Historic Rain, Yet Drought Remains

County of Orange

Grand Jury 2022-2023

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SUMMARY

The “atmospheric river” of winter 2022-23 in California, causing floods in the lowlands and record snowpack in the mountains, has many people assuming that the “drought is over.” *This assumption is far from the truth*. Drought conditions are here to stay. While Orange County dams and reservoirs are currently at full capacity and the Sierra snowpack is at its deepest level in many years, there has been limited impact on the Western Rockies, the Colorado River, Lake Powell, and Lake Mead from which Southern California draws a significant amount of its potable water supply.

For the purposes of this report, the Orange County Grand Jury differentiated between source and supply. The source of water is the ocean and the resultant precipitation. The supply of water is how precipitation is captured and delivered to consumers of water, including recycling and reuse of this water.

Climatologists, water experts, and water managers agree we must adapt to climate change because longer droughts and extreme weather patterns are inevitable, adding urgency towards finding new methods for obtaining additional water sources.

In Orange County, the lack of available water over the past few years has frequently been identified as a “Water Crisis”, yet the phrase has failed to capture the scope of how dire the situation is. Generally, people don’t think about having enough water because it has been reliably available their entire lives. Throughout the county, there are numerous innovative water projects under consideration or development, but they may not be timely enough to avoid people running short of water and having to conserve much more, ultimately leading to mandated rationing.

Approximately half of all water used in Southern California is imported from the Colorado River and from the California Aqueduct. This imported water is severely constrained and unreliable. With infrequent and unreliable amounts of precipitation supplying both the Northern California Water Project and the Colorado River, the situation is becoming more critical. Several South Orange County cities rely almost solely on these imports. Locally, significant efforts are being made to re-use wastewater. These efforts are limited by the amount of water available from everyday use and do not create a new water source.

North and Central Orange County are served by a well-managed supply of water in underground storage, but it cannot meet the needs of the entire County. South County is entirely dependent on imported water.

The State of California mandated local governments to provide more affordable housing and is also promoting higher density development. This does not recognize the limitations of the current water supply and its social and economic impacts. The State has failed to provide a supply of water to support these mandates.

Public awareness must be expanded to encourage better management of our water by expediting the process for planning and construction of new water sources such as desalination and prioritizing funding.

The Orange County Grand Jury recommends the creation of a “Climate Resiliency District” to lessen the County’s dependence on State and regional water projects. Just as Orange County supported Measure M and created the Orange County Transportation Authority to solve the county’s transportation crisis, the same bold leadership is needed to solve the county’s water crisis.

This report presents information about the current crisis in water planning, existing projects to increase the supply of non-potable water for irrigation, and storage issues. The report makes recommendations for a reliable source of potable water through desalination of ocean water.

BACKGROUND

Water is our most precious resource, but due to shifts in climatic weather patterns, the reliability of traditional water supplies is under intense pressure in Orange County. Many water business insiders are stating privately that these systemic events are now at a “crisis” stage, despite the recent precipitation.

To date, traditional water suppliers in Orange County have not addressed the implications of this systemic shift. They have maximized local resources by recycling, capturing flood water runoff, and finding new areas for storage. However, they have yet to fully develop a transformational drought-resistant water resource outside the status quo.

Numerous past Orange County Grand Jury reports[1] have dealt with the internal governance and organizational structure or the need for conservation efforts to maximize water utilization. This report elaborates on the dependency on outside water supplies such as the California Water Project and the Colorado River Basin that provide over 50% of our county’s local water supply. South Orange County lacks a bountiful aquifer that provides North and Central Orange County with 70% of its water supply.[2]

South Orange County depends on imported water for 90% of its needs. These imported water supplies are becoming less reliable, with annual reductions occurring in both the California Water Project and the Colorado River Basin creating major disruptions. Conservation measures have been put in place throughout Orange County to maximize existing supplies to help mitigate these concerns. This is simply inadequate to resolve the long-term supply issue. One of the ways to resolve this issue is desalination, a proven alternative that has not yet been fully implemented in Orange County.

REASON FOR STUDY

The Western United States is experiencing a water crisis. The climate is changing, and our supply of water has diminished while our population has increased. This situation did not occur overnight and the efforts to mitigate the crisis have been slow and ineffective.

Existing water agencies in Orange County are not adequately structured or managed to implement the transformational strategies necessary to create a new source of potable water, specifically through desalination. It is possible that a merger of two or more agencies could pivot this new source, but they are already performing the functions for which they were created and it might be difficult to assimilate new functions. The Orange County Grand Jury recommends the creation of a new agency, a Climate Resiliency District, to develop and manage this drought-resistant resource.

Local water suppliers, including cities and special districts, are to be commended for attempting to meet the crisis within constraints. The Orange County Water District very

successfully manages the ground water basin serving North and Central Orange County. These efforts include actively pursuing water transfer and water banking agreements outside of Orange County. Local water suppliers need to expand their portfolio to meet demands. Additional capture of precipitation, supplying groundwater through infiltration, additional storage systems, development of ocean desalination, and recycling and reuse of water all need to be considered and improved and implemented.

The general public, the ultimate users of the water, need to continue their efforts to conserve water by installing low-flow toilets and showerheads, appliances that use less water, using recycled water for landscape irrigation, and eventually accepting the use of recycled water purified for drinking purposes. They also need to support and expedite the development of desalination plants to create a new source of water for the future. It will be necessary for the water suppliers to develop effective public awareness programs to help the public understand the need and desirability of this new paradigm.

METHOD OF STUDY

The Orange County Grand Jury (OCGJ) took the following steps in investigating this issue:

- Identified and interviewed key personnel:
    - Persons or entities responsible for providing potable water to their Orange County constituents
    - Persons knowledgeable in projects to improve capture, reclamation, recycling, delivery, and infrastructure improvements
    - Persons involved in the planning and execution of providing new habitable dwellings
    - Persons who are reputable in the field of climatology – past, present, and future
- Reviewed information from the various water districts and interested parties including:
    - Orange County Water District (OCW)
    - Orange County Coast Keepers
    - California Department of Water Resources
    - Miscellaneous Water Districts
    - Municipal Water District of Orange County (MWDOC)
    - Metropolitan Water District (MET)
- Reviewed numerous documents pertaining to this report (see bibliography for complete list)
- Members of the OCGJ toured the following facilities:
    - Municipal Water District of Orange County Headquarters
    - Orange County Water District Ground Water Recovery Facility
    - Metropolitan Water District
        - Headquarters

- F.E. Weymouth Water Treatment Plant and Quality Control Laboratory
- Pure Water Southern California Demonstration Plant in Carson

INVESTIGATION AND ANALYSIS

Climate

The current state of our climate is a prolonged drought. To survive, local sources of water need to be more resilient.

Throughout Earth's evolution, there have been and continue to be impacts on its climate. The continents have been drifting since there was a super continent, Pangea, 175 million years ago. The resulting different geographic locations have differing climate conditions which are still evolving. These "climate changes" have been extensively studied and documented by paleo-climatologists, and their data has been used to forecast what climate conditions will most probably be in the future.

"The current state of our climate is a prolonged drought. To survive, local sources of water need to be more resilient. "

Today's scientists and climatologists agree that Earth is changing due to evolutionary cycles and that climate warming is being acutely exacerbated and accelerated by the effects of human activities. Worldwide, glaciers are receding, sea levels are rising, and permafrost melting. Many global regions that were historically self-sufficient for potable water are now in periods of extended drought where precipitation is a declining resource. Orange County is directly affected by the resulting effects of climate change, evidenced by water reduction mandates and the various proposed means and methods to capture, recycle, and store more water.

This report acknowledges climate change and its effects on the people of Orange County. It examines whether the current proposed means and methods for securing more water are sufficient to sustain the projected growth in the county and support the green and vibrant lifestyle to which its inhabitants have become accustomed.

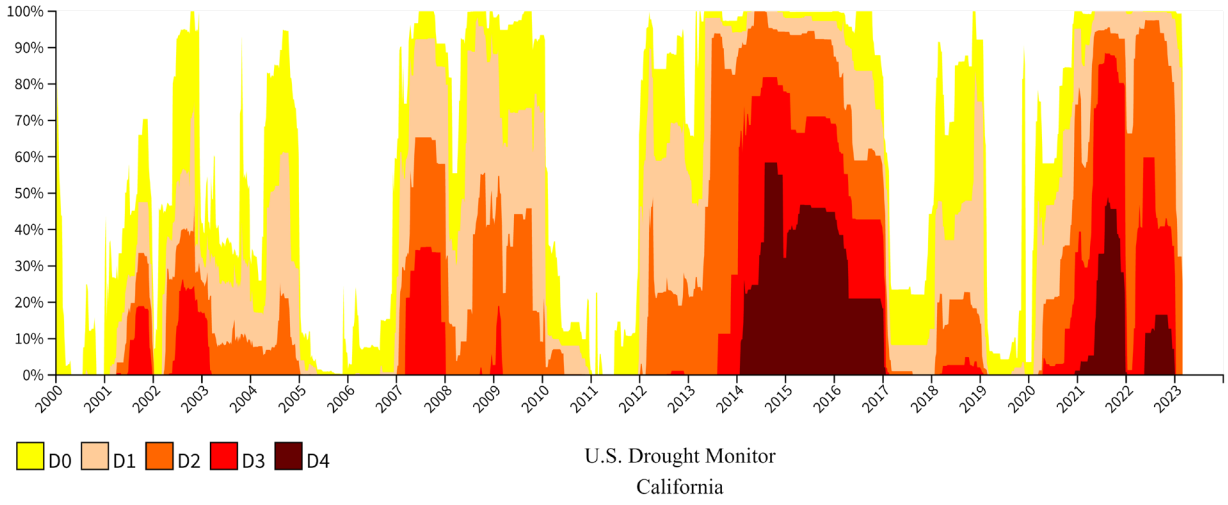
As evidenced over the past five decades, the durations and resulting expectations from the seasons in this geographic region of the U.S. (Western) have dramatically changed. Winters have seen declining periods of sustained precipitation, and summers are hotter, longer, and drier. This has directly affected the rivers, lakes, streams, dammed reservoirs above ground and aquifers below ground that rely on melted snow and rain for continued and reliable replenishment. Paleo-climatologists have validated the past

climate drought trends, and today's climatologists are predicting the same, punctuated by infrequent periods of precipitation, like the precipitation events of this past winter (2022-23). This all points to the current supplies of water not being dependable.

Key facts and predictions identified during interviews and the numerous climate articles reviewed are:

- The current Western United States drought is the longest in 1,200 years
- The drought is likely to continue for the next 100 years.
- The current Southern California climate is characterized as "drought" but this is likely to be interrupted by infrequent wet years.
- Human activities have affected the climate. The Southern California climate is expected to enter a cooler phase based upon long-term historic trends, rather than the current warming.
- Even if carbon emissions are suddenly decreased, the climate could take up to 100 years to adjust.

The following graph illustrates the current tendency of the climate. It shows five categories: Abnormally Dry (D0), showing areas that may be going into or are coming out of drought, and four levels of drought (D1–D4). The darker the color, the deeper the drought. It clearly shows increased and more frequent levels of drought for California.



Drought as the norm has reduced precipitation as a source of water and Orange County needs to respond to it by providing a more drought resilient supply of water.

Water Demands

- In the past fifty years, California's population has nearly doubled. Water is needed, and expected, to sustain the current population in all aspects: quality of life, commerce, industry, agriculture, etc., and promote growth and development. However, current, and foreseeable circumstances regarding water availability

have severely impacted modern Californians' expected way of life. To preserve the status quo, water reduction mandates are used to facilitate further development.

- Some water agencies are paying farmers to not grow crops. They are transferring the farmer's water rights to the water agency to feed the thirst of metropolitan areas. Many projects to capture, transport, and store water have been proposed but not yet constructed due to various political and environmental obstructions. The projects that have been approved to capture, store, recycle, and transport more water will only succeed if there is enough water to do so. Precipitation is a declining source of water. Interviews with water experts, e.g., wholesalers, retailers, and suppliers have said that "we cannot conserve our way out of the drought" but they have yet to make Orange County self-sufficient.

Overview of Water Suppliers and Agencies

The water supply for Orange County is primarily managed by three entities – Orange County Water District (OCWD), Municipal Water District of Orange County (MWDOC), and Metropolitan Water District (MET).

Consumers receive their water from 29 independent water districts and cities. The suppliers primarily receive water from either the groundwater basin managed by OCWD, directly from MET, or through MWDOC. The water agencies also have additional minor supplies of water, including treated surface waters and supplies obtained from agreements with other entities. Some of the water agencies provide treated wastewater for landscaping and industrial uses (recycling).

Metropolitan Water District (MET) – (Water Wholesaler)

The Metropolitan Water District (MET) serves the water needs of Southern California by securing and transporting water. This includes overseeing the importation of water from the Colorado River Basin since 1941 and the State Water Project since 1971. MET is a wholesaler which sells and allocates this water to other water agencies, municipalities,[3] and counties from Ventura to San Diego. Orange County receives its purchased allocation through the Municipal Water District of Orange County. Recognizing the long-term effects of drought and reduced flows from the Colorado river and California Aqueduct, the MET has initiated major water conservation and recycling programs to make water management a priority. They have attempted to create storage capability and negotiate contracts with the agricultural entities within the Colorado basin to limit their water usage and acquire their allocations.

The long-term threat of climate change and historic droughts have challenged MET and they have failed to identify new supplies of water beyond their historic charter. The State Water Project is delivering only 10% of the historical allocation and the Colorado River supply allocation was reduced 25% in 2022.

Metropolitan Water District is in the water movement business and is not historically tasked with securing new sources of water. As the leading water agency in Southern California, MET has not taken on this responsibility. Their supply of water is dependent on precipitation. When the water allocation was reduced from the State Water Project, MET had to switch many of its customers to the Colorado River. However, numerous articles have documented that the lakes on the Colorado River (Mead and Powell) are at the lowest levels since they were built, and their future viability is at question due to a decade's long drought in the west.

The State Water Project[4] includes 700 miles of delivery canals (California Aqueduct) that serves 27 million people and irrigates 750,000 acres of farmland, which supplies fifty percent of the United States' produce. The project originated in 1960 and although it is well maintained, it has not been upgraded in years. The water for the State Water Project comes primarily from the Sacramento-San Joaquin Delta. When forming its water strategies, Orange County needs to recognize that the State Water Project's reliability is in doubt due to its 53-year history of not being adequately maintained.

The Colorado River has been in the news due to the drought reducing its flow over the past twenty years. The agreements regarding the allocation of Colorado River water are set to expire in 2026 and are currently being renegotiated. Water levels at Lake Mead and Lake Powell have dropped significantly, and experts say it would take at least 10 years of above average precipitation to restore them. Orange County should simply not rely upon the Colorado River as a dependable supply, now or in the future.

Following numerous interviews and a thorough review of project documentation, the Grand Jury reached several conclusions regarding MET programs to replace dwindling

water supplies. Most notable is that the Carson wastewater reclamation project is years away from being completed and 20 years behind similar projects in Orange County. Overall, MET cannot be expected to significantly replace the reductions in water allocations from the Colorado River and the State Water Project within the next decade.

"MET water will not be reliable for at least a decade and Orange County needs to consider developing other resources to make up for this lack of reliability."

Municipal Water District of Orange County (Water Wholesaler)

The Municipal Water District of Orange County (MWDOC) is primarily a wholesale water provider and, to a lesser extent, a water resource development and planning agency for nearly 3.2 million Orange County residents, and businesses. MWDOC buys imported water from the California State Water Project in Northern California and the Colorado River through the Metropolitan Water District of Southern California. MWDOC has four representative seats on the Metropolitan Water District (MET) Board. Through its member agencies, MWDOC covers all of Orange County except the Cities of Anaheim, Fullerton, and Santa Ana.

Orange County must import water due to limited local water supplies. Central and North County import approximately 30% of their water to supplement its existing supply. However, South County is highly reliant on the Municipal Water District, as South County water districts must import 90% of their water supply from outside of Orange County.

The Municipal Water District of Orange County is extremely important as a wholesaler or broker to the retail water districts in Orange County and as a representative of Orange County's interest on the Metropolitan Water District Board.

MWDOC has completed a comprehensive study of Orange County's water reliability needs that could serve to achieve a climate resilient water supply. The study covers MET system reliability and Orange County projects including desalination projects, water shed projects, and water banking projects. The study also identifies the crisis Orange County is facing – by 2030, eight out of every ten years can be expected to be in drought. However, the study is devoid of information about financing and implementation, and its conclusions rely too much on MET efforts that are decades behind where they should be.

Based upon this study and MWDOC's countywide area of responsibility, MWDOC could conceivably lead Orange County's efforts to plan, finance, and implement water source and supply projects.

MWDOC serves no other purpose than to distribute water and has not attempted to expand its supply of water beyond its engagement with the MET. Previous Orange

County Grand Juries have recommended that the MWOC and OCWD merge for a more efficient and streamlined approach towards water management.

Orange County Water District (Water Wholesaler)

The Orange County Water District (OCWD) provides water to 2.5 million residents in North and Central Orange County. The District effectively manages the Orange County groundwater basin that provides approximately 77% of water used in the region. It supplies the 19 cities and retail water agencies in Central and North Orange County with potable water. As the sole adjudicator of Orange County's ground water basin, the agency plays a vital role in assuring the aquifer is effectively managed.

The Orange County Water District has been a true innovator in water management and operates the world's largest water purification replenishment system for indirect potable water use. Over 130 million gallons per day are recycled into the Orange County aquifer, thus replenishing this vital resource. It has exhausted the wastewater supply available for recycling through its comprehensive efforts.

The management of Orange County's underground reservoir has been exceptional. OCWD has also implemented a regional groundwater banking program to assure long-term reliability and increasing stormwater capture behind Prado Dam where water eventually gets released and recharged into the Orange County aquifer, thus becoming part of the local water supply.

Despite its absolute success at recycling, the Orange County Water District must still import 23% of its water brokered by the Municipal Water District of Orange County through the Metropolitan Water District. The local Orange County ground water basin is simply not large enough to meet demand.

Water Retailers

The **Irvine Ranch Water District** serves a large Orange County populace of 600,000, primarily in the Cities of Irvine, Lake Forest, parts of the Cities of Orange, Costa Mesa, Tustin, and Newport Beach. IRWD provides water as well as reliable sewage collection and treatment. The combination of being a water retailer combined with managing sewage treatment has allowed IRWD to implement groundbreaking recycling water programs for non-potable use and innovative urban runoff programs. The district relies partially on the Orange County basin for its water supply, but also is dependent on 20% of imported water from the Municipal Water District of Orange County.

As an innovator, the IRWD secured rights to the Kern water basin for water storage. This storage reduces its reliance on Metropolitan Water District and provides access to a potential supply of water in an emergency. Through conservation and water efficiency programs, IRWD has reduced overall water consumption year over year allowing development to continue to move forward unabated within the jurisdiction it serves. However, growth in community development exposes IRWD to shortages as its allocation of imported water is determined by Municipal Water District of Orange County.

The **Moulton Niguel Water District** serves 170,000 residents in South Orange County, and is highly dependent on imported water from the Municipal Water District of Orange County (in excess of 90% of its potable water). Therefore, the District has made a major effort to drive efficiency and conservation efforts, which have been successful in reducing water utilization and continue to allow local development. Negotiations are underway with local sanitation districts to attempt to initiate recycling programs for the betterment of the community. The collaboration with South Orange County Wastewater Authority (SOCWA) has been less than cooperative thereby impeding recycling efforts. Should the Municipal Water District of Orange County fail to deliver the required water, Moulton Niguel Water District is highly vulnerable to supply disruption.

The **Rancho Santa Margarita Water District** (RSMWD) imports 100% of its potable water from the Municipal Water District of Orange County and services over 200,000 residents in south Orange County, primarily the eastern portion of Orange County from Mission Viejo to San Clemente. As a result, the District has committed to developing local reliable drinking water supplies. RSMWD constantly monitors opportunities to enhance its water portfolio. The current major effort is the San Juan Watershed project that will capture local stormwater runoff as well as directing recycled water to recharge the local underground aquifer.

Conservation water efficiency efforts have also played a major role to minimize water usage. Within RSMWD's service area, there are major communities being planned. The planned communities under development, Los Flores and the Ranch, will add 15,000 homes or approximately 60,000 additional residents to the District's customer base. With this development the water demand will increase and therefore will increase the need to import water. Should Municipal Water District of Orange County fail to deliver required water, RSMWD is highly vulnerable to supply disruption.

The **South Coast Water District** (SCWD), like other south Orange County water districts, is highly dependent on imported water from the MWDOC. SCWD serves 35,000 residents and 2 million visitors a year. SCWD relies on 90% of its potable water being supplied by the MWDOC. SCWD is to be applauded in its attempt to expand its efforts to decrease its dependence on imported water. Recently, SCWD was granted approval to proceed with an ocean desalination plant of 5 million gallons of water a day. The plant is to be built within the next five years. SCWD is working to maximize recycling efforts to minimize reliance on imported water. Major conservation and water efficiency programs have been implemented locally. Until the desalination plant comes online, and should MWDOC fail to deliver required water, SCWD is highly vulnerable to supply disruption.

Until the desalination plant comes online, and should MWDOC fail to deliver required water, SCWD is highly vulnerable to supply disruption.

Other Orange County Water Suppliers. Water wholesalers in Orange County work with local water retailers to provide water to their residents. The Orange County local retailers include 29 cities and local water districts.

Most of the cities and water agencies have implemented programs to minimize water utilization to become more efficient. They are to be applauded for their efforts.

South Orange County retailers Moulton Niguel Water District, Rancho Santa Margarita Water District, and South Coast Water District are highly dependent on the importation of water, in excess of 90% of total local demand.

Irvine Ranch Water District is included because of the unique characteristics that were identified during the course of this investigation. Specifically, the Grand Jury noted its creativity in securing potential sources of water coupled with the continued development of the Irvine Ranch and water required to serve new residents.

South Orange County retailers are highly dependent on the importation of water for more than 90% of local demand. The Grand Jury's investigatory efforts have included a focus on this dependency.

State of California Managed Supplies

The State of California is responsible for operating the State Water Project, planning and implementation of statewide projects for water supply, State bond financing for projects, and management of federal and State funding programs. These have been insufficient to address the threats to Orange County water supply.

Water management in California is very complex. There are numerous constituents placing a huge demand on water resources: agriculture, urban centers, industry, business, developers, tourism, and residents. This pressure coupled with an antiquated water structure with hundreds of water wholesalers and retailers makes a challenging dynamic.

Environmental pressure exacerbates the challenge. The State's lack of long-term solutions to California's water needs is not new. No new reservoirs have been built since the 1970's when the population was 20 million people. 50 years later, California's population has almost doubled to 39 million. For years, the State has studied proposals to secure additional supplies of water by moving water from the Sacramento delta to Southern California through the California Water Project, with no discernable results. The project is needed to protect the existing water supply and secure additional water but has been bogged down by debate about approach and environmental review.

No new reservoirs have been built since 1970 when the population was approximately 20 million, yet California's population has almost doubled to 39 million.

In 2014, a bond initiative was passed to provide $7.3 billion in funding for 10 new reservoirs and other water related projects, yet the reservoirs have not been completed. The recent rains that swept California this winter resulted in billions of gallons of water flowing out to sea.[5] The California Natural Resources Agency maintains a web page that shows the progress of the bond issue.[6] The web page shows most of the funds have been committed but lacks information regarding what has been accomplished.

In terms of planning, in August 2022, the California Environmental Protection Agency issued a major report entitled "California Water Supply Strategy – Adapting to a Hotter, Drier Future, California Agencies."[7] But the strategy does not detail schedules or actions or assign resources or funding. In the report, the Newsom administration points out that in order to deliver the pace and scale of projects necessary to meet California's water crisis, the State's regulatory structures must be modernized so that "State agencies can assess, permit, fund and implement projects at the pace this climate emergency warrants." The report does not describe how Newsom's directive is to be understood or executed. Other relevant State reports touching upon State water resources include those on climate change, water supply assessment, and an analysis of recent droughts. While all these reports help identify problems, they provide few and limited actionable recommendations.

The California State Water Control Board is the State's key water agency, yet its focus on water supply is not clear. Other State agencies that have water oversight include: the Department of California Water Resources, the California Water Commission, and the National Resources Agency, and State Conservancies, such as the Sacramento-San Joaquin Delta Conservancy that are involved in water grants and planning. The State environmental and river basin authorities also complicate planning and actions. There seems to be no coordinated focus on water supply.

The Sacramento-San Joaquin levees are very important to the State Water Project. They protect the integrity of the system. For decades, the levees have been identified as needing bolstering, yet this has not been done. If the levees fail or are breached there will be an influx of brackish water from the San Joaquin Delta that will contaminate the fresh water in the Project, making it unusable. The recent rains have focused the need for action, yet nothing is likely to be done anytime soon. As an example, the need to capture and store rainwater in aquifers has been recognized for decades, yet the recent rainfalls show little has been done.

Recently, the State initiated the Delta Conveyance Project (DCP). This is a joint powers authority formed to help ensure water supply reliability for the State Water Project and to adapt to forecasts of future changes in precipitation and seasonal flow patterns due

to climate change. An important part of the DCP is a proposed tunnel under the Delta. The concept for the project originated in the 1970s and subsequent versions included the Trans-Delta System, Peripheral Canal, Bay Delta Conservation Plan, and the California Water Fix (a dual tunnel). The Delta Conveyance Project faces strong opposition from environmentalists. The prospect of the project being completed in a timely manner, if at all, is doubtful.

Governor Newsom himself noted the difficulty of getting water projects going in his statement at an August 2022 news conference: “The time to get these damn projects is ridiculous,” Newsom said. “It’s absurd. It’s reasonably comedic. In so many ways, the world we invented from an environmental perspective is now getting in the way of moving these projects forward.”[8] Projects take decades to accomplish, if they are completed at all. The State cannot be relied upon for consistent water delivery in wet or dry years.

Water management in California can best be summed up as always studied but never resolved. The impacts of this paralysis mean that Orange County cannot currently rely on the State to identify or secure a new source or supplies of water.

Federal Intervention

California may have to reduce its reliance on Colorado river water under a proposal by the U.S. Department of the Interior, unveiled on April 11, 2023, that upends the longstanding system of water rights. The Department proposed two methods for reducing water usage by as much as 25% in 2024. The seven states utilizing the Colorado river have been negotiating with each other since August 2022 to make voluntary cuts. To date no agreement has been reached.

The U.S. Bureau of Reclamation, part of the U.S. Department of the Interior, warned that it would impose large cuts if the states relying on the river did not come up with a plan by January 31, 2023. The states failed to do so. Although California has experienced an unusually wet winter, this has not changed the Colorado River’s longstanding challenges amid a much drier climate.

The rationing of water from the Colorado River basin appears inevitable at the time of this report, disrupting the long-tenured stability of Southern California’s imported water supply. It reinforces the idea that the time to act for securing a new source of water for Orange County is now.

Water Justice

As the demand for water increases, not only to sustain the status quo but also for development, equal access to water must also be addressed. What regions will be entitled to preserve their way of life and what regions will have to compromise?

The cost of obtaining and distributing water is equally important to water justice. The projects required to ensure a reliable water supply are costly and, if delegated to the ratepayers, may have a significant impact on lower income households. Traditionally,

major water projects have been financed through state and federal governments or through special tax assessments. This is an easier burden on lower income groups than strictly through rate structures. Orange County should develop a funding strategy for water projects that is acceptable to rate-payers and does not overly burden lower income groups.

Orange County should develop a funding strategy for water projects that is acceptable to rate-payers and does not overly burden lower income groups.

Actions to Secure and Strengthen Supply

Numerous initiatives and projects have been planned to improve and strengthen the existing supply systems:

1) water banking,
2) purchasing water rights,
3) recycling water,
4) reuse of water for potable purposes,
5) aquifer management,
6) utilization of other supplies, and
7) water efficiency.

However, these projects are years behind schedule and taking an extraordinarily long time to complete. These initiatives are important to point out as efforts, but it must be noted that by themselves, they are not solutions to Orange County's water reliability. The Grand Jury's evaluation of these efforts is included in Appendix A "Local Agency Action to Secure Water Supply."

The efforts to diversify the water portfolio and make the existing supply more resilient are commendable, but a new source is also needed.

Effective Management of Initiatives

Orange County needs an entity to champion and lead the efforts to develop a water source that will enhance the reliability of existing water supplies. Orange County water suppliers have completed and are engaged in several projects to improve the resilience of our water supply, but efforts for the whole County have been limited. A countywide effort to develop a drought-resistant source of water is necessary due to climate change.

Effective countywide management of water resources would alleviate the jurisdictional issues that have hampered the development of recycled water in South County including shared use of the aquifer for all of Orange County. A Climate Resiliency District could serve this purpose.

A Climate Resiliency District is authorized by the Climate Resilience District Act, codified in California Government Code Sections 62300-62312. Section 62301 describes the legislative intent of the Act:

> *It is the intent of the Legislature in enacting this division to provide the ability for local governments to create districts for the purpose of addressing climate change effects and impacts through activities and actions that include mitigation and adaptation, as necessary and appropriate, to achieve all of the following:*
>
> *(a) Providing a sustained and certain level and source of funding at the local level.*
>
> *(b) Allowing activities and actions on an appropriate geographic basis.*
>
> *(c) Facilitating the receipt and use of federal, state, local, and private funds.*

The purpose of the Climate Resiliency District would be to promote a project that addresses drought, including multiuse land repurposing, groundwater replenishment, groundwater storage, or conjunctive use.[9] It is envisioned that a Climate Resiliency District would be capable of planning and financing water source projects such as desalination that are beyond the means of existing Orange County water agencies.

There were concerns about a Climate Resiliency District expressed by some water district leaders interviewed by the Grand Jury. They stated that a Climate Resiliency District might be another level of bureaucracy that could impede the pursuit and development of their own projects. However, these concerns would carry more weight if planned projects were actually being implemented.

Alternative structural entities could be a joint powers authority (JPA) created for this purpose, either spearheaded by Orange County Water District (OCWD) or Municipal Water District of Orange County (MWDOC), or a collaborative effort between both.

The Joint Exercise of Powers Act, codified in California Government Code Section 6500 et seq., authorizes two or more public agencies, by agreement, to exercise any power common to the agencies to provide more effective or efficient government services or to solve a service delivery problem. A JPA could plan, finance, and implement water source and water supply projects. Similarly, Orange County Transportation Authority (OCTA) was created in 1991 to fund, plan, and implement transit and capital projects. OCTA has been successful in solving some of Orange County's transportation needs. A JPA focused on Orange County's water needs could similarly succeed.

Forming a JPA to comprehensively address all of Orange County's water needs would ultimately require the cooperation of 29 entities including special water districts and cities that supply water. The political effort required for this cooperation would be significant and would require a new approach towards such collaboration.

Either separately or cooperatively, OCWD or MWDOC could take the lead for the planning, financing, and implementing of water source and supply projects to the benefit

for all of Orange County. Unifying the water districts is also a possibility, as previously reported by the 2021-2022 Grand Jury.[10]

Through its member agencies, MWDOC covers all of Orange County except the Cities of Anaheim, Fullerton, and Santa Ana. MWDOC has completed a comprehensive study of Orange County's water reliability needs that could serve as means to achieve a climate resilient water supply.[11] The study covers MET system reliability and Orange County projects including desalination projects, watershed projects, and water banking projects. The study clearly identifies that Orange County is facing a water crisis, and forewarns that by the year 2030, eight out of every ten years can be expected to be dry. Based upon this study and MWDOC's countywide charter, MWDOC could accept responsibility to lead Orange County's efforts to plan, finance, and implement water source and supply projects. However, the study would need to be updated, as it is totally devoid of financing and implementation data, and it relies too much on MET efforts that are decades behind where they should be.

Orange County needs a champion to lead the efforts to develop a water source and to enhance the reliability of existing water supplies. OCWD and MWDOC have planned but failed to implement a solution, and a joint powers authority requires a level of political cooperation that may not be possible with 29 separate water agencies. Therefore, the County of Orange should initiate the Climate Resiliency District to plan, finance, and implement water supply projects to meet future conditions and needs.

Orange County needs a champion to lead the efforts to develop a water source and to enhance the reliability of existing water supplies

Public Awareness of the Need for Action

Public awareness of the consequences of current and future climate change is important as a catalyst for adapting to the change. In the past several months, there have been numerous newspaper and magazine articles on water concerns in California and the Western United States. There have also been at least two television documentaries. Many local water agencies have included fact sheets and other information on their web pages and in monthly statements warning of the water “crisis”. These messages have resulted in increased public awareness but more needs to be done. Public education to promote projects to address the crisis is a must.

As a result of increased public awareness, water agencies have noticed a decrease in per-capita water usage. The public is using water more efficiently. However, several Grand Jury interviewees noted that we cannot conserve our way out of the drought. Solving Orange County’s future water shortfall through conservation alone would require drastic changes in water usage and would likely meet strong public resistance. Additional efforts are needed to inform the public of potential lifestyle changes if additional water sources and supplies are not developed.

Some water agencies in Orange County have conducted public campaigns to make the public aware of the need to increase rates. The rate increases are for projects to increase the water supply and source resiliency of the agency. South Coast Water District's outreach to its customers has been most notable and enabled the District to proceed with community support for the Doheny Desalination Project.

The public needs to be galvanized to move forward. The Grand Jury recommends that the County Board of Supervisors lead a countywide campaign to mobilize the public in support of new water sources that will make the supply systems more efficient and resilient.

Effect on Local Economy

If no new sustainable source of potable water is developed there will be an adverse impact on Orange County. While North Orange County has an underground aquifer with a substantial amount of water, South County is almost entirely dependent upon external supplies. Major strides have been made in recycling water for industrial and landscaping purposes, but there is still a shortage of potable water with the only current source of "new" water being the Doheny Desalination plant, which will take years to complete and probably not begin operations until 2028. Capital costs of building a desalination plant are generally beyond the capability of a single water district.

Water supplies collected through precipitation are the most economical but the most unreliable. There are insufficient storage facilities in Orange County for capturing precipitation and there are no aquifers in South County.

The State of California has mandated that municipalities create new housing opportunities, particularly low-income housing. Developers are required to install water saving features such as low-flow toilets and showers, water-saving washing machines and drought-resistant landscaping, all of which increase the cost of building. These features do not offset the effects of the drought, and experts predict an eventual shortage of water would result in a moratorium on development.

Businesses and industries such as retailers, manufacturers, and theme parks rely on clean and dependable water. If they cannot depend on the local suppliers their enterprises are at risk. Homeowners, as ratepayers, are likely to see increases in their water bills due to increased costs of purchased water by the wholesalers and retailers.

Severe drought, causing major reductions in river flow, has an adverse effect on hydroelectric plants resulting in shortages of power to the grid. Developing an alternative source of water (desalination) reduces the reliance on this supply for consumption, thus making more available for power generation.

... experts predict an eventual shortage of water would result in a moratorium on development.

Drinking Water Obtained from the Sea

South Orange County imports 90% of its drinking water, with most of it currently coming from the Colorado River. The allotment of water from the river is at serious risk and will likely be significantly reduced. In recent years, not enough precipitation has fallen to meet Orange County's drinkable water needs, and there is no way to make it rain or snow.

Seawater can be made into fresh potable water in a process called desalination, one of the solutions being considered to resolve this looming crisis. However, the Grand Jury determined that desalination is not being implemented fast enough. Although ocean desalination currently requires an initial capital investment and high operating costs and raises environmental challenges, critics acknowledge it would make a significant contribution to Orange County's water portfolio.[12]

Desalination is being used increasingly around the world to provide people with needed freshwater.[13] According to the International Desalination Association, more than 300 million people around the globe receive their water from desalination plants.[14]

Multiple desalination plants are under consideration in California, with only a few in operation. The Carlsbad Desalination Plant, near San Diego, provides approximately ten percent of the freshwater used in the region, and Santa Barbara is currently

upgrading an older plant. Recently, two new seawater plants have received approval to begin construction: one on the Monterey Peninsula, and the Doheny Plant in Dana Point. Orange County must consider the benefits of a high-capacity facility as a means towards self-sufficiency.

Current challenges to desalination include planning, construction costs, impact on marine life from saltwater intake, high energy demands, operating complexities, difficulty of cycling plants on and off, and disposal of concentrated salt brine.

Desalination challenges are mitigated by creating economies of scale with high volume production and careful planning, selecting suitable locations, and technological improvements. For example, the Carlsbad plant produces 50 million gallons per day or more than 56,000 acre feet (AF) per year. The plant started operation in 2015 and reports that it produces water for ½ cent per gallon, or $1600 per AF, in large part due to its high volume.[15] For comparison, the MWDOC published rate as of January 1, 2023, is $1,209 per acre foot.[16] If Orange County were to establish a similar facility, it would offset the need for imported water and allow imported water to be redirected to other Southern California communities relying on importation, such as Inland Empire.

The length of time to plan, obtain permits, and construct a desalination plant can take decades. A proposed plant at Huntington Beach was in planning and permitting for over twenty years and ultimately was not approved. South Coast Water District began the initial steps for the Doheny Plant at Dana Point in 2016 and it is expected to be in operation by 2028.

Unless the State of California initiates methods for expediting the planning and approval processes, it can take at least as long as these two projects for any new ocean desalination plants. The State has shown it can accelerate the approval process as evidenced by the approval of SoFi Stadium[17] in record time by enacting legislation that expedited the permit and environmental requirements without compromise.

It is well known that desalination has an impact on the environment, and we are fortunate to live in a state where protecting the environment is important. Engineers and water experts are researching how to integrate more renewable energy into the next generation of plants. The environmental impacts and costs of desalination should be compared against the full environmental impacts and costs of importing water from 700 miles away, not just wholesale rate costs as is usually done.

Orange County cannot continue to rely on imported water, nor can it ignore the fact that there is an immediate need to take advantage of the ocean as a drought-resistant source of water. According to the Grand Jury’s research and interviews, the environmental concerns, surrounding intake and outflow of saltwater, and high electricity demand are being met as evidenced by the Doheny approval, therefore allowing desalination plants to operate. Orange County should embrace desalination as a major part of an overall local plan, not just a last resort.

COMMENDATIONS

South Coast Water District is to be commended for its strategic foresight. The District has recently gained approval for the Doheny Ocean Desalination Project for which they initiated feasibility studies in 2008. The plant is now anticipated to be operational in 2028. The Doheny Ocean Desalination Project is a new, reliable, local, and drought-proof water supply. The Doheny Ocean Desalination Project is the first desalination project in the State of California to be fully compliant with the California Ocean Plan.[18]

Orange County Water District successfully manages the aquifer under Central and North Orange County for the benefit of multiple water suppliers. It has also built the Groundwater Recovery System (GWRS) to treat wastewater to potable levels for supplementing the aquifer. Recently, it expanded and commissioned the GWRS. The Orange County Grand Jury commends OCWD for its work.

The water suppliers for Orange County have undertaking numerous initiatives to increase the resiliency of their water supplies. The Orange County Grand Jury commends these suppliers for their efforts and encourages them to continue pursuing expanded opportunities.

The Orange County public has significantly reduced the per-capita water usage through conservation efforts. This is important to maximizing the water supply. The Orange County Grand Jury commends the public for these efforts.

The Orange County Grand Jury commends the leadership of MWDOC and OCWD for their continued negotiations regarding merger.

The Orange County Grand Jury commends the Southern California news media for their continued efforts in reporting on the critical nature of our water supply.

FINDINGS

In accordance with California Penal Code Sections 933 and 933.05, the 2022-2023 Grand Jury requires (or, as noted, requests) responses from each agency affected by the findings presented in this section. The responses are to be submitted to the Presiding Judge of the Superior Court.

Based on its investigation titled "**Historic Rain, Yet Drought Remains**," the 2022-2023 Orange County Grand Jury has arrived at the 12 principal findings, as follows:

F1 Future water supplies are impacted by climate change and current supplies will not meet future demands.

F2 Climatologists predict future extended periods of low moisture with occasional wet years.

F3 Climate change is inevitable and is exacerbated by human behavior.

F4 South Orange County relies primarily on the importation of water.

F5 Local water suppliers recognize that enhanced stormwater capture and storage, wastewater recycling, and infrastructure improvements will not be sufficient to address the long-term forecast of drought and its effects on supply.

F6 There is significant water infrastructure planning, but inadequate implementation.

F7 The review and approval process for major water capital projects is cumbersome and overly restrictive.

F8 Failing to find solutions to water shortages will have a significant impact on the Orange County economy.

F9 Continued development in Orange County creates additional water supply needs.

F10 Conservation and efficient use of water is essential.

F11 Increased outreach and public education are necessary.

F12 Desalination has proven to be technologically and environmentally feasible and is slowly being embraced as a drought-resistant source of water.

RECOMMENDATIONS

In accordance with California Penal Code Sections 933 and 933.05, the 2022-2023 Grand Jury requires (or as noted, requests) responses from each agency affected by recommendations presented in this section. The responses are to be submitted to the Presiding Judge of the Superior Court.

Based on its investigation titled "**Historic Rain, Yet Drought Remains**," makes the following four recommendations:

R1 The County of Orange Board of Supervisors should take a leadership role by the end of calendar year 2023 to explore the establishment of a "Climate Resiliency District" or Joint Powers Authority to fund and expedite implementation of a drought-resistant source of water. F1, F2, F3, F4, F5, F6, F7, F8, F9, F12

R2 Orange County water agencies should expedite the planning, development, and construction of desalination plants over the next five years to insure a sustainable and reliable drought-resistant source of water. F1, F2, F3, F4, F5, F6, F7, F8, F9, F11, F12

R3 The County of Orange and all Orange County cities should formulate an emergency development moratorium plan in anticipation of the Colorado River water supply being constrained. The emergency moratorium plan should be developed by the end of calendar year 2023. F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12

R4 Orange County water agencies should update their public communication strategies, by calendar year end 2023, to inform the public of lifestyle changes if additional water sources are not developed. F10, F11, F12

REQUIRED RESPONSES

Findings – 90 Day Response Required

County of Orange Board of Supervisors	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
Municipal Water District of Orange County	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
Orange County Water District	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
Irvine Ranch Water District	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
Moulton Niguel Water District	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
Santa Margarita Water District	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
South Coast Water District	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12

Recommendations – 90 Day Response Required

County of Orange Board of Supervisors	R1, R3
Municipal Water District of Orange County	R2, R4
Orange County Water District	R2, R4
Irvine Ranch Water District	R2, R4
Moulton Niguel Water District	R2, R4
Santa Margarita Water District	R2, R4

Recommendations – 90 Day Response Required

South Coast Water District	R2, R4

REQUESTED RESPONSES

Findings – 90 Day Response Requested

East Orange County Water District	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
El Toro Water District	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
City of Anaheim	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
City of Santa Ana	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
City of Fullerton	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
Emerald Bay Service District	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
Golden State Water Company	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
Laguna Beach County Water District	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
Mesa Water District	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
Serrano Water District	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
Trabuco Canyon Water District	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
Yorba Linda Water District	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
City of San Juan Capistrano	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
City of San Clemente	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
City of Tustin	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
City of Fountain Valley	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12

Findings – 90 Day Response Requested

City of Westminster	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
City of La Habra	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
City of Brea	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
City of Buena Park	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
City of La Palma	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
City of Seal Beach	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
City of Huntington Beach	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
City of Garden Grove	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
City of Newport Beach	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12
Santa Ana Water Shed Project Authority	F1, F2, F3, F5, F6, F7, F8, F9, F10, F11, F12
Metropolitan Water District of Southern California	F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12

Recommendations – 90 Day Response Requested

East Orange County Water District	R2, R3, R4
El Toro Water District	R2, R3, R4
City of Anaheim	R2, R3, R4
City of Santa Ana	R2, R3, R4
City of Fullerton	R2, R3, R4

Recommendations – 90 Day Response Requested

Emerald Bay Service District	R2, R3, R4
Golden State Water Company	R2, R4
Laguna Beach County Water District	R2, R3, R4
Mesa Water District	R2, R3, R4
Serrano Water District	R2, R3, R4
Trabuco Canyon Water District	R2, R3, R4
Yorba Linda Water District	R2, R3, R4
City of San Juan Capistrano	R2, R3, R4
City of San Clemente	R2, R3, R4
City of Tustin	R2, R3, R4
City of Fountain Valley	R2, R3, R4
City of Westminster	R2, R3, R4
City of La Habra	R2, R3, R4
City of Brea	R2, R3, R4
City of Buena Park	R2, R3, R4
City of La Palma	R2, R3, R4
City of Seal Beach	R2, R3, R4
City of Huntington Beach	R2, R3, R4
City of Garden Grove	R2, R3, R4
City of Newport Beach	R2, R3, R4
Santa Ana Water Shed Project Authority	R2, R3

Recommendations – 90 Day Response Requested

Metropolitan Water District of Southern California	R2, R3, R4

GLOSSARY

Acre-feet

The unit of volume typically used to describe the quantity of water stored in large reservoirs and aquifers and delivered through large conveyance systems for irrigation use and for treating for public use. An acre-foot is one surface acre that is one foot deep and is equal to 325,851 gallons.

Aquifer

An underground layer or body of permeable rock, sediment, or soil that can store and yields water. Orange County has a large aquifer underlying North and Central County.

California State Water Project (CSWP)

A multi-purpose water storage and delivery system that extends more than 705 miles and includes a collection of canals, pipelines, and reservoirs to deliver water to 27 million Californians, 750,000 acres of farmland, and businesses throughout the state.

Conjunctive Use

Using surface water in wet years and storing as groundwater for use in dry years. Surface water is injected directly into aquifers and wells to be used as needed as part of groundwater banking or is stocked in ponds or basins and then allowed to percolate naturally into aquifers.

Desalination

The process of removing salt from brackish water or seawater. For the purposes of this report, desalination is used primarily in terms of sea or ocean water.

Direct Potable Water Reuse

The process by which recycled wastewater is treated to a high degree suitable for potable use and placed directly into potable distribution systems. California has recently created regulations for direct potable water reuse.

Drought

A prolonged period of low or no rainfall that causes water scarcity and affects ecosystems, agriculture, and human health.

Gray Water
Wastewater from bathtubs, shower drains, sinks, washing machines and dishwashers; however, some plumbing codes exclude water from sink and dishwasher as being classified as gray water.

Ground Water Recovery System (GWRS)

Operated by Orange County Water District, the system takes highly treated wastewater that would have previously been discharged into the Pacific Ocean and purifies it to potable standards.

Potable Water Reuse Indirect

Treatment of water such as recycled wastewater, to a high degree suitable for potable purposes and uses an environmental buffer, such as a lake, river, or a groundwater aquifer, before the water is treated again and utilized as potable water. This process is used by Orange County Water District at GWRS to treat water and replenish the aquifer under North and Central Orange County.

Recycled Water

Water reuse (also commonly known as water recycling or water reclamation) reclaims water from a variety of sources then treats and reuses it for beneficial purposes such as agriculture and irrigation, potable water supplies, groundwater replenishment, industrial processes, and environmental restoration. For the purposes of this report, recycled water comes primarily from highly treated wastewater.

Reverse Osmosis

A process of producing pure water by forcing it through a semipermeable membrane that only allows water to pass. It is the primary method for large scale desalination and is also used as one of the final treatment steps for producing potable water from wastewater.

Sustainability

The long-term viability of a community or practice.

Urban Runoff

As commonly referred to in Orange County, surface runoff during dry weather of landscape irrigation, and car washing created by urbanization. It can also refer to the stormwater runoff over impervious surfaces (roads, parking lots and sidewalks). The concern with urban runoff is possible contamination of surface and groundwater.

Water Banking

The practice of forgoing water deliveries during certain periods, and “banking” either the right to use the water in the future or saving it for someone else to use in exchange for a fee or delivery in kind. Typically, in Southern California, it is stored in aquifers.

Water Source

As used in this report, a water source is defined as the ocean or precipitation.

Water Suppliers

As used in this report, water suppliers include water districts and cities that provide water to the public.

Water Supply

As used in this report, water supply includes water derived from a water source and that is stored, conveyed, and utilized by the public.

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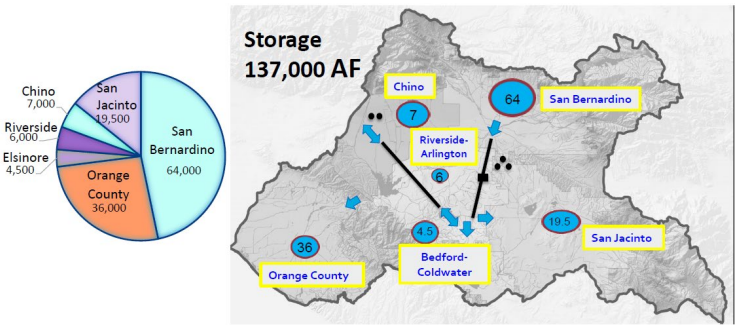
APPENDIX A: ACTIONS BY LOCAL AGENCIES TO SECURE SUPPLY

Water Banking:

Water banking may help with droughts but is only a part of the solution and it has yet to prove itself.

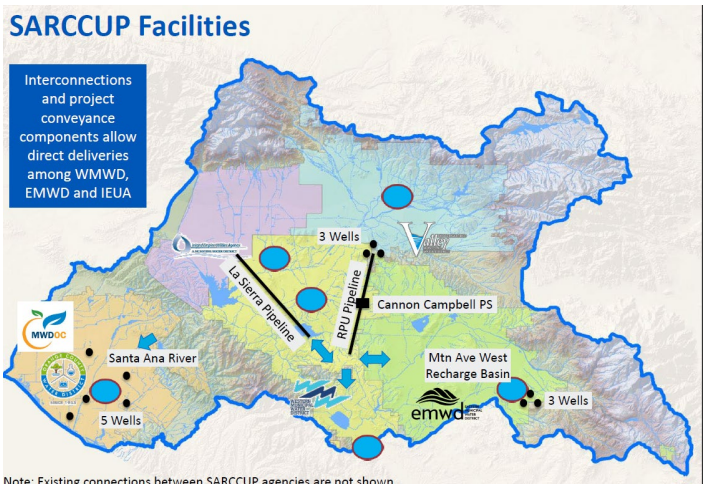
Water banking is being pursued Metropolitan Water District and various water suppliers. Simply put, water banking is a voluntary, market-based tool that could facilitate water transactions between willing sellers and buyers. Water right owners, who are willing to free up some of their water in a particularly dry year or years, would temporarily lease it to those who simply cannot afford to be without water. Water banking also takes water during periods when it is available and stores it. Banking water during wet years provides water districts with a cushion of protection during droughts. It also conserves any unused water, rather than letting it run out to the sea or be lost to evaporation. The storage is usually done in aquifers and generally not within the individual agencies area. The water banking agreements can be complex and depend upon broad cooperation among various agencies for delivery and storage.

SARCCUP Water Bank Storage



Conjunctive use is a catchphrase for coordinated use of surface water and groundwater. The state considers water banking a “conjunctive use” and encourages such uses.[19]

On a statewide level, California has 517 groundwater basins. Stanford’s Water in the West institute estimates that the capacity of underground water storage in California is at least 20 times greater than that of the state’s reservoirs and lakes. However, the means to store surplus water and return it in dry years is lacking. The Sustainable Groundwater Management Act of 2014 has created the opportunity to expand recharge basins and banking particularly in agricultural areas but to date, action is lagging.



The largest water banking project underway that affects Orange County is the Santa Ana River Conservation and Conjunctive Use Program (SARCCUP). It is a regional program that involves several agencies in Orange County, Riverside County, and San Bernardino County. While a logical program to undertake, there are technical and distribution issues that must be worked out and these items may take several years.

A more controversial banking program is the Cadiz project. The Cadiz Water Project is a water supply project to manage the groundwater basin underlying a portion of the Cadiz and Fenner Valleys in California's Mojave Desert. At least one water agency in Orange County has considered this program as a potential source of water to meet their needs. The program has been promoted since 1997 and has yet to move forward. There are several environmental concerns with the program and concerns about transferring water between basins, particularly one under a desert. The Cadiz project currently is not viable supply of water.

There are criticisms of water banking and its effect on local communities. A Georgetown Environmental Law Review article in March 2022 stated, "While advocates of water banking believe its market-based approach will efficiently allow a reduction of use of water, especially during droughts, opponents may cite some examples of how letting the market take over may be detrimental to local communities." Such concerns are valid and need to be considered prior to relying on water banking as the only solution to ensure water supply during times of drought.

Purchase of water rights

Temporary transfers of water from one water user to another have been used increasingly as a way of meeting statewide water demands, particularly in drought years. This has been done through the purchase of water rights. There are numerous articles concerning the possible negative effects of this practice, including the effects on less wealthy communities and agricultural. Due to these concerns, this practice should be limited. Farms in western Arizona are growing alfalfa – one of the most water-

intensive crops – in an area where there's a shortage of water. Some farms are foreign-owned and are shipping the crop to Saudi Arabia, where it's illegal to grow because it takes too much water.[20]

Water sources cannot be bought or sold but the water taken from a lake, river, stream, or creek, or from underground supplies for a beneficial use, requires you have a water right.[21] The right to use that water can be conveyed on a temporary basis. Temporary transfers of water from one water user to another have been used increasingly as a way of meeting water demands, particularly in drought years.

During interviews, the Grand Jury found the purchase of water rights to be widespread. Agencies stated the cost of acquiring water rights is significantly less than developing new sources. The practice includes asking agricultural users to allow their land to lay fallow.

There are numerous articles about making the agriculture industry more efficient. These effects, if they occur, will take time and be costly. Taking water from a major industry to satisfy urban demands is inherently wrong and will not solve the problem of extended drought.

Recycling Water

Recycled water offers Orange County a way to reduce water requirements but is limited by the amount of wastewater that can be recycled which in turn is dependent upon available water supply. It is an important piece of Orange County water resiliency but not a solution itself.

Recycled water is wastewater that has been treated to a level acceptable for landscaping and certain other industrial uses. The regulations regarding the use and stand for treatment of recycled water are referred to as Title 22.[22] Orange County has been a leader in recycling of water through Orange County Water District and Irvine Ranch Water District.[23] Irvine Ranch Water District reports that 25% of the water it supplies is recycled. Recycled water replaces the need for using potable water.

Currently, various water districts are expanding their recycling systems by constructing additional reservoirs and distribution systems. The cities and water districts in Orange County have also been active in sponsoring legislation that supports recycling of water.

South Orange County Wastewater Authority (SOCWA) treats and distributes for reuse roughly six billion gallons of water every year.[24] However, not all SOCWA treatment plants are recycling as much as feasible, most notably the JB Latham Treatment Plant does not recycle any treated wastewater. During the interviews, different agencies noted there are jurisdictional friction that is being worked on to increase recycling and potentially water reuse in South Orange County. The Grand Jury strongly encourages cooperation or mergers that would increase recycling in South Orange County.

In summary, water recycling is an important part of Orange County's water supply and needs to be utilized to the maximum extent. However, it will not resolve water resiliency issues by itself and it relies on existing sources of water.

Reuse of Water for Potable Purposes

Reusing wastewater for potable purposes is an important part of North Orange County's water portfolio. Orange County Water District produces 130 million gallons of indirect reuse water per day. However, the amount reused water is dependent upon the diminishing supplies within Orange County.

Water reuse is used to enhance water security, sustainability, and resilience. The process of using treated wastewater for drinking water is called potable water reuse. Potable water reuse provides another option for expanding a region's water supply portfolio.

There are two types of potable water reuse:

- Indirect potable reuse: Uses an environmental buffer, such as a lake, river, or a groundwater aquifer, before the water is treated at a drinking water treatment plant.
- Direct potable reuse: Involves the treatment and distribution of water without an environmental buffer.[25]

Orange County Water District has been providing indirect potable reuse. In the mid-1990s, OCWD began the planning and construction that created the Groundwater Replenishment System to produce indirect potable water. The process built upon an earlier process to produce water to prevent groundwater intrusion. The process took over ten years to implement and the system is working well. However, it should be noted as being limited because it relies upon a declining supply and it is a lengthy process.

Interviewees have noted that OCWD is considering direct potable reuse. The State of California is currently enacting regulations to enable direct potable reuse. One of the advantages of direct potable reuse is the elimination of the loss due to evaporation at the percolation ponds and the efficiency of direct use.

In summary, water reuse is a vital part of the portfolio of water for Orange County to insure water resiliency. Water reuse should also be expanded to the practical extent possible. The time to complete such projects is lengthy and needs to be started immediately. However, reuse is only part of the water needed by Orange County and the source problem needs to be addressed.

Aquifer Management

Managing the aquifer underneath North Orange County created a highly resilient source of water, but it is challenged by the climate change. The main and supplemental supplies of water are diminishing with less precipitation. The use of the aquifer for wet

weather storage has not met it potential due to challenges in trapping rainwater and runoff. The aquifer has not been made a regular source of water for all of Orange County which could ease South Orange County's supply problems.

The aquifer supplies approximately 72% of the water for North and Central Orange County. The aquifer is primarily supplied by runoff in the Santa Ana River and supplemented with water from the OCWD's Groundwater replenishment project and water purchased through MWDOC and MET.

OCWD has done well managing the aquifer for North and Central Orange County with existing flows. It has also taken steps to increase the supply of water by working with the Corps of Engineers to better manage the flow of water in the Prado Reservoir, expanding the groundwater replenishment system, and participating in the Santa Ana River Conservation and Conjunctive Use Program.[26] All of these steps reinforce the ability of the basin to supply water but do not in themselves assure an increased supply water.

South Orange County can only receive water during times of emergencies but does not have regular access to the water. Interviewees noted there was a lack of ability to move water to South Orange County. Because South Orange County is almost 100% dependent upon water imported from MET, this is highly problematic during drought.

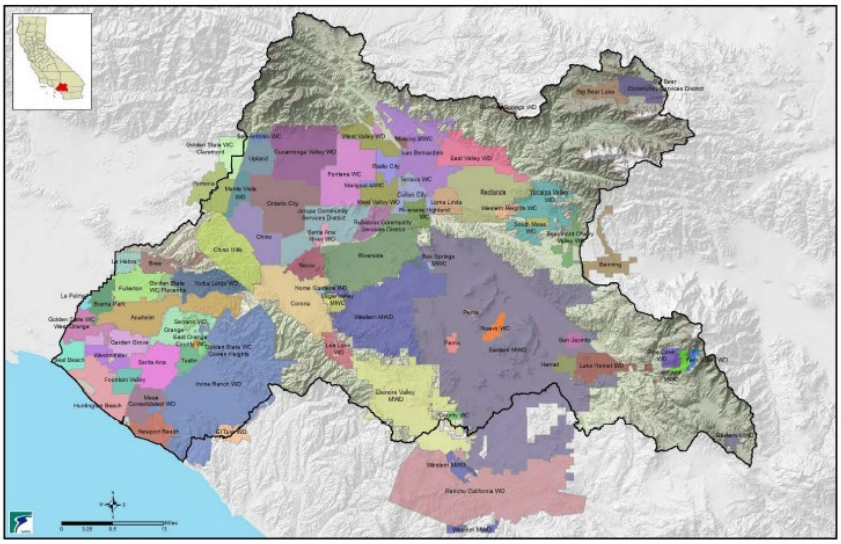
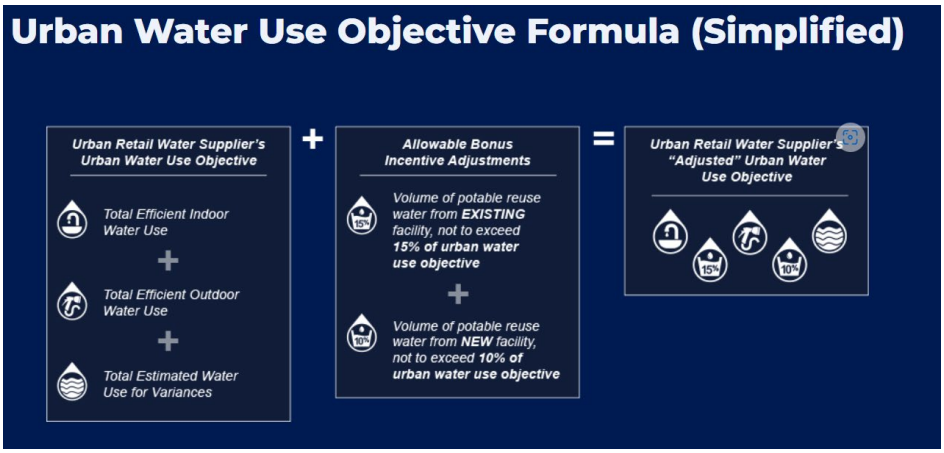


Figure 4.3-1. Water Retail Service Areas in the Santa Ana River Watershed

The Santa Ana River water basin covers San Bernardino and Riverside Counties as well as Orange County. The Santa Ana Watershed Project Authority (SAWPA) works to maintain the water quality in the Santa Ana River and is actively working on drought responses. According to its web site, "SAWPA's work in the Santa Ana River Watershed advances projects and programs that build water resiliency and promote collaborative, innovative responses to water planning, all of which help address drought conditions."[27] SAWPA also prepared a water shed management plan.[28]



Weather modification and promoting water efficiency are the primary drought responses of SAWP. Through weather modification (cloud seeding) it hopes to achieve 5% more precipitation in specific types of storms.

The water efficiency approach is to help implement water use efficiency programs and conservation-based rate structures.[29] We were provided with no specifics regarding what percentage can be saved, but through interviews the Grand Jury learned that the savings are between 15% to 30%.

None of the initiatives by SAWPA are likely to have an impact on water supplies during prolonged California drought. Interviewees consistently stated that we cannot conserve our way out of a drought.

Adding to the concern about the Santa Ana River ground water supply basin is the Inland Empire's future demands on the water. Development is rapidly taking place and surface water sources and water agencies are recycling water to greater degrees rather than discharging treated wastewater to the Santa Ana River.[30] The Inland Empire communities are largely dependent upon Metropolitan Water District supplies which are subject to drought.

Orange County Water District only has rights to withdrawing an adjudicated amount of 34,000-acre feet of water from the Santa Ana River. This is approximately half of the 70,000-acre feet typically used to manage the aquifer levels. OCWD typically purchases 30% of the water added to the aquifer from MWDOC. The water MWDOC supplies comes from Metropolitan Water District (MET). During late 2022, MET reduced the water from Northern California Sources to 5% of previous amounts. The water MET receives from the Colorado River is endangered as discussed elsewhere.

In summary, the Central and North Orange County aquifer has limits on its ability to supply water to Orange County. These include dependencies on water from Metropolitan Water District, which has had problems supplying water, and a potentially dwindling supply of water from the Santa Ana River. The aquifer is not a supply of water for South Orange County. The aquifer limitations reinforce the need for Orange County to provide for a more drought-resistant supply of water.

Utilization of other supplies

Besides the North/Central Orange County aquifer and those obtained from Metropolitan Water District, there are other insignificant supplies of water. These include surface water captured in Irvine Lake and the San Juan Creek Groundwater Basin in South Orange County. Neither of these are significant supplies of water.

Water Efficiency to Increase Supply

Orange County Water Districts have found they can reduce the immediate need for increasing water supplies by more efficient use of water. This certainly stretches the water supplies, but it is limited in its ability. Future water needs will require more than just efficient water use.

During the recent drought from 2011 to late 2022, Orange County Water Suppliers reduced the per-capita water use significantly by more efficient water use and conservation. This has allowed development to continue to occur even as the water supply was reduced.

Irvine Ranch Water District (IRWD) customers reduced their water use from 89 gallons per capita in 2007 to 67 gallons per capita in 2021.[31] The area served by IRWD is a newer area where much of the landscaping is irrigated by recycled water and is drought tolerant. The IRWD also has extensive use of water saving plumbing in homes. Older areas of Orange County have also reduced per-capita water use. North and Central Orange County reduced water use from 330 acre-feet in water year 1999-2000 to 230 acre-feet in water year 2022-2023[32] while the population grew slightly.[33]

Water efficiency savings have been achieved by adopting water saving devices, changes in landscape practices, greater recycling of water, tiered water rates (higher users, higher rates) and the public's participation. Water suppliers have worked with users to identify the need for greater efficiency by promoting these changes. The State of California also mandated a 20 percent reduction in urban per-capita water use by 2020 in the Water Conservation Act of 2009.

The change to efficient use of water will need to become the future standard as water supplies diminish and as housing development increases. However, it is not reasonable to expect greater efficiency to make up for the reduction in supply caused by climate change. Several of the interviewees and many of the reference documents the Grand Jury reviewed stated Orange County cannot conserve its way out of a drought.

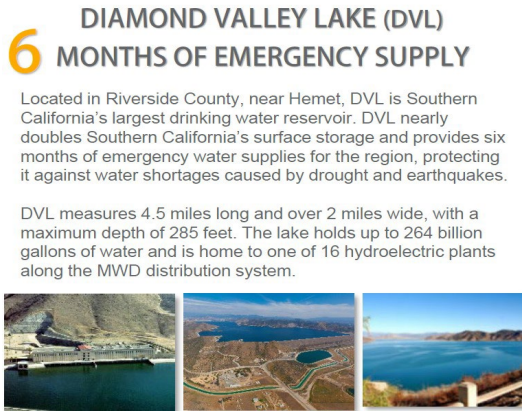
Besides the significant reduction in per-capita water use, greater savings may be made by more drastic changes in lifestyle. None of the information supplied by water suppliers and reviewed by the Grand Jury addressed these changes. As an example of lifestyle changes, areas such as Phoenix and Las Vegas have either adopted or are in the process of adopting drastic restrictions on landscape water use as a long-term

climate mitigation. Among these restrictions is a moratorium on development by restricting new water connections.[34]

Continue efficient water use is needed for the future. Orange County has made significant changes in per-capita water use by being efficient, but any additional savings will only come through changes to lifestyle. This needs to be made clear to residents if additional efficiency is to be achieved, but even additional efficiency will not mitigate the effects of climate on Orange County's current water supply. Ocean desalination is recommended as the ultimate answer to an untapped source of water and can secure Orange County's future.

APPENDIX B: graphics of interest

Metropolitan Water District of Southern California, Municipal Water District Orange County and Orange County Water District Information Sheets



WATER RECLAMATION

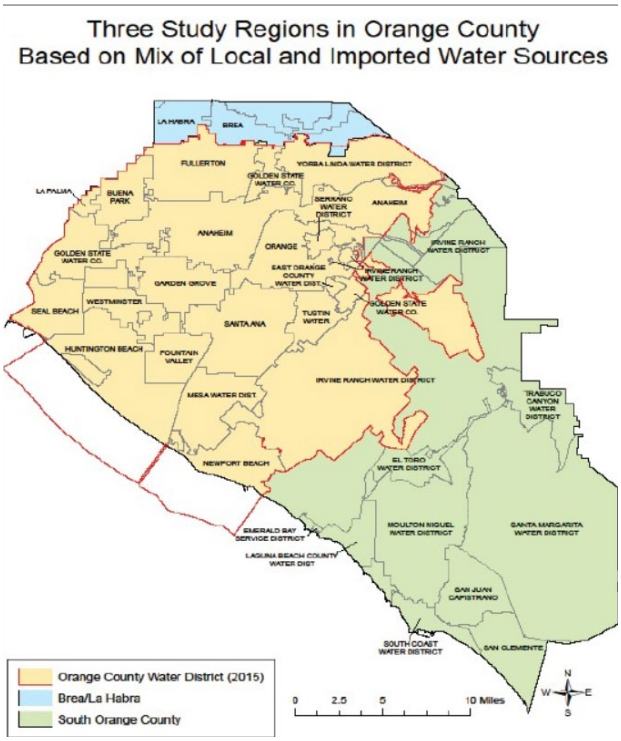
Wastewater has become an important source of water for California. Wastewater is processed at a water reclamation facility to remove solids and impurities, increasing the quality of water. The water, now clean, can be used for a variety of applications.

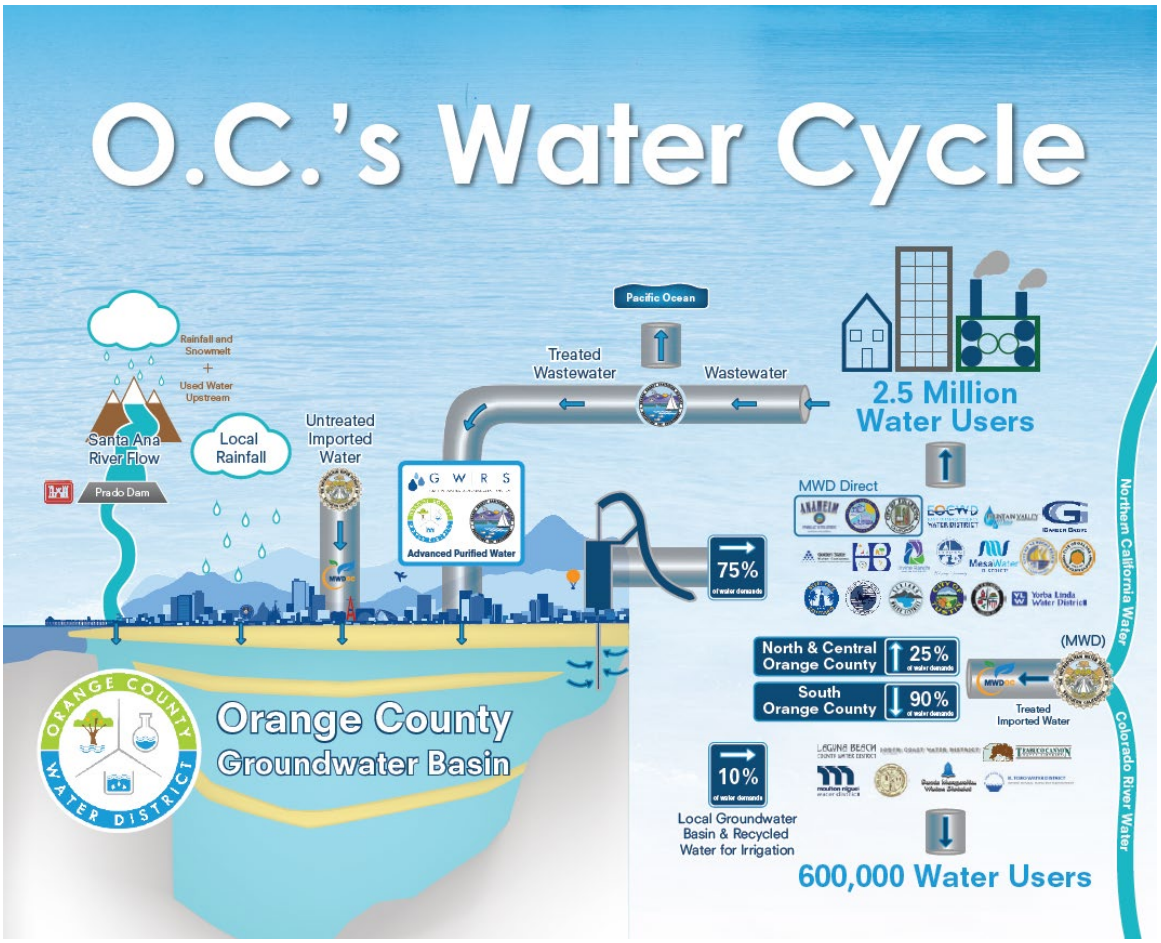
Reclaimed water is used for irrigation, toilet flushing, industrial purposes, and groundwater replenishment.

DIEMER WATER TREATMENT PLANT

The Robert B. Diemer Treatment Plant (Diemer) is located in Yorba Linda. The plant's hilltop location is well suited for gravity-flow distribution of water to homes and businesses throughout Los Angeles and Orange counties. Most water brought to Diemer for treatment comes from the Colorado River via the 242-mile long Colorado River Aqueduct. To a lesser degree, the plant also receives water from Northern California through the State Water Project.

Diemer delivers up to **520 MILLION GALLONS** of clean drinking water a day to Orange and Los Angeles counties.




O.C.'s Water Cycle
Pacific Ocean
Rainfall and Snowmelt
+
Used Water Upstream
Santa Ana River Flow
Prado Dam
Local Rainfall
Untreated Imported Water
Treated Wastewater
Wastewater
2.5 Million Water Users
MWD Direct
G W R S
Advanced Purified Water
75%
Northern California Water
Colorado River Water
North & Central Orange County
25%
South Orange County
90%
(MWD)
Treated Imported Water
10%
Local Groundwater Basin & Recycled Water for Irrigation
600,000 Water Users
Orange County Groundwater Basin
ORANGE COUNTY WATER DISTRICT

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NOTICE

Reports issued by the Grand Jury do not identify individuals interviewed. Penal Code section 929 requires that reports of the Grand Jury not contain the name of any person or facts leading to the identity of any person who provides information to the Grand Jury.

ENDNOTES

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