Water Issues in the Santa Ynez Valley

This information is intended to help educate WE Watch members and other Valley residents on issues related primarily to water supplies in the Valley and to a more limited extent on wastewater and water quality issues. Topics are organized as follows:

- Surface Water
- Santa Ynez River Flow and Underflow
- Ground Water
- Imported Water from the State Water Project
- Wastewater and Stormwater Management
- Water Conservation, Water Quality, and Desalination

This document begins with a list of contents and acronyms. Throughout the document there are links to more detailed information on various water agencies' websites.

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Water Conservation Water Quality

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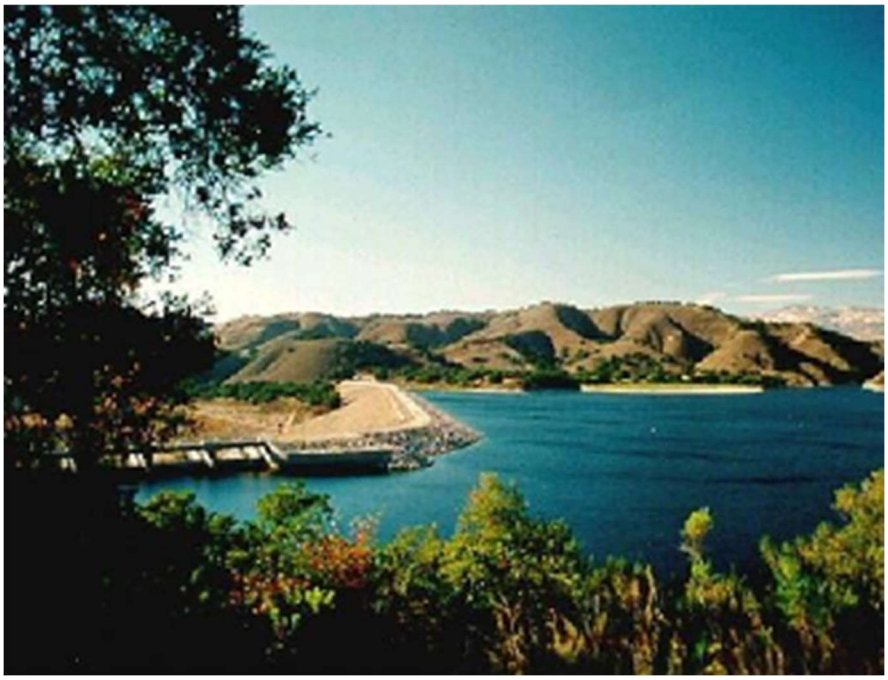
ABBREVIATIONS USED IN THIS DOCUMENT

AF	Acre-feet
BDCP	Bay Delta Conservation Plan
BOS	Santa Barbara County Board of Supervisors
CAG	Citizen Advisory Group
CCWA	Central Coast Water Authority
COMB	Cachuma Operations and Maintenance Board
CWA	Clean Water Act
ID No 1	Santa Ynez River Water Conservation District, Improvement District No 1
DCP	Delta Conveyance Project
DWR	Department of Water Resources, State of California
EPA	U.S. Environmental Protection Agency
FCWCD	Flood Control and Water Conservation District, Santa Barbara County
gpd	Gallons per day
GSA	Groundwater Sustainability Agency
mgd	Million gallons per day
NMFS	National Marine Fisheries Service
RWQCB	Regional Water Quality Control Board
SGMA	Sustainable Groundwater Management Act
SWP	State Water Project
SYR	Santa Ynez River
SYRWCD	Santa Ynez River Water Conservation District
TMDL	Total Maximum Daily Load
USBR	U. S. Bureau of Reclamation
WEW	WE Watch
WWTP	Waste Water Treatment Plant

WATER ISSUES IN THE SANTA YNEZ VALLEY

Surface Water

Cachuma Project



The U. S. Bureau of Reclamation (USBR) owns and operates the Cachuma Reservoir and Bradbury Dam, along the Santa Ynez River, as parts of the federal government's Cachuma Project. USBR has a contract with the Santa Barbara County Water Agency which in turn has subcontracts with Santa Ynez River Water Conservation District, Improvement District #1 (ID#1) and four water providers on the south coast: the City of Santa Barbara, Goleta Water District, Montecito Water District, and the Carpinteria Valley Water District. ID#1 is the only water provider in the Santa Ynez Valley that has an allocation (10.31%) of Cachuma water. The five agencies are the "member units" of the Cachuma Project, but only the four south-coast agencies constitute the Cachuma Operations and Maintenance Board (COMB), which manages and tracks delivery of the project's water and through the Tecolote Tunnel to the south coast and then through the south coast conduit which goes all the way to Carpinteria.

USBR remains the owner of the reservoir and dam. It controls downstream water releases, issues monthly reports on inflows and outflows, oversees COMB, and requires management plans from COMB members.

Cachuma outflow

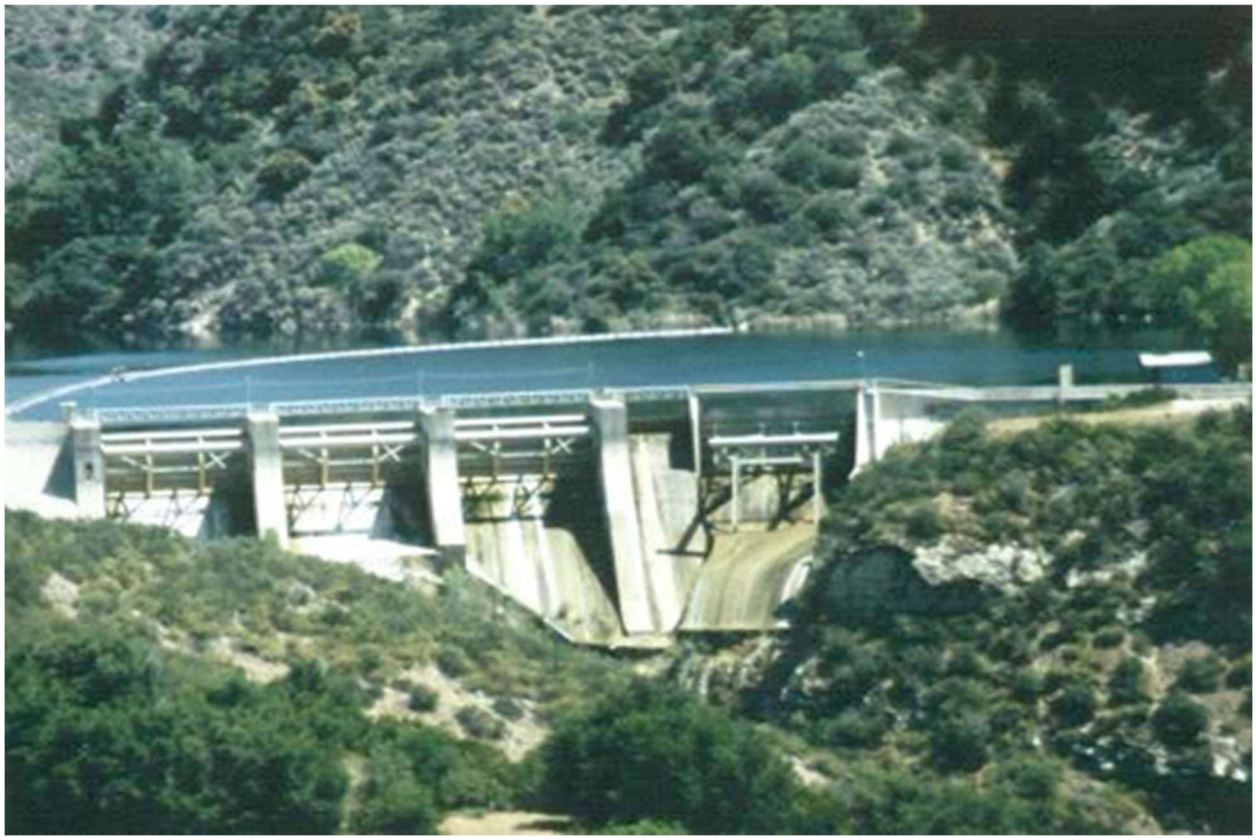
In September 2026 USBR's contract was extended (with no changes) until 2031.

For more information on the Cachuma Operations and Maintenance Board, visit its website at: https://www.cachuma-board.org/

Jameson Lake

The Montecito Water District completed construction of Juncal Dam and Jameson Lake on the upper reach of the Santa Ynez River in 1930. Water is diverted to the Montecito area through the Doulton Tunnel, which is a 2.2-mile-long tunnel that conveys water from Jameson Lake through the Santa Ynez Mountains to the District's Bella Vista treatment plant through the tunnel.

Gibraltar Dam and Reservoir



Gibraltar Dam and reservoir are located on the Santa Ynez River about 9 miles north of the City of Santa Barbara upstream from Lake Cachuma. The city owns and operates the dam and reservoir. Stored water is diverted through Mission Tunnel to the Cater Water Treatment Plant in Santa Barbara. The dam was constructed in 1920 with an original capacity of 14,500 AF.

Diversions from the Santa Ynez River are limited by the 1930 Gin Chow legal judgment and the 1989 Upper Santa Ynez River Operations Agreement (USYROA, also known as the "Pass Through Agreement"). The USYROA was developed to resolve concerns that the City's planned raising of Gibraltar Dam would impact the feasibility of a potential Cachuma enlargement project. The City agreed to defer the planned raising of Gibraltar Dam in exchange for the right to "pass through" some of its Gibraltar water to Lake Cachuma for delivery to the City through Tecolote Tunnel. The amount of Pass-Through water is based on the difference in Gibraltar spills under actual conditions as compared to a hypothetical "Base Reservoir." The Base Reservoir is equal in size to the 1988 reservoir and "operated" (by computer model) according to a compromise interpretation of the Gin Chow judgment agreed to as a part of the USYROA. A basic goal of the agreement is to allow the City to stabilize the yield from Gibraltar at approximately 1988 levels while minimizing impacts on the Cachuma Project and other downstream interests.

Santa Ynez River Flow and Underflow

The SY River flows are visible when there's enough rainfall to generate surface runoff and when there are releases from Lake Cachuma. Even when there is no visible surface flow, there is water underflow within the riverbed. ID#1, Solvang and Buellton have water rights allowing them to tap into this underflow with wells that provide a portion of their water needs. Likewise, some private well owners have rights to water pumped from the alluvial soil under the river bed.

A key issue for the City of Solvang is whether it will drill new wells into the SYR underflow. The city has run into concerns raised by various parties, including: ID#1, a private landowner, State and federal agencies, and CalTrout. Another key issue for all water providers is what relationship, if any, exists between SYR underflow and nearby groundwater basins. The groundwater issues are being addressed through Groundwater Sustainability Plans as noted in the section below on groundwater.

Both the SYR's surface flow and its underflow are enhanced when USBR releases Cachuma water downstream. These releases can occur for various reasons, such as: (1) when the reservoir level is nearing capacity and/or a storm is predicted; (2) to provide water for steelhead habitat; and (3) when downstream water rights holders (Lompoc) acting through the SYRWCD request releases consistent with their entitlement to Cachuma water for groundwater replenishment. The Santa Ynez River Water Conservation District (SYRWCD), which is not a water provider, represents water rights holders along the SY River from Cachuma to the Lompoc Plain. SYRWCD can ask USBR to release water from Cachuma Reservoir based on several factors, including groundwater levels downstream, the rate of SY River flow at the Alisal Bridge in Solvang, and the level of water in Cachuma. For information on SYRWCD's role in protecting members' water rights, see https://www.syrwcd.com/

Cachuma water releases to help improve steelhead fish habitat are based on the US National Marine Fisheries Service's biological opinions. An opinion was issued in 2000 under which water is pumped into Hilton Creek very close to Bradbury Dam. This creek then flows into the Santa Ynez River. NMFS concluded that ongoing and proposed Cachuma Project operations would not jeopardize the continued existence of steelhead or adversely modify critical habitat. In 2016 NMFS issued a new draft biological opinion, and in 2019 USBR developed a proposed

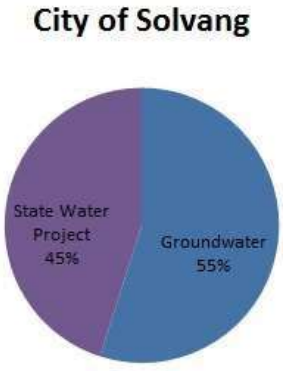
operating plan which incorporated NMFS's opinion along with requirements of a DWR Water Rights Order. However, NMFS has not yet issued a final updated biological opinion that will govern Cachuma Project operations.

For information on COMB's role in water releases for fish, see:
https://www.cachuma-board.org/fisheries

Ground Water

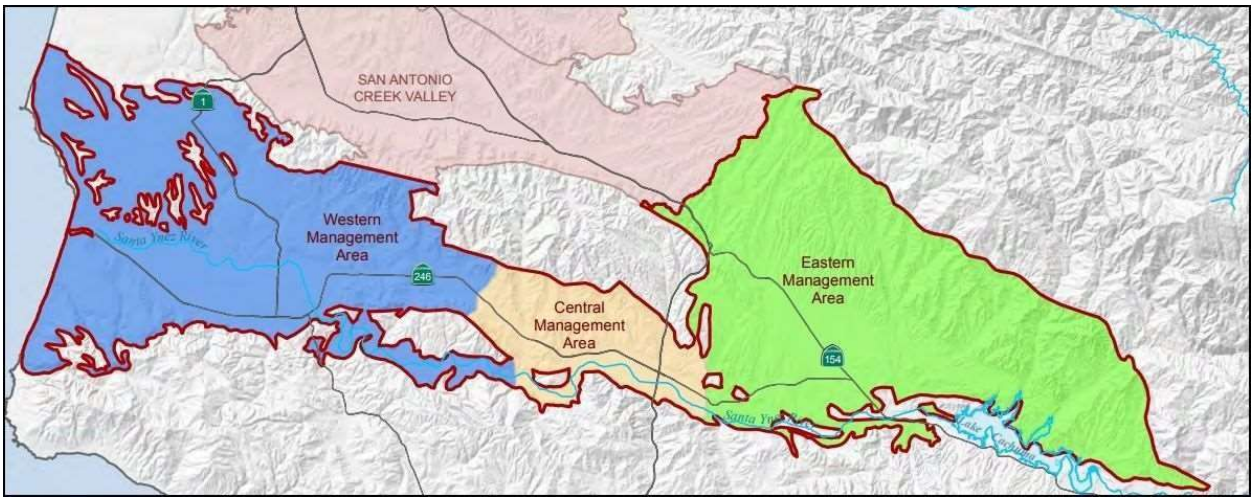
All water providers in the SYV rely on groundwater for part or all of their water supply. Buellton, Solvang and ID#1 have groundwater wells in upland basins separate from their riverbed underflow wells. Groundwater aquifers are recharged through infiltration from rainfall, creek and river flow, agricultural runoff, urban stormwater runoff, and wastewater discharge into ponds or creeks.

Unlike other water sources in California, groundwater was not regulated until 2014 when the CA legislature passed the Sustainable Groundwater Management Act (SGMA). SGMA requires local water providers to form a Groundwater Sustainability Agency (GSA) to develop a Groundwater Sustainability Plan (GSP) and then manage their basins according to the plan. It set deadlines for the development of a Groundwater Sustainability Plan (GSP) and for the achievement of groundwater sustainability by 2040. For the Santa Ynez Valley, divided into three Groundwater Management Areas and three corresponding Groundwater Sustainability Agencies, the California Department of Water Resources (DWR) determined that the Santa Ynez River watershed groundwater basin is a medium priority for regulation under SGMA. In Santa Barbara County, only the Cuyama Valley Basin is a high priority.



The entire SY Valley has been divided into 3 sub-areas for purpose of planning and analysis. The Western Management Area is centered on Lompoc; the Central Management Area on Buellton; and the Eastern Management Area encompasses Solvang, Santa Ynez, nearby unincorporated areas including Ballard and Los Olivos, and the Santa Ynez Band of Chumash Indians. Each of the 3 GSAs developed and submitted a Groundwater Sustainability Plan (GSP), as required, by January 2022. The planning effort is continuing, and it is being led by SYRWCD in coordination with water providers, local cities, the SB County Water Agency, private well owners, the Chumash Tribe, and others. The tools for managing groundwater sustainability may include: registration of wells; measurement of groundwater extraction, annual extraction reports, placing limits on individual wells, and assessing fees to fund the three local Groundwater Sustainability Agencies.

The GSP includes technical information regarding hydrogeological conditions of the aquifer; historical and projected water demand; potential areas of recharge; measurable objectives and milestones toward sustainability; and monitoring and management plans.



WE Watch is monitoring this SGMA planning effort which is underway in the Santa Ynez Valley. We are alert for issues such as: transparency of the planning effort; whether a thorough and data-driven analysis is being conducted; whether data is shared with the public; how citizens are involved; and how decisions are being made for managing groundwater. Information on groundwater management in the SYV can be found at: https://www.santaynezwater.org/

Aside from groundwater planning and management under SGMA, another groundwater issue facing only the eastern portion of the SY Valley is a water quality issue pertaining to the level of Hexavalent Chromium (i.e., "Chromium 6"). The State of California recently re-examined its standard but decided (in rulemaking in April 2024) to maintain a "maximum contaminant level" standard of 0.01 mg/L (i.e., 10 parts per billion, ppb). The Chromium 6 occurs naturally in rock formations in the San Rafael Mountains. Two of ID#1's well exceeded the State standard, but ID#1 is not using those wells at this time. ID#1 is investigating options for groundwater treatment and other alternatives to meet the State's standard. Information on Chromium 6 rules can be found at:
https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/SWRCBDDW-21-003_hexavalent_chromium.html

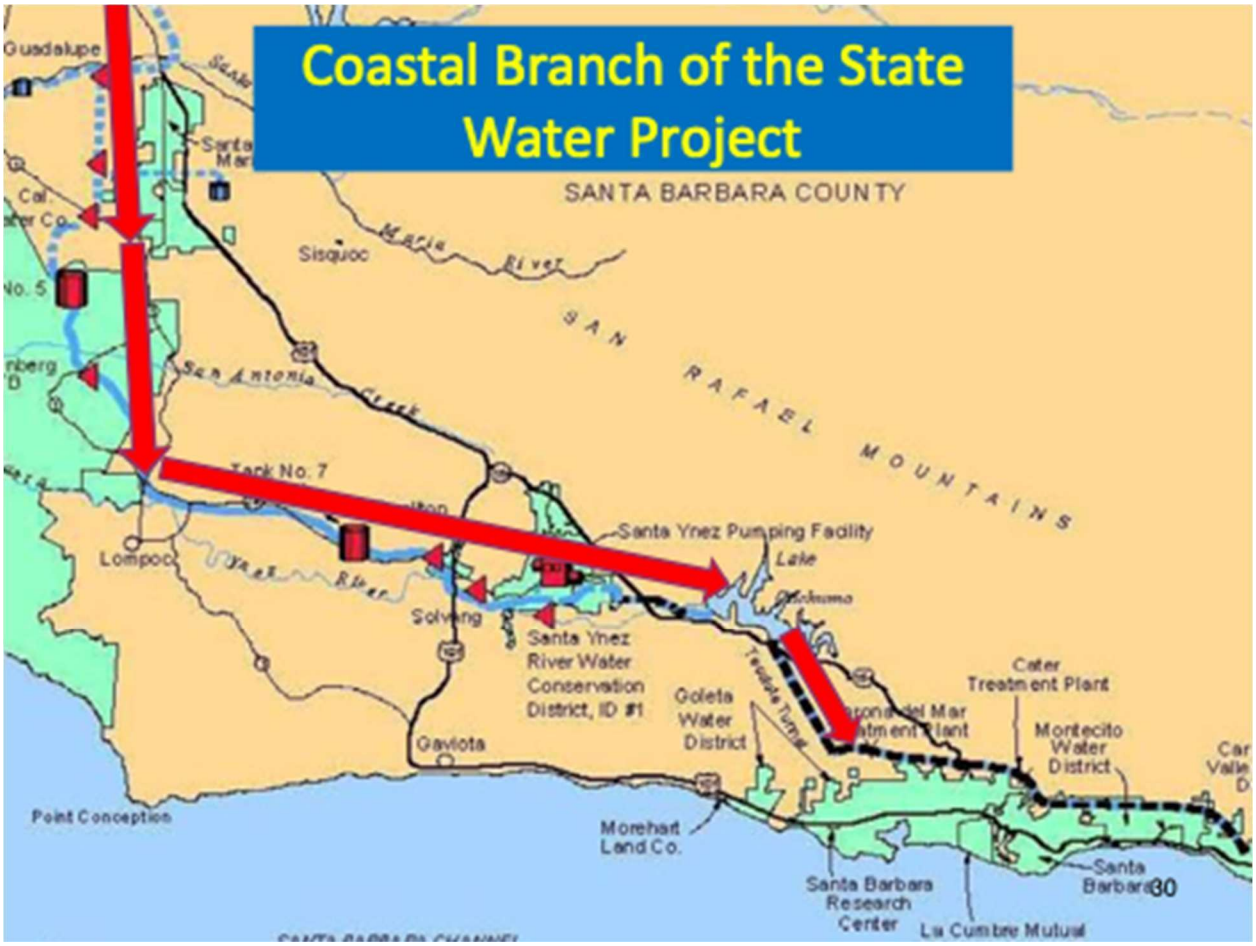
The Santa Barbara County Public Works Department has a website on Groundwater in SB County at:https://www.countyofsb.org/pwd/SBCoGroundwater.sbc

Imported Water from the State Water Project (SWP)

State Water Project and CCWA

The State Water Project (SWP) has transported water via aqueduct and pipeline from northern

California to Central Valley farmers and to Southern California for many years. In Santa Barbara County most major water providers also began to import this water in 1997 after forming the Central Coast Water Authority (CCWA) to manage pipeline construction and water delivery. Lompoc residents voted to not buy into the SWP. The residents of Buellton, Solvang and areas served by ID#1 voted to participate in the SWP thereby giving them an additional water source. In the SYV, only Buellton and ID#1 are members of CCWA, while Solvang purchases its SWP water through ID#1.



The SWP water pipeline enters Santa Barbara County north of Santa Maria, and the water is then pumped to the City and to Guadalupe. The pipeline passes south to Vandenberg AFB where water is again pumped from the pipeline. Although the pipeline passes by Lompoc, no water is taken by the City of Lompoc. Instead, the pipeline heads east to Buellton and on to Solvang and Santa Ynez, so that each of those three water providers can take SWP water. Finally, the pipeline goes east to Cachuma Reservoir where SWP water is pumped into the lake where it mixes with Cachuma water. Eventually some of the molecules of SWP water will make their way, along with Cachuma water, to the south coast water providers who have entitlements to SWP water.

When the SWP pipeline was constructed in SB County in the 1990's, construction costs were kept lower by not building a new pipeline section from Santa Ynez to Cachuma, but rather by using an existing pipe that had been carrying water in the opposite direction from Cachuma to ID#1. ID#1 agreed to take more water from the SWP pipeline in "exchange" for not taking an

equal volume of Cachuma Project water. The water that ID#1 would have taken from Cachuma is thus available to south coast water providers as part of their SWP entitlement.

CCWA's Board of Directors is composed of 8 member agencies which have an annual State "contractual right" to the acre-feet of SWP water shown in parentheses: Santa Maria (16,200), Guadalupe (550), Buellton (578), SYRWCD-ID#1 (2,000), Goleta WD (4,500), City of Santa Barbara (3,000), Montecito WD (3,000), and Carpinteria Valley WD (2,000). Five other entities also have rights to SWP water, but these entities aren't CCWA Board members. These entities and their SWP water entitlements are: Vandenberg AFB (5,500), Golden State Water in Orcutt (500), Raytheon Systems in Goleta (50), Morehart Land Company in Gaviota (200), and La Cumbre Mutual Water in Hope Ranch (1,000).

SWP "Contractual Rights": Table A Amounts

(acre-feet per year)

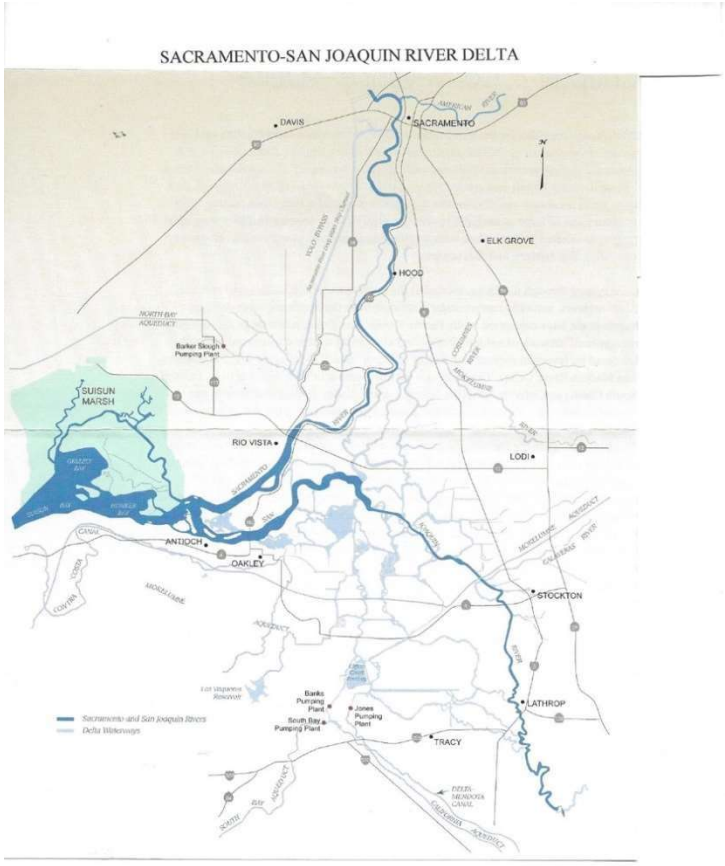
- Buellton 578
- Carpinteria VWD 2,000
- Golden State WC 500
- Goleta WD 4,500
- Guadalupe 550
- La Cumbre MWC 1,000
- Montecito WD 3,000
- Morehart Land Co 200
- Raytheon Systems 50
- Santa Barbara 3,000
- Santa Maria 16,200
- Sta Ynez RWCD-ID#1 2,000
- Vandenberg AFB 5,500

39,078

Plus 3,908 AF/yr "drought buffer"
& 2,500 AF/yr add'l entitlement.

Decision-making by CCWA's Board is weighted, with the voting strength of each member determined by its SWP water entitlement. Thus, the City of Santa Maria receives over 43% of the SWP water allocated to the 8 Board members, so Santa Maria has 43.19% of the votes on any issue. Buellton has 2.2% voting strength, and ID#1 holds 7.64% of the Board's votes. Solvang is not a CCWA Board member, but rather gets its supply of SWP water through ID#1.

The importing of SWP water has always been controversial in SB County. One reason is the high cost relative to Cachuma Project water or groundwater. Another concern has been the highly variable nature of SWP water availability. Since 2010, the percentage of SWP water allocations to CCWA members has varied from only 5% (in 2014) to 100%, averaging about 50% of total entitlement. During recent extreme drought years when SWP water was most needed in SB County, the allocation was very low.



For more information on CCWA, visit its website at: http://www.ccwa.com/

<u>Delta Conveyance Project (DCP – the Delta Tunnel Project, a part of the SWP)</u>

For many years, California water purveyors and agencies have been trying to develop methods to export more water out of the Bay Delta for southern California water users. It started with a Peripheral Canal Plan which was defeated by a public vote in 1982. It restarted in the 1990's with CALFED (a canal or tunnels), then BDCP (Bay Delta Conservation Plan), then the California Water Fix (twin tunnels under the Delta). The latter was cancelled by Governor Newsom in January 2019; next the Governor ordered that a single tunnel called the Delta Conveyance Project (DCP) be analyzed.

WE Watch sent letters to local agencies involved in providing water to Santa Ynez Valley residents, urging each agency to opt-out of participation in the newly proposed DCP. Local water agencies that currently manage or receive SWP water would continue to receive their current allocation of SWP water while opting out of participation in, and payment for, the DCP.

WE Watch's objections to the DCP are based on several concerns, including:

- The DCP would be very expensive, with those costs directly passing through to those agencies which receive state water in Santa Barbara County.
- The DCP won't necessarily improve the reliability of SWP water delivery.
- By reducing ground-level water flow, the DCP will undoubtedly harm endangered species and further degrade habitats, water quality, and the healthy farming and recreational economies of the Delta.

- The has tended to over-estimate water supplies from State projects, while underestimating actual costs and project implementation schedules.

In December 2019, CCWA decided to opt out of the Delta Conveyance Project, and the Department of Water Resources was notified of those plans by Central Coast water agencies. Opting out of this project will save rate payers in these cities significant dollars as well as place emphasis on local solutions for future water supply. Information from CA DWR regarding the Delta Conveyance Project can be found at: https://www.deltaconveyanceproject.com/about-the-delta-conveyance-project

Assignment of State Water Project Contract in Santa Barbara County

Since CA's DWR began to provide State Water Project water in Santa Barbara County in the 1990's, the County's Flood Control and Water Conservation District had been DWR's SWP contract holder. The County's role was primarily as a guarantor that DWR will be paid if a Central Coast Water Authority member should fail to meet its fiduciary responsibilities for the SWP. However, CCWA went to court to argue that CCWA should hold the contract because only its members, and not the County, buy and sell SWP water. WE Watch believed the contract should have remained with SB County for the following reasons, as stated in a letter sent to the Board of Supervisors:

- to ensure oversight by elected officials representing all county residents;
- to provide a broader perspective on water management than CCWA can provide;
- to promote transparency and accountability in decision-making;
- to retain fiduciary responsibility; and
- to maintain effective inter-governmental relationships.

Unfortunately, in light of CCWA's litigation and in deference to the local water agencies, in 2025 the County Board of Supervisors voted unanimously to support assigning the SWP contract to CCWA.

Suspended Table A Reacquisition

In 1988 CCWA signed an agreement with DWR to "suspend" 12,214 AF of allocated water since it was not needed at that time. The agreement included the ability to reacquire the allocation if needed in future, at some cost. CCWA has recommended that the 12,214 AF allocation be reacquired at the cost of $42 million. It is being considered a "drought buffer" by some water providers. Solvang's estimated share for an additional 300 AF allocation would be .025%, which equals $1,050,000, or $52,000 per year, amortized over a 20-year period. Solvang has agreed to participate in the reacquisition since the price of delivered water over the 20-year period is to be much lower than ordinary state water, probably less than $800 per AF of delivered water. Buellton has decided not to request any of the suspended water allocation.

Solvang's water supply is adequate for future growth, considering that an additional well has recently been added and the future potential to produce potable water with a Waste Water Treatment Plant upgrade. Before any additional SWP water can be "reacquired", CCWA must prepare an Environmental Impact Statement.

Wastewater Management

Wastewater Management in Buellton

The City of Buellton's wastewater treatment plant currently discharges approximately 427,000 gallons of secondary treated effluent per day (2023 average daily flows) into infiltration basins close to the Santa Ynez River. Specific studies on the extent of actual replenishment have not been conducted. In 2023 the City participated in a study funded by the County of Santa Barbara to evaluate the potential for potable water reuse using the effluent from the municipal wastewater treatment facilities of both Buellton and Solvang. Though the technology is not new, costs are not economically feasible on the small scale for Buellton or Buellton/Solvang jointly. The "Countywide Potable Reuse Evaluation" report can be found at: https://content.civicplus.com/api/assets/5702dde4-fe4d-420e-997f-b2dc30b74f78

Wastewater Management in Solvang

The City of Solvang currently operates a Sequencing Batch Reactor (SBR) type Wastewater Treatment Plant (WWTP) with an original design capacity of 1.5 million gallons per day (MGD). The WWTP operates under a Waste Discharge Permit issued by the Regional Water Quality Control Board. The WWTP currently receives and treats wastewater from the City of Solvang and the Santa Ynez Community Services District (SYCSD) which serves the town of Santa Ynez. The SYCSD owns 0.30 MGD of capacity in the Solvang WWTP. The Plant provides full secondary treatment of the wastewater received. The WWTP discharges the treated wastewater to percolation ponds located adjacent to the plant along the Santa Ynez River.

The original 1.5 MGD capacity can no longer be maintained and currently operates at a capacity of 0.7 to 0.9 MGD due to changes in the composition of incoming wastewater and the aging equipment. In order to achieve the goal of 1.5 MGD and to replace parts of the current system, the city is planning upgrades to the system. Modernized technology, referred to as membrane bioreactor (MBR), has been selected as the favored approach. It is scalable for projected growth

and potential future regulations; it provides tertiary treatment; and it allows the option of recycling in future at an additional cost. Funding would be through 30-year bond repayments increasing over time. The city is also seeking Federal and State grants.

Wastewater in Santa Ynez: the Santa Ynez Community Services District

The Santa Ynez Community Services District (SYCSD) was formed in 1971 by citizens in the area for the purpose of providing community sewage disposal services in the Santa Ynez area (approximately one square mile). In January 1974 State and County health departments determined a health hazard existed due to septic systems, and a building moratorium was put on the area. The original system was built to address this problem and was completed in 1981. Subsequent to that date there have been extensions to the mainline to make public sewer available to residents who have come to the District requesting service.

The Santa Ynez Community Services District is an independent special district created under the Community Services District Law of the State of California. The District is governed by a Board of Directors consisting of five elected members serving four-year terms. Board members must reside in the District.

The Chumash Tribe owns 0.088 gpd of the SYCSD's capacity. The Chumash Tribe has constructed a wastewater treatment plant with a capacity of 200,000 gallons per day (gpd), which was brought on-line in May 2004. This plant serves the Casino, Hotel, administration buildings, and approximately 350 residents on the reservation. Treatment includes head works, extended aeration, filtration, and the disinfection is by UV prior to discharge to Zanja de Cota Creek. Some of this tertiary water is being utilized in the irrigation throughout the reservation and for water to flush the toilets. The SYCSD is under contract to maintain the Chumash wastewater plant and collection system.

Los Olivos Community Services District

The Los Olivos Community Services District was formed in 2018 by local voters to provide direction and obtain funding that will enable the development, financing, building, and operation of facilities to collect and reclaim wastewater in the unincorporated community of Los Olivos.

The purpose of the Los Olivos Wastewater Reclamation Program is to define a strategy to provide economically viable wastewater treatment solutions to the residents and property owners within the District that meets public health needs and the regulatory requirements of the Regional Water Quality Control Board (RWQCB). The Los Olivos Wastewater Reclamation

Program is comprised of four distinct components, each being interdependent and implemented concurrently: 1. Define interim requirements for Onsite Wastewater Treatment Systems (OWTS) in Los Olivos while the longer-term solution is developed. 2. Secure project funding. 3.Implement a local groundwater monitoring program; and 4. Design and build a collection and treatment system.

Currently, all residential Onsite Wastewater Treatment Systems in Los Olivos are governed by the Santa Barbara County Public Health Department's (County EHS) Local Area Management Plan. Any proposed treatment facility is to be consistent with the polices and development standards of the Santa Barbara County Comprehensive Plan, including the Santa Ynez Valley Community Plan and the Santa Barbara County Land Use and Development Code.

Because the project will generate in excess of 10,000 gallons per day, exceeding the 10,000 gallons per day County EHS limit, it will be under the jurisdiction of the Central Coast Regional Wastewater Quality Control Board which would be the lead regulator agency to review the system and issue all appropriate permits.

In a project description in 2022, LOCSD was envisioning the reclamation facility to be "a high-efficiency, low odor, expandable Membrane Bioreactor (MBR) package plant that can be sized to serve the entire District." However, in June 2025 the LOCSD Board decided to forego having a treatment facility within Los Olivos and instead favored transporting collected wastewater through a pipeline to the Solvang wastewater treatment plant. The Board has hired consultants to conduct preliminary design studies and cost assessments. The 60% design report by the Wallace Group is expected to be presented to the Board in early 2027.

In early 2027 residents of the District will be able to vote through a Proposition 218 process on whether to approve this project of transporting wastewater to Solvang. The Board's decisions have been highly controversial for numerous reasons including: high cost of the proposed project; high cost to residential property owners; uncertainty regarding sources of funding; lack of detailed analysis for local treatment options in Los Olivos; building a 3-mile pipeline through predominantly agricultural land to Solvang, which could theoretically result in growth (residential and commercial) along the pipeline's length; and apparent inconsistency with the Santa Ynez Valley Plan.

Water Conservation

In California the availability of adequate water supplies to satisfy all segments of our population as well as agriculture and industry is close to a tipping point. Unless significant measures are taken to develop and apportion future water supplies, the competition for water will become a major resource battleground.

California manages a combination of natural rainfall, imported water from other states or other parts of our own state, and the ingenuity of local water management districts to allocate local supplies. Ensuring the health of our population, industry, and agricultural economy requires the following types of actions:

- Statewide water availability analyses to align local water needs with availability, down to the local water district level.
- Statewide benefit/cost analyses to determine the economic desirability of any major water project or plan, considering environmental benefits and costs.
- A policy to ensure that water imports and exports are consistent with full implementation of the Public Trust Doctrine and Clean Water Act, as well as the protection of sociological and ecological values.
- An emphasis on the following local actions: urban water conservation, agricultural water conservation, water recycling and reuse, groundwater storage, desalination, and similar economically feasible water usage actions.

There are overarching issues that must influence all the above efforts to develop sustainable, effective, and equitable water policies. They include: periodic drought, climate change, and environmental justice, the preservation of Native American cultural traditions, the precautionary principle, and population pressures.

WE Watch believes local water providers could take more aggressive actions in lawn replacement, residential and commercial hardware replacements, and water recycling. These actions should also be applied to the communities of Buellton, Santa Ynez, Los Olivos, Ballard, and Lompoc.

Information on water conservation can be found at: http://www.waterwisesb.org/

Water Quality

Water is critical to human life and to our natural world, our environment. The quality of water is affected by many variables, and it affects the many uses that can be made of a body of water. Water quality describes the condition of the water, including chemical, physical, and biological characteristics, usually with respect to its suitability for a particular purpose such as drinking or swimming. Water quality standards are developed by various agencies in the US, starting with the federal Environmental Protection Agency (EPA) and tiering down from the EPA through various state and local agencies at the city and county level.

In the setting of standards, agencies make political and technical/scientific decisions about how the water will be used. In the case of natural water bodies, they also make some reasonable estimate of pristine conditions. Environmental lawyers and policymakers work to define legislation with the intention that water is maintained at an appropriate quality for its identified use.

The vast majority of surface water on the Earth is neither potable nor toxic. In fact, water quality is a complex subject, in part because water is a complex medium intrinsically tied to the ecology of the Earth. Industrial and commercial activities such as manufacturing, mining, construction, and transportation are the major causes of water pollution as are runoff from agricultural areas, urban runoff, and discharge of treated and untreated sewage.

Contaminants that may be in untreated water include microorganisms such as viruses, protozoa and bacteria; inorganic contaminants such as salts and metals; organic chemical contaminants from industrial processes and petroleum use; pesticides and herbicides; and radio-active contaminants. Water quality depends on the local geology and ecosystems, as well as human uses such as sewage dispersion or industrial pollution.

The United States Environmental Protection Agency (EPA) limits the amounts of certain contaminants in tap water provided by US public water systems. The Safe Drinking Water Act authorizes EPA to issue two types of standards:

- Primary standards regulate substances that potentially affect human health
- Secondary standards prescribe aesthetic qualities, those that affect taste, odor, or appearance.

The U.S. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water that must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that the water poses a health risk.

In urbanized areas around the world, water purification technology is used in municipal water systems to remove contaminants from the source water (surface water or groundwater) before it is distributed to homes, businesses, schools and other recipients. Water drawn directly from a stream, lake, or aquifer and that has no treatment will be of uncertain quality.

In the United States, Water Quality Standards are defined by state agencies for various water bodies, guided by the desired uses for the water body (e.g., fish habitat, drinking water supply, recreational use). The Clean Water Act (CWA) requires each governing jurisdiction (states, territories, and covered tribal entities) to submit a set of biennial reports on the quality of water in their area. These reports are known as the 303(d) and 305(b) reports, named for their

respective CWA provisions, and are submitted to, and approved by the EPA. The CWA requires states to adopt standards for each of the possible designated uses that they assign to their waters. Should evidence suggest or document that a stream, river or lake has failed to meet the water quality criteria for one or more of its designated uses, it is placed on a list of impaired waters. Once a state has placed a water body on this list, it must develop a management plan establishing Total Maximum Daily Loads (TMDLs) for the pollutant(s) impairing the use of the water. These TMDLs establish the reductions needed to fully support the designated uses.

In California, The State and Regional Water Boards adopt plans and policies to carry out federal and State water quality protection laws. The plans and policies contain water quality standards and regulations, which form the basis of the Water Boards' regulatory actions for protecting the quality of the State's waters. The Water Boards monitor and assess the condition of the waters to determine if they are supporting their uses, detect long-term trends, and focus and evaluate regulatory efforts.

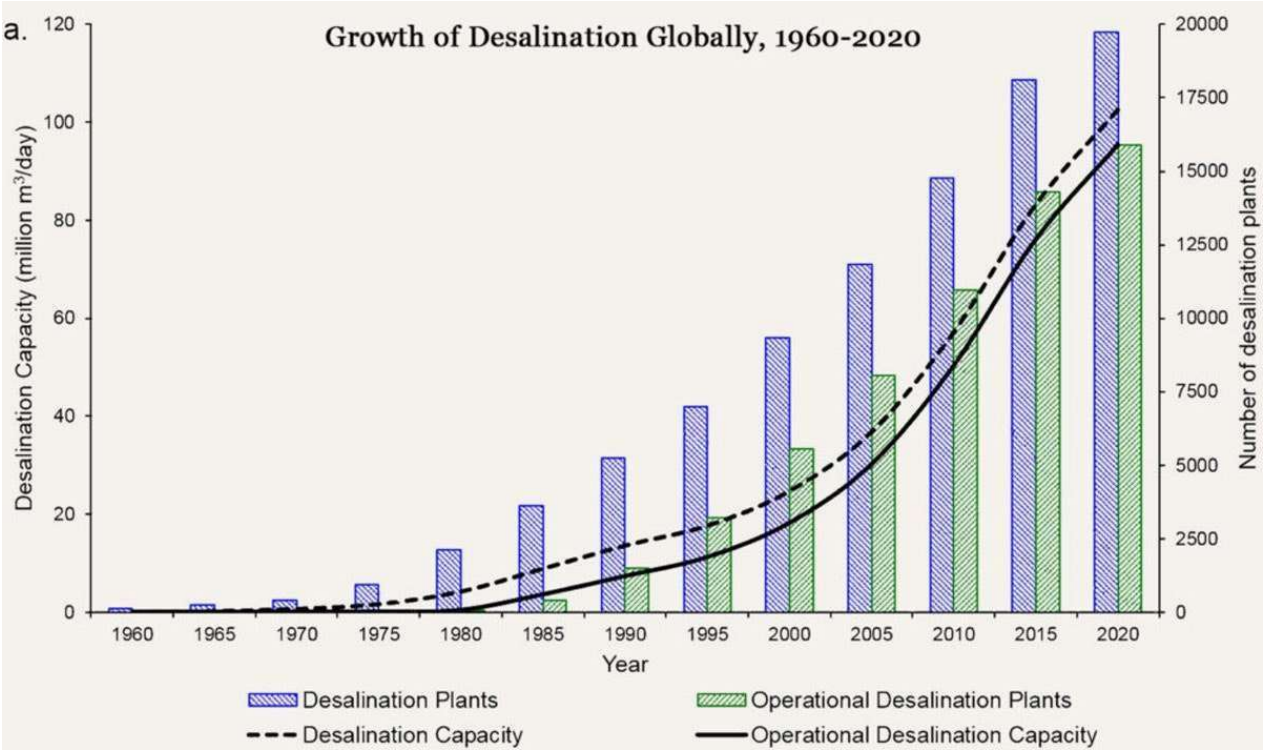
The Santa Ynez River watershed falls within California's Region 3, Central Coast Region. It contains numerous rivers and creeks that are shown in the Listing of Impaired Water Bodies, the main one being the Santa Ynez River. The pollutants shown in the current List of Impaired Water Bodies (303d) vary by location but include: excessive pH; excessive Sodium; excessive Temperatures; Total Dissolved Solids; and Sedimentation/Siltation,
plus (for the area west of Lompoc): Chloride; Escherichia coli (E. coli); Fecal Coliform; low dissolved Oxygen; and Nitrate. Basin Plans, which are an EPA requirement for all impairments, have been developed and all are in various stages of being addressed by local agencies.

CALIFORNIA
WATER BOARDS
Central Coast - R3

Desalination[1]

Desalination is the process of converting oceanic saltwater into drinkable (potable) water, or alternatively converting brackish water into useable water. Desal, as it is usually called, has been growing as shown in the following chart:

[1] Much of the information on Desalination is taken from various issues of WIRED magazine.



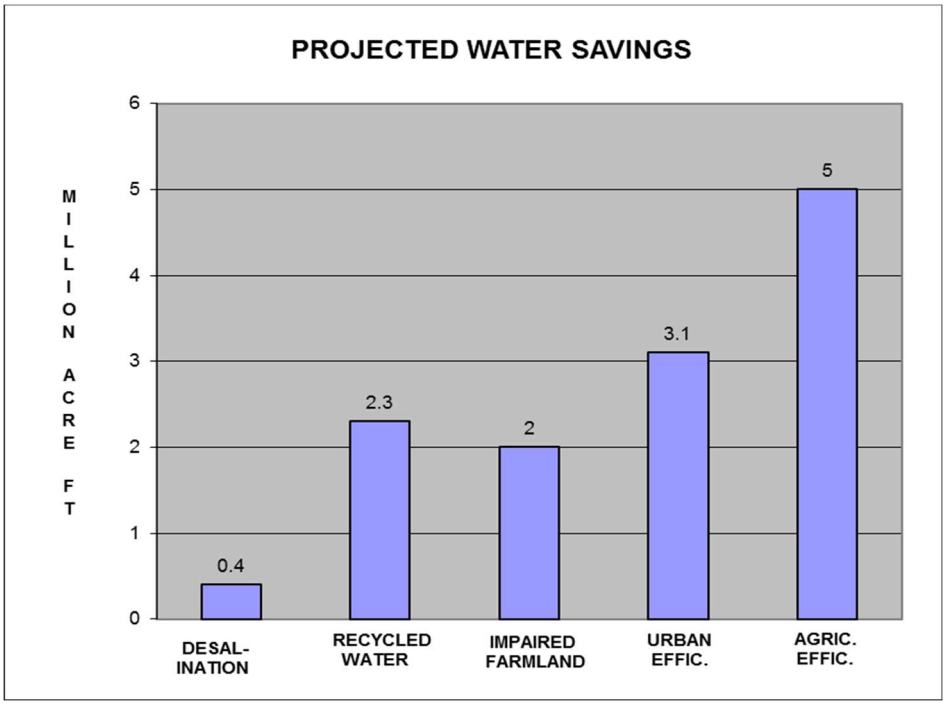
Source: JONES ET AL/ SCIENCE OF THE TOTAL ENVIRONMENT, 2019

The cost of desalinated water has been coming down as the technology evolves. In the last three decades, the cost of desalination has dropped by more than half.

A boom in desal, though, doesn't mean that all coastal locations with access to the sea have found a new source of fresh water. According to Michael Kiparsky of the Wheeler Water Institute at the UC Berkeley School of Law, "There are places around the world where desal makes economic sense, where there is high pressure on the water resources plus a lot of available energy resources". Globally, more than 300 million people now get their water from desalination plants, according to the International Desalination Association.

But despite the need, desal plants will not be built on every coastline. Foremost among the barriers is the cost of constructing a plant and the cost of processing the water. The San Diego County Water Authority pays about $1,200 for an acre-foot of water sourced from the Colorado River and the Sacramento San Joaquin River Delta and pumped hundreds of miles to Southern California. The same amount from the new (2015) Carlsbad desal plant costs about $2,200.

Desal, however, has some serious environmental problems. There are two types of desalination: thermal, which heats up water and then captures the condensation; and reverse osmosis, which forces sea water through the pores of a membrane that are many times smaller than the diameter of a human hair. This traps salt molecules but allows the smaller water molecules to go through. Both require a great deal of energy, and greenhouse gas emissions created by the power needed are a significant contributor to global warming.



There are ecological impacts as well. It takes two gallons of sea water to make a gallon of fresh water, which means the gallon left behind is briny. It is disposed of by returning it to the ocean and—if not done properly by diffusing it over large areas—can deplete the ocean of oxygen and have negative impacts on sea life. Because it is denser than typical seawater, it sinks to the seafloor and disrupts vibrant communities of life, which need far less salt and far more oxygen. Facilities can mitigate the environmental impact by, for example, mixing the brine with seawater before pumping it out, to dilute it. They might also take care to expel the byproduct where currents are strongest, thus dissipating the brine quicker. Inland, a plant might evaporate the water in pools and cart away the remaining salt.

But brine is more than just hypersaline water—it can be loaded with heavy metals and chemicals that keep the feedwater from fouling the complicated and expensive facility. The antifoulants used in the process, particularly in the pretreatment process of the source water, accumulate and discharge to the environment in concentrations that can potentially have damaging effects on the ecosystems. Dilution may help with the hyper salinity problem, but it doesn't get rid of the chemical toxins. Desal, for all its faults, will continue to become more common. Regions like Southern California will use it to supplement traditional – and increasingly unpredictable – sources of water. The City of Santa Barbara has a desal plant which helps meet water supply needs for both the City and the Montecito Water District. See more at: https://santabarbaraca.gov/government/departments/water-resources/water-system/water-sources/desalination

Another problem comes from the sucking in of sea water for processing. When a fish or other large organism gets stuck on the intake screen, it dies or is injured; in addition, fish larvae, eggs

and plankton get sucked into the system and are killed. A strategy increasingly being used to obviate, or reduce, that problem is to bury the sea water intakes beneath the sea floor and use the sandy ocean bottom as a natural filter. In 2016, California passed the Desalination Amendment, which tightened regulations for intake and brine disposal. Because of the cost of seawater processing and the impacts on the ocean, much of the recent desalination growth has involved the use of brackish water. The solids in brackish water are one-tenth the amount in ocean water, and that makes the process much cheaper.

DESALINATION