	9.	7469	2091.	1930.
265	PAPERBOARD CONTAINERS AND BOXES	15081	3877	670.	4788.	5458.	8.	7867	940.	592.
266	BUILDING PAPER AND BOARD MILLS	896	777	199.	184.	383.	2.	802	199.	133.
26	PAPER AND ALLIED PRODUCTS	38779	13437	32042.	247146.	279188.	9.	22540	32511.	30654.
271	NEWSPAPERS	39464	0	0.	0.	0.	0.	0	0.	0.
272	PERIODICALS	10240	0	0.	0.	0.	0.	0	0.	0.
273	BOOKS	11347	0	0.	0.	0.	0.	0	0.	0.
274	MISCELLANEOUS PUBLISHING	8868	0	0.	0.	0.	0.	0	0.	0.
275	COMMERCIAL PRINTING	40902	738	29.	16.	45.	2.	2137	42.	25.
276	MANIFOLD BUSINESS FORMS	4423	0	0.	0.	0.	0.	0	0.	0.
277	GREETING CARD PUBLISHING	523	0	0.	0.	0.	0.	0	0.	0.
278	BLANKBOOKS AND BOOKBINDING	3855	0	0.	0.	0.	0.	285	2.	1.
279	PRINTING TRADE SERVICES	3323	0	0.	0.	0.	0.	0	0.	0.
27	PRINTING AND PUBLISHING	122945	738	29.	16.	45.	2.	2422	44.	26.
281	INDUSTRIAL INORGANIC CHEMICALS	11739	3044	2551.	12880.	15431.	5.	5124	3381.	1720.
282	PLASTICS MATERIALS AND SYNTHETICS	9591	3010	1175.	3262.	4437.	4.	4576	1300.	1051.
283	DRUGS	20668	5389	1280.	2712.	3993.	3.	8323	1391.	1186.
284	SOAP, CLEANERS, AND TOILET GOODS	15736	3115	1418.	2149.	3567.	3.	6540	1534.	1275.
285	PAINTS AND ALLIED PRODUCTS	7831	2392	109.	232.	341.	3.	3960	239.	175.
286	INDUSTRIAL ORGANIC CHEMICALS	2230	579	832.	7464.	8297.	10.	823	851.	563.
287	AGRICULTURAL CHEMICALS	7008	2353	1701.	6301.	8003.	5.	3150	1741.	421.
289	MISCELLANEOUS CHEMICAL PRODUCTS	9010	1521	715.	17205.	17921.	25.	3656	1246.	779.
28	CHEMICALS AND ALLIED PRODUCTS	83813	21403	9783.	52206.	61989.	5.	36152	11683.	7170.
291	PETROLEUM REFINING	17170	7838	21086.	391564.	412650.	20.	8842	23522.	11039.
295	PAVING AND ROOFING MATERIALS	4073	969	817.	613.	1431.	2.	1510	961.	282.
299	MISC. PETROLEUM AND COAL PRODUCTS	1697	155	55.	913.	969.	17.	434	109.	51.
29	PETROLEUM AND COAL PRODUCTS	22940	8962	21959.	393091.	415050.	19.	10786	24592.	11383.
301	TIRES AND INNER TUBES	3264	3567	379.	6775.	7155.	19.	3787	382.	213.
302	RUBBER & PLASTICS FOOTWEAR	99	885	3.	75.	78.	23.	885	3.	3.
303	RECLAIMED RUBBER	450	269	3.	2.	6.	2.	269	3.	3.

1/ NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

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TABLE 5 (CONTINUED)

REPORTED ANNUAL FRESH WATER INTAKE, RECIRCULATION, AND DISCHARGE IN 1979

IN MILLIONS OF GALLONS
1 MILLION GALLONS = 3.7854 MEGALITRES

SIC CODE	INDUSTRY GROUP	TOTAL NO. OF EMPLOYEES	RECIRCULATION					DISCHARGE		
			EMPLOYEE REPORTING 1/	INTAKE	RECYCLED	GROSS USE	RECYCLE RATE	EMPLOYEE REPORT	INTAKE	WATER DISCHARGE
304	RUBBER & PLASTICS HOSE & BELTING	781	82	44.	127.	171.	4.	82	44.	13.
306	FABRICATED RUBBER PRODUCTS, NEC	10345	2704	109.	1433.	1541.	14.	5213	303.	231.
307	MISCELLANEOUS PLASTICS PRODUCTS	48503	10553	375.	6106.	6482.	17.	18523	1071.	872.
30	RUBBER & MISC. PLASTICS PRODUCTS	63442	18060	914.	14519.	15433.	17.	28759	1806.	1297.
311	LEATHER TANNING AND FINISHING	1406	459	118.	253.	371.	3.	794	230.	130.
313	BOOT & SHOE CUT STOCK & FINDINGS	204	0	0.	0.	0.	0.	0	0.	0.
314	FOOTWEAR, EXCEPT RUBBER	6703	0	0.	0.	0.	0.	0	0.	0.
315	LEATHER GLOVES & MITTENS	107	0	0.	0.	0.	0.	0	0.	0.
316	LUGGAGE	1401	0	0.	0.	0.	0.	0	0.	0.
317	HANDBAGS AND PERSONAL LEATHER GOODS	3524	0	0.	0.	0.	0.	0	0.	0.
319	LEATHER GOODS, NEC	1330	0	0.	0.	0.	0.	7	0.	0.
31	LEATHER AND LEATHER PRODUCTS	14675	459	118.	253.	371.	3.	801	230.	130.
321	FLAT GLASS	1852	1235	874.	6697.	7571.	9.	1301	877.	312.
322	GLASS AND GLASSWARE, PRESSED OR BLOWN	9216	4921	344.	3466.	3810.	11.	5346	360.	245.
323	PRODUCTS OF PURCHASED GLASS	5880	992	74.	566.	640.	9.	2009	131.	119.
324	CEMENT, HYDRAULIC	3426	2681	3021.	1727.	4748.	2.	3064	3269.	746.
325	STRUCTURAL CLAY PRODUCTS	2730	648	79.	52.	131.	2.	1575	169.	54.
326	POTTERY AND RELATED PRODUCTS	6521	654	40.	3.	42.	1.	2293	126.	44.
327	CONCRETE, GYPSUM, AND PLASTER PRODUCTS	23042	2907	1665.	3054.	4719.	3.	6152	2233.	312.
328	CUT STONE AND STONE PRODUCTS	1048	0	0.	0.	0.	0.	178	7.	7.
329	MISC. NONMETALLIC MINERAL PRODUCTS	10981	4459	1112.	9893.	11006.	10.	7069	1185.	233.
32	STONE, CLAY, & GLASS PRODUCTS	64696	18497	7209.	25458.	32666.	5.	28987	8356.	2072.
331	BLAST FURNACE AND BASIC STEEL PRODUCTS	23247	5845	3223.	29415.	32644.	10.	9382	3366.	3051.
332	IRON AND STEEL FOUNDRIES	9852	2239	99.	208.	307.	3.	3499	419.	349.
333	PRIMARY NONFERROUS METALS	964	671	126.	2428.	2555.	20.	1276	177.	135.
334	SECONDARY NONFERROUS METALS	2537	862	791.	656.	1447.	2.	1228	817.	79.
335	NONFERROUS ROLLING AND DRAWING	12410	7601	717.	6974.	7691.	11.	8621	748.	513.
336	NONFERROUS FOUNDRIES	26367	8885	393.	1999.	2393.	5.	10748	443.	320.
339	MISCELLANEOUS PRIMARY METAL PRODUCTS	2654	599	38.	4230.	4268.	112.	956	41.	30.
33	PRIMARY METAL INDUSTRIES	78031	27702	5394.	45909.	51303.	10.	35710	6010.	4467.
341	METAL CANS & SHIPPING CONTAINERS	8977	855	160.	147.	307.	2.	1957	176.	166.
342	CUTLERY, HAND TOOLS, AND HARDWARE	23830	4706	440.	3549.	3989.	9.	4706	440.	271.
343	PLUMBING AND HEATING, EXCEPT ELECTRIC	9175	1196	69.	750.	818.	12.	1311	69.	46.
344	FABRICATED STRUCTURAL METAL PRODUCTS	43937	4200	212.	590.	802.	4.	6432	248.	186.
345	SCREW MACHINE PRODUCTS, BOLTS, ETC.	10396	525	7.	2.	9.	1.	1106	10.	8.
346	METAL FORGINGS & STAMPINGS	12141	0	0.	0.	0.	0.	243	15.	10.
347	METAL SERVICES, NEC	17374	4662	761.	1553.	2314.	3.	9490	1741.	1499.
348	ORDNANCE AND ACCESSORIES, NEC	2677	1485	403.	5020.	5423.	13.	1659	409.	373.
349	MISC. FABRICATED METAL PRODUCTS	23344	110	3.	2.	12.	1.	873	23.	21.
34	FABRICATED METAL PRODUCTS	151851	17739	2059.	11614.	13672.	7.	27783	3130.	2590.

1/ NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

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TABLE 5 (CONTINUED)

REPORTED ANNUAL FRESH WATER INTAKE, RECIRCULATION, AND DISCHARGE IN 1979

IN MILLIONS OF GALLONS
1 MILLION GALLONS = 3.7854 MEGALITRES

SIC CODE	INDUSTRY GROUP	TOTAL NO. OF EMPLOYEES	RECIRCULATION					DISCHARGE		
			EMPLOYEE REPORTING 1/	INTAKE	RECYCLED	GROSS USE	RECYCLE RATE	EMPLOYEE REPORT	INTAKE	WATER DISCHARGE
351	ENGINES AND TURBINES	9006	5323	341.	2486.	2827.	8.	6625	354.	250.
352	FARM AND GARDEN MACHINERY	6455	689	7.	1.	9.	1.	689	7.	6.
353	CONSTRUCTION AND RELATED MACHINERY	22882	3017	145.	37.	183.	1.	5156	181.	135.
354	METALWORKING MACHINERY	19291	1494	21.	5.	26.	1.	1914	54.	47.
355	SPECIAL INDUSTY MACHINERY	12823	0	0.	0.	0.	0.	0	0.	0.
356	GENERAL INDUSTRIAL MACHINERY	28789	3383	588.	750.	1338.	2.	5612	638.	557.
357	OFFICE AND COMPUTING MACHINES	119759	32866	1105.	528.	1734.	2.	52838	1491.	1043.
358	REFRIGERATION AND SERVICE MACHINERY	9519	0	0.	0.	0.	0.	122	1.	0.
359	MISC. MACHINERY, EXCEPT ELECTRICAL	48452	117	4.	16.	20.	5.	589	12.	9.
35	MACHINERY, EXCEPT ELECTRICAL	276976	46889	2214.	3922.	6136.	3.	73545	2739.	2037.
361	ELECTRIC DISTRIBUTING EQUIPMENT	8429	0	0.	0.	0.	0.	265	4.	4.
362	ELECTRICAL INDUSTRIAL APPARATUS	18902	2023	56.	37.	93.	2.	2023	56.	48.
363	HOUSEHOLD APPLIANCES	6511	2110	69.	52.	120.	2.	2110	69.	27.
364	ELECTRIC LIGHTING AND WIRING EQUIPMENT	25306	378	15.	90.	107.	7.	4015	244.	210.
365	RADIO AND TV RECEIVING EQUIPMENT	18803	1745	86.	883.	969.	11.	2410	103.	76.
366	COMMUNICATION EQUIPMENT	123559	26472	986.	4793.	5779.	5.	55084	1434.	1054.
367	ELECTRONIC COMPONENTS AND ACCESSORIES	157854	30182	1345.	15116.	16462.	12.	51864	2258.	2015.
369	MISC. ELECTRICAL EQUIPMENT & SUPPLIES	12486	2055	65.	732.	797.	12.	2055	65.	55.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	371850	64965	2624.	21703.	24327.	9.	119826	4233.	3450.
371	MOTOR VEHICLES AND EQUIPMENT	39772	11836	360.	11080.	11440.	32.	15375	606.	390.
372	AIRCRAFT AND PARTS	78326	18436	680.	1303.	1983.	3.	37349	1022.	743.
373	SHIP AND BOAT BUILDING AND REPAIRING	30778	1516	59.	52.	111.	2.	21435	1137.	197.
374	RAILROAD EQUIPMENT	633	0	0.	0.	0.	0.	0	0.	0.
375	MOTORCYCLES, BICYCLES, AND PARTS	3417	0	0.	0.	0.	0.	0	0.	0.
376	GUIDED MISSELS, SPACE VEHICLES, & PARTS	47310	40245	2101.	1686.	3787.	2.	40245	2101.	1688.
379	MISCELLANEOUS TRANSPORTATION EQUIPMENT	5819	0	0.	0.	0.	0.	0	0.	0.
37	TRANSPORTATION EQUIPMENT	206055	72033	3199.	14121.	17320.	5.	114404	4866.	3019.
381	ENGINEERING & SCIENTIFIC INSTRUMENTS	18436	2408	402.	6356.	6758.	17.	2709	407.	36.
382	MEASURING & CONTROLLING INSTRUMENTS	37406	6778	177.	127.	304.	2.	9472	284.	218.
383	OPTICAL INSTRUMENTS AND LENSES	6627	753	45.	1.	47.	1.	1429	56.	53.
384	MEDICAL INSTRUMENTS AND SUPPLIES	21713	3001	39.	60.	100.	3.	4977	62.	34.
385	OPHTHALMIC GOODS	4557	0	0.	0.	0.	0.	778	3.	3.
386	PHOTOGRAPHIC EQUIPMENT AND SUPPLIES	7347	0	0.	0.	0.	0.	0	0.	0.
387	WATCHES, CLOCKS, AND WATCHCASES	820	0	0.	0.	0.	0.	0	0.	0.
38	INSTRUMENTS AND RELATED PRODUCTS	96906	12940	665.	6544.	7209.	11.	19365	811.	344.
391	JEWELRY, SILVERWARE, AND PLATED WARE	4628	323	7.	0.	7.	1.	756	22.	20.
393	MUSICAL INSTRUMENTS	4130	727	4.	0.	5.	1.	727	4.	4.
394	TOYS AND SPORTING GOODS	16180	1727	35.	124.	159.	5.	3421	51.	32.
395	PENS, PENCILS, OFFICE AND ART MATERIALS	4116	0	0.	0.	0.	0.	0	0.	0.
396	COSTUME JEWELRY AND NOTIONS	3130	0	0.	0.	0.	0.	165	2.	1.
399	MISCELLANEOUS MANUFACTURES	30684	1655	72.	1004.	1076.	15.	8825	121.	96.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	62868	4432	118.	1129.	1247.	11.	13894	200.	153.
	EMPLOYEE TOTAL	2026608	397127					643971		
	MILLION GALLONS TOTAL			140356.	912873.	1053229.	8.		161849.	114130.
	ACRE FEET TOTAL			430737.	2801504.	3232240.			496696.	350435.
	MEGALITRE TOTAL			531309.	3455626.	3986935.			612669.	432258.

1/ NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
AMADOR								
20	FOOD AND KINDRED PRODUCTS	1	1	10	5	2.	0.	1.
23	APPAREL AND OTHER TEXTILE PRODUCTS	1	0	7	0	0.	0.	0.
24	LUMBER AND WOOD PRODUCTS	5	2	679	719	932.	246.	756.
27	PRINTING AND PUBLISHING	1	0	15	0	1.	0.	1.
28	CHEMICALS AND ALLIED PRODUCTS	1	1	25	26	247.	65.	200.
32	STONE, CLAY, & GLASS PRODUCTS	5	1	225	89	1800.	476.	1460.
35	MACHINERY, EXCEPT ELECTRICAL	4	0	33	0	2.	1.	2.
	TOTAL	18	5	994	839	2985.	789.	2420.
BUTTE								
20	FOOD AND KINDRED PRODUCTS	21	9	1047	613	2391.	632.	1939.
24	LUMBER AND WOOD PRODUCTS	20	2	1413	110	1308.	345.	1060.
25	FURNITURE AND FIXTURES	4	0	54	0	3.	1.	3.
27	PRINTING AND PUBLISHING	9	0	283	0	18.	5.	15.
28	CHEMICALS AND ALLIED PRODUCTS	2	0	100	0	39.	10.	32.
30	RUBBER & MISC. PLASTICS PRODUCTS	1	1	10	90	193.	51.	157.
32	STONE, CLAY, & GLASS PRODUCTS	6	0	124	0	261.	69.	211.
33	PRIMARY METAL INDUSTRIES	2	1	29	80	7.	2.	6.
34	FABRICATED METAL PRODUCTS	5	1	150	110	44.	12.	35.
35	MACHINERY, EXCEPT ELECTRICAL	20	0	672	0	58.	15.	47.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	2	0	17	0	3.	1.	2.
37	TRANSPORTATION EQUIPMENT	2	0	70	0	7.	2.	5.
38	INSTRUMENTS AND RELATED PRODUCTS	2	0	30	0	2.	0.	1.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	11	0	424	0	35.	9.	29.
	TOTAL	107	14	4423	1003	4369.	1154.	3542.
CALAVERAS								
24	LUMBER AND WOOD PRODUCTS	3	1	58	30	719.	190.	583.
25	FURNITURE AND FIXTURES	2	0	12	0	0.	0.	0.
27	PRINTING AND PUBLISHING	3	0	27	0	1.	0.	1.
28	CHEMICALS AND ALLIED PRODUCTS	2	0	307	0	51.	13.	41.
32	STONE, CLAY, & GLASS PRODUCTS	1	1	6	251	2394.	632.	1941.
33	PRIMARY METAL INDUSTRIES	1	0	15	0	4.	1.	3.
34	FABRICATED METAL PRODUCTS	1	0	20	0	1.	0.	1.
35	MACHINERY, EXCEPT ELECTRICAL	1	0	6	0	0.	0.	0.
	TOTAL	14	2	451	281	3170.	837.	2570.
COLUSA								
20	FOOD AND KINDRED PRODUCTS	3	4	103	104	40.	11.	33.
27	PRINTING AND PUBLISHING	1	0	14	0	1.	0.	1.
32	STONE, CLAY, & GLASS PRODUCTS	2	0	15	0	62.	16.	50.
33	PRIMARY METAL INDUSTRIES	1	1	173	150	142.	38.	115.
	TOTAL	7	5	305	254	245.	65.	199.

1/NUMBER OF PLANTS INCLUDED IN THE SURVEY.
2/NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
COLUSA								
20	FOOD AND KINDRED PRODUCTS	3	4	103	104	40.	11.	33.
27	PRINTING AND PUBLISHING	1	0	14	0	1.	0.	1.
32	STONE, CLAY, & GLASS PRODUCTS	2	0	15	0	62.	16.	50.
33	PRIMARY METAL INDUSTRIES	1	1	173	150	142.	38.	115.
	TOTAL	7	5	305	254	245.	65.	199.
CONTRA COSTA								
20	FOOD AND KINDRED PRODUCTS	20	8	3652	1645	5571.	1472.	4517.
22	TEXTILE MILL PRODUCTS	2	0	27	0	1.	0.	0.
23	APPAREL AND OTHER TEXTILE PRODUCTS	8	0	172	0	4.	1.	3.
24	LUMBER AND WOOD PRODUCTS	20	0	619	0	41.	11.	34.
25	FURNITURE AND FIXTURES	13	0	279	0	17.	4.	14.
26	PAPER AND ALLIED PRODUCTS	12	5	1761	1519	22909.	6052.	18573.
27	PRINTING AND PUBLISHING	53	0	1687	0	98.	26.	80.
28	CHEMICALS AND ALLIED PRODUCTS	40	15	3261	2085	12051.	3183.	9770.
29	PETROLEUM AND COAL PRODUCTS	13	7	6357	3791	57439.	15174.	46566.
30	RUBBER & MISC. PLASTICS PRODUCTS	15	5	447	195	82.	22.	67.
32	STONE, CLAY, & GLASS PRODUCTS	17	3	754	557	796.	210.	645.
33	PRIMARY METAL INDUSTRIES	14	8	3118	2758	10002.	2642.	8108.
34	FABRICATED METAL PRODUCTS	38	3	1338	63	281.	74.	228.
35	MACHINERY, EXCEPT ELECTRICAL	39	0	772	0	64.	17.	52.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	37	0	1526	0	191.	50.	155.
37	TRANSPORTATION EQUIPMENT	10	0	723	0	127.	33.	103.
38	INSTRUMENTS AND RELATED PRODUCTS	34	1	2944	125	237.	62.	192.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	21	2	792	639	28.	7.	22.
	TOTAL	406	57	30229	13379	109938.	29042.	89128.
DEL NORTE								
24	LUMBER AND WOOD PRODUCTS	0	0	0	0	0.	0.	0.
20	FOOD AND KINDRED PRODUCTS	1	0	12	0	35.	9.	28.
23	APPAREL AND OTHER TEXTILE PRODUCTS	1	0	6	0	0.	0.	0.
24	LUMBER AND WOOD PRODUCTS	11	2	1262	379	244.	65.	198.
27	PRINTING AND PUBLISHING	2	0	25	0	1.	0.	1.
29	PETROLEUM AND COAL PRODUCTS	1	0	20	0	88.	23.	71.
35	MACHINERY, EXCEPT ELECTRICAL	1	0	12	0	2.	0.	1.
37	TRANSPORTATION EQUIPMENT	1	0	14	0	3.	1.	2.
	TOTAL	18	2	1351	379	373.	99.	302.
EL DORADO								
24	LUMBER AND WOOD PRODUCTS	0	0	0	0	0.	0.	0.
20	FOOD AND KINDRED PRODUCTS	1	0	12	0	8.	2.	7.
24	LUMBER AND WOOD PRODUCTS	17	2	735	237	1148.	303.	931.
25	FURNITURE AND FIXTURES	2	0	15	0	1.	0.	1.
27	PRINTING AND PUBLISHING	10	0	180	0	12.	3.	9.
28	CHEMICALS AND ALLIED PRODUCTS	1	1	15	5	34.	9.	28.

1/NUMBER OF PLANTS INCLUDED IN THE SURVEY.
2/NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
EL DORADO (CONTINUED)								
29	PETROLEUM AND COAL PRODUCTS	1	0	6	0	26.	7.	21.
32	STONE, CLAY, & GLASS PRODUCTS	4	2	122	117	45.	12.	36.
34	FABRICATED METAL PRODUCTS	1	0	9	0	8.	2.	6.
35	MACHINERY, EXCEPT ELECTRICAL	3	0	22	0	2.	1.	2.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	1	0	6	0	0.	0.	0.
	TOTAL	41	5	1122	360	1283.	339.	1040.
FRESNO								
20	FOOD AND KINDRED PRODUCTS	83	48	8178	3811	23137.	6112.	18757.
22	TEXTILE MILL PRODUCTS	2	0	255	0	9.	2.	7.
23	APPAREL AND OTHER TEXTILE PRODUCTS	10	0	619	0	20.	5.	16.
24	LUMBER AND WOOD PRODUCTS	39	3	930	261	76.	20.	61.
25	FURNITURE AND FIXTURES	9	0	332	0	45.	12.	37.
26	PAPER AND ALLIED PRODUCTS	5	3	242	65	121.	32.	98.
27	PRINTING AND PUBLISHING	42	0	1290	0	76.	20.	62.
28	CHEMICALS AND ALLIED PRODUCTS	19	4	857	343	3712.	981.	3009.
29	PETROLEUM AND COAL PRODUCTS	1	0	20	0	201.	53.	163.
30	RUBBER & MISC. PLASTICS PRODUCTS	12	2	268	138	13.	3.	10.
32	STONE, CLAY, & GLASS PRODUCTS	30	5	1234	719	693.	183.	562.
33	PRIMARY METAL INDUSTRIES	10	2	179	95	65.	17.	53.
34	FABRICATED METAL PRODUCTS	52	2	1855	49	313.	83.	254.
35	MACHINERY, EXCEPT ELECTRICAL	77	2	3716	438	440.	116.	357.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	15	0	229	0	27.	7.	22.
37	TRANSPORTATION EQUIPMENT	25	1	2392	611	252.	67.	205.
38	INSTRUMENTS AND RELATED PRODUCTS	14	0	249	0	15.	4.	12.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	13	2	342	105	19.	5.	16.
	TOTAL	458	74	23187	6637	29235.	7723.	23701.
GLENN								
20	FOOD AND KINDRED PRODUCTS	8	6	536	302	3021.	798.	2449.
24	LUMBER AND WOOD PRODUCTS	2	0	37	0	25.	7.	20.
27	PRINTING AND PUBLISHING	1	0	25	0	2.	0.	1.
28	CHEMICALS AND ALLIED PRODUCTS	1	0	6	0	12.	3.	9.
32	STONE, CLAY, & GLASS PRODUCTS	6	1	335	308	340.	90.	275.
33	PRIMARY METAL INDUSTRIES	1	0	7	0	1.	0.	1.
35	MACHINERY, EXCEPT ELECTRICAL	2	0	114	0	5.	1.	4.
37	TRANSPORTATION EQUIPMENT	1	0	225	0	39.	10.	31.
	TOTAL	22	7	1285	610	3444.	910.	2792.
HUMBOLDT								
20	FOOD AND KINDRED PRODUCTS	12	10	528	191	2198.	581.	1782.
23	APPAREL AND OTHER TEXTILE PRODUCTS	2	0	19	0	1.	0.	0.
24	LUMBER AND WOOD PRODUCTS	71	5	7152	1571	9019.	2383.	7312.
25	FURNITURE AND FIXTURES	3	0	96	0	6.	1.	4.
26	PAPER AND ALLIED PRODUCTS	1	2	200	845	64038.	16917.	51916.
27	PRINTING AND PUBLISHING	7	0	85	0	4.	1.	3.

1/ NUMBER OF PLANTS INCLUDED IN THE SURVEY.
2/ NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
HUMBOLDT (CONTINUED)								
28	CHEMICALS AND ALLIED PRODUCTS	3	0	56	0	109.	29.	88.
29	PETROLEUM AND COAL PRODUCTS	1	0	30	0	132.	35.	107.
30	RUBBER & MISC. PLASTICS PRODUCTS	1	0	10	0	2.	1.	2.
31	LEATHER AND LEATHER PRODUCTS	1	0	10	0	1.	0.	0.
32	STONE, CLAY, & GLASS PRODUCTS	6	0	81	0	196.	52.	159.
33	PRIMARY METAL INDUSTRIES	2	0	13	0	6.	2.	5.
34	FABRICATED METAL PRODUCTS	6	0	77	0	23.	6.	19.
35	MACHINERY, EXCEPT ELECTRICAL	5	0	101	0	6.	2.	5.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	4	0	103	0	8.	2.	7.
	TOTAL	125	17	8561	2607	75748.	20010.	61410.
IMPERIAL								
20	FOOD AND KINDRED PRODUCTS	18	7	483	183	1624.	429.	1317.
23	APPAREL AND OTHER TEXTILE PRODUCTS	8	0	328	0	10.	3.	8.
24	LUMBER AND WOOD PRODUCTS	2	0	36	0	1.	0.	0.
27	PRINTING AND PUBLISHING	4	0	196	0	13.	3.	11.
28	CHEMICALS AND ALLIED PRODUCTS	6	0	195	0	440.	116.	357.
30	RUBBER & MISC. PLASTICS PRODUCTS	2	0	51	0	11.	3.	9.
32	STONE, CLAY, & GLASS PRODUCTS	3	1	411	359	752.	199.	610.
35	MACHINERY, EXCEPT ELECTRICAL	5	0	65	0	4.	1.	3.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	1	0	25	0	2.	1.	2.
37	TRANSPORTATION EQUIPMENT	2	0	15	0	3.	1.	2.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	1	0	11	0	1.	0.	0.
	TOTAL	52	8	1815	547	2861.	756.	2320.
INYO								
20	FOOD AND KINDRED PRODUCTS	1	1	6	2	0.	0.	0.
27	PRINTING AND PUBLISHING	1	0	20	0	1.	0.	1.
30	RUBBER & MISC. PLASTICS PRODUCTS	1	1	45	65	9.	2.	7.
	TOTAL	3	2	71	67	10.	3.	8.
KERN								
20	FOOD AND KINDRED PRODUCTS	23	15	1503	875	3505.	926.	2842.
22	TEXTILE MILL PRODUCTS	2	0	27	0	1.	0.	1.
23	APPAREL AND OTHER TEXTILE PRODUCTS	7	0	330	0	8.	2.	6.
24	LUMBER AND WOOD PRODUCTS	12	0	345	0	142.	38.	115.
25	FURNITURE AND FIXTURES	4	0	82	0	15.	4.	12.
26	PAPER AND ALLIED PRODUCTS	2	0	26	0	15.	4.	12.
27	PRINTING AND PUBLISHING	20	0	544	0	33.	9.	27.
28	CHEMICALS AND ALLIED PRODUCTS	24	9	1750	1654	4563.	1205.	3700.
29	PETROLEUM AND COAL PRODUCTS	20	11	1909	1075	14714.	3887.	11929.
30	RUBBER & MISC. PLASTICS PRODUCTS	9	0	190	0	69.	18.	56.
31	LEATHER AND LEATHER PRODUCTS	1	0	10	0	1.	0.	0.
32	STONE, CLAY, & GLASS PRODUCTS	22	4	968	615	2821.	745.	2287.
33	PRIMARY METAL INDUSTRIES	5	0	858	0	213.	56.	173.

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TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
KERN (CONTINUED)								
34	FABRICATED METAL PRODUCTS	12	1	261	515	88.	23.	71.
35	MACHINERY, EXCEPT ELECTRICAL	53	1	1627	80	159.	42.	129.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	7	0	214	0	26.	7.	21.
37	TRANSPORTATION EQUIPMENT	15	0	320	0	34.	9.	28.
38	INSTRUMENTS AND RELATED PRODUCTS	3	0	159	0	80.	21.	65.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	6	0	87	0	4.	1.	4.
	TOTAL	248	41	11210	4816	26491.	6998.	21476.
KINGS								
20	FOOD AND KINDRED PRODUCTS	13	8	486	413	2088.	551.	1692.
22	TEXTILE MILL PRODUCTS	2	0	780	0	27.	7.	22.
24	LUMBER AND WOOD PRODUCTS	1	0	8	0	0.	0.	0.
26	PAPER AND ALLIED PRODUCTS	1	1	75	50	22.	6.	18.
27	PRINTING AND PUBLISHING	5	0	141	0	7.	2.	6.
28	CHEMICALS AND ALLIED PRODUCTS	5	0	79	0	176.	47.	143.
29	PETROLEUM AND COAL PRODUCTS	1	1	225	50	1933.	511.	1567.
30	RUBBER & MISC. PLASTICS PRODUCTS	1	1	700	646	327.	86.	265.
32	STONE, CLAY, & GLASS PRODUCTS	1	0	30	0	16.	4.	13.
34	FABRICATED METAL PRODUCTS	4	1	105	3	16.	4.	13.
35	MACHINERY, EXCEPT ELECTRICAL	8	0	171	0	13.	3.	11.
37	TRANSPORTATION EQUIPMENT	1	0	35	0	1.	0.	1.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	1	0	6	0	1.	0.	0.
	TOTAL	44	12	2841	1162	4626.	1222.	3751.
LAKE								
20	FOOD AND KINDRED PRODUCTS	1	1	6	5	1.	0.	1.
24	LUMBER AND WOOD PRODUCTS	4	0	7[illegible]	0	2.	0.	1.
25	FURNITURE AND FIXTURES	1	0	1[illegible]	0	1.	0.	0.
27	PRINTING AND PUBLISHING	2	0	34	0	2.	1.	2.
30	RUBBER & MISC. PLASTICS PRODUCTS	1	0	17	0	4.	1.	3.
32	STONE, CLAY, & GLASS PRODUCTS	2	0	17	0	70.	18.	57.
34	FABRICATED METAL PRODUCTS	1	0	15	0	3.	1.	2.
35	MACHINERY, EXCEPT ELECTRICAL	2	0	1[illegible]	0	1.	0.	1.
37	TRANSPORTATION EQUIPMENT	1	0	9	0	2.	0.	1.
	TOTAL	15	1	197	5	85.	22.	69.
LASSEN								
20	FOOD AND KINDRED PRODUCTS	0	1	0	1	0.	0.	0.
23	APPAREL AND OTHER TEXTILE PRODUCTS	1	0	6	0	0.	0.	0.
24	LUMBER AND WOOD PRODUCTS	11	1	514	49	581.	153.	471.
27	PRINTING AND PUBLISHING	3	0	50	0	3.	1.	2.
35	MACHINERY, EXCEPT ELECTRICAL	1	0	6	0	0.	0.	0.
37	TRANSPORTATION EQUIPMENT	1	0	7	0	1.	0.	1.
	TOTAL	17	2	583	50	585.	155.	474.

1/NUMBER OF PLANTS INCLUDED IN THE SURVEY.
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NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
MADERA								
20	FOOD AND KINDRED PRODUCTS	12	8	952	993	2857.	755.	2316.
24	LUMBER AND WOOD PRODUCTS	9	3	362	226	313.	83.	254.
26	PAPER AND ALLIED PRODUCTS	1	1	60	64	34.	9.	28.
27	PRINTING AND PUBLISHING	6	0	89	0	5.	1.	4.
28	CHEMICALS AND ALLIED PRODUCTS	1	0	21	0	66.	17.	54.
30	RUBBER & MISC. PLASTICS PRODUCTS	2	0	44	0	10.	3.	8.
32	STONE, CLAY, & GLASS PRODUCTS	7	2	456	366	722.	191.	585.
34	FABRICATED METAL PRODUCTS	5	0	205	0	27.	7.	22.
35	MACHINERY, EXCEPT ELECTRICAL	5	0	409	0	39.	10.	31.
37	TRANSPORTATION EQUIPMENT	1	0	110	0	6.	2.	5.
	TOTAL	52	14	2707	1649	4078.	1077.	3306.
MARIN								
20	FOOD AND KINDRED PRODUCTS	11	5	134	43	55.	14.	44.
22	TEXTILE MILL PRODUCTS	4	0	168	0	7.	2.	6.
23	APPAREL AND OTHER TEXTILE PRODUCTS	13	0	131	0	3.	1.	3.
24	LUMBER AND WOOD PRODUCTS	9	0	70	0	2.	0.	1.
25	FURNITURE AND FIXTURES	3	0	28	0	2.	0.	1.
26	PAPER AND ALLIED PRODUCTS	1	0	26	0	2.	1.	2.
27	PRINTING AND PUBLISHING	54	0	1048	0	90.	24.	73.
28	CHEMICALS AND ALLIED PRODUCTS	10	2	187	60	36.	10.	29.
30	RUBBER & MISC. PLASTICS PRODUCTS	12	0	295	0	65.	17.	52.
31	LEATHER AND LEATHER PRODUCTS	1	0	8	0	0.	0.	0.
32	STONE, CLAY, & GLASS PRODUCTS	8	2	154	199	183.	48.	148.
33	PRIMARY METAL INDUSTRIES	1	0	12	0	1.	0.	1.
34	FABRICATED METAL PRODUCTS	8	2	108	14	32.	9.	26.
35	MACHINERY, EXCEPT ELECTRICAL	13	0	322	0	29.	8.	23.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	18	0	1116	0	85.	22.	69.
37	TRANSPORTATION EQUIPMENT	6	0	88	0	16.	4.	13.
38	INSTRUMENTS AND RELATED PRODUCTS	6	0	350	0	32.	8.	26.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	12	1	331	30	21.	6.	17.
	TOTAL	190	12	4576	256	661.	175.	536.
MARIPOSA								
20	FOOD AND KINDRED PRODUCTS	0	0	0	0	0.	0.	0.
24	LUMBER AND WOOD PRODUCTS	1	0	7	0	1.	0.	1.
27	PRINTING AND PUBLISHING	1	0	12	0	1.	0.	1.
32	STONE, CLAY, & GLASS PRODUCTS	1	0	9	0	37.	10.	30.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	1	0	45	0	4.	1.	3.
	TOTAL	4	0	73	0	43.	11.	35.
MENDOCINO								
20	FOOD AND KINDRED PRODUCTS	9	10	195	209	1275.	337.	1034.
22	TEXTILE MILL PRODUCTS	1	0	83	0	4.	1.	3.
24	LUMBER AND WOOD PRODUCTS	49	5	1882	495	497.	131.	403.

1/NUMBER OF PLANTS INCLUDED IN THE SURVEY.
2/NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
MENDOCINO (CONTINUED)								
25	FURNITURE AND FIXTURES	3	0	228	0	13.	3.	10.
26	PAPER AND ALLIED PRODUCTS	1	1	500	385	1514.	400.	1228.
27	PRINTING AND PUBLISHING	5	0	116	0	7.	2.	6.
28	CHEMICALS AND ALLIED PRODUCTS	1	1	15	14	1.	0.	1.
32	STONE, CLAY, & GLASS PRODUCTS	4	0	144	0	165.	43.	133.
34	FABRICATED METAL PRODUCTS	7	1	363	115	21.	5.	17.
35	MACHINERY, EXCEPT ELECTRICAL	5	0	171	0	12.	3.	9.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	3	0	20	0	3.	1.	3.
37	TRANSPORTATION EQUIPMENT	2	0	27	0	2.	0.	1.
38	INSTRUMENTS AND RELATED PRODUCTS	1	0	31	0	2.	1.	2.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	3	0	30	0	1.	0.	1.
	TOTAL	94	18	3805	1218	3516.	929.	2850.
MERCED								
20	FOOD AND KINDRED PRODUCTS	23	13	6041	3744	18099.	4781.	14673.
22	TEXTILE MILL PRODUCTS	4	0	1220	0	49.	13.	40.
23	APPAREL AND OTHER TEXTILE PRODUCTS	1	0	65	0	1.	0.	1.
24	LUMBER AND WOOD PRODUCTS	9	0	236	0	5.	1.	4.
25	FURNITURE AND FIXTURES	1	0	11	0	1.	0.	1.
26	PAPER AND ALLIED PRODUCTS	2	2	201	215	16.	4.	13.
27	PRINTING AND PUBLISHING	7	0	264	0	16.	4.	13.
28	CHEMICALS AND ALLIED PRODUCTS	1	0	25	0	101.	27.	82.
29	PETROLEUM AND COAL PRODUCTS	1	0	175	0	768.	203.	623.
30	RUBBER & MISC. PLASTICS PRODUCTS	3	2	81	67	846.	224.	686.
32	STONE, CLAY, & GLASS PRODUCTS	4	1	62	3	186.	49.	151.
34	FABRICATED METAL PRODUCTS	8	0	320	0	93.	24.	75.
35	MACHINERY, EXCEPT ELECTRICAL	11	0	243	0	17.	4.	13.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	1	0	46	0	6.	1.	4.
37	TRANSPORTATION EQUIPMENT	6	0	449	0	37.	10.	30.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	1	0	7	0	0.	0.	0.
	TOTAL	83	18	9452	4031	20241.	5347.	16409.
MODOC								
24	LUMBER AND WOOD PRODUCTS	8	1	213	33	249.	56.	202.
27	PRINTING AND PUBLISHING	2	0	15	0	1.	0.	0.
	TOTAL	10	1	228	33	250.	56.	202.
MONO								
32	STONE, CLAY, & GLASS PRODUCTS	0	0	0	0	0.	0.	0.
27	PRINTING AND PUBLISHING	1	0	7	0	0.	0.	0.
32	STONE, CLAY, & GLASS PRODUCTS	1	1	35	20	0.	0.	0.
35	MACHINERY, EXCEPT ELECTRICAL	2	0	14	0	1.	0.	1.
	TOTAL	4	1	56	20	2.	0.	1.

1/NUMBER OF PLANTS INCLUDED IN THE SURVEY.
2/NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
MONTEREY								
20	FOOD AND KINDRED PRODUCTS	31	17	3063	2014	17162.	4534.	13913.
22	TEXTILE MILL PRODUCTS	1	0	12	0	1.	0.	0.
23	APPAREL AND OTHER TEXTILE PRODUCTS	8	0	218	0	7.	2.	6.
24	LUMBER AND WOOD PRODUCTS	9	0	157	0	3.	1.	3.
25	FURNITURE AND FIXTURES	3	0	34	0	2.	0.	1.
26	PAPER AND ALLIED PRODUCTS	2	1	185	173	38.	10.	31.
27	PRINTING AND PUBLISHING	25	0	1184	0	91.	24.	74.
28	CHEMICALS AND ALLIED PRODUCTS	8	3	692	112	1073.	283.	870.
30	RUBBER & MISC. PLASTICS PRODUCTS	4	2	135	1573	461.	122.	374.
31	LEATHER AND LEATHER PRODUCTS	1	0	6	0	0.	0.	0.
32	STONE, CLAY, & GLASS PRODUCTS	12	1	205	67	548.	145.	444.
33	PRIMARY METAL INDUSTRIES	2	1	255	138	2725.	720.	2209.
34	FABRICATED METAL PRODUCTS	4	1	43	13	9.	2.	8.
35	MACHINERY, EXCEPT ELECTRICAL	19	0	619	0	61.	16.	50.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	7	0	462	0	68.	18.	55.
37	TRANSPORTATION EQUIPMENT	6	0	51	0	5.	1.	4.
38	INSTRUMENTS AND RELATED PRODUCTS	4	0	71	0	12.	3.	10.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	7	0	71	0	4.	1.	4.
	T O T A L	153	26	7463	4095	22271.	5883.	18055.
NAPA								
20	FOOD AND KINDRED PRODUCTS	35	33	1205	693	466.	123.	378.
23	APPAREL AND OTHER TEXTILE PRODUCTS	5	0	574	0	19.	5.	16.
24	LUMBER AND WOOD PRODUCTS	9	0	129	0	3.	1.	3.
26	PAPER AND ALLIED PRODUCTS	2	0	36	0	14.	4.	11.
27	PRINTING AND PUBLISHING	10	0	226	0	10.	3.	8.
28	CHEMICALS AND ALLIED PRODUCTS	0	1	1	14	0.	0.	0.
31	LEATHER AND LEATHER PRODUCTS	2	1	98	80	67.	18.	55.
32	STONE, CLAY, & GLASS PRODUCTS	5	2	318	235	49.	13.	39.
33	PRIMARY METAL INDUSTRIES	1	1	750	982	208.	55.	169.
34	FABRICATED METAL PRODUCTS	3	0	170	0	9.	2.	8.
35	MACHINERY, EXCEPT ELECTRICAL	6	0	69	0	7.	2.	6.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	3	0	102	0	9.	2.	7.
38	INSTRUMENTS AND RELATED PRODUCTS	3	0	65	0	7.	2.	6.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	5	0	182	0	9.	3.	8.
	T O T A L	88	38	3924	2004	879.	232.	713.
NEVADA								
24	LUMBER AND WOOD PRODUCTS	0	0	0	0	0.	0.	0.
20	FOOD AND KINDRED PRODUCTS	1	0	7	0	14.	4.	11.
23	APPAREL AND OTHER TEXTILE PRODUCTS	1	0	8	0	0.	0.	0.
24	LUMBER AND WOOD PRODUCTS	8	3	478	228	181.	48.	147.
25	FURNITURE AND FIXTURES	1	0	7	0	0.	0.	0.
26	PAPER AND ALLIED PRODUCTS	1	0	7	0	1.	0.	1.
27	PRINTING AND PUBLISHING	5	0	88	0	6.	2.	5.
32	STONE, CLAY, & GLASS PRODUCTS	2	1	26	3	79.	21.	64.

1/ NUMBER OF PLANTS INCLUDED IN THE SURVEY.
2/ NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
NEVADA (CONTINUED)								
34	FABRICATED METAL PRODUCTS	2	0	24	0	6.	2.	5.
35	MACHINERY, EXCEPT ELECTRICAL	7	0	107	0	10.	3.	8.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	3	1	835	631	21.	5.	17.
38	INSTRUMENTS AND RELATED PRODUCTS	2	0	20	0	9.	2.	7.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	2	0	67	0	21.	6.	17.
	T O T A L	35	5	1674	862	350.	92.	284.
ORANGE								
20	FOOD AND KINDRED PRODUCTS	94	25	5194	1538	4585.	1211.	3717.
22	TEXTILE MILL PRODUCTS	51	0	2907	0	117.	31.	95.
23	APPAREL AND OTHER TEXTILE PRODUCTS	125	0	3584	0	102.	27.	83.
24	LUMBER AND WOOD PRODUCTS	145	1	3705	23	98.	26.	79.
25	FURNITURE AND FIXTURES	178	1	8614	626	558.	147.	452.
26	PAPER AND ALLIED PRODUCTS	60	9	4391	2042	6026.	1592.	4885.
27	PRINTING AND PUBLISHING	358	0	11012	0	750.	198.	608.
28	CHEMICALS AND ALLIED PRODUCTS	158	33	10576	5129	9496.	2508.	7698.
29	PETROLEUM AND COAL PRODUCTS	6	0	195	0	229.	60.	186.
30	RUBBER & MISC. PLASTICS PRODUCTS	262	40	11860	4959	1395.	369.	1131.
31	LEATHER AND LEATHER PRODUCTS	18	0	624	0	108.	29.	88.
32	STONE, CLAY, & GLASS PRODUCTS	110	10	3297	816	1236.	326.	1002.
33	PRIMARY METAL INDUSTRIES	62	14	2809	815	1155.	305.	937.
34	FABRICATED METAL PRODUCTS	427	28	17525	3785	3586.	947.	2907.
35	MACHINERY, EXCEPT ELECTRICAL	760	17	48735	19790	5784.	1528.	4689.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	495	11	48195	19394	6362.	1681.	5157.
37	TRANSPORTATION EQUIPMENT	215	4	22536	9350	3765.	995.	3052.
38	INSTRUMENTS AND RELATED PRODUCTS	244	3	24330	1849	4655.	1230.	3774.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	231	7	8972	3015	738.	195.	598.
	T O T A L	3999	203	239061	72133	50746.	13406.	41140.
PLACER								
20	FOOD AND KINDRED PRODUCTS	2	1	13	4	6.	1.	5.
24	LUMBER AND WOOD PRODUCTS	18	1	697	49	355.	94.	288.
25	FURNITURE AND FIXTURES	2	0	506	0	9.	2.	8.
26	PAPER AND ALLIED PRODUCTS	2	1	120	112	24.	6.	20.
27	PRINTING AND PUBLISHING	13	0	218	0	14.	4.	11.
28	CHEMICALS AND ALLIED PRODUCTS	1	0	12	0	3.	1.	2.
30	RUBBER & MISC. PLASTICS PRODUCTS	2	2	450	490	1391.	368.	1128.
32	STONE, CLAY, & GLASS PRODUCTS	7	4	573	337	2288.	604.	1855.
34	FABRICATED METAL PRODUCTS	2	1	21	7	6.	2.	5.
35	MACHINERY, EXCEPT ELECTRICAL	9	0	449	0	32.	8.	26.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	4	0	71	0	6.	2.	5.
37	TRANSPORTATION EQUIPMENT	3	0	28	0	4.	1.	3.
38	INSTRUMENTS AND RELATED PRODUCTS	1	0	7	0	1.	0.	1.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	4	0	79	0	4.	1.	3.
	T O T A L	70	10	3244	999	4143.	1094.	3358.

1/ NUMBER OF PLANTS INCLUDED IN THE SURVEY.
2/ NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
PLUMAS								
24	LUMBER AND WOOD PRODUCTS	11	3	761	646	37142.	9812.	30112.
32	STONE, CLAY, & GLASS PRODUCTS	2	0	13	0	53.	14.	43.
34	FABRICATED METAL PRODUCTS	1	0	12	0	2.	0.	1.
37	TRANSPORTATION EQUIPMENT	1	0	7	0	1.	0.	1.
	T O T A L	15	3	793	646	37199.	9827.	30157.
RIVERSIDE								
20	FOOD AND KINDRED PRODUCTS	26	15	1392	746	1665.	440.	1350.
22	TEXTILE MILL PRODUCTS	9	0	163	0	7.	2.	5.
23	APPAREL AND OTHER TEXTILE PRODUCTS	15	0	342	0	10.	3.	8.
24	LUMBER AND WOOD PRODUCTS	66	0	2232	0	46.	12.	37.
25	FURNITURE AND FIXTURES	18	0	521	0	37.	10.	30.
26	PAPER AND ALLIED PRODUCTS	4	2	655	600	246.	65.	200.
27	PRINTING AND PUBLISHING	40	0	1781	0	106.	28.	86.
28	CHEMICALS AND ALLIED PRODUCTS	15	2	303	70	347.	92.	282.
29	PETROLEUM AND COAL PRODUCTS	1	0	66	0	290.	77.	235.
30	RUBBER & MISC. PLASTICS PRODUCTS	24	3	954	88	196.	52.	159.
31	LEATHER AND LEATHER PRODUCTS	1	0	250	0	15.	4.	12.
32	STONE, CLAY, & GLASS PRODUCTS	42	13	2450	1502	3824.	1010.	3100.
33	PRIMARY METAL INDUSTRIES	12	6	905	591	171.	45.	139.
34	FABRICATED METAL PRODUCTS	51	1	2006	5	244.	64.	198.
35	MACHINERY, EXCEPT ELECTRICAL	58	1	2728	747	299.	79.	243.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	19	0	2290	0	252.	67.	204.
37	TRANSPORTATION EQUIPMENT	47	1	4684	170	332.	88.	269.
38	INSTRUMENTS AND RELATED PRODUCTS	21	1	2950	345	255.	67.	207.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	23	0	446	0	28.	7.	22.
	T O T A L	492	45	27118	4864	8371.	2211.	6787.
SACRAMENTO								
20	FOOD AND KINDRED PRODUCTS	41	21	4215	2815	12005.	3171.	9733.
22	TEXTILE MILL PRODUCTS	7	0	136	0	5.	1.	4.
23	APPAREL AND OTHER TEXTILE PRODUCTS	18	0	254	0	5.	1.	4.
24	LUMBER AND WOOD PRODUCTS	69	2	2319	154	47.	12.	38.
25	FURNITURE AND FIXTURES	25	0	562	0	29.	8.	24.
26	PAPER AND ALLIED PRODUCTS	9	3	651	359	3030.	800.	2456.
27	PRINTING AND PUBLISHING	55	0	1154	0	56.	15.	45.
28	CHEMICALS AND ALLIED PRODUCTS	13	3	962	622	3291.	859.	2668.
29	PETROLEUM AND COAL PRODUCTS	2	1	430	121	1329.	351.	1078.
30	RUBBER & MISC. PLASTICS PRODUCTS	11	1	203	55	78.	21.	63.
31	LEATHER AND LEATHER PRODUCTS	1	0	8	0	0.	0.	0.
32	STONE, CLAY, & GLASS PRODUCTS	20	5	359	195	211.	56.	171.
33	PRIMARY METAL INDUSTRIES	8	3	251	150	104.	27.	84.
34	FABRICATED METAL PRODUCTS	42	5	764	50	136.	36.	110.
35	MACHINERY, EXCEPT ELECTRICAL	48	0	1867	0	177.	47.	144.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	22	0	1156	0	153.	40.	124.
37	TRANSPORTATION EQUIPMENT	31	1	359[illegible]	4757	4714.	1245.	3822.

1/ NUMBER OF PLANTS INCLUDED IN THE SURVEY.
2/ NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
SACRAMENTO (CONTINUED)								
38	INSTRUMENTS AND RELATED PRODUCTS	7	0	189	0	18.	5.	15.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	28	0	477	0	25.	7.	20.
	TOTAL	457	45	19550	9288	25413.	6713.	20603.
SAN BENITO								
20	FOOD AND KINDRED PRODUCTS	5	5	777	415	2394.	632.	1941.
23	APPAREL AND OTHER TEXTILE PRODUCTS	1	0	7	0	0.	0.	0.
24	LUMBER AND WOOD PRODUCTS	1	0	15	0	0.	0.	0.
25	FURNITURE AND FIXTURES	1	0	15	0	0.	0.	0.
26	PAPER AND ALLIED PRODUCTS	1	0	40	0	12.	3.	10.
27	PRINTING AND PUBLISHING	1	0	31	0	2.	1.	2.
28	CHEMICALS AND ALLIED PRODUCTS	3	3	484	448	117.	31.	95.
29	PETROLEUM AND COAL PRODUCTS	0	1	0	75	242.	64.	196.
30	RUBBER & MISC. PLASTICS PRODUCTS	2	3	70	85	8.	2.	6.
32	STONE, CLAY, & GLASS PRODUCTS	2	0	30	0	16.	4.	13.
34	FABRICATED METAL PRODUCTS	4	0	88	0	35.	9.	29.
35	MACHINERY, EXCEPT ELECTRICAL	4	0	161	0	16.	4.	13.
37	TRANSPORTATION EQUIPMENT	3	0	48	0	5.	1.	4.
	TOTAL	28	12	1766	1024	2847.	752.	2308.
SAN BERNARDINO								
20	FOOD AND KINDRED PRODUCTS	37	13	1559	849	1373.	363.	1113.
22	TEXTILE MILL PRODUCTS	2	0	195	0	8.	2.	7.
23	APPAREL AND OTHER TEXTILE PRODUCTS	25	0	934	0	30.	8.	24.
24	LUMBER AND WOOD PRODUCTS	72	0	2724	0	133.	35.	108.
25	FURNITURE AND FIXTURES	18	0	544	0	37.	10.	30.
26	PAPER AND ALLIED PRODUCTS	9	3	487	319	166.	44.	135.
27	PRINTING AND PUBLISHING	56	0	2704	0	148.	39.	120.
28	CHEMICALS AND ALLIED PRODUCTS	29	4	866	252	1443.	381.	1170.
29	PETROLEUM AND COAL PRODUCTS	3	1	83	7	359.	95.	291.
30	RUBBER & MISC. PLASTICS PRODUCTS	44	13	2252	1636	224.	59.	182.
31	LEATHER AND LEATHER PRODUCTS	2	0	14	0	1.	0.	1.
32	STONE, CLAY, & GLASS PRODUCTS	54	16	2977	1985	9361.	2473.	7589.
33	PRIMARY METAL INDUSTRIES	32	7	10620	1226	3975.	1050.	3223.
34	FABRICATED METAL PRODUCTS	93	10	3792	267	1425.	377.	1156.
35	MACHINERY, EXCEPT ELECTRICAL	117	0	2654	0	354.	94.	287.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	39	0	1323	0	145.	38.	117.
37	TRANSPORTATION EQUIPMENT	40	0	2910	0	244.	64.	198.
38	INSTRUMENTS AND RELATED PRODUCTS	20	0	834	0	141.	37.	114.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	21	0	787	0	50.	13.	41.
	TOTAL	713	67	38259	6541	13618.	5182.	15904.
SAN JOAQUIN								
20	FOOD AND KINDRED PRODUCTS	62	47	5606	5333	21641.	5717.	17544.
22	TEXTILE MILL PRODUCTS	1	0	11	0	0.	0.	0.
23	APPAREL AND OTHER TEXTILE PRODUCTS	4	0	356	0	9.	2.	7.

1/NUMBER OF PLANTS INCLUDED IN THE SURVEY.
2/NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
SAN JOAQUIN (CONTINUED)								
24	LUMBER AND WOOD PRODUCTS	29	2	1969	527	268.	71.	217.
25	FURNITURE AND FIXTURES	12	0	556	0	109.	29.	88.
26	PAPER AND ALLIED PRODUCTS	6	4	853	840	3697.	977.	2997.
27	PRINTING AND PUBLISHING	24	0	689	0	46.	12.	37.
28	CHEMICALS AND ALLIED PRODUCTS	15	4	768	132	421.	111.	342.
29	PETROLEUM AND COAL PRODUCTS	1	0	28	0	123.	32.	100.
30	RUBBER & MISC. PLASTICS PRODUCTS	11	5	623	531	365.	96.	296.
32	STONE, CLAY, & GLASS PRODUCTS	22	8	2804	2135	5574.	1472.	4519.
33	PRIMARY METAL INDUSTRIES	9	2	285	78	127.	34.	103.
34	FABRICATED METAL PRODUCTS	36	3	1894	113	397.	105.	321.
35	MACHINERY, EXCEPT ELECTRICAL	39	0	1179	0	104.	27.	84.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	16	0	1213	0	147.	39.	119.
37	TRANSPORTATION EQUIPMENT	15	0	666	0	65.	17.	53.
38	INSTRUMENTS AND RELATED PRODUCTS	2	0	14	0	1.	0.	1.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	11	0	749	0	39.	10.	32.
	TOTAL	315	75	20263	10689	33132.	8752.	26860.
SAN LUIS OBISPO								
20	FOOD AND KINDRED PRODUCTS	7	6	78	26	83.	22.	67.
23	APPAREL AND OTHER TEXTILE PRODUCTS	2	0	14	0	1.	0.	0.
24	LUMBER AND WOOD PRODUCTS	11	0	224	0	7.	2.	5.
25	FURNITURE AND FIXTURES	2	0	32	0	1.	0.	0.
27	PRINTING AND PUBLISHING	16	0	564	0	34.	9.	28.
28	CHEMICALS AND ALLIED PRODUCTS	3	0	33	0	55.	15.	45.
29	PETROLEUM AND COAL PRODUCTS	2	1	65	32	1307.	345.	1060.
30	RUBBER & MISC. PLASTICS PRODUCTS	2	1	184	163	5.	1.	4.
32	STONE, CLAY, & GLASS PRODUCTS	8	0	100	0	114.	30.	93.
33	PRIMARY METAL INDUSTRIES	2	1	60	33	56.	15.	45.
34	FABRICATED METAL PRODUCTS	9	0	164	0	26.	7.	21.
35	MACHINERY, EXCEPT ELECTRICAL	11	0	129	0	12.	3.	10.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	13	1	1241	529	89.	24.	72.
37	TRANSPORTATION EQUIPMENT	5	0	409	0	52.	14.	42.
38	INSTRUMENTS AND RELATED PRODUCTS	7	0	238	0	31.	8.	25.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	4	0	75	0	6.	1.	5.
	TOTAL	105	10	3610	783	1880.	497.	1524.
SAN MATEO								
20	FOOD AND KINDRED PRODUCTS	61	35	5484	2369	4689.	1239.	3801.
22	TEXTILE MILL PRODUCTS	9	0	248	0	6.	2.	5.
23	APPAREL AND OTHER TEXTILE PRODUCTS	21	0	370	0	10.	3.	8.
24	LUMBER AND WOOD PRODUCTS	19	0	436	0	7.	2.	6.
25	FURNITURE AND FIXTURES	24	0	447	0	24.	6.	20.
26	PAPER AND ALLIED PRODUCTS	19	8	1188	755	228.	60.	184.
27	PRINTING AND PUBLISHING	111	1	3477	325	186.	49.	151.
28	CHEMICALS AND ALLIED PRODUCTS	45	13	2052	1350	2678.	707.	2171.
29	PETROLEUM AND COAL PRODUCTS	4	0	60	0	363.	96.	294.
30	RUBBER & MISC. PLASTICS PRODUCTS	26	10	1195	529	185.	49.	150.
31	LEATHER AND LEATHER PRODUCTS	4	1	221	46	46.	12.	37.

1/ NUMBER OF PLANTS INCLUDED IN THE SURVEY.
2/ NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
SAN MATEO (CONTINUED)								
32	STONE, CLAY, & GLASS PRODUCTS	23	3	576	109	1057.	279.	857.
33	PRIMARY METAL INDUSTRIES	17	5	4538	3937	1170.	309.	948.
34	FABRICATED METAL PRODUCTS	88	7	3315	135	606.	150.	491.
35	MACHINERY, EXCEPT ELECTRICAL	131	4	4430	1673	466.	123.	378.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	82	3	8724	4849	945.	250.	766.
37	TRANSPORTATION EQUIPMENT	9	0	277	0	44.	12.	36.
38	INSTRUMENTS AND RELATED PRODUCTS	31	0	1262	0	268.	71.	217.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	28	1	624	11	42.	11.	34.
	TOTAL	752	91	38924	16083	13018.	3439.	10554.
SANTA BARBARA								
20	FOOD AND KINDRED PRODUCTS	27	10	1361	815	4241.	1120.	3438.
22	TEXTILE MILL PRODUCTS	1	0	12	0	1.	0.	0.
23	APPAREL AND OTHER TEXTILE PRODUCTS	15	0	313	0	9.	2.	8.
24	LUMBER AND WOOD PRODUCTS	12	0	127	0	3.	1.	3.
25	FURNITURE AND FIXTURES	9	0	81	0	4.	1.	3.
26	PAPER AND ALLIED PRODUCTS	2	0	22	0	5.	1.	4.
27	PRINTING AND PUBLISHING	49	0	1787	0	100.	26.	81.
28	CHEMICALS AND ALLIED PRODUCTS	10	2	107	129	261.	69.	212.
29	PETROLEUM AND COAL PRODUCTS	2	0	77	0	679.	179.	550.
30	RUBBER & MISC. PLASTICS PRODUCTS	8	2	115	198	16.	4.	13.
31	LEATHER AND LEATHER PRODUCTS	5	0	125	0	4.	1.	3.
32	STONE, CLAY, & GLASS PRODUCTS	14	3	254	93	341.	90.	277.
33	PRIMARY METAL INDUSTRIES	5	0	244	0	242.	64.	196.
34	FABRICATED METAL PRODUCTS	24	0	634	0	186.	49.	151.
35	MACHINERY, EXCEPT ELECTRICAL	58	2	4810	1373	934.	247.	757.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	52	0	6233	0	829.	219.	672.
37	TRANSPORTATION EQUIPMENT	15	2	1564	2072	281.	74.	228.
38	INSTRUMENTS AND RELATED PRODUCTS	32	0	1707	0	165.	44.	134.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	16	1	606	300	47.	12.	38.
	TOTAL	356	22	20179	4980	8349.	2206.	6769.
SANTA CLARA								
20	FOOD AND KINDRED PRODUCTS	111	63	9390	8739	18505.	4888.	15002.
22	TEXTILE MILL PRODUCTS	8	0	84	0	4.	1.	3.
23	APPAREL AND OTHER TEXTILE PRODUCTS	23	0	392	0	9.	2.	7.
24	LUMBER AND WOOD PRODUCTS	58	0	1125	0	57.	15.	46.
25	FURNITURE AND FIXTURES	46	1	799	40	30.	8.	25.
26	PAPER AND ALLIED PRODUCTS	28	11	1477	1018	1813.	479.	1470.
27	PRINTING AND PUBLISHING	174	0	6233	0	323.	85.	262.
28	CHEMICALS AND ALLIED PRODUCTS	69	15	3435	3442	5497.	1452.	4456.
29	PETROLEUM AND COAL PRODUCTS	2	1	83	32	94.	25.	76.
30	RUBBER & MISC. PLASTICS PRODUCTS	66	12	2621	1303	182.	48.	147.
31	LEATHER AND LEATHER PRODUCTS	1	0	8	0	9.	2.	7.
32	STONE, CLAY, & GLASS PRODUCTS	61	12	2931	1975	2990.	790.	2424.
33	PRIMARY METAL INDUSTRIES	30	8	1298	420	557.	147.	451.
34	FABRICATED METAL PRODUCTS	196	28	8882	878	2716.	718.	2202.

1/NUMBER OF PLANTS INCLUDED IN THE SURVEY.
2/NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
SANTA CLARA (CONTINUED)								
35	MACHINERY, EXCEPT ELECTRICAL	522	15	70470	29869	7634.	2017.	6189.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	538	21	94099	43023	15896.	4199.	12887.
37	TRANSPORTATION EQUIPMENT	44	2	21731	18042	2204.	582.	1787.
38	INSTRUMENTS AND RELATED PRODUCTS	209	2	14325	1954	3117.	823.	2527.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	75	2	4865	5995	71.	19.	57.
	TOTAL	2261	193	244248	115729	61707.	16301.	50026.
SANTA CRUZ								
20	FOOD AND KINDRED PRODUCTS	28	22	4325	3801	4929.	1302.	3996.
22	TEXTILE MILL PRODUCTS	1	0	8	0	0.	0.	0.
23	APPAREL AND OTHER TEXTILE PRODUCTS	13	0	378	0	12.	3.	10.
24	LUMBER AND WOOD PRODUCTS	14	1	350	88	14.	4.	11.
25	FURNITURE AND FIXTURES	7	0	160	0	8.	2.	6.
27	PRINTING AND PUBLISHING	19	0	392	0	21.	5.	17.
28	CHEMICALS AND ALLIED PRODUCTS	7	1	106	53	101.	27.	82.
29	PETROLEUM AND COAL PRODUCTS	1	0	8	0	10.	3.	8.
30	RUBBER & MISC. PLASTICS PRODUCTS	5	2	101	98	2.	0.	2.
31	LEATHER AND LEATHER PRODUCTS	3	1	370	350	380.	100.	308.
32	STONE, CLAY, & GLASS PRODUCTS	6	2	290	300	325.	86.	264.
33	PRIMARY METAL INDUSTRIES	1	1	200	251	508.	134.	412.
34	FABRICATED METAL PRODUCTS	12	1	244	1	58.	15.	47.
35	MACHINERY, EXCEPT ELECTRICAL	19	0	373	0	35.	9.	29.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	23	1	1779	350	165.	44.	134.
37	TRANSPORTATION EQUIPMENT	7	0	461	0	51.	13.	41.
38	INSTRUMENTS AND RELATED PRODUCTS	5	0	56	0	5.	1.	4.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	17	0	623	0	37.	10.	30.
	TOTAL	189	32	10224	5292	6660.	1759.	5400.
SHASTA								
24	LUMBER AND WOOD PRODUCTS	0	0	0	0	0.	0.	0.
20	FOOD AND KINDRED PRODUCTS	7	0	167	0	391.	103.	317.
24	LUMBER AND WOOD PRODUCTS	52	6	2436	660	6951.	1836.	5635.
25	FURNITURE AND FIXTURES	5	0	57	0	3.	1.	2.
26	PAPER AND ALLIED PRODUCTS	1	1	550	540	16671.	4404.	13516.
27	PRINTING AND PUBLISHING	8	0	249	0	16.	4.	13.
28	CHEMICALS AND ALLIED PRODUCTS	2	2	340	208	22.	6.	18.
29	PETROLEUM AND COAL PRODUCTS	2	0	23	0	101.	27.	82.
30	RUBBER & MISC. PLASTICS PRODUCTS	3	1	74	24	1.	0.	0.
32	STONE, CLAY, & GLASS PRODUCTS	3	1	135	100	199.	52.	161.
34	FABRICATED METAL PRODUCTS	6	1	115	10	23.	6.	18.
35	MACHINERY, EXCEPT ELECTRICAL	7	0	156	0	16.	4.	13.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	4	0	117	0	22.	6.	18.
37	TRANSPORTATION EQUIPMENT	4	0	146	0	22.	6.	18.
38	INSTRUMENTS AND RELATED PRODUCTS	4	0	104	0	13.	4.	11.
	TOTAL	108	12	4669	1542	24451.	6459.	19823.

1/NUMBER OF PLANTS INCLUDED IN THE SURVEY.
2/NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
SIERRA								
20	FOOD AND KINDRED PRODUCTS	0	0	0	0	0.	0.	0.
24	LUMBER AND WOOD PRODUCTS	3	0	190	0	312.	82.	253.
27	PRINTING AND PUBLISHING	1	0	7	0	0.	0.	0.
	TOTAL	4	0	197	0	312.	82.	253.
SISKIYOU								
20	FOOD AND KINDRED PRODUCTS	3	3	55	23	374.	99.	303.
23	APPAREL AND OTHER TEXTILE PRODUCTS	1	0	15	0	1.	0.	0.
24	LUMBER AND WOOD PRODUCTS	27	6	2241	964	3896.	1029.	3158.
25	FURNITURE AND FIXTURES	3	0	51	0	3.	1.	2.
27	PRINTING AND PUBLISHING	5	0	61	0	4.	1.	3.
32	STONE, CLAY, & GLASS PRODUCTS	4	0	57	0	31.	8.	25.
34	FABRICATED METAL PRODUCTS	1	0	26	0	5.	1.	4.
35	MACHINERY, EXCEPT ELECTRICAL	2	0	16	0	1.	0.	1.
	TOTAL	46	9	2522	987	4313.	1139.	3497.
SOLANO								
20	FOOD AND KINDRED PRODUCTS	19	9	1552	1315	5333.	1409.	4323.
23	APPAREL AND OTHER TEXTILE PRODUCTS	3	0	21	0	0.	0.	0.
24	LUMBER AND WOOD PRODUCTS	11	0	387	0	7.	2.	6.
26	PAPER AND ALLIED PRODUCTS	1	1	35	43	1.	0.	1.
27	PRINTING AND PUBLISHING	17	0	658	0	37.	10.	30.
28	CHEMICALS AND ALLIED PRODUCTS	4	2	191	183	12.	3.	10.
29	PETROLEUM AND COAL PRODUCTS	2	1	410	403	5798.	1532.	4700.
30	RUBBER & MISC. PLASTICS PRODUCTS	9	3	442	162	41.	11.	33.
31	LEATHER AND LEATHER PRODUCTS	1	0	8	0	9.	2.	7.
32	STONE, CLAY, & GLASS PRODUCTS	12	1	222	40	383.	101.	311.
33	PRIMARY METAL INDUSTRIES	5	0	90	0	85.	22.	69.
34	FABRICATED METAL PRODUCTS	10	0	358	0	108.	28.	87.
35	MACHINERY, EXCEPT ELECTRICAL	13	0	531	0	52.	14.	42.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	5	0	230	0	23.	6.	19.
37	TRANSPORTATION EQUIPMENT	10	1	9393	9000	3348.	884.	2714.
38	INSTRUMENTS AND RELATED PRODUCTS	2	0	15	0	1.	0.	1.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	9	0	152	0	6.	2.	5.
	TOTAL	133	18	14695	11145	15244.	4027.	12358.
SONOMA								
20	FOOD AND KINDRED PRODUCTS	59	57	2299	1855	1911.	505.	1550.
22	TEXTILE MILL PRODUCTS	5	0	107	0	2.	1.	2.
23	APPAREL AND OTHER TEXTILE PRODUCTS	5	0	109	0	2.	1.	2.
24	LUMBER AND WOOD PRODUCTS	45	3	1807	171	71.	19.	58.
25	FURNITURE AND FIXTURES	16	0	652	0	27.	7.	22.
27	PRINTING AND PUBLISHING	38	1	823	30	48.	13.	39.
28	CHEMICALS AND ALLIED PRODUCTS	8	1	156	52	84.	22.	68.
29	PETROLEUM AND COAL PRODUCTS	1	1	10	5	463.	122.	376.

1/ NUMBER OF PLANTS INCLUDED IN THE SURVEY.
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NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
SONOMA (CONTINUED)								
30	RUBBER & MISC. PLASTICS PRODUCTS	10	3	299	213	19.	5.	15.
31	LEATHER AND LEATHER PRODUCTS	5	0	747	0	25.	7.	20.
32	STONE, CLAY, & GLASS PRODUCTS	21	2	661	472	666.	176.	540.
33	PRIMARY METAL INDUSTRIES	3	1	213	331	328.	87.	266.
34	FABRICATED METAL PRODUCTS	29	0	491	0	99.	26.	81.
35	MACHINERY, EXCEPT ELECTRICAL	43	1	1904	460	137.	36.	111.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	17	0	441	0	55.	14.	44.
37	TRANSPORTATION EQUIPMENT	13	0	351	0	52.	14.	42.
38	INSTRUMENTS AND RELATED PRODUCTS	10	2	3197	2961	322.	85.	261.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	18	0	294	0	17.	5.	14.
	T O T A L	346	72	14561	6551	4329.	1144.	3510.
STANISLAUS								
20	FOOD AND KINDRED PRODUCTS	58	30	10400	7919	23896.	6313.	19373.
23	APPAREL AND OTHER TEXTILE PRODUCTS	2	0	28	0	1.	0.	1.
24	LUMBER AND WOOD PRODUCTS	22	0	710	0	96.	25.	78.
25	FURNITURE AND FIXTURES	7	0	207	0	24.	6.	19.
26	PAPER AND ALLIED PRODUCTS	6	7	1212	1160	491.	130.	398.
27	PRINTING AND PUBLISHING	20	0	532	0	35.	9.	28.
28	CHEMICALS AND ALLIED PRODUCTS	5	2	101	35	18.	5.	14.
29	PETROLEUM AND COAL PRODUCTS	2	0	140	0	615.	162.	498.
30	RUBBER & MISC. PLASTICS PRODUCTS	3	0	74	0	16.	4.	13.
31	LEATHER AND LEATHER PRODUCTS	1	1	28	32	57.	15.	46.
32	STONE, CLAY, & GLASS PRODUCTS	11	2	664	73	2532.	659.	2052.
33	PRIMARY METAL INDUSTRIES	3	2	209	189	22.	6.	18.
34	FABRICATED METAL PRODUCTS	25	0	1207	0	494.	130.	400.
35	MACHINERY, EXCEPT ELECTRICAL	38	0	1079	0	88.	23.	71.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	4	0	231	0	14.	4.	12.
37	TRANSPORTATION EQUIPMENT	4	0	102	0	10.	3.	8.
38	INSTRUMENTS AND RELATED PRODUCTS	2	0	47	0	2.	0.	2.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	8	0	147	0	8.	2.	7.
	T O T A L	221	44	17118	9403	28416.	7507.	23037.
SUTTER								
20	FOOD AND KINDRED PRODUCTS	7	4	2093	774	4267.	1127.	3459.
23	APPAREL AND OTHER TEXTILE PRODUCTS	1	0	11	0	0.	0.	0.
24	LUMBER AND WOOD PRODUCTS	8	1	670	165	27.	7.	22.
27	PRINTING AND PUBLISHING	1	0	8	0	1.	0.	1.
28	CHEMICALS AND ALLIED PRODUCTS	1	0	7	0	29.	8.	24.
32	STONE, CLAY, & GLASS PRODUCTS	3	0	35	0	93.	25.	76.
34	FABRICATED METAL PRODUCTS	6	1	109	9	13.	3.	10.
35	MACHINERY, EXCEPT ELECTRICAL	11	0	224	0	10.	3.	8.
37	TRANSPORTATION EQUIPMENT	1	0	25	0	1.	0.	1.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	2	0	32	0	2.	0.	1.
	T O T A L	41	6	3214	948	4443.	1174.	3602.

1/NUMBER OF PLANTS INCLUDED IN THE SURVEY.
2/NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
TEHAMA								
20	FOOD AND KINDRED PRODUCTS	3	2	162	68	229.	61.	186.
24	LUMBER AND WOOD PRODUCTS	13	1	1410	114	137.	36.	111.
25	FURNITURE AND FIXTURES	2	0	22	0	1.	0.	1.
27	PRINTING AND PUBLISHING	4	0	118	0	7.	2.	6.
28	CHEMICALS AND ALLIED PRODUCTS	1	0	6	0	4.	1.	3.
30	RUBBER & MISC. PLASTICS PRODUCTS	2	0	28	0	6.	2.	5.
32	STONE, CLAY, & GLASS PRODUCTS	1	0	10	0	41.	11.	33.
35	MACHINERY, EXCEPT ELECTRICAL	2	0	25	0	1.	0.	1.
37	TRANSPORTATION EQUIPMENT	1	0	18	0	2.	1.	2.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	1	0	10	0	0.	0.	0.
	TOTAL	30	3	1809	182	429.	113.	348.
TRINITY								
20	FOOD AND KINDRED PRODUCTS	0	1	0	1	2.	1.	2.
24	LUMBER AND WOOD PRODUCTS	6	1	249	144	48.	13.	39.
32	STONE, CLAY, & GLASS PRODUCTS	2	1	46	1	187.	49.	152.
	TOTAL	8	3	295	146	237.	63.	192.
TULARE								
20	FOOD AND KINDRED PRODUCTS	27	19	1912	2114	11790.	3115.	9558.
22	TEXTILE MILL PRODUCTS	2	0	330	0	9.	2.	7.
23	APPAREL AND OTHER TEXTILE PRODUCTS	3	0	518	0	18.	5.	15.
24	LUMBER AND WOOD PRODUCTS	26	2	1345	374	421.	111.	341.
25	FURNITURE AND FIXTURES	7	0	101	0	7.	2.	6.
26	PAPER AND ALLIED PRODUCTS	2	0	160	0	50.	13.	41.
27	PRINTING AND PUBLISHING	17	0	1471	0	55.	15.	45.
28	CHEMICALS AND ALLIED PRODUCTS	8	0	109	0	57.	15.	46.
29	PETROLEUM AND COAL PRODUCTS	1	0	10	0	44.	12.	36.
30	RUBBER & MISC. PLASTICS PRODUCTS	8	2	147	55	68.	18.	55.
31	LEATHER AND LEATHER PRODUCTS	1	0	20	0	2.	1.	2.
32	STONE, CLAY, & GLASS PRODUCTS	19	2	331	87	447.	118.	363.
33	PRIMARY METAL INDUSTRIES	5	1	380	204	320.	85.	260.
34	FABRICATED METAL PRODUCTS	11	2	787	72	192.	51.	155.
35	MACHINERY, EXCEPT ELECTRICAL	34	1	1138	194	72.	19.	58.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	11	1	1345	474	119.	32.	97.
37	TRANSPORTATION EQUIPMENT	5	0	439	0	45.	12.	37.
38	INSTRUMENTS AND RELATED PRODUCTS	1	0	10	0	1.	0.	1.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	3	0	168	0	11.	3.	9.
	TOTAL	191	30	10721	3575	13729.	3627.	11130.
TUOLUMNE								
20	FOOD AND KINDRED PRODUCTS	2	2	32	10	32.	8.	26.
23	APPAREL AND OTHER TEXTILE PRODUCTS	1	0	8	0	0.	0.	0.
24	LUMBER AND WOOD PRODUCTS	9	1	693	415	765.	202.	620.
25	FURNITURE AND FIXTURES	1	0	24	0	1.	0.	1.

1/ NUMBER OF PLANTS INCLUDED IN THE SURVEY. **NOTE:** ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.
2/ NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
TUOLUMNE (CONTINUED)								
27	PRINTING AND PUBLISHING	1	0	50	0	3.	1.	3.
30	RUBBER & MISC. PLASTICS PRODUCTS	3	1	60	35	2.	0.	1.
35	MACHINERY, EXCEPT ELECTRICAL	2	0	19	0	2.	0.	1.
	TOTAL	19	4	886	460	805.	213.	653.
VENTURA								
20	FOOD AND KINDRED PRODUCTS	19	7	1161	1553	3168.	837.	2568.
22	TEXTILE MILL PRODUCTS	9	0	155	0	5.	1.	4.
23	APPAREL AND OTHER TEXTILE PRODUCTS	18	0	578	0	18.	5.	15.
24	LUMBER AND WOOD PRODUCTS	7	0	339	0	7.	2.	6.
25	FURNITURE AND FIXTURES	14	0	571	0	34.	9.	28.
26	PAPER AND ALLIED PRODUCTS	9	5	852	889	1851.	489.	1500.
27	PRINTING AND PUBLISHING	54	0	1591	0	88.	23.	71.
28	CHEMICALS AND ALLIED PRODUCTS	20	3	1433	104	1203.	318.	975.
29	PETROLEUM AND COAL PRODUCTS	3	1	155	20	1939.	512.	1572.
30	RUBBER & MISC. PLASTICS PRODUCTS	23	5	1244	881	276.	73.	224.
31	LEATHER AND LEATHER PRODUCTS	4	0	96	0	5.	1.	4.
32	STONE, CLAY, & GLASS PRODUCTS	19	6	731	323	1073.	283.	870.
33	PRIMARY METAL INDUSTRIES	14	0	654	0	227.	60.	184.
34	FABRICATED METAL PRODUCTS	32	2	1067	36	328.	87.	266.
35	MACHINERY, EXCEPT ELECTRICAL	86	3	4786	1541	509.	134.	412.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	65	0	5955	0	674.	178.	546.
37	TRANSPORTATION EQUIPMENT	18	1	1604	921	271.	72.	220.
38	INSTRUMENTS AND RELATED PRODUCTS	37	1	1442	389	321.	85.	260.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	32	0	917	0	60.	16.	49.
	TOTAL	483	34	25331	6657	12058.	3185.	9775.
YOLO								
20	FOOD AND KINDRED PRODUCTS	18	12	1293	1887	6811.	1799.	5522.
22	TEXTILE MILL PRODUCTS	1	0	45	0	1.	0.	1.
23	APPAREL AND OTHER TEXTILE PRODUCTS	4	0	51	0	1.	0.	1.
24	LUMBER AND WOOD PRODUCTS	20	0	1053	0	118.	31.	95.
25	FURNITURE AND FIXTURES	1	0	8	0	0.	0.	0.
26	PAPER AND ALLIED PRODUCTS	1	0	15	0	1.	0.	1.
27	PRINTING AND PUBLISHING	8	0	196	0	12.	3.	10.
28	CHEMICALS AND ALLIED PRODUCTS	7	3	435	385	49.	13.	39.
29	PETROLEUM AND COAL PRODUCTS	1	0	60	0	263.	70.	214.
30	RUBBER & MISC. PLASTICS PRODUCTS	4	1	223	82	135.	36.	110.
32	STONE, CLAY, & GLASS PRODUCTS	5	1	85	35	49.	13.	39.
34	FABRICATED METAL PRODUCTS	14	1	385	34	50.	13.	41.
35	MACHINERY, EXCEPT ELECTRICAL	21	0	561	0	28.	7.	22.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	3	0	242	0	47.	12.	38.
37	TRANSPORTATION EQUIPMENT	14	0	317	0	25.	7.	20.
38	INSTRUMENTS AND RELATED PRODUCTS	2	0	35	0	20.	5.	16.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	2	0	37	0	1.	0.	1.
	TOTAL	126	18	5043	2423	7611.	2011.	6170.

1/NUMBER OF PLANTS INCLUDED IN THE SURVEY.
2/NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
YUBA								
20	FOOD AND KINDRED PRODUCTS	4	3	195	132	233.	62.	189.
22	TEXTILE MILL PRODUCTS	1	0	20	0	1.	0.	1.
24	LUMBER AND WOOD PRODUCTS	8	0	417	0	220.	58.	179.
25	FURNITURE AND FIXTURES	1	0	11	0	0.	0.	0.
27	PRINTING AND PUBLISHING	2	0	90	0	5.	1.	4.
28	CHEMICALS AND ALLIED PRODUCTS	1	0	12	0	3.	1.	2.
30	RUBBER & MISC. PLASTICS PRODUCTS	2	0	56	0	12.	3.	10.
35	MACHINERY, EXCEPT ELECTRICAL	1	0	14	0	0.	0.	0.
37	TRANSPORTATION EQUIPMENT	3	0	134	0	8.	2.	7.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	1	0	12	0	0.	0.	0.
	TOTAL	24	3	957	132	484.	128.	392.
ALAMEDA								
20	FOOD AND KINDRED PRODUCTS	142	85	10924	8484	10493.	2772.	8507.
22	TEXTILE MILL PRODUCTS	13	1	265	85	9.	2.	7.
23	APPAREL AND OTHER TEXTILE PRODUCTS	61	0	1691	0	54.	14.	44.
24	LUMBER AND WOOD PRODUCTS	41	0	1087	0	42.	11.	34.
25	FURNITURE AND FIXTURES	45	2	1861	139	109.	29.	88.
26	PAPER AND ALLIED PRODUCTS	44	17	3304	1313	4214.	1113.	3417.
27	PRINTING AND PUBLISHING	183	0	6502	0	349.	92.	283.
28	CHEMICALS AND ALLIED PRODUCTS	102	35	5667	2557	4357.	1151.	3532.
29	PETROLEUM AND COAL PRODUCTS	11	1	547	45	582.	154.	472.
30	RUBBER & MISC. PLASTICS PRODUCTS	62	13	1793	826	414.	109.	336.
31	LEATHER AND LEATHER PRODUCTS	8	1	217	75	59.	16.	48.
32	STONE, CLAY, & GLASS PRODUCTS	60	20	4168	2253	2164.	572.	1754.
33	PRIMARY METAL INDUSTRIES	61	26	4502	2933	3672.	970.	2977.
34	FABRICATED METAL PRODUCTS	207	24	10243	2195	1545.	408.	1252.
35	MACHINERY, EXCEPT ELECTRICAL	209	3	7246	1044	2727.	720.	2210.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	104	1	5641	25	647.	171.	525.
37	TRANSPORTATION EQUIPMENT	50	2	7636	2157	475.	126.	385.
38	INSTRUMENTS AND RELATED PRODUCTS	62	0	2403	0	494.	130.	400.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	54	0	933	0	59.	16.	48.
	TOTAL	1519	231	76630	24133	32465.	8576.	26320.
LOS ANGELES								
20	FOOD AND KINDRED PRODUCTS	632	225	50644	21435	71369.	18853.	57859.
21	TOBACCO MANUFACTURES	3	0	313	0	27.	7.	22.
22	TEXTILE MILL PRODUCTS	279	0	12616	0	465.	123.	377.
23	APPAREL AND OTHER TEXTILE PRODUCTS	1816	2	76091	302	2482.	656.	2012.
24	LUMBER AND WOOD PRODUCTS	437	3	13222	84	1000.	264.	811.
25	FURNITURE AND FIXTURES	805	5	37767	1772	2708.	715.	2196.
26	PAPER AND ALLIED PRODUCTS	284	79	18650	8747	15869.	4192.	12865.
27	PRINTING AND PUBLISHING	1441	4	55891	1654	3123.	825.	2532.
28	CHEMICALS AND ALLIED PRODUCTS	701	161	44083	14561	38899.	10276.	31536.
29	PETROLEUM AND COAL PRODUCTS	105	24	11435	4959	95915.	25338.	77759.
30	RUBBER & MISC. PLASTICS PRODUCTS	666	124	34888	12729	6449.	1704.	5228.

1/NUMBER OF PLANTS INCLUDED IN THE SURVEY. **NOTE:** ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.
2/NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET
LOS ANGELES (CONTINUED)								
31	LEATHER AND LEATHER PRODUCTS	154	2	10693	210	1293.	342.	1049.
32	STONE, CLAY, & GLASS PRODUCTS	437	76	23121	10458	16074.	4246.	13031.
33	PRIMARY METAL INDUSTRIES	444	114	43690	20103	10923.	2886.	8855.
34	FABRICATED METAL PRODUCTS	1581	183	75651	16045	21926.	5792.	17775.
35	MACHINERY, EXCEPT ELECTRICAL	2183	26	84537	10280	10334.	2730.	8378.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	1359	43	164039	45784	18227.	4815.	14777.
37	TRANSPORTATION EQUIPMENT	694	25	92066	41105	9667.	2554.	7837.
38	INSTRUMENTS AND RELATED PRODUCTS	459	12	28809	9814	7193.	1900.	5831.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	804	14	30604	3727	1962.	518.	1591.
	TOTAL	15285	1122	908810	223770	335906.	88736.	272321.
SAN FRANCISCO								
20	FOOD AND KINDRED PRODUCTS	90	52	4904	2358	3985.	1053.	3231.
22	TEXTILE MILL PRODUCTS	18	0	359	0	14.	4.	11.
23	APPAREL AND OTHER TEXTILE PRODUCTS	134	1	6507	30	220.	58.	178.
24	LUMBER AND WOOD PRODUCTS	25	0	323	0	17.	4.	13.
25	FURNITURE AND FIXTURES	34	0	785	0	39.	10.	32.
26	PAPER AND ALLIED PRODUCTS	15	3	407	143	463.	122.	375.
27	PRINTING AND PUBLISHING	233	1	9011	413	557.	147.	451.
28	CHEMICALS AND ALLIED PRODUCTS	33	6	1369	463	1351.	357.	1095.
29	PETROLEUM AND COAL PRODUCTS	1	0	13	0	11.	3.	9.
30	RUBBER & MISC. PLASTICS PRODUCTS	8	0	70	0	14.	4.	11.
31	LEATHER AND LEATHER PRODUCTS	11	1	305	7	68.	18.	55.
32	STONE, CLAY, & GLASS PRODUCTS	21	1	8865	23	4944.	1306.	4008.
33	PRIMARY METAL INDUSTRIES	10	2	283	108	303.	80.	245.
34	FABRICATED METAL PRODUCTS	74	5	3464	713	844.	223.	684.
35	MACHINERY, EXCEPT ELECTRICAL	50	1	1207	80	130.	34.	105.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	46	0	993	0	134.	35.	108.
37	TRANSPORTATION EQUIPMENT	15	3	2899	2142	770.	203.	624.
38	INSTRUMENTS AND RELATED PRODUCTS	16	0	334	0	35.	9.	28.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	69	0	1183	0	63.	17.	51.
	TOTAL	903	76	43281	6481	13961.	3688.	11318.
SAN DIEGO								
20	FOOD AND KINDRED PRODUCTS	61	26	3190	3118	3391.	896.	2749.
22	TEXTILE MILL PRODUCTS	19	0	251	0	10.	3.	8.
23	APPAREL AND OTHER TEXTILE PRODUCTS	75	0	4272	0	143.	38.	116.
24	LUMBER AND WOOD PRODUCTS	68	0	1047	0	50.	13.	41.
25	FURNITURE AND FIXTURES	51	0	1130	0	60.	16.	49.
26	PAPER AND ALLIED PRODUCTS	12	3	392	341	194.	51.	157.
27	PRINTING AND PUBLISHING	228	0	7978	0	446.	118.	362.
28	CHEMICALS AND ALLIED PRODUCTS	41	10	2610	1662	8182.	2162.	6634.
29	PETROLEUM AND COAL PRODUCTS	6	2	300	169	459.	121.	372.
30	RUBBER & MISC. PLASTICS PRODUCTS	51	7	1108	841	69.	18.	56.
31	LEATHER AND LEATHER PRODUCTS	25	0	809	0	91.	24.	74.
32	STONE, CLAY, & GLASS PRODUCTS	56	16	2051	1859	759.	201.	616.

1/NUMBER OF PLANTS INCLUDED IN THE SURVEY.
2/NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 6 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE BY COUNTY AND MAJOR INDUSTRY GROUP IN 1979

SIC CODE	MAJOR INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER USE		
		TOTAL	REPORTING[1]	TOTAL	REPORTING[2]	MEGALITRES	MILLION GALLONS	ACRE FEET
SAN DIEGO (CONTINUED)								
33	PRIMARY METAL INDUSTRIES	19	2	619	137	979.	259.	794.
34	FABRICATED METAL PRODUCTS	156	9	6262	2535	1103.	291.	894.
35	MACHINERY, EXCEPT ELECTRICAL	231	4	14934	5975	2394.	632.	1941.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	155	7	18897	4767	2300.	608.	1865.
37	TRANSPORTATION EQUIPMENT	82	3	27226	25065	2763.	730.	2240.
38	INSTRUMENTS AND RELATED PRODUCTS	96	3	8527	1928	460.	122.	373.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	140	2	4444	71	280.	74.	227.
	TOTAL	1572	88	106047	48470	24135.	6376.	19567.
	ALL COUNTIES TOTAL	33119	2968	2026608	644236	1132436.	299156.	918075.

1/NUMBER OF PLANTS INCLUDED IN THE SURVEY.
2/NUMBER OF EMPLOYEES INCLUDED IN THE SURVEY.

NOTE: ZEROS MAY INDICATE VALUES BETWEEN 0 AND 1 OR INCONCLUSIVE VALUES.

TABLE 7

ESTIMATED ANNUAL TOTAL FRESH WATER USE AND UNIT EMPLOYEE USE BY INDUSTRY GROUP IN 1979

SIC CODE	INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER			UNIT USE/WORK DAY	
		TOTAL	REPORTING [1]	TOTAL	REPORTING [2]	MEGALITRES	MILLION GALLONS	ACRE FEET	LITRES	GALLONS
201	MEAT PRODUCTS	234	95	19281	9442	20249.	5349.	16415.	4647.	1228.
202	DAIRY PRODUCTS	147	69	7977	4238	29367.	7758.	23808.	16290.	4303.
203	PRESERVED FRUITS AND VEGETABLES	323	196	46769	35757	110538.	29201.	89614.	10458.	2753.
204	GRAIN MILL PRODUCTS	179	92	8375	4993	4737.	1251.	3841.	2503.	661.
205	BAKERY PRODUCTS	266	100	21549	7499	11350.	2998.	9202.	2331.	616.
206	SUGAR AND CONFECTIONARY PRODUCTS	80	44	7465	5469	26907.	7108.	21814.	15949.	4213.
207	FATS AND OILS	61	29	2695	2644	2587.	683.	2097.	4247.	1122.
208	BEVERAGES	322	206	19652	12975	33771.	8921.	27379.	7604.	2009.
209	MISC. FOODS AND KINDRED PRODUCTS	389	174	25393	14332	36394.	9614.	29505.	6342.	1675.
20	FOOD AND KINDRED PRODUCTS	2001	1005	159156	97349	275901.	72885.	223675.	7670.	2026.
212	CIGARS	2	0	13	0	1.	0.	1.	377.	100.
213	CHEWING AND SMOKING TOBACCO	1	0	300	0	26.	7.	21.	377.	100.
21	TOBACCO MANUFACTURES	3	0	313	0	27.	7.	22.	377.	100.
221	WEAVING MILLS, COTTON	52	0	1077	0	46.	12.	37.	188.	50.
222	WEAVING MILLS, SYNTHETICS	47	0	740	0	32.	8.	25.	188.	50.
223	WEAVING AND FINISHING MILLS, WOOL	3	0	60	0	3.	1.	2.	188.	50.
224	NARROW FABRIC MILLS	10	0	296	0	13.	3.	10.	188.	50.
225	KNITTING MILLS	101	0	5967	0	254.	67.	206.	188.	50.
226	TEXTILE FINISHING, EXCEPT WOOL	52	0	1414	0	60.	16.	49.	188.	50.
227	FLOOR COVERING MILLS	77	0	5600	0	238.	63.	193.	188.	50.
228	YARN AND THREAD MILLS	20	0	1926	0	68.	18.	55.	155.	41.
229	MISCELLANEOUS TEXTILE GOODS	82	1	3404	88	49.	13.	40.	64.	17.
22	TEXTILE MILL PRODUCTS	454	1	20484	88	762.	201.	618.	165.	43.
231	MEN'S AND BOYS' SUITS AND COATS	51	0	3753	0	132.	35.	107.	155.	41.
232	MEN'S AND BOYS' FURNISHINGS	313	0	15436	0	542.	143.	439.	155.	41.
233	WOMEN'S AND MISSES' OUTERWEAR	1275	0	49959	0	1753.	463.	1421.	155.	41.
234	WOMEN'S AND CHILDREN'S UNDERGARMENTS	40	0	4104	0	144.	38.	117.	155.	41.
235	HATS, CAPS, AND MILLINERY	20	0	719	0	25.	7.	20.	155.	41.
236	CHILDREN'S OUTERWEAR	47	0	1985	0	70.	18.	56.	155.	41.
237	FUR GOODS	9	0	172	0	6.	2.	5.	155.	41.
238	MISCELLANEOUS APPAREL AND ACCESSORIES	102	0	3182	0	112.	29.	91.	155.	41.
239	MISC. FABRICATED TEXTILE PRODUCTS	595	3	20017	332	404.	107.	329.	89.	24.
23	APPAREL AND OTHER TEXTILE PRODUCTS	2452	3	99327	332	3188.	842.	2584.	142.	38.
241	LOGGING CAMPS & LOGGING CONTRACTORS	153	0	3571	0	660.	174.	535.	818.	216.
242	SAWMILLS AND PLANING MILLS	214	56	18459	8596	108791.	28739.	88198.	26022.	6874.
243	MILLWORK, PLYWOOD & STRUCTURAL MEMBERS	713	1	21264	32	236.	62.	191.	49.	13.
244	WOODEN CONTAINERS	161	0	4610	0	196.	52.	159.	188.	50.
245	WOOD BUILDINGS & MOBILE HOMES	134	0	7383	0	157.	42.	127.	94.	25.
249	MISCELLANEOUS WOOD PRODUCTS	306	7	8356	288	12738.	3365.	10327.	6745.	1782.
24	LUMBER AND WOOD PRODUCTS	1681	64	63703	8916	122778.	32434.	99537.	8528.	2253.

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TABLE 7 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE AND UNIT EMPLOYEE USE BY INDUSTRY GROUP IN 1979

SIC CODE	INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER			UNIT USE/WORK DAY	
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET	LITRES	GALLONS
251	HOUSEHOLD FURNITURE	875	2	37424	148	2145.	567.	1739.	254.	67.
252	OFFICE FURNITURE	142	0	7570	0	580.	153.	470.	339.	90.
253	PUBLIC BUILDING & RELATED FURNITURE	47	2	3729	1497	554.	146.	449.	657.	174.
254	PARTITIONS AND FIXTURES	262	3	8526	762	2083.	550.	1689.	1081.	286.
259	MISCELLANEOUS FURNITURE AND FIXTURES	152	2	4924	170	148.	39.	120.	133.	35.
25	FURNITURE AND FIXTURES	1478	9	62173	2577	5511.	1456.	4467.	392.	104.
261	PULP MILLS	3	3	470	1055	29625.	7826.	24017.	278903.	73678.
262	PAPER MILLS, EXCEPT BUILDING PAPER MILLS	27	12	4312	3262	36845.	9733.	29870.	37808.	9988.
263	PAPERBOARD MILLS	15	8	3291	2085	24838.	6561.	20136.	33395.	8822.
264	MISC. CONVERTED PAPER PRODUCTS	280	73	14729	7469	15610.	4124.	12655.	4689.	1239.
265	PAPERBOARD CONTAINERS AND BOXES	205	71	15081	7867	6821.	1802.	5530.	2001.	529.
266	BUILDING PAPER AND BOARD MILLS	16	6	896	802	843.	223.	683.	4161.	1099.
26	PAPER AND ALLIED PRODUCTS	546	173	38779	22540	114581.	30269.	92892.	13074.	3454.
271	NEWSPAPERS	466	0	39464	0	2588.	684.	2098.	290.	77.
272	PERIODICALS	335	0	10240	0	445.	118.	361.	192.	51.
273	BOOKS	278	0	11347	0	449.	119.	364.	175.	46.
274	MISCELLANEOUS PUBLISHING	178	0	8868	0	1344.	355.	1090.	671.	177.
275	COMMERCIAL PRINTING	1795	5	40902	2137	3077.	813.	2495.	333.	88.
276	MANIFOLD BUSINESS FORMS	60	0	4423	0	196.	52.	159.	196.	52.
277	GREETING CARD PUBLISHING	23	0	523	0	17.	5.	14.	147.	39.
278	BLANKBOOKS AND BOOKBINDING	124	2	3855	285	83.	22.	67.	95.	25.
279	PRINTING TRADE SERVICES	198	0	3323	0	333.	88.	270.	443.	117.
27	PRINTING AND PUBLISHING	3457	7	122945	2422	8532.	2254.	6917.	307.	81.
281	INDUSTRIAL INORGANIC CHEMICALS	193	46	11739	5124	29319.	7745.	23769.	11051.	2918.
282	PLASTICS MATERIALS AND SYNTHETICS	151	52	9591	4576	10316.	2725.	8363.	4759.	1257.
283	DRUGS	182	43	20668	8323	13078.	3455.	10602.	2800.	740.
284	SOAP, CLEANERS, AND TOILET GOODS	313	56	15736	6543	13970.	3690.	11326.	3928.	1038.
285	PAINTS AND ALLIED PRODUCTS	177	52	7831	3960	1789.	473.	1451.	1011.	267.
286	INDUSTRIAL ORGANIC CHEMICALS	56	11	2230	823	8728.	2306.	7076.	17319.	4575.
287	AGRICULTURAL CHEMICALS	106	23	7003	3150	14665.	3874.	11889.	9260.	2446.
289	MISCELLANEOUS CHEMICAL PRODUCTS	249	59	9010	3656	11623.	3070.	9422.	5708.	1508.
28	CHEMICALS AND ALLIED PRODUCTS	1427	342	83813	35152	103487.	27338.	83898.	5463.	1443.
291	PETROLEUM REFINING	82	28	17170	8842	172903.	45676.	140174.	44558.	11771.
295	PAVING AND ROOFING MATERIALS	67	18	4073	1510	9804.	2590.	7948.	10650.	2814.
299	MISC. PETROLEUM AND COAL PRODUCTS	49	8	1697	434	1612.	426.	1307.	4204.	1111.
29	PETROLEUM AND COAL PRODUCTS	198	54	22940	10785	184319.	48692.	149429.	35552.	9392.
301	TIRES AND INNER TUBES	26	8	3264	3787	1246.	329.	1010.	1689.	446.
302	RUBBER & PLASTICS FOOTWEAR	5	1	93	885	1.	0.	1.	65.	17.
303	RECLAIMED RUBBER	7	2	450	269	21.	6.	17.	210.	55.

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TABLE 7 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE AND UNIT EMPLOYEE USE BY INDUSTRY GROUP IN 1979

SIC CODE	INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER			UNIT USE/WORK DAY	
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET	LITRES	GALLONS
304	RUBBER & PLASTICS HOSE & BELTING	12	2	781	82	1585.	419.	1285.	8983.	2373.
306	FABRICATED RUBBER PRODUCTS, NEC	176	44	10345	5213	2273.	600.	1843.	972.	257.
307	MISCELLANEOUS PLASTICS PRODUCTS	1156	211	48503	18523	10613.	2804.	8604.	968.	256.
30	RUBBER & MISC. PLASTICS PRODUCTS	1382	268	63442	28759	15740.	4158.	12760.	1098.	290.
311	LEATHER TANNING AND FINISHING	23	7	1406	794	1544.	408.	1252.	4858.	1283.
313	BOOT & SHOE CUT STOCK & FINDINGS	7	0	204	0	6.	2.	5.	136.	35.
314	FOOTWEAR, EXCEPT RUBBER	60	0	6703	0	206.	54.	167.	136.	36.
315	LEATHER GLOVES & MITTENS	4	0	107	0	3.	1.	3.	136.	35.
316	LUGGAGE	32	0	1401	0	51.	14.	42.	162.	43.
317	HANDBAGS AND PERSONAL LEATHER GOODS	89	0	3524	0	230.	61.	186.	288.	76.
319	LEATHER GOODS, NEC	36	1	1330	7	80.	21.	65.	265.	70.
31	LEATHER AND LEATHER PRODUCTS	251	8	14675	801	2120.	560.	1718.	639.	169.
321	FLAT GLASS	25	4	1852	1301	4724.	1248.	3830.	11286.	2982.
322	GLASS AND GLASSWARE, PRESSED OR BLOWN	87	14	9215	5346	2349.	621.	1904.	1128.	298.
323	PRODUCTS OF PURCHASED GLASS	157	18	5880	2009	1451.	383.	1177.	1092.	288.
324	CEMENT, HYDRAULIC	22	11	3425	3064	13666.	3610.	11079.	17649.	4662.
325	STRUCTURAL CLAY PRODUCTS	66	23	2730	1575	1095.	289.	888.	1775.	469.
326	POTTERY AND RELATED PRODUCTS	138	13	6521	2293	1357.	359.	1100.	921.	243.
327	CONCRETE, GYPSUM, AND PLASTER PRODUCTS	475	88	23042	5152	31645.	8360.	25655.	6077.	1605.
328	CUT STONE AND STONE PRODUCTS	64	4	1048	178	150.	40.	122.	633.	167.
329	MISC. NONMETALLIC MINERAL PRODUCTS	211	52	10981	7069	6966.	1840.	5648.	2807.	742.
32	STONE, CLAY, & GLASS PRODUCTS	1245	227	64656	28987	63403.	16749.	51402.	4336.	1146.
331	BLAST FURNACE AND BASIC STEEL PRODUCTS	152	41	23247	9382	31569.	8340.	25593.	6009.	1587.
332	IRON AND STEEL FOUNDRIES	107	29	9852	3499	4464.	1179.	3619.	2005.	530.
333	PRIMARY NONFERROUS METALS	26	7	964	1276	505.	133.	409.	2317.	612.
334	SECONDARY NONFERROUS METALS	47	18	2537	1228	6390.	1688.	5181.	11145.	2944.
335	NONFERROUS ROLLING AND DRAWING	117	35	12410	8621	4044.	1068.	3279.	1442.	381.
336	NONFERROUS FOUNDRIES	258	62	26367	10748	4110.	1086.	3332.	690.	182.
339	MISCELLANEOUS PRIMARY METAL PRODUCTS	88	17	2654	956	430.	114.	349.	718.	190.
33	PRIMARY METAL INDUSTRIES	795	209	78031	35710	51513.	13608.	41762.	2921.	772.
341	METAL CANS & SHIPPING CONTAINERS	66	6	8977	1957	3054.	807.	2476.	1506.	398.
342	CUTLERY, HAND TOOLS, AND HARDWARE	304	8	23830	4706	8432.	2227.	6836.	1566.	414.
343	PLUMBING AND HEATING, EXCEPT ELECTRIC	153	2	9175	1311	1820.	481.	1475.	878.	232.
344	FABRICATED STRUCTURAL METAL PRODUCTS	1243	8	43937	6432	6401.	1691.	5190.	645.	170.
345	SCREW MACHINE PRODUCTS, BOLTS, ETC.	174	3	10396	1106	354.	94.	287.	151.	40.
346	METAL FORGINGS & STAMPINGS	295	2	12141	249	2734.	722.	2217.	997.	263.
347	METAL SERVICES, NEC	640	286	17374	9490	12067.	3188.	9783.	3073.	812.
348	ORDNANCE AND ACCESSORIES, NEC	31	4	2677	1659	2498.	660.	2025.	4129.	1091.
349	MISC. FABRICATED METAL PRODUCTS	559	5	23344	873	2288.	604.	1855.	434.	115.
34	FABRICATED METAL PRODUCTS	3465	324	151851	27783	39649.	10474.	32144.	1155.	315.

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TABLE 7 (CONTINUED)

ESTIMATED ANNUAL TOTAL FRESH WATER USE AND UNIT EMPLOYEE USE BY INDUSTRY GROUP IN 1979

SIC CODE	INDUSTRY GROUP	NUMBER OF PLANTS		NUMBER OF EMPLOYEES		FRESH WATER			UNIT USE/WORK DAY	
		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET	LITRES	GALLONS
351	ENGINES AND TURBINES	47	3	9005	6625	1822.	481.	1477.	895.	237.
352	FARM AND GARDEN MACHINERY	185	1	6455	689	256.	68.	208.	176.	46.
353	CONSTRUCTION AND RELATED MACHINERY	334	9	22882	5156	3042.	803.	2466.	588.	155.
354	METALWORKING MACHINERY	616	10	19291	1914	2047.	541.	1660.	470.	124.
355	SPECIAL INDUSTRY MACHINERY	373	0	12823	0	1149.	304.	931.	396.	105.
356	GENERAL INDUSTRIAL MACHINERY	480	11	28789	5612	12392.	3273.	10046.	1905.	503.
357	OFFICE AND COMPUTING MACHINES	550	34	119759	52838	12796.	3380.	10373.	473.	125.
358	REFRIGERATION AND SERVICE MACHINERY	258	2	9519	122	384.	101.	311.	178.	47.
359	MISC. MACHINERY, EXCEPT ELECTRICAL	2499	11	49452	589	3658.	966.	2965.	334.	88.
35	MACHINERY, EXCEPT ELECTRICAL	5342	81	276976	73545	37545.	9918.	30438.	600.	159.
361	ELECTRIC DISTRIBUTING EQUIPMENT	130	1	9429	265	469.	124.	379.	246.	65.
362	ELECTRICAL INDUSTRIAL APPARATUS	226	3	18902	2023	1980.	523.	1605.	463.	122.
363	HOUSEHOLD APPLIANCES	70	2	6511	2110	800.	211.	649.	544.	144.
364	ELECTRIC LIGHTING AND WIRING EQUIPMENT	343	10	25306	4015	5832.	1541.	4728.	1020.	269.
365	RADIO AND TV RECEIVING EQUIPMENT	281	5	18803	2410	3044.	804.	2468.	716.	189.
366	COMMUNICATION EQUIPMENT	536	27	123559	55084	12179.	3217.	9874.	436.	115.
367	ELECTRONIC COMPONENTS AND ACCESSORIES	1407	39	157854	51864	25755.	6804.	20890.	722.	191.
369	MISC. ELECTRICAL EQUIPMENT & SUPPLIES	226	3	12486	2055	1497.	395.	1214.	530.	140.
36	ELECTRIC AND ELECTRONIC EQUIPMENT	3219	90	371850	119826	51555.	13619.	41796.	613.	162.
371	MOTOR VEHICLES AND EQUIPMENT	580	15	39772	15375	5936.	1568.	4812.	660.	174.
372	AIRCRAFT THEI PARTS	336	21	78326	37349	8117.	2144.	6580.	459.	121.
373	SHIP AND BOAT BUILDING AND REPAIRING	228	6	30778	21435	6178.	1632.	5009.	888.	235.
374	RAILROAD EQUIPMENT	11	0	633	0	14.	4.	11.	98.	26.
375	MOTORCYCLES, BICYCLES, AND PARTS	97	0	3417	0	370.	98.	300.	479.	126.
376	GUIDED MISSELS, SPACE VEHICLES, & PARTS	17	4	47310	40245	9347.	2469.	7578.	874.	231.
379	MISCELLANEOUS TRANSPORTATION EQUIPMENT	165	0	5819	0	519.	137.	421.	394.	104.
37	TRANSPORTATION EQUIPMENT	1434	46	206055	114404	30481.	8052.	24711.	655.	173.
381	ENGINEERING & SCIENTIFIC INSTRUMENTS	156	4	18436	2709	10475.	2767.	8492.	2514.	664.
382	MEASURING & CONTROLLING INSTRUMENTS	501	11	37406	9472	4240.	1120.	3437.	502.	132.
383	OPTICAL INSTRUMENTS AND LENSES	123	2	6627	1429	982.	259.	796.	656.	173.
384	MEDICAL INSTRUMENTS AND SUPPLIES	327	7	21713	4977	1022.	270.	828.	208.	55.
385	OPHTHALMIC GOODS	76	1	4557	778	70.	18.	57.	68.	18.
386	PHOTOGRAPHIC EQUIPMENT AND SUPPLIES	160	0	7347	0	813.	215.	660.	490.	129.
387	WATCHES, CLOCKS, AND WATCHCASES	34	0	820	0	31.	8.	25.	166.	44.
38	INSTRUMENTS AND RELATED PRODUCTS	1377	25	96916	19365	17633.	4658.	14295.	805.	213.
391	JEWELRY, SILVERWARE, AND PLATED WARE	240	14	4628	756	501.	132.	405.	479.	126.
393	MUSICAL INSTRUMENTS	49	1	4130	727	90.	24.	73.	97.	26.
394	TOYS AND SPORTING GOODS	425	9	16180	3421	918.	242.	744.	251.	66.
395	PENS, PENCILS, OFFICE AND ART MATERIALS	92	0	4116	0	499.	132.	404.	536.	142.
396	COSTUME JEWELRY AND NOTIONS	110	3	3130	165	109.	29.	88.	154.	41.
399	MISCELLANEOUS MANUFACTURES	826	5	30684	8825	1595.	421.	1293.	230.	61.

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TABLE 7 (CONTINUED)

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		TOTAL	REPORTING 1/	TOTAL	REPORTING 2/	MEGALITRES	MILLION GALLONS	ACRE FEET	LITRES	GALLONS
399	MISCELLANEOUS MANUFACTURES	826	5	30684	8825	1595.	421.	1293.	230.	61.
39	MISCELLANEOUS MANUFACTURING INDUSTRIES	1742	32	62868	13894	3711.	980.	3009.	261.	69.
	T O T A L	33119	2968	2026608	644236	1132436.	299156.	918075.	2472.	653.

1/NUMBER OF PLANTS INCLUDED IN THE SURVEY.
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CHAPTER V
INDUSTRIAL WATER RECYCLING AND USE OF RECLAIMED WATER

Until recently, supplies of fresh water were generally unlimited, and waste water treatment and disposal requirements were virtually nonexistent throughout the nation. Fresh water, and the treatment of what waste water was treated, were relatively inexpensive and were seldom significant budget items of industrial operation.

Today, however, fresh water supplies are becoming increasingly scarce and their costs are increasing. Furthermore, new environmental protection laws have made treatment and reuse of waste water more attractive and economical. To compete in today's market, many industries are being compelled to reduce fresh water intake, reduce waste loadings, recycle water, and use treated waste water.

Industrial Water Reuse

Reuse of water by industry is the planned reuse of waste water for industrial applications. Waste water may be recycled within a plant, or it may be treated and reused; when waste water is treated in a reclamation plant, it is called reclaimed water. By definition, recycling is the direct reuse of water, without treatment, at the same general location or for the same purpose.* Reclaimed water is defined in the California Water Code as ". . . water that, as a result of treatment of wastes, is suitable for a direct beneficial use or a controlled use that would not otherwise occur.**

In general, a manufacturing plant may reuse its own waste water, with or without treatment, or it may purchase reclaimed water for certain uses. Since 1970, industrial water reuse has increased substantially, because industrial water requirements have grown significantly over the past 12 years.

The use of reclaimed water should become increasingly economical and attractive. As fresh water supplies become more scarce, their costs are expected to rise, and reclaimed water should become a less costly alternative water supply.

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* Recycled water often receives some limited treatment before reuse. In general, recycled water is continuously reused for the same purpose. Reclaimed water is water that has been treated in a reclamation plant and is usually transported to another location for reuse.

** Section 13050 (n).

An example of industrial water recycling is the continuous use of water in an industrial cooling tower. Although the water is continuously recycled and reused, additional fresh water must be introduced, because (1) some of the water evaporates, (2) some becomes excessively mineralized and must be discharged as "blowdown", and (3) some escapes as "drift", i.e., droplets of water entrained in the air leaving the tower. All of those losses (evaporation, blowdown, and drift) must then be replaced with additional water (called "makeup") of a lower mineral concentration.

Once-Through Water Use

Once-through water use is the conventional method of using fresh water for cleaning and other purposes. The water not incorporated into the product is usually discharged after a single use. Once-through water use produces large quantities of low-strength waste water, which must be treated and discharged. Although in-plant conservation can reduce the costs of water intake and waste discharge as much as 25 to 50 percent, once-through use entails higher costs for waste-water treatment and water intake than when a recycling system is used.

Recycling and Reuse of Process Water

In a reuse system, process water may be recycled continuously and fresh water added only to compensate for losses to evaporation, for product filling, and to maintain the required water quality. Another example of industrial water recycling is the use of sprinkled log decks in a lumber mill. As the logs are sprinkled, the once-used water is diverted to a sump and recycled (see Chapter I).

The cost of water supplies can be reduced significantly by recycling; however, in some industries, particularly the food industry, reuse systems may conflict with sanitation requirements, except for such operations as container cooling, floor washing, and other cleaning, where the recycled water does not directly contact the product.

Clean Water Act of 1972

The federal Clean Water Act of 1972 (Public Law 92-500), enacted by Congress to improve the ". . . chemical and biological condition of the nation's waters," has profoundly affected various aspects of industrial water use. In general, the act provides that by 1985, discharges of pollutants into navigable waters will be eliminated and that a research and development program be established to achieve that goal. The act specifically provides that the cost of treating industrial wastes will be assessed to the discharger, with a formula that considers both the quality and volume of discharges. That section of the act thus provides a powerful incentive for the recycling and reuse of formerly discharged industrial waste water.

Responsibility for implementing the Clean Water Act was assigned to the U. S. Environmental Protection Agency, along with an order to accelerate the development of:

1. waste-management methods applicable to point and non-point sources of pollution;*

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* As defined in the Clean Water Act of 1972, a point source of pollution is one that is "confined", as in a pipe, ditch, channel, etc. (For the complete definition, see Appendix C, "Glossary of Terms.") A non-point source would include such unconfined sources of potential pollution as agricultural runoff, urban runoff, forest runoff, mine runoff, etc.

2. advanced waste-treatment methods applicable to both point and non-point sources;

3. methods for recycling and reclaiming waste water; and

4. confining pollutants to eliminate migrating water or other environmental pollution.

In effect, the new law has both reduced the volume of discharges and increased the recycling rate throughout industry. Recycling rates for the various industrial groups discussed in this bulletin are shown in Table 5, beginning on page 51.

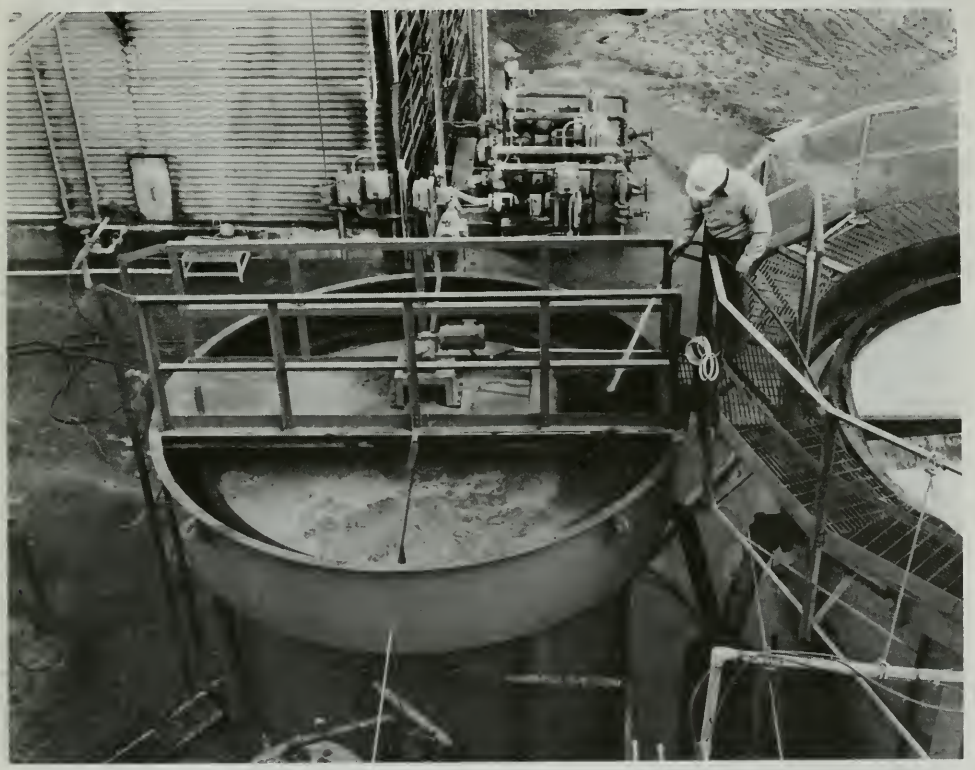
Incentives to Recycle and Reuse Water

In 1978, the Department of Water Resources sponsored a survey (conducted by Dun and Bradstreet) to determine what might motivate certain industries to recycle or reuse water. Among other questions, various companies were asked what they would do if:

1. costs of fresh water were increased;

2. they were required to use various percentages of recycled water;

3. costs of discharges into municipal sewers were increased; and



Water is treated in this flotation cell before it is discharged into the city sewer system at this plant in Fresno.

4. the volume of permissible discharges was reduced.

With those questions as hypothetical incentives, the firms responded as follows:

1. About 70 percent of those using water for cooling indicated they could use treated or recycled water for that purpose.

2. About 50 percent of those using water for processing and washdown indicated they could use recycled water.

3. In response to question 3 (increased cost of waste discharges), about 50 percent indicated they would begin recycling or activate new processes that use less water.

4. If the volumes of permissible waste

Waste water from a sugar beet factory in Woodland is discharged into this sedimentation pond.

discharges were reduced, more than 20 percent would begin recycling, install or activate new processes that use less water, accept lower quality water from another source, or follow other alternatives suggested in the survey.

Overflow from the pond is used to irrigate forage for livestock.

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In general, the respondents indicated that the achievement of reduced fresh water intake, increased recycling, and reduced waste discharges would depend on the availability of incentives, for example, reduced taxes or low-interest loans for the purchase of recycling equipment. Other important economic incentives include possible:

- lower fresh water costs resulting from reduced fresh water intake;
- lower sewer charges resulting from decreased effluent loadings;
- lower capital and operating costs for waste treatment facilities resulting from reduced waste discharges;
- increased product recovery resulting from improved process efficiency; and
- increased revenues resulting from recovery of marketable by-products.

Industrial Reuse of Reclaimed Water

In the South Coastal area, more than 1.6 million cubic dekametres (1.3 million acre-feet) of sewage is produced annually, most of which is discharged to the ocean. Over the past several years, the Department of Water Resources has been studying the feasibility of reclaiming this water. Results of the studies indicate that about 40 percent of the sewage now being discharged could be reclaimed, at costs ranging from $200 to $1000 per acre-foot. The actual costs would depend, among other things, on the location of treatment plants, the types of treatment needed, and how far the treated water must be transported for reuse.

Waste water from a Spreckels sugar beet factory is used to fill this pond, which has been allocated to the Audubon Society for use by wildlife.

Because of public health concerns, reclaimed water cannot be used for direct public consumption. Therefore, the potential markets for direct reuse are generally limited to recharge of ground water, repulsion of sea water intrusion, certain agricultural and recreational uses, and manufacturing uses, such as boiler-feed water, cleaning, firefighting, and, in particular, cooling. In some cases, however, tertiary-treated waste water may be usable for certain actual production processes.

The Three Levels of Waste Water Treatment

The three levels of waste-water treatment are primary, secondary, and tertiary, or advanced.

Primary treatment involves physical processes for removal of settleable solids and floating matter by screening, skimming, and sedimentation. The settled material goes to digesters, where it is reduced in volume and stabilized; by-products, such as methane gas and dried humus, are recovered. The water, now minus the settled material, is then disinfected with chlorine.

Secondary treatment is the biological process of reducing suspended, colloidal, and dissolved organic matter from the effluent from primary treatment. Secondary treatment is usually carried out with trickling filters or by the activated sludge process. The biomass is settled out, leaving a fairly clear effluent that is 95 percent free of the original organics. This is followed by clarification and further chlorination.

Tertiary (advanced) treatment removes specific constituents, such as nutrients, suspended and colloidal organics, refractory or nonbiodegradable organics, dissolved organic materials, and pathogenic organisms. A common method of tertiary treatment involves passing the clarified water through coal/sand or activated-carbon filters. Other tertiary processes include steps to remove specific nutrients, such as nitrogen or phosphorous; these include air-stripping, reverse osmosis, ion exchange, and electrodialysis. Chlorine is used for final disinfection of the effluent, which is then suitable for many uses.

High Water Requirements for Industrial Cooling

According to the American Water Works Association, more water is required for cooling than for any other industrial process.[47] Whereas treated municipal waste water is now used for cooling in many industries, the total potential use far exceeds the actual use. The results of a study of the potential use of reclaimed water in Los Angeles and Orange counties show that some 62 000 cubic dekametres (50,000 acre-feet) of treated waste water is reused in those two counties alone.[57] However, the same report estimates that some 123 000 cubic dekametres (100,000 acre-feet) of treated waste water now being discharged could be used for industrial cooling.

The disparity between actual and potential use of treated waste water for cooling is due in part to uncertainties about the cost and technology of wastewater reuse. For example, large industrial cooling systems are subject to scaling, corrosion, biological growths, and fouling. Although both fresh water and treated waste water contain contaminants that cause those problems, the concentrations remaining in once-used water are generally much higher.

Scaling is caused by calcium salts of carbonate, sulfate, and phosphate. Corrosion is caused by the electrical potential created between dissimilarities in metal surfaces, which results in dissolution of the metal. Treated water may also contain some nutrients that support biological growths; when deposited on the surfaces

of heat exchangers, such growths inhibit heat transfer and result in lowered pressure in pipes and heat-exchange equipment. Fouling, which also inhibits heat transfer in heat exchangers, is caused by biological growths and deposits of suspended solids, soil particles, corrosion products, and inorganic scale in cooling-tower recirculation systems. However, the chemicals, nutrients, and other constituents that cause these problems can usually be reduced to acceptable levels (for industrial cooling) by appropriate levels of treatment.

Water Quality Requirements for Various Industrial Processes

Each industry has its own particular water-quality requirements, which relate mainly to the interaction between certain chemicals, or other constituents, and the product.

Food Processing (SIC Major Group 20). In the food industry, constituents of concern include suspended solids, heavy metals, turbidity, and coliform bacteria. Reclaimed water could be used for floor and gutter washing, boiler-feed water, and initial raw-product conveyance. However, reclaimed water would not be acceptable for certain processes in which water directly contacts the product. For example, in the meat-processing industry, reclaimed water can be used for clean-up and sanitation only. In fruit and vegetable packing, however, reclaimed water may also be used for washing and processing, because the products are thoroughly sanitized by the intense heat used to process them.

Textiles (SIC Major Group 22). Of concern in the textile industry are calcium and magnesium, which can interact with soaps during the washing process, cause dyes to precipitate, and produce irregularities between batches of dyed material.

Paper Products (SIC Major Group 26). Paper manufacturers are concerned with color, turbidity, and suspended solids. Hardness is also a problem, because certain constituents may react with sizing compounds, and other organisms may cause slime and growths on the paper. Manufacturers of lower grade papers can more easily use reclaimed water for processing. In general, the finer the grade of paper, the more critical water quality becomes.

Chemical Industry (SIC Major Group 28). Processing in the chemical industry is highly specific, and each industry has separate and individual requirements. In general, manufacturers of inorganic chemicals could more easily use reclaimed water than could manufacturers of organic chemicals.

Petroleum Refining (SIC Major Group 29). In the petroleum industry, some 75 to 85 percent of the water is used for cooling.* Constituents of concern in cooling water include calcium (hardness), phosphate, silica, and ammonia. In boiler-feed water, the principal considerations are hardness and total dissolved solids (TDS). Constituents of concern in process water are TDS, bacteria, and suspended solids. In general, the use of reclaimed water for those processes would conserve large quantities of fresh water, but would also involve high costs for pretreatment and treatment of effluents.

Glass and Glassware (SIC Major Group 32). Glass manufacturers would have few problems with the use of reclaimed water, since water is not used in the product, nor does it contact the product.

Primary Metals (SIC Major Group 33). Water quality requirements for the primary metals industry vary, depending on whether the water is used for

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* Although some newer refineries use about 50 percent air cooling, which lowers cooling-water use to about 50 percent of the total.

quenching, hot-rolling, cold-rolling, or rinsing. Regardless of the process, however, most metals manufacturers could use reclaimed water.

Legislation Encouraging Waste Water Reclamation

Federal and state laws provide legislation encouraging the reclamation and use of treated waste water through the federal Clean Water Act (Public Law 92-500) and the California Water Code. Public Law 92-500 specifically encourages reclamation as an integral part of water pollution control projects. The California Water Code also encourages water reuse as a part of pollution control, and it specifically encourages reclamation projects on their own merits. Section 13512 clearly spells out the State's policy:

> "It is the intention of the Legislature that the State undertake all possible steps to encourage development of water reclamation facilities so that reclaimed water may be made available to help meet the growing water requirements of the State."

Thus California has primary responsibility for development of regulations, criteria, and guidelines for waste-water reclamation and reuse within its boundaries. Basic legislation is spelled out in the California Water Code, Division 7, Section 13000 et seq., titled the "Porter-Cologne Water Quality Control Act" of 1969. The act directs the Department of Public Health to establish statewide criteria for the use of reclaimed water that would ". . . result in reclaimed water safe from the standpoint of public health, for the uses to be made". The act also authorizes the State Water Resources Control Board to provide loans for studies and investigations of water-reclamation projects.

Current Planning for Industrial Use of Reclaimed Water

Studies are now underway in Los Angeles and Orange counties to develop a long-range plan and strategy for the cost-effective distribution and use of treated waste water. The study, which was authorized by state and federal water-quality legislation, is a cooperative planning effort by The Metropolitan Water District of Southern California and five other local water-management supply and reclamation agencies.[67]

Stringent water-quality requirements resulting from the federal Clean Water Act and California's Porter-Cologne Act require that inland treatment plants be upgraded from secondary to tertiary treatment.* During the summer of 1978, tertiary-treated water became available for reuse in the Los Angeles Basin. At present, however, much of this high-quality treated effluent is being discharged to the ocean for lack of marketing arrangements.

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* The three levels of waste-water treatment are discussed on page 87.

APPENDIX A
REFERENCES

APPENDIX A

REFERENCES

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3. Standard Industrial Classification Manual, 1978, Sponsored by the Executive Office of the President, prepared by the Office of Statistical Standards, Bureau of the Budget.

4. K. L. Koller and Patrick MacAuley, "Water Requirements for Industrial Development," American Water Works Association Journal, January 1980, pp. 2-9.

5. Orange and Los Angeles Counties Water Reuse Study, Mid-Course Report Summary, The Metropolitan Water District of Southern California et al., Summer 1980.

APPENDIX B
SURVEY FORM

INDUSTRIAL WATER USE SURVEY

(FOR CALENDAR YEAR 1979)

CONFIDENTIAL

Data furnished in this report will be treated in strict confidence and will only be published in combination with industry totals.

ITEM 1 **INTAKE WATER** (NEW, OR MAKEUP WATER)

A. TOTAL ANNUAL FRESH WATER USE _____ ☐ GALLONS ☐ MILLION GALLONS

B. PEAK DAILY FRESH WATER USE _____ ☐ GALLONS ☐ MILLION GALLONS

C. HIGHEST MONTHLY FRESH WATER USE _____ ☐ GALLONS ☐ MILLION GALLONS MONTH _____

D. DISTRIBUTION OF ANNUAL FRESH WATER USE:

JANUARY _____% APRIL _____% JULY _____% OCTOBER _____

FEBRUARY _____% MAY _____% AUGUST _____% NOVEMBER _____

MARCH _____% JUNE _____% SEPTEMBER _____% DECEMBER _____

E. TOTAL ANNUAL BRACKISH WATER* USE _____ ☐ GALLONS ☐ MILLION GALLONS

* FOR THIS SURVEY, BRACKISH WATER IS CONSIDERED TO CONTAIN MORE THAN 1,000 MILLIGRAMS (1,000 PARTS PER MILLION) OF DISSOLVED SOLIDS PER LITER

ITEM 2. **SOURCE OF FRESH WATER**

A. WELLS (COMPANY PRODUCED ONLY) _____%

B. STREAM, LAKE OR RESERVOIR (COMPANY PRODUCED ONLY) _____%

C. PURCHASED (PUBLIC SUPPLIER) _____%

D. RECLAIMED (OUTSIDE SOURCE) _____%

100 %

E. NAME OF PUBLIC SUPPLIER FROM WHICH WATER WAS PURCHASED (IF ANY):

_____

ITEM 3. **PURPOSE OF USE** (FOR WATER REPORTED IN 1-A AND 1-E ABOVE) (SEE DEFINITION OF TERMS)

	PURCHASED FRESH WATER	SELF-PRODUCED FRESH WATER	BRACKISH WATER
A. COOLING (NON-CONTACT)			
B. PROCESSING			
C. SANITARY AND MISCELLANEOUS			
TOTAL			

FIGURES ARE STATED IN ☐ GALLONS ☐ MILLION GALLONS

1 ACRE-FOOT = 43,560 CUBIC FEET OR 325,851 GALLONS
1 CUBIC FOOT = 7.481 GALLONS
100 CUBIC FEET = 748.1 GALLONS

ITEM 4. **WATER RECIRCULATED** (FRESH WATER RECIRCULATED WITHIN THE PLANT ONLY)

A. WAS ANY WATER RECIRCULATED (RECYCLED) WITHIN YOUR PLANT? ☐ YES ☐ NO

B. (1) IF THE ANSWER TO 4-A WAS **YES**, HOW MUCH **ADDITIONAL** WATER WOULD HAVE BEEN REQUIRED ANNUALLY IF **NO** WATER HAD BEEN RECIRCULATED?

_____ ☐ GALLONS ☐ MILLION GALLONS

(2) IF THE ANSWER TO 4-A WAS **YES** SHOW THE PERCENT OF RECIRCULATED WATER THAT WAS USED FOR THESE PURPOSES

COOLING (NON-CONTACT) _____

PROCESSING _____

SANITARY AND MISCELLANEOUS _____

TOTAL 100

ITEM 5. **WATER CONSERVATION** (FRESH WATER ONLY)

A. HAVE YOU INSTALLED **WATER CONSERVATION** METHODS OR EQUIPMENT SINCE 1970?

☐ YES ☐ NO

B. IF THE ANSWER TO 5-A WAS **YES** (ASSUMING YOUR SAME LEVEL OF PRODUCTION) HOW MUCH HAVE YOU REDUCED?

INTAKE _____ DISCHARGE _____

(BY **CONSERVATION** TECHNIQUES ALONE)

ITEM 6. **FRESH WATER DISCHARGED** (REPORT ONLY THE WATER THAT LEAVES YOUR PREMISES ANNUALLY **EXCLUDING** STEAM OR EVAPORATIVE LOSSES, WATER INCORPORATED INTO THE PRODUCT AND INTAKE BRACKISH WATER)

_____ ☐ GALLONS ☐ MILLION GALLONS

ITEM 7. **FUTURE FRESH WATER INTAKE**

IN YOUR BEST JUDGMENT CONSIDERING WATER CONSERVATION AND RECIRCULATION, GROWTH, ADVANCED TECHNOLOGY AND AUTOMATION COST OF WATER STATUTORY REQUIREMENTS FOR WATER QUALITY DISCHARGES, AND OTHER MODIFYING INFLUENCES, **WHAT CHANGES IN WATER INTAKE** DO YOU EXPECT FROM THE PRESENT LEVEL OF USE OVER THE NEXT 10 YEARS?

INCREASE ☐

REMAIN THE SAME ☐

DECREASE ☐

BY **HOW MUCH** _____

ITEM 8. **PLANT PRODUCTION** (AT THIS LOCATION)

A. LIST THE MANUFACTURED PRODUCTS IN ORDER OF ANNUAL WATER USE REQUIREMENTS.

PRODUCT	% OF FRESH INTAKE WATER	PRODUCTION LEVEL **

** HOW **MUCH** BY WEIGHT OR HOW **MANY** UNITS DID YOU MANUFACTURE IN 1979? PLEASE SHOW THE NUMBER OF UNITS I.E. 10 TONS, 1,000 BARRELS, 500 BOXES, ETC

B. IN YOUR JUDGMENT, WHAT CHANGE WOULD BE EXPECTED TO OCCUR IN YOUR LEVEL OF PRODUCTION OVER THE NEXT 10 YEARS?

INCREASE ☐

REMAIN THE SAME ☐

DECREASE ☐

HOW MUCH _____

ITEM 9. **EMPLOYMENT**: INDICATE YOUR NUMBER OF EMPLOYEES EARNING WAGES AT THIS LOCATION DURING THE PAY PERIODS WHICH INCLUDE THE 12TH DAY OF EACH MONTH.

JANUARY _____	APRIL _____	JULY _____	OCTOBER _____
FEBRUARY _____	MAY _____	AUGUST _____	NOVEMBER _____
MARCH _____	JUNE _____	SEPTEMBER _____	DECEMBER _____

DEPARTMENT PHONES AVAILABLE TO ANSWER YOUR QUESTIONS IN LOS ANGELES, (213) 620-2418 IN FRESNO, (209) 445-5262 IN SACRAMENTO, (916) 445-9978 IN RED BLUFF (916) 527-6530, EXTENSION 292

NAME OF RESPONSIBLE COMPANY OFFICIAL TO CONTACT _____

APPENDIX C
DEFINITION OF TERMS

APPENDIX C

DEFINITIONS OF TERMS

Air Conditioning: Water used as a heat-exchange medium in an apparatus for controlling the humidity and temperature of air.

Blowdown: Water highly concentrated with contaminants (accumulated salts plus precipitates) in boilers or cooling tower systems. This water is periodically or continuously removed, and good quality makeup water is added to maintain favorable operational conditions in the system.

Boiler Feed: Water with a mineral content in the general range between fresh water and sea water. It may contain from 1,000 to 10,000 milligrams of dissolved solids per litre. For this survey, brackish water is considered as water containing more than 1,000 milligrams of dissolved solids per litre (or 1,000 parts per million).

Cooling Water (noncontact): In this application, water is separated from the material being cooled by heat exchanger surfaces. The most common noncontact cooling uses are equipment cooling, process temperature control, steam-electric-power condensing, and air conditioning.

Dross: Refuse or impurity in molten metal; slag; cinders; any waste matter.

Employee: Each person on the payroll of an operating manufacturing establishment for any duration.

Employee Working Days: The product of the average annual number of employees and working days.

Employment: The total number of employees working at each plant on the 12th day of each month in 1979.

Establishment: An economic unit which produces goods or services -- for example, a farm, a mine, a factory, a store. In most instances, the establishment is at a single physical location, and it is engaged in only one, or predominantly one, type of economic activity for which an industry code is applicable.

Gross Fresh Water Use: Intake plus recycled water. Volume of intake required on a "once-through" basis.

Intake: Makeup or new water brought into the plant distribution system, either purchased or self-supplied.

Makeup: Fresh water or water of a low mineral content added to boiler-feed water or cooling water to replace blowdown (see Blowdown) and maintain the desired mineral concentration in the boiler-feed or cooling water stream.

Miscellaneous Uses (questionnaire Item 3C): Includes a variety of plant water applications such as air conditioning, fire-suppression standby, esthetics, dust control, equipment washing, and others. This water is not used for either direct production of the manufactured product or with the raw materials entering the manufacturing process.

Non-Point Source of Pollution: See Point Source of Pollution.

Point Source of Pollution: As defined in Public Law 92-500, the federal Clean Water Act of 1972, Section 502(14), ". . . point source means any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged." By extension, a non-point source is one that is unconfined, for example, runoff from irrigated agriculture, urban runoff, forest runoff, and mine runoff, etc.

Plant Production: Quantity of product produced, expressed in terms of weight, numbers, or other measure such as tons of steel, barrels of oil, etc.

Process Water: A wide variety of applications where water comes into contact with process materials or waste products, or is incorporated in the product. Common process applications are inclusion in food and beverages, slurrying, paper forming, fume scrubbing, spray cooling, and barometric condensing; included in this category is boiler-feed water, which is used to generate steam for process purposes or steam electric power generation.

Reclaimed Water: Water recovered directly from wastes by treatment in a treatment plant (and most often used at another location).

Recycling (or Recirculation): The process of recapturing water once used in the manufacturing process and using this source to supply intake requirements. In doing so, the supply may or may not be upgraded. It differs from reclaimed water in that the source orginates within the plant (see also, p. 81.

Recycling Rate: Gross fresh water use divided by intake (see above).

Sanitary Use: Chiefly sanitary service water for employee personal uses; these include washing, drinking, and personal hygiene.

Standard Industrial Classification (SIC): A system that defines industries in accordance with the composition and structures of the economy and that covers the entire field of economic activities. This survey deals with Division D (Manufacturing). This classification system is further defined in Appendixes D and E.

Urban Water Use: The use of water for urban purposes, including, but not limited to, residential, commercial, industrial, municipal, military, and institutional classes. The term is applied in the sense that it is a kind of use rather than a place of use.

Working Day: Any day during which the establishment is operated by some or all employees.

APPENDIX D
DEFINITION OF MANUFACTURING

APPENDIX D

DEFINITION OF MANUFACTURING

The Standard Industrial Classification Manual[1/] defines manufacturing as:

". . . . . establishments engaged in the mechanical or chemical transformation of materials of substances into new products. These establishments are usually described as plants, factories, or mills and characteristically use power driven machines and materials handling equipment. Establishments engaged in assembling component parts of manufactured products are also considered manufacturing if the new product is neither a structure nor other fixed improvement. Also included is the blending of materials such as lubricating oils, plastics, resins, or liquors.

"The materials processed by manufacturing establishments include products of other manufacturing establishments. The new product of a manufacturing establishment may be 'finished' in the sense that it is ready for utilization or consumption, or it may be 'semifinished' to become a raw material for an establishment engaged in further manufacturing. For example, the product of the copper smelter is the raw material used in electrolytic refineries; refined copper is the raw material used by copper wire mills; and copper wire is the raw material used by certain electrical equipment manufacturers.

"The materials used by manufacturing establishments may be purchased directly from producers, obtained through customary trade channels, or secured without recourse to the market by transferring the product from one establishment to another which is under the same ownership. Manufacturing production is usually carried on for the wholesale market, for interplant transfer, or domestic consumer.

"There are numerous borderline cases between manufacturing and other division of the classification system. Specific instances will be found in the descriptions of the individual industries. The following activities, although not always considered as manufacturing, are so classified:

Milk bottling and pasteurizing;
Fresh fish packaging (oyster shucking, fish filleting);
Apparel jobbing (assigning of materials to contract factories or shops for fabrication or other contract operations) as well as contracting on materials owned by others;
Publishing;
Ready-mixed concrete production;
Electroplating, plating, metal heat treating; and polishing for the trade;
Leather converting;
Logging;
Wood preserving;
Various service industries to the manufacturing trade, such as typesetting, engraving, plate printing, and preparing electrotyping and sterotype plates, but not blue printing or photocopying services;
Lapidary work for the trade;
Fabricating of signs and advertising displays.

1/ U. S. Government Printing Office, Washington, D. C. 1967.

"There are also some manufacturing-type activities performed by establishments which are primarily engaged in activities covered by other divisions, and are thus not classified as manufacturing. A few of the more important examples are:

AGRICULTURE, FORESTRY, AND FISHERIES

"Processing on farms is not considered manufacturing if the raw materials are grown on the farm and if the manufacturing activities are on a small scale without the extensive use of paid labor. Other exclusions are custom grist milling, threshing, and cotton ginning.

MINING

"The dressing and beneficiating of ores, and the breaking, washing, and grading of coal are not considered manufacturing.

CONSTRUCTION

"Fabricating operations performed at the site of construction by contractors are not considered manufacturing, but the prefabrication of sheet metal, concrete, and terrazzo products and similar construction materials is included in the manufacturing division.

WHOLESALE AND RETAIL TRADE

"Establishments engaged in the following types of operations are included in Wholesale or Retail Trade: cutting and selling purchased carcasses; preparing feed at grain elevators and farm supply stores; stemming leaf tobacco at wholesale establishments; and production of wiping rags. The breaking of bulk and redistribution in smaller lots, including packaging, repackaging, or bottling products such as liquors or chemicals, is also classified as Wholesale or Retail Trade. Also included in Retail Trade are establishments primarily engaged in selling, to the general public products produced on the same premises from which they are sold, such as bakeries, candy stores, ice cream parlors, and custom tailors.

SERVICES

"Tire retreading and rebuilding, sign painting and lettering shops, and the production of motion picture films are classified as Services. Repair activities are classified as Services, except ship and boat building and repair, the rebuilding of machinery and equipment on a factory basis, and machine ship repair, all of which are classified as manufacturing."

APPENDIX E
STRUCTURE OF THE STANDARD INDUSTRIAL CLASSIFICATION SYSTEM

APPENDIX E

STRUCTURE OF THE STANDARD INDUSTRIAL CLASSIFICATION SYSTEM

Mechanical Basis of Coding

The SIC is an industrial classification of the total economy. It was used in this survey as a means for numerically labling each manufacturing group. As such, it divides all activities into broad industrial division, subdivides each division into two-digit major groups, breaks the major groups into three-digit industry subgroups, and further divides the latter into four-digit detailed industries. The numbering system provides flexibility by permitting use of classifications at various levels of detailed (four-digit, three-digit, two-digit, division) according to the specific uses desired. The U. S. Census of Manufacturers, Mining, Wholesale, Retail and Service trade utilizes the classification at the most detailed level (four-digit) and in some instances provide subindustry or kind-of-business breakdowns below the four-digit classification.

Limitations

This sytem of classification is not without its limitations for certain types of uses. Although the classification system attempts to reflect the "real world" industrial structure, it nevertheless must serve the major function of grouping data of infinite variety into a finite number of classes. As a result, it becomes to a degree, over-simplified and idealized when applied to the complex of activities that constitute the actual reporting establishments. In manufacturing, the presentation of data has been plagued by the fact that some establishments produce products ordinarily associated with two or more different industries. This results in a lack of perfect concordance between product and industry statistics. Furthermore, in many important industries, the establishments within the same industry differ as to the number and kind of processes employed in making a final product. These are the types of realities that the users of many classification system, including the SIC, must recognize.

Purpose of the SIC -- Possibilities of Rearrangement

The user of industrial statistics should look at the SIC system as a tool susceptible to rearrangement for his own special needs. Thus, water planners need to group industries according to their water requirements and potential impact on local water sources and suppliers. From the recent industrial water use survey conducted in California a number of major industrial groups could be easily identified as high intensity water users each of which must be looked at in detail.

Because of the inclusion of variable rate water users, even at the 4-digit level, a subdivision of some industries at this level is almost a necessity. For example, different processes, or extent of recirculation in the manufacture of automobile storage batteries may cause a two-fold variance in makeup water requirements per unit of product, among different plants manufacturing the identical product. This points out that the SIC must be tailored to its

specific need to classify water users and to provide information through this classification method to supply all of the water data collection needs to the planner, by adding one and possibly 2 digits to the 4-digit level of industry identification in order to adequately separate significantly different water-using entities engaged in producing essentially the same product. As time goes on and more information is gained about identifiable differences in what now appear to be very similar industries, these differences should be documented and the SIC numbering system extended to account for these occassional events.

Common Statistical Language. No single method of classification can possibly encompass, in one structural system, so diverse a group of statistical objectives. The reason for having such a system, however, is that it provides a common statistical language -- a single set of definitions that can become generally understood through frequent usage and through agreement upon inclusions as well as exclusions. Of greater importance, it provides for comparability in federal statistics in terms of a single classification system. While the SIC system in its original framework falls short for many statistical purposes, it can be highly flexible. The standard must be in considerable detail to provide a set of building blocks that can be regrouped to form a variety of different classifications.

Flows From Actual Business Structure

This standard flows very largely from the actual structure into which American businesses have grouped themselves, and it is this characteristic that makes it the best single system for the largest number of uses. In most instances, an industry consists of producers of similar materials by similar processes and the producers usually compete with one another.

Principles of the Standard Industrial Classification

In establishing the industries under the SIC, the following general principles, taken largely from previous censuses, served as guides:

(1) The classification should conform to the existing structure of American industry.

(2) The units to be classified are establishments rather than legal entities or companies, and each establishment is to be classified according to its major activity.

(3) In order to be recognized as a separate category, the group of establishments comprising the industry should be of significant size from the standpoint of number of persons employed, volume of business, and other economic factors.

(4) The group of establishments should be homogeneous with respect to the type of activity in which they are engaged. Further, they should, in the aggregate, account for a significant portion of that activity.

Establishment is the Unit Classified

The SIC is a classification of establishments, meaning that the establishment is the reporting unit that gets an SIC code number. The establishment is the economic unit that produces goods or services -- for example, a farm, a mine, a factory, a store. The economic unit (establishment) is characterized by these elements: physical location, distinctive activity, and reportability. The establishment is not necessarily identical with the business concern, or firm, which may consist of one or more establishments. Also, it is to be distinguished from organizational departments or divisions within an establishment. Each establishment is assigned a single industry code on the basis of its major activity, which is generally determined by the product or group of products produced or handled, or services rendered.

A classification based on establishments has certain inherent limitations. For concerns that operate more than one establishment, the establishment is too small a unit for the compilation of financial data such as profits and investments. On the other hand, it is frequently too gross a unit for measuring or describing the relationship of production or sales of detailed products to employment, payrolls, capital expenditures, etc. To overcome some of the deficiencies in the use of the establishment as a reporting unit, the 1954 Census of Manufacturers provided a number of supplementary tabulations showing general industrial statistics such as employment, cost of materials, shipments, etc., by degree of establishment specialization in product classes within each 4-digit industry.

Basis for Classification - Product or Services

Primary emphasis in defining manufacturing industries in the SIC is on the supply side of the economic picture. Manufacturing industries are generally defined in terms of establishments primarily producing a group of related products. However, in some instances, the determining factor is the process the establishments perform, or the materials used, and occassionally, the method of distribution. Manufacture of the product, rather than the demand, determines the industry classification. For example, establishments primarily manufacturing butter are in a different industry from those producing margarine, although the demands for butter and for margarine are quite similar. On the other hand, most toys, regardless of the method of manufacture or the materials used, are classified in the same industry.

For nonmanufacturing segments of the economy that produce goods (agriculture, fisheries, mining, and construction), emphasis is again centered on the nature of the output rather than demand for the goods or services. A principle in developing industry classifications requires that establishments in the industry account for a large portion of the total activity defining the industry. There is great variation among industries in this respect. For example, almost the entire output of synthetic fiber is manufactured by establishments in the synthetic fiber industry. On the other hand, only about two-thirds of the margarine is accounted for by establishments in the margarine industry; almost all of the remaining one-third is made as a secondary product by establishments in the Shortening and Cooking Oils industry.

Range of Products Within an Industry

Some industries, such as beet sugar, are defined to include a very narrow range of products while others, such as farm equipment, encompass a wide product spectrum. The latter is practically always true of the so-called "not elsewhere classified" industries which generally represent a combination of many products that do not meet the size criterion for separate industry status. Such residual industries may not meet all of the criteria stipulated for an industry but they are necessary to complete the classification structure which accounts for all economic activity and make it possible to retain the purity of other industries.

Sub-Industry Product Classes

For industries that include a range of products, an additional analytical tool is available from the 1,000 product classes developed and published by the Census Bureau from the SIC manufacturing industry classification.

These product classes were developed in order to provide an intermediate level of classification for the publication of product data and for the presentation of industry-type statistics relating to input-output data for specialized establishments. In many instances, the establishment of a product class has the effect of dividing industries in the SIC into smaller industry categories. This is particularly true in those industries in which establishments do not tend to produce the full range of products of the industry but instead specialize in selected products of the industry. Publication of selected statistics for establishments classified according to their degree of specialization in products of the industry first appeared in the 1954 Census of Manufacturers.

Integration

Since the product produced by an establishment is the controlling factor in determining its classification, an industry may include establishments of greatly different physical characteristics even though they produce the same product. This is because some are "integrated" further down the production chain than others. Although the final output of two establishments may be identical, one may have accomplished its output with low-cost raw materials and sizeable amounts of labor and/or capital equipment, while the other establishment may have achieved the same output with high-cost fabricated materials and parts assembled by relatively small use of labor and equipment.

Limitations - Captive Plants

It should also be recognized that many establishments are owned by companies that take the entire output of the establishment for the production of some other manufactured products at a different location. These captive establishments are classified in the industry of their principal product just as if they were completely independent enterprises.

Conclusions

Like earlier classifications, the 1972 editions and 1977 supplement of the manual are certainly not the final product in the evolution of industry classification. Additional revisions will be required from time to time as production patterns change or reconsideration of existing industry groupings and definitions is needed for use in the development of more meaningful statistics for government and industry use.

APPENDIX F
COMPUTER PROCEDURES

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COMPUTER PROCEDURES

Mailing of the questionnaires and other material was contracted through inter-agency agreement with the State Department of General Services. The mailing package consisted of an address mailing slip, a letter of transmittal, a definition of terms used in the survey forms, and the questionnaire. Actually, two questionnaires* were circulated, each covering the same points but one considerably simplified for industries in which water was used primarily for drinking and sanitation.

As questionnaires were returned, they were recorded and replies to questions were sent where requested. Editing of the forms was conducted by the three cooperating agencies. A procedure was established whereby forms were checked for identification, consisting of name, address, county of operation, special assigned account number for filing purposes, and Standard Industrial Classification Code number. Secondly, units of water measurement were examined for reasonableness. Then, each of the questions answered was examined to see if a logical reply was provided.

Where there were questions involving significant factors, companies were contacted by phone. If the editor thought certain pertinent information may have been inadvertently deleted by the respondent, phone contacts were made, or letters sent. Because of the possibility of human error in the editing process, final edits were made by the computer at the University of California Lawrence Berkeley Laboratory (described in the following paragraphs).

After the initial edit, the forms were sent to San Francisco Optimation Center for recording. Here the data were keyed in by an operator using the ENTREX Key to Disk System; with the use of a NOVA Mini Computer, the data were coded, packed, and transferred to magnetic tape according to a fixed format. The recording of this survey directly onto magnetic tape eliminated the costly, time-consuming, and awkward handling of punched cards as were used on the previous survey.

The magnetic tapes were sent to U. C. Lawrence Berkeley Laboratory where programs and procedures were written in Fortran on a VAX-VMS computer system to reformat, edit, analyze, sort, and summarize the information for producing the published tables at the end of Chapter IV.

Data from each form were reformatted for optimum compactness and ease of viewing. Each item in a form was computer-checked to see if it had correct character type, was within reasonable limits, was logically consistent with itself, and was logically consistent with related items. Notations about probable errors were appended to each reformatted form and stored on disc.

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* See Appendix B.

Since the original forms were filed with respect to Dun & Bradstreet (Dun's) account number, the reformated, error-flagged forms were also sorted by Dun's number, using the VAX-VMS SORT utility, and printed for editor review. Corrections were noted on the reformated computer printout, and edits were made using the EDP editor on the VAX.

The final edit was sorted by county code and Standard Industrial Classification (SIC). Accumulations were made on each of the form items at the 4-digit SIC level, and the summary table was provided of reported intake, expanded water use, and Dun & Bradstreet employment information. Edits were made on the forms, as described previously, and also on the Dun's employment information. With the acceptance of the 4-digit SIC summary table, the water use values were further expanded by use of the Dun's employment data to account for the unreported plants. Survey data from respondents reported in tables 1 through 5 provided the sample used to estimate total water use shown in tables 6 and 7.

From the reported data, a unit water use, per employee, was calculated for each industrial group. In expanding the employee unit use, the value so developed was multiplied by the total number of employees known to be engaged in each industrial group.

Where responses were lacking for certain industries, the 1970 statewide average unit use value for that industry was substituted in order to expand the data.

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