

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 Requirements for the Watershed Sanitary Survey (WSS)**

The California Surface Water Treatment Rule (CSWTR), in Title 22, Article 7, Section 64665 of the California Code of Regulations (CCRs), requires every public water system using surface water to conduct a comprehensive sanitary survey of its watersheds. The purpose of the survey is to identify actual or potential sources of contamination, or any other watershed-related factor, which might adversely affect the quality of water used for domestic drinking water. The initial Watershed Sanitary Survey (WSS) was completed January 1, 1996 and is to be updated every five years thereafter.

### **1.2 Objectives of the Watershed Sanitary Survey**

The main objectives of this WSS Update are to:

- Satisfy the regulatory requirement for a watershed sanitary survey
- Provide a general description of the City of San Diego (CSD) local source water system
- Provide a general description of existing environmental conditions in the watersheds
- Identify and assess existing and future potential sources of contamination in the watersheds
- Provide a quality assessment of water in the watersheds
- Provide a general description of existing watershed control and management practices
- Provide general recommendations for improving watershed management practices to protect the quality of the surface waters entering the reservoirs.

### **1.3 Conduct of the Watershed Sanitary Survey**

The CSD Public Utilities Department, Water Quality Laboratory and Engineering Sections staff produced this update of the WSS for the local source water system. Staff reviewed existing aerial photographs, GIS data, regulatory websites, reports, water quality data and other record documents; and supplemented this information with interviews, field surveys, and personal knowledge of Public Utilities Department staff.

### **1.4 Basic Water Rights**

In California, water use and supplies are controlled and managed under an intricate system for federal and state laws. These laws, court decisions, rules, regulations, and contracts agreements all govern how water is allocated, developed or used. A brief summary is provided below:

California Constitution Article X, Section 2, requires that all uses of the State's water be both reasonable and beneficial. It limits water rights by prohibiting the waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water. All water

belongs to the State. Other entities may obtain rights for water use, but they cannot obtain ownership.

California operates under a dual system of Riparian and Appropriative Rights for surface water as follows:

***Riparian Rights:***

The owner of land contiguous to a stream has a right to use water from the stream's watershed. Under riparian rights, this use includes the right to divert, but not to store, a portion of water flowing by his land for reasonable and beneficial use subject to certain limitations. In general, during times of water shortages, all riparian water users must reduce their diversion of water.

***Appropriative Rights:***

Under Appropriative Rights, an entity has a right to divert, store and use water on land regardless if it is within the watershed or adjacent to a stream, provided the water is for reasonable and beneficial uses and is surplus to water from the same stream used by earlier appropriators. The rule of priority between appropriators is "first in time is first in rights". If the land is not riparian, a permit is required for the use of surface water. Permits are issued by the State Water Resources Control Board (SWRCB). The SWRCB can temporarily grant water rights and change those already granted, which is an important authority especially during droughts or other emergencies.

***Pueblo Water Rights:***

This is a paramount water right granted by the King of Spain when California was under Spanish rule, and was affirmed by the California Supreme Court. The CSD owns paramount rights to surface and groundwater resources of the San Diego River. The Helix Water District (HWD), through an agreement with the CSD, shares yield of the San Diego River.

**The Water Commission Act**

Enacted in 1914, this act established a system of state issued permits and licenses to appropriate water which, per Division 2, Section 1000 of the Water Code, the SWRCB has the administrative responsibility to implement. The permitting and licensing provisions do not apply to pre-1914 appropriative rights (those initiated before the act took effect in 1914). The CSD's water rights on the Cottonwood Creek and the Otay River are pre-1914 appropriative rights. The CSD's water rights on the San Dieguito River are post-1914 appropriative rights

**Contracts**

Much of the water used in the state is not directly authorized under water rights, but under contracts between users and agencies with water rights. This includes all water used in the Central Valley Project (CVP), California State Water Project (CSWP) and most of the water from the Colorado River.

**Preferential Rights**

A provision of the Metropolitan Water District (MWD) Act under Section 135 authorizes the right to allocate water supplies available to MWD during water shortages. The allocation is based on assessed valuation of land within MWD member agencies. To date, MWD has not

called upon preferential rights to allocate water during imported water shortages. Instead, MWD has allocated water based on water deliveries in prior years.

### **Groundwater**

Generally, entities that own land also have a right to use the groundwater underlying that land (unless the basin is subject to Pueblo Rights or adjudication). Management of groundwater in California is accomplished by either judicial court decisions, adjudication of the respective rights of groundwater users and exporters, or by local management of groundwater rights authorized by statute or agreement.

### **Adjudicated Rights**

The courts have adjudicated rights to some watersheds and groundwater basins. Adjudicated rights supersede all others.

### **AB 255**

In 1991, AB 255 was enacted authorizing local agencies with overlying basins subject to critical conditions of overdraft to establish programs for groundwater management within their service areas. The provisions of AB 255 were repealed in 1992 with the passage of AB 3030

### **AB 3030**

The Groundwater Management Act of 1992 is commonly called AB 3030. This legislation was significant in that it greatly increased the number of local agencies authorized to develop a groundwater management plan and set forth a common framework for management by local agencies throughout California. Groundwater management plans include the identification and protection of well heads and recharge areas, well construction policies, abandonment and destruction of wells, monitoring and mitigation of contaminated water, control of salt water intrusion, mitigation of overdraft, replenishment, conjunctive use, recharge, recycling and extraction projects.

### **Other Laws and Regulations**

#### **Public Trust Doctrine**

In 1983, the California Supreme Court extended the public trust doctrine's limitations on private rights to appropriative water rights. The state must balance public trust needs with the needs for other beneficial uses. Under the Equal Footing Doctrine of the U.S. Constitution (also recognized as the Public Trust Doctrine by most states), each state has title to tidelands and the beds of navigable streams and lakes within its borders. The state holds these properties in trust for the beneficial use of the public, and that the public rights of access and use of tidelands and navigable waters are inalienable.

California law has expanded the traditional public trust uses to include protection of fish and wildlife, preserving them in their natural condition for scientific study and scenic enjoyment, and related open-space uses. As a result of prior court cases regarding water diversions from Mono Lake and from the American River, the SWRCB is now authorized to reconsider water right permits and licenses in these areas at any time to protect the public trust.

### **Decision 1485**

In year 1978, SWRCB adopted Decision 1485 (D-1485) setting water quality standards, export limitations, and minimum flow rates in the Sacramento Delta for CSWP and CVP water diversions. The decisions protected beneficial uses for municipal and industrial water supply, agriculture, and fish and wildlife. SWRCB asserted that Delta water quality is to be at least as good as it would have been if the CSWP and CVP had not been constructed.

### **Racanelli Decision**

In response to lawsuits challenging D-1485, court opinion written by Judge Racanelli, interpreted the SWRCB's obligation to establish water quality objectives, and its authority to set water rights permits to provide reasonable beneficial uses of Delta water. The court stated that SWRCB needs to maintain a "global perspective" in identifying beneficial uses to be protected (not limited to water rights) and in allocating responsibility for implementing water quality objectives (not just to the CSWP and CVP). In determining priorities for a reasonable use of water, stream uses (such as fish, wildlife, or navigation) can take precedence over water rights. All water rights holders, not just the state and federal projects, can be held responsible for the Delta's condition.

### **Area of Origin Statute**

County of origin statutes reserve water supplies for counties in the watersheds and deltas where the water originates. Prior appropriative water rights for water exports may be curtailed if it deprives an area of origin of its present or future beneficial needs of water.

### **Endangered Species Act**

Once species are listed as threatened or endangered, this act mandates that two basic requirements must be met:

1. No taking of the species allowed
2. Any activity that could affect species requires consultation with the California Department of Fish and Game (CDFG) and the United States Fish and Wildlife Service (USFWS). Mitigation is not considered until it is demonstrated that there is no feasible alternative consistent with project goals that would not affect listed species.

### **Section 404 Dredge and Fill Permits**

Section 404 of the Federal Water Pollution Act regulates the discharge of dredged and fill materials into the waters of the United States including wetlands. These terms are defined broadly to include the alteration of streambeds and construction of any structure in most water courses in San Diego County. No work may commence unless a permit is obtained from the United States Army Corps of Engineers (ACOE).

### **Wild and Scenic Rivers**

Federal and state acts requires preserving designated rivers in their free-flowing condition for their outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. The acts prohibit the construction of any dam, reservoir, diversion, or other water impoundment on a designated river. However, the federal act authorizes the Federal Energy Commission to issue a license to build a dam on a river designated as wild and scenic by a state.

### **Porter-Cologne Water Quality Control Act**

This is California's comprehensive water quality control law and complete regulatory program. This act is designed to protect water quality and beneficial uses of the State's waters. The San Diego Regional Water Quality Control Board (SDRWQCB) sets waste discharge requirements according to the state act and the Federal Water Pollution Control Act.

### **Federal Water Pollution Control Act (FWPCA)/Clean Water Act (FWPCA)**

Section 402 of the FWPCA established a permit system known as the National Pollution Discharge Elimination System (NPDES) to regulate point sources of discharges in waters of the United States. Before a permit is issued, Section 401 of the Clean Water Act requires the RWQCB to certify the discharge will comply with applicable water quality standards. After making the certification, the SDRWQCB may issue the permit, satisfying both state and federal law. In 1987, Section 402 was amended to require the regulation of storm water runoff under the NPDES permit system.

### **Federal Safe Drinking Water Act (FSDWA)**

Enacted in 1974 and significantly amended in 1986 and 1996, this federal act directed the United States Environmental Protection Agency (USEPA) to set national standards for drinking water quality. USEPA is required to set maximum contaminant levels, treatment technique standards, and monitoring and reporting requirements. The act allows states to enact and administer their own FSDWA as long as the provisions are at least as protective as the federal standards.

### **California Safe Drinking Water Act (CSDWA)**

In 1976, California enacted its own Safe Drinking Water Act, requiring the California Department of Public Health (CDPH) to administer laws relating to drinking water standards, administering water quality testing programs, and administering permits for public water system operations. The standards established by CDPH are found in the CCRs, Title 22.

## **1.5 Historical Background**

At first, the water was provided within San Diego city limits from private wells and from the San Diego River by individual water carriers. Water was piped to the San Diego city limits from wells in Mission Valley for the first time in 1875. By 1889, additional water was supplied by the San Diego Flume Company from the San Diego River at a site located 35 miles upstream from the coast.

The municipal water system was established in 1901, when the CSD voted to buy the holdings of the San Diego Water Company and Southern California Mountain Water Company located within San Diego city limits. Around this time, the CSD started to receive water from the Otay River and Cottonwood Creek watersheds. The CSD also expanded its newly acquired well fields. By 1914, twelve wells were pumping water up 300 feet (ft) from Mission Valley to University Heights Reservoir. The evolution of the water distribution system was greatly affected by early reliance on surface water from local mountains. Besides Mission Valley well water, the University Heights Reservoir received surface water first from the San Diego River via the San Diego Flume company, and later from Lower Otay Reservoir (Otay) via the first Otay Pipeline and Chollas Reservoir.

In 1913, the CSD purchased the Otay-Cottonwood Water Supply System from the Southern California Mountain Water Company with the obligation to continue to serve water to the Coronado Water Company customers. The Coronado Water Company was succeeded by the California-American Water Company, currently serving the cities of Coronado, Imperial Beach and a portion of the city of San Diego's south bay service area. Shortly after this purchase, the Otay Dam failed resulting in a loss of lives downstream when the so-called "Hatfield Floods" of 1916, overtopped the dam. A new dam was constructed and the damage to pipelines and well fields were repaired by 1919.

During the early years, most of the La Jolla area was served water from the Hodges Reservoir via the San Dieguito Flume, San Dieguito Reservoir and Lockwood Mesa - Torrey Pines Pipeline owned by the San Dieguito Mutual Water Company. In 1925, the CSD purchased Hodges and San Dieguito Dams, and the Pamo and Sutherland dam sites with an obligation to continue delivery of water from this system to the Santa Fe Irrigation District (SFID), San Dieguito Water District (SDWD), and the Del Mar Power, Light and Water Company.

Surface water from the San Diego River was not used by the CSD for almost two (2) Decades due to litigation. In 1930, the courts affirmed the CSD's preeminent water rights on the San Diego River dating back to Spanish and Mexican times when the Pueblo (City) of San Diego was established. In 1934, the CSD completed the El Capitan Dam and El Capitan/El Monte Pipeline which again delivered San Diego River water to the city. In a separate settlement, HWD received rights to the first 27 cubic feet per second (cfs) flow of the San Diego River and 10,000 acre feet (AF) of storage capacity in the El Capitan Reservoir. The CSD has received the remaining yield of the river, as well as land for the El Capitan Reservoir and the Mission George Reservoir site, and 5,000 AF of storage capacity in Lake Murray.

Besides the Mission Valley well fields, 19 wells were providing water to the CSD from the Upper San Diego River in the Lakeside/Riverview area by 1927. After the El Capitan Dam and Reservoir were completed, the well fields served as drought reserve.

The CSD made an application to divert 112,000 AF of water per year from the Colorado River in 1926. The Secretary of Interior approved the "Seven Party Agreement of 1930" which allocated Colorado River water among California users including the CSD. In 1934, the CSD entered into a contract with the Secretary of Interior to provide for a 155 cfs capacity in the All-American Canal to convey its 112,000 acre feet per year (AFY) of Colorado River water allocation. The CSD paid off its share of the All American Canal construction costs by 1992 and continues to make annual payments for the maintenance of the canal.

The rapid defense build-up during World War II nearly doubled the 1930's San Diego city population of 148,000. This made imported water an immediate necessity. Therefore, pipelines connecting to both the All American Canal and the Colorado River Aqueduct of the MWD were studied. It was recommended that a 71-mile-long pipeline be constructed from MWD's Colorado River Aqueduct to the CSD's San Vicente Dam and Reservoir. Construction of the pipeline was completed in 1943. Although this pipeline was longer than the connection to the All-American Canal, it utilized gravity flow requiring no electrical or pumping equipment (which was on short supply during the war), and had a shorter

construction schedule. In 1945, the CSD contracted with the Department of Defense to guarantee repayment of the First San Diego Aqueduct and thereby making imported water to the region a reality.

The CSD was not set up to serve water outside of its city limits, but the entire region needed a new imported water supply. Therefore, in 1944, the San Diego County Water Authority (SDCWA) was formed by the CSD along with six (6) other water districts and cities to distribute MWD delivered Colorado River Water within San Diego County. In 1946, after SDCWA joined the MWD, the CSD merged its Colorado River water rights with MWD and was annexed to the MWD service area. Delivery of the Colorado River water the CSD's San Vicente Reservoir began in November 1947.

The CSD's first WTP, Lower Otay Water Treatment Plant (Otay WTP) located adjacent to Otay Reservoir in the southern area of San Diego County, was originally built to treat only local water. In 1950, the CSD built the Alvarado Water Treatment Plant (Alvarado WTP) adjacent to Murray Reservoir in the eastern area of the city due to availability of both local and imported water provided by completion of the First San Diego Aqueduct. In 1960, completion of the Second Aqueduct provided water to the newly constructed Miramar Water Treatment Plant (Miramar WTP) and Reservoir in the northeastern area of the city. With the addition of the imported water supply treated at Miramar and Alvarado WTPs, the center of water production for the CSD's water supply system shifted northward.

The last local water supply project, Sutherland Dam and Reservoir was completed in 1954. Local water from the Sutherland Reservoir was conveyed to the Alvarado WTP via the Sutherland-San Vicente Pipeline (SU-SV Pipeline) through Ramona, and from the San Vicente Reservoir via the San Vicente Pipelines Nos. 1&2 and El Monte Pipeline through Lakeside and La Mesa. The additional local water supply from the Sutherland Reservoir was in part offset by the CSD's discontinued use of Hodges Reservoir to serve the La Jolla - Del Mar area after completion of Miramar WTP and the Del Mar Heights Pipeline in the early 1960's.

Dryer than normal conditions between 1948 and 1978 left local reservoirs empty except for imported emergency storage. In 1969, during this dry period, the CSD sold the San Dieguito Conduit from Lake Hodges to San Dieguito Lake, the San Dieguito Dam and Reservoir, and portions of the Lockwood Mesa -Torrey Pines Pipeline outside of San Diego city limits to the SDWD and the SFID.

By the 1980's, aging well facilities, storm damage to wells and connecting pipelines, deteriorating groundwater quality and other budgetary priorities resulted in the CSD's total reliance on imported water and local surface water supplies.

In 1989, the Otay WTP was upgraded and expanded; this made more local water available to the CSD's South San Diego and Central service areas. In 2010, additional improvements to the Otay WTP were completed. Improvements include the addition of a third flocculation/sedimentation basin, the addition of a powder activated carbon facility, rebuilding of the filters, the addition of pumped filter backwash, and conversion of its primary disinfection treatment method from free chlorine to chlorine dioxide.

Projects to increase reliability, increased capacity and improved water quality at the Alvarado and Miramar WTPs were also completed in 2010. The projects included replacement or complete rebuilding of all processes within the plants. Potable water quality was improved through improved flocculation/sedimentation basins and the conversion from free chlorine to ozone as the primary disinfectant treatment method.

The recent improvements to the plants better position the CSD to meet current and future drinking water regulations and treat a wider range of source water. These improvements increase the CSD's ability to treat water with higher turbidity and Total Organic Carbon (TOC).

The first CSWP water from the California Department of Water Resources (CDWR) California Aqueduct reached the San Diego city limits via MWD and SDCWA facilities in 1978. Imported water has proven to be reliable since 1948, with some exceptions. The 1977-78 and 1987-92 droughts curtailed imported water deliveries. Imported water deliveries are also subject to interruption by earthquakes and other disasters. For these reasons, the CSD maintains a sufficient amount of water in its reservoirs to supply CSD customers' water demands for up to seven (7) months. While a sufficient amount of water is being stored in CSD reservoirs, the capacity of pipelines between CSD reservoirs and WTPs has not kept pace with the need to deliver increasing amounts of water for the growing population during limited emergencies. The SDCWA and the CSD have embarked on a mission to reestablish both imported water supply reliability and adequate access to local water storage to meet all present and foreseeable future needs.

## **1.6 Water Operations Plan**

### **Goals:**

1. Provide adequate water supply to all customers at all times.
- 2) Meet drinking water standards at all times.
- 3) Minimize cost of service (such as water purchases, treatment, pumping).

### **Reservoir Operations:**

1. Maintain Emergency Storage Requirements per Council Policy 400-4.
2. Maximize use of local water in excess of emergency storage requirements.
3. Distribute any additional water storage among reservoirs to:
  - a. Maximize conservation of local runoff in wet seasons.
  - b. Minimize evaporation and transport losses in dry seasons.

### **Treatment Operations:**

1. Keep clear wells within target levels.
2. Adjust treatment process to variable source water quality to meet drinking water quality requirements to:
  - a. Follow reservoir operations plan for local water use.
  - b. Minimize plant chemical and energy use.



- c. Minimize imported treated water purchases at Otay WTP.
- d. Maximize pumping of treated water to SDCWA aqueduct at Miramar WTP.

**Distribution Operations:**

1. Keep line pressures and treated water storage levels within targets.
2. Maintain water circulation through treated water storage facilities and dead-end mains.
3. Adjust service areas as needed to: a) Minimize service interruptions due to equipment failures. b) Minimize imported treated water purchases. c) Maximize use of available treatment capacity and local water. d) Minimize pumping cost.