12770 Second Street, Yucaipa, California 92399 Phone: (909) 797-5117

Notice and Agenda of a Meeting of the Board of Directors

Tuesday, September 1, 2020 at 4:00 p.m.

Due to the spread of COVID-19 and in accordance with the Governor's Executive Order N-29-20 (a copy of which is attached to this agenda), the Yucaipa Valley Water District will be conducting this meeting by teleconference only. Public comments on matters listed on the agenda or on any matter within the District's jurisdiction will be received during Public Comments, Agenda Item No. III.

This meeting is available by calling (888) 475-4499 using passcode 676-950-731#

View live presentation material at
https://zoom.us/j/676950731

There will be no public physical location for attending this meeting in person. The District's Board meeting room will be closed to the public until further notice.

If you are unable to participate by telephone, you may submit comments and/or questions in writing for the Board's consideration by sending them to inquiry@yvwd.us. Submit your written inquiry prior to the start of the meeting. All public comments received prior to the start of the meeting will be provided to the Board and may be read into the record or compiled as part of the record.

I. CALL TO ORDER

II. ROLL CALL

III. PUBLIC COMMENTS - At this time, members of the public may briefly address the Board of Directors on matters within its jurisdiction or on any matter listed on this agenda.

Any person who requires accommodation to participate in this meeting should contact the District office at (909) 797-5117, at least 48 hours prior to the meeting to request a disability-related modification or accommodation.

Materials that are provided to the Board of Directors after the meeting packet is compiled and distributed will be made available for public review during normal business hours at the District office located at 12770 Second Street, Yucaipa. Meeting materials are also available on the District's website at www.yvwd.dst.ca.us

IV. CONSENT CALENDAR - All consent calendar matters are routine and will be acted upon in one motion. There will be no discussion of these items unless board members, administrative staff, or members of the public request specific items to be discussed and/or removed prior to the vote for approval.

A. Minutes of Meetings

1. Board Meeting - August 25, 2020

V. STAFF REPORT

VI. DISCUSSION ITEMS

A. Overview of the Economic Benefits of Investing in Water Infrastructure by the American Society of Civil Engineers [Director Memorandum No. 20-129 - Page 15 of 67]

RECOMMENDED ACTION: Informational item for presentation by District staff.

B. Consideration of Director District Staff to Prepare Plans for the Construction of Recycled Water Fill Station No. 2 [Director Memorandum No. 20-130 - Page 53 of 67]

RECOMMENDED ACTION: That the Board authorizes the District staff to develop plans for the construction Recycled Water Fill Station No. 2 on 5th Street north of Wildwood Canyon Road, Yucaipa.

VII. BOARD REPORTS & DIRECTOR COMMENTS

VIII. ANNOUNCEMENTS

A. September 8, 2020 at 4:00 p.m. - Board Meeting - Teleconference Only

B. September 15, 2020 at 4:00 p.m. - Board Meeting - Teleconference Only

C. September 22, 2020 at 4:00 p.m. - Board Meeting - Teleconference Only

D. September 29, 2020 at 4:00 p.m. - Board Meeting - Teleconference Only

E. October 6, 2020 at 4:00 p.m. - Board Meeting - Teleconference Only

IX. CLOSED SESSION

A. Conference with Legal Counsel - Anticipated Litigation (Government Code 54956.9) - Two Cases

B. Conference with Labor Negotiator (Government Code 54957.6)
District Negotiator: Joseph Zoba, General Manager
Employee Organization: YVWD Supervisory Employees

X. ADJOURNMENT

EXECUTIVE DEPARTMENT
STATE OF CALIFORNIA

EXECUTIVE ORDER N-29-20

WHEREAS on March 4, 2020, I proclaimed a State of Emergency to exist in California as a result of the threat of COVID-19; and

WHEREAS despite sustained efforts, the virus continues to spread and is impacting nearly all sectors of California; and

WHEREAS the threat of COVID-19 has resulted in serious and ongoing economic harms, in particular to some of the most vulnerable Californians; and

WHEREAS time bound eligibility redeterminations are required for Medi-Cal, CalFresh, CalWORKs, Cash Assistance Program for Immigrants, California Food Assistance Program, and In Home Supportive Services beneficiaries to continue their benefits, in accordance with processes established by the Department of Social Services, the Department of Health Care Services, and the Federal Government; and

WHEREAS social distancing recommendations or Orders as well as a statewide imperative for critical employees to focus on health needs may prevent Medi-Cal, CalFresh, CalWORKs, Cash Assistance Program for Immigrants, California Food Assistance Program, and In Home Supportive Services beneficiaries from obtaining in-person eligibility redeterminations; and

WHEREAS under the provisions of Government Code section 8571, I find that strict compliance with various statutes and regulations specified in this order would prevent, hinder, or delay appropriate actions to prevent and mitigate the effects of the COVID-19 pandemic.

NOW, THEREFORE, I, GAVIN NEWSOM, Governor of the State of California, in accordance with the authority vested in me by the State Constitution and statutes of the State of California, and in particular, Government Code sections 8567 and 8571, do hereby issue the following order to become effective immediately:

IT IS HEREBY ORDERED THAT:

1. As to individuals currently eligible for benefits under Medi-Cal, CalFresh, CalWORKs, the Cash Assistance Program for Immigrants, the California Food Assistance Program, or In Home Supportive Services benefits, and to the extent necessary to allow such individuals to maintain eligibility for such benefits, any state law, including but not limited to California Code of Regulations, Title 22, section 50189(a) and Welfare and Institutions Code sections 18940 and 11265, that would require redetermination of such benefits is suspended for a period of 90 days from the date of this Order. This Order shall be construed to be consistent with applicable federal laws, including but not limited to Code of Federal Regulations, Title 42, section 435.912, subdivision (e), as interpreted by the Centers for Medicare and Medicaid Services (in guidance issued on January 30, 2018) to permit the extension of

otherwise-applicable Medicaid time limits in emergency situations.

2. Through June 17, 2020, any month or partial month in which California Work Opportunity and Responsibility to Kids (CalWORKs) aid or services are received pursuant to Welfare and Institutions Code Section 11200 et seq. shall not be counted for purposes of the 48-month time limit set forth in Welfare an Institutions Code Section 11454. Any waiver of this time limit shall not be applied if it will exceed the federal time limits set forth in Code of Federal Regulations, Title 45, section 264.1.

3. Paragraph 11 of Executive Order N-25-20 (March 12, 2020) is withdrawn and superseded by the following text:

   Notwithstanding any other provision of state or local law (including, but not limited to, the Bagley-Keene Act or the Brown Act), and subject to the notice and accessibility requirements set forth below, a local legislative body or state body is authorized to hold public meetings via teleconferencing and to make public meetings accessible telephonically or otherwise electronically to all members of the public seeking to observe and to address the local legislative body or state body. All requirements in both the Bagley-Keene Act and the Brown Act expressly or impliedly requiring the physical presence of members, the clerk or other personnel of the body, or of the public as a condition of participation in or quorum for a public meeting are hereby waived.

   In particular, any otherwise-applicable requirements that

   (i) state and local bodies notice each teleconference location from which a member will be participating in a public meeting;

   (ii) each teleconference location be accessible to the public;

   (iii) members of the public may address the body at each teleconference conference location;

   (iv) state and local bodies post agendas at all teleconference locations;

   (v) at least one member of the state body be physically present at the location specified in the notice of the meeting; and

   (vi) during teleconference meetings, a least a quorum of the members of the local body participate from locations within the boundaries of the territory over which the local body exercises jurisdiction

   are hereby suspended.

   A local legislative body or state body that holds a meeting via teleconferencing and allows members of the public to observe and address the meeting telephonically or otherwise electronically, consistent with the notice and accessibility requirements set forth below, shall have satisfied any requirement that the body allow members of the public to attend the meeting and offer public comment. Such a body need not make available any physical location from which members of the public may observe the meeting and offer public comment.

Accessibility Requirements: If a local legislative body or state body holds a meeting via teleconferencing and allows members of the public to observe and address the meeting telephonically or otherwise electronically, the body shall also:

(i) Implement a procedure for receiving and swiftly resolving requests for reasonable modification or accommodation from individuals with disabilities, consistent with the Americans with Disabilities Act and resolving any doubt whatsoever in favor of accessibility; and

(ii) Advertise that procedure each time notice is given of the means by which members of the public may observe the meeting and offer public comment, pursuant to subparagraph (ii) of the Notice Requirements below.

Notice Requirements: Except to the extent this Order expressly provides otherwise, each local legislative body and state body shall:

(i) Give advance notice of the time of, and post the agenda for, each public meeting according to the timeframes otherwise prescribed by the Bagley-Keene Act or the Brown Act, and using the means otherwise prescribed by the Bagley-Keene Act or the Brown Act, as applicable; and

(ii) In each instance in which notice of the time of the meeting is otherwise given or the agenda for the meeting is otherwise posted, also give notice of the means by which members of the public may observe the meeting and offer public comment. As to any instance in which there is a change in such means of public observation and comment, or any instance prior to the issuance of this Order in which the time of the meeting has been noticed or the agenda for the meeting has been posted without also including notice of such means, a body may satisfy this requirement by advertising such means using "the most rapid means of communication available at the time" within the meaning of Government Code, section 54954, subdivision (e); this shall include, but need not be limited to, posting such means on the body's Internet website.

All of the foregoing provisions concerning the conduct of public meetings shall apply only during the period in which state or local public health officials have imposed or recommended social distancing measures.

All state and local bodies are urged to use sound discretion and to make reasonable efforts to adhere as closely as reasonably possible to the provisions of the Bagley-Keene Act and the Brown Act, and other applicable local laws regulating the conduct of public meetings, in order to maximize transparency and provide the public access to their meetings.

IT IS FURTHER ORDERED that as soon as hereafter possible, this Order be filed in the Office of the Secretary of State and that widespread publicity and notice be given of this Order.

This Order is not intended to, and does not, create any rights or benefits, substantive or procedural, enforceable at law or in equity, against the State of California, its agencies, departments, entities, officers, employees, or any other person.

IN WITNESS WHEREOF I have hereunto set my hand and caused the Great Seal of the State of California to be affixed this 17th day of March 2020.

GAVIN NEWSOM
Governor of California

Consent Calendar

Yucaipa Valley Water District

MINUTES OF A BOARD MEETING - TELECONFERENCE

August 25, 2020 at 4:00 P.M.

Directors Present:
- Chris Mann, President
- Lonni Granlund, Vice President
- Jay Bogh, Director
- Joyce McIntire, Director
- Dennis Miller, Director

Staff Present:
- Wade Allsup, Information Systems Specialist
- Jennifer Ares, Water Resource Manager
- Madeline Blua, Water Resource Specialist
- Allison Edmisten, Chief Financial Officer
- Chelsie Fogus, Administrative Assistant I
- Ashley Gibson, Regulatory Compliance Manager
- Kathryn Hallberg, Implementation Manager
- Dustin Hochreiter, Senior Engineering Technician
- Mike Kostelecky, Operations Manager
- Tim Mackamul, Operations Manager
- Jesse McCartney, Public Works Supervisor
- Matthew Porras, Implementation Manager
- Charles Thomas, Operations Manager
- John Wrobel, Public Works Manager
- Joseph Zoba, General Manager

Directors Absent:
- None

Consulting Staff Present:
- David Wysocki, Legal Counsel

Registered Guests and Others Present:
- Logan Largent, Ortega Strategies Group

Due to the spread of COVID-19 and in accordance with the Governor's Executive Order N-29-20 (a copy of which was attached to the meeting agenda), the Yucaipa Valley Water District conducted this meeting by teleconference.

The meeting was available to the public by calling (888) 475-4499 using passcode 676-950-731 and live presentation material was available at https://zoom.us/j/676950731.

CALL TO ORDER — The regular meeting of the Board of Directors of the Yucaipa Valley Water District was called to order by Chris Mann at 4:00 p.m.

ROLL CALL — The roll was called with Director Jay Bogh, Director Lonni Granlund, Director Chris Mann, Director Joyce McIntire, and Director Dennis Miller present.

PUBLIC COMMENTS — None

CONSENT CALENDAR

Director Joyce McIntire moved to approve the consent calendar and Director Lonni Granlund seconded the motion.

A. Minutes of Meetings
   1. Board Meeting - August 18, 2020

The motion was approved by the following vote:
Director Jay Bogh - Yes
Director Lonni Granlund - Yes
Director Chris Mann - Yes
Director Joyce McIntire - Yes
Director Dennis Miller - Yes

STAFF REPORT

General Manager Joseph Zoba provided information on the following item(s):

- General Manager Joseph Zoba provided a presentation for the Inland Empire WateReuse chapter meeting on August 25, 2020. The presentation focused on the District's efforts to build a sustainable community using recycled water.
- The District recently reached a new milestone of removing 4,000 tons of minerals with the use of the brine disposal pipeline and the reverse osmosis system at the Wochholz Regional Water Recycling Facility.
- The Yucaipa Sustainable Groundwater Management Agency will be conducting their next meeting on Wednesday, August 26, 2020 at 10:00 am.
- The San Gorgonio Pass Regional Water Alliance will be conducting their next meeting on Wednesday, August 26, 2020 at 5:00 pm.
- The Beaumont Basin Watermaster will be conducting a special meeting on Thursday, August 27, 2020 at 9:00 am.

DISCUSSION ITEMS:

DM 20-125 CONSIDERATION OF DEVELOPMENT AGREEMENT NO. 2020-04 PURCHASING AN EASEMENT AT 36450 OAK GLEN ROAD, YUCAIPA (ASSESSOR PARCEL NUMBER 0321-194-01) FOR THE RESERVOIR R-16.2 COMPLEX	Implementation Manager Matthew Porras presented Development Agreement No. 2020-04 which is necessary to secure an easement for the Reservoir R-16.2 Complex. Director Dennis Miller moved that the Board approve and authorize the President to execute Development Agreement No. 2020-04. Director Jay Bogh seconded the motion. The motion was approved by the following vote: Director Jay Bogh - Yes Director Lonni Granlund - Yes Director Chris Mann - Yes Director Joyce McIntire - Yes Director Dennis Miller - Yes
DM 20-126 REVIEW OF PUBLIC DISCLOSURE REPORT PURSUANT TO GOVERNMENT CODE SECTION 53065.5 FOR FISCAL YEAR ENDING JUNE 30, 2020	Chief Financial Officer Allison Edmisten discussed the annual Public Disclosure Report. Director Lonni Granlund moved that the Board receive and file the Public Disclosure Report for Fiscal Year 2019-20. Director Joyce McIntire seconded the motion. The motion was approved by the following vote: Director Jay Bogh - Yes Director Lonni Granlund - Yes Director Chris Mann - Yes Director Joyce McIntire - Yes Director Dennis Miller - Yes

DM 20-127

AUTHORIZATION TO PURCHASE A CLOSED CIRCUIT REVERSE OSMOSIS PILOT TESTING SYSTEM

General Manager Joseph Zoba discussed the importance of conducting a pilot study test of a closed circuit reverse osmosis system at the Wochholz Regional Water Recycling Facility. The use of a closed circuit process will likely reduce the amount of brine discharged to the Inland Empire Brlineline.

Director Jay Bogh moved that the Board authorize the General Manager to purchase a closed circuit reverse osmosis pilot testing system from Desalitech for a sum not to exceed $190,000 and adopt Resolution No. 2020-36 authorizing the transfer of reserve funds equal to the cost of the equipment purchase.

Director Lonni Granlund seconded the motion.

The motion was approved by the following vote:

Director Jay Bogh - Yes
Director Lonni Granlund - Yes
Director Chris Mann - Yes
Director Joyce McIntire - Yes
Director Dennis Miller - Yes

DM 20-128

APPROVAL OF THE TERMS AND CONDITIONS OF EMPLOYMENT FOR MANAGEMENT-EXEMPT EMPLOYEES OF THE YUCAIPA VALLEY WATER DISTRICT

General Manager Joseph Zoba presented the Memorandum of Agreement with the Management-Exempt employees of the Yucaipa Valley Water District.

Director Jay Bogh moved that the Board approve the Memorandum of Agreement with the Management-Exempt Employees.

Director Dennis Miller seconded the motion.

The motion was approved by the following vote:

Director Jay Bogh - Yes
Director Lonni Granlund - Yes
Director Chris Mann - Yes
Director Joyce McIntire - Yes
Director Dennis Miller - Yes

BOARD REPORTS AND DIRECTOR COMMENTS

None

ANNOUNCEMENTS

Director Chris Mann called attention to the announcements listed on the agenda.

CLOSED SESSION

None

ADJOURNMENT The meeting was adjourned at 4:25 p.m.

Respectfully submitted,

____

Joseph B. Zoba, Secretary (Seal)

Staff Report

Yucaipa Valley Water District

Discussion Items

Yucaipa Valley Water District

Yucaipa Valley Water District

Director Memorandum 20-129

Date: September 1, 2020

Prepared By: Joseph B. Zoba, General Manager

Subject: Overview of the Economic Benefits of Investing in Water Infrastructure by the American Society of Civil Engineers

Recommendation: Informational item for presentation by District staff.

On August 26, 2020, the American Society of Civil Engineers with their Value of Water Campaign released an economic report about the underinvestment in water and sewer infrastructure. The attached report will be briefly discussed at the board meeting and steps taken by the District to make sure our community continues to upgrade and replace aging infrastructure.

Source:

http://www.uswateralliance.org/sites/uswateralliance.org/files/publications/The%20Economic%20Benefits%20of%20Investing%20in%20Water%20Infrastructure_final.pdf

The Economic Benefits of Investing in Water Infrastructure

How a Failure to Act Would Affect the US Economic Recovery

About this Report

The American Society of Civil Engineers (ASCE) partnered with the Value of Water Campaign to commission this study. It is part of ASCE's Failure to Act series, which began in 2011. It is one of five studies in the series that ASCE will release in 2020. Subsequent studies will address electricity, surface transportation, ocean ports, inland waterways, and airports. This study also builds on the Value of Water Campaign's 2017 study *The Economic Benefits of Investing in Water Infrastructure*.

About the American Society of Civil Engineers

The American Society of Civil Engineers represents more than 150,000 members of the civil engineering profession in 177 countries. Founded in 1852, ASCE is the nation's oldest engineering society. ASCE stands at the forefront of a profession that plans, designs, constructs, and operates society's economic and social engine—the built environment—while protecting and restoring the natural environment.

To learn more: www.asce.org

About the Value of Water Campaign

The Value of Water Campaign educates and inspires the nation about how water is essential, invaluable, and in need of investment. Spearheaded by top leaders in the water industry, and coordinated by the US Water Alliance, the Value of Water Campaign is building public and political will for investment in the United States' water and wastewater infrastructure through best-in-class communication tools, high-impact events, media activities, and robust research and publications.

To learn more: www.thevalueofwater.org

About EBP

EBP—formally Economic Development Research (EDR) Group—is a firm dedicated to advancing the state-of-the-art in economic evaluation and analysis to support planning and policy in the areas of transportation, energy resources, urban development, and economic growth strategy. Since its founding in 1996, EBP has helped state and local governments make infrastructure investment and economic development decisions that support broad-based job creation, income generation, and overall prosperity. ASCE and the Value of Water Campaign contracted with EBP to conduct this study.

To learn more: www.ebp-us.com/en

About Downstream Strategies

Downstream Strategies offers environmental consulting services that combine sound interdisciplinary skills with a core belief in the importance of protecting the environment and linking economic development with natural resource stewardship. Within the water program, the company performs economic and policy analyses, provides expert testimony and litigation support, and conducts field monitoring.

To learn more: www.downstreamstrategies.com

The Economic Benefits of Investing in Water Infrastructure

How a Failure to Act Would Affect the US Economic Recovery

Acknowledgements

ASCE and the Value of Water Campaign are grateful to an esteemed group of Value of Water Campaign supporters and ASCE members for their expert review of the document, including:

- **Greg DiLoreto,** P.E., retired, former CEO of Tualatin Valley Water District
- **Mami Hara,** General Manager and CEO, Seattle Public Utilities
- **John Kmiec,** Deputy Water Director, Tucson Water
- **Kelley Neumann,** P.E., Deputy Director, Planning and Engineering, Aurora Water
- **Darren Olson,** P.E., Vice President, Assistant Department Head, Water Resources, Christopher B. Burke Engineering, Ltd.
- **Carolyn Peterson,** Director, Communications and Public Affairs, Association of Metropolitan Water Agencies
- **Larry Pierce,** P.E., retired, San Diego region
- **Jim Schlaman,** Director, Planning and Water Resources, Black & Veatch
- **Amit Shah,** Senior Manager, Evoqua
- **Joe Szafran,** External Affairs Manager, American Water

Thank you to US Water Alliance staff Katie Henderson and Katy Lackey and ASCE staff Anna Denecke and Christine Prouty for managing this project. Special thanks as well to Emily Feenstra and Alexa Lopez at ASCE and Radhika Fox at the US Water Alliance for their contributions to this project.

Introduction

The American Society of Civil Engineers (ASCE) and the Value of Water Campaign release this report at a time when the COVID-19 public health crisis is causing economic disruption at an unprecedented speed and scale in the United States. Workers are losing jobs by the millions as consumer confidence, retail sales, and gross domestic product plummet. It is clear that the nation's economic recovery will be long and difficult. In the coming months and years, public officials at every level of government will consider policies and investments to jumpstart economic recovery. Investment in the nation's aging water infrastructure—composed of drinking water, wastewater, and stormwater systems—can spark a new era of job creation and economic growth while protecting public health and improving the quality of life for families across the United States.

Water is essential to every aspect of household and community life and the economy. Dozens of industries, like mining, manufacturing, and health care, rely directly on water and wastewater services to function. If they lost access to clean water supplies, the economic impact would be acute. Meanwhile, the COVID-19 pandemic has shown that the public health benefits from safe drinking water and wastewater treatment are immeasurable. Much of the nation's vast water infrastructure is buried underground or out-of-sight, but it is hard to overstate how vital these systems are for people's health and the economy.

Like so much else in the US economy, water utilities have been affected by the effects of the COVID-19 pandemic. Tourism and convention activities have canceled, sports arenas have closed, hotels and schools have emptied, and many restaurants and bars have been operating at less than maximum capacity—all of which translates to reductions in water consumption and rate revenues. It is uncertain when full economic activity will return. The American Water Works Association (AWWA) and the Association of Metropolitan Water Agencies (AMWA) estimate that drinking water utilities will experience a negative aggregate financial impact of $13.9 billion—or 16.9 percent—by 2021, due to revenue losses and increased operational costs during the pandemic.[1] The National Association of Clean Water Agencies (NACWA) estimates that the resulting financial impact on wastewater utilities will be even higher, around $16.8 billion, including a 20 percent drop in sewer revenues.[2]

The financial challenges water utilities face as a result of the COVID-19 pandemic are layered onto chronic, long-term, and insufficient investment in the nation's water infrastructure. Billions of dollars are needed each year to renew and replace outdated pipes, pumps, storage facilities, and treatment plants that ensure clean water delivers to homes and businesses across the nation, carry away and safely treat sewage and stormwater, and return treated water to rivers, streams, and other water bodies. Local, state, and federal funding is meeting **a fraction** of the current need. If this trend continues, the nation's water systems will become less reliable, breaks and failures will become more common, vulnerabilities to disruptions will compound, and the nation will public health and the economy at risk.

This report details the cost to the nation's economy if current investment trends in the nation's water infrastructure continue, and it explores the massive economic benefits people would realize from fully funding the nation's water infrastructure needs. The report is organized in the following manner:

- **The US Water Infrastructure Investment Gap** section summarizes the mismatch between the current spending levels and funding needs.
- **The Costs of Inaction** section analyzes the impact on gross domestic product (GDP), businesses, households, and public health if current investment trends in water infrastructure continue for the next 20 years.
- **The Economic Benefits** section describes the economic gains that could be realized over the next 20 years if the water infrastructure investment gap were closed and spending needs fully funded.

The United States is entering what may be the deepest economic contraction since the Great Depression.[3] As such, the policy and investment decisions that public officials make will have enormous consequences on the pace of economic recovery. This analysis presents two very different futures. **If current underinvestment in water continues**, businesses will become less competitive, household costs will increase, GDP will shrink, and public health may be at greater risk. **If the United States acts boldly and closes the water infrastructure investment gap**, we will boost economic recovery, create jobs, fuel business activity across a wide range of sectors, improve public health, and protect the environment.

ASCE created the Infrastructure Report Card to assign grades for the nation's infrastructure based on condition, safety, capacity, and other factors. The most recent report card assigned drinking water and wastewater infrastructure a D and D+, respectively. Closing the investment gap would be equivalent to the nation's water infrastructure achieving at least a "B" letter grade, reaching a state of good repair and posing a minimal risk, or an "A" letter grade, a standard of resilience and capacity that is fit for the future.

D

Drinking water infrastructure grade according to ASCE's most recent Infrastructure Report Card

D+

Wastewater infrastructure grade according to ASCE's most recent Infrastructure Report Card

Study Methodology

ASCE and the Value of Water Campaign worked with an economic research team that included EBP, Downstream Strategies, and the Interindustry Forecasting Project at the University of Maryland (INFORUM) to develop this analysis. The researchers relied on a model called the Long-term Interindustry Forecasting Tool (LIFT), housed at University of Maryland's INFORUM Group. LIFT is a dynamic interindustry-macro (IM) model that uses macroeconomic data to examine how changes in one industry will affect other industries and the entire economy.

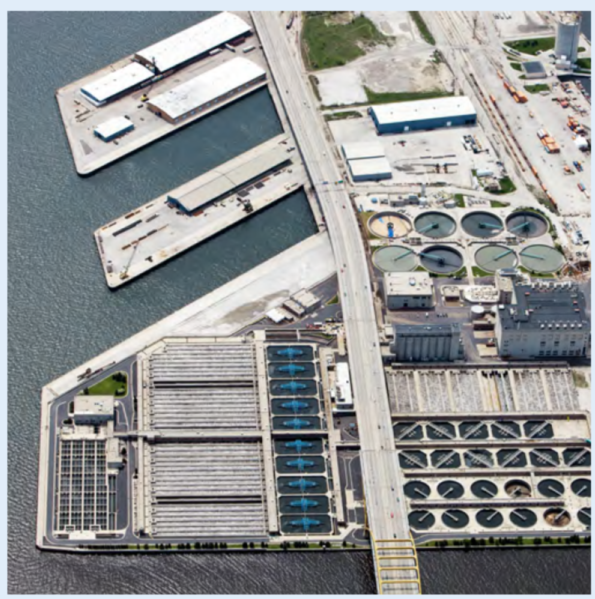
This study estimated the capital and operations and maintenance (O&M) needs of water utilities and generated 10-year and 20-year economic projections for the potential consequences of two future scenarios: the first, continuing delay and underinvestment in water infrastructure and the second, increasing investment in water infrastructure at levels that would close the chronic investment gap. The focus of this report is on the pipes, treatment plants, pumping stations, and other infrastructure that make up the nation's drinking water, wastewater, and stormwater systems. This report does not address drinking water supply infrastructure beyond treatment plants and distribution systems, such as source water structures like dams and levees.

The economic analysis included two types of infrastructure needs:

1. **Building new infrastructure to service increasing populations and expanded economic activity**
2. **Maintaining or rehabilitating existing infrastructure that needs repair or replacement**

The report includes projections for both 10-year (2029) and 20-year (2039) time horizons. It bases the economic modeling on the 2019 national economy and uses 2019 dollars, so as not to reflect the economic impacts of the COVID-19 pandemic. The study's projections also do not reflect the financial impacts from climate change, though climate change is expected to increase both the cost and the urgency of water infrastructure investments.

The full methodology can be found in this report's technical appendix, also available on the Value of Water Campaign website.



What Is US Water Infrastructure?

The vast majority of US homes and businesses receive drinking water, wastewater, and stormwater services through a network of treatment plants, pumps, pipes, storage facilities, and other assets operated by both public and investor-owned utilities. In this study, we refer to these structures and facilities as "water infrastructure."

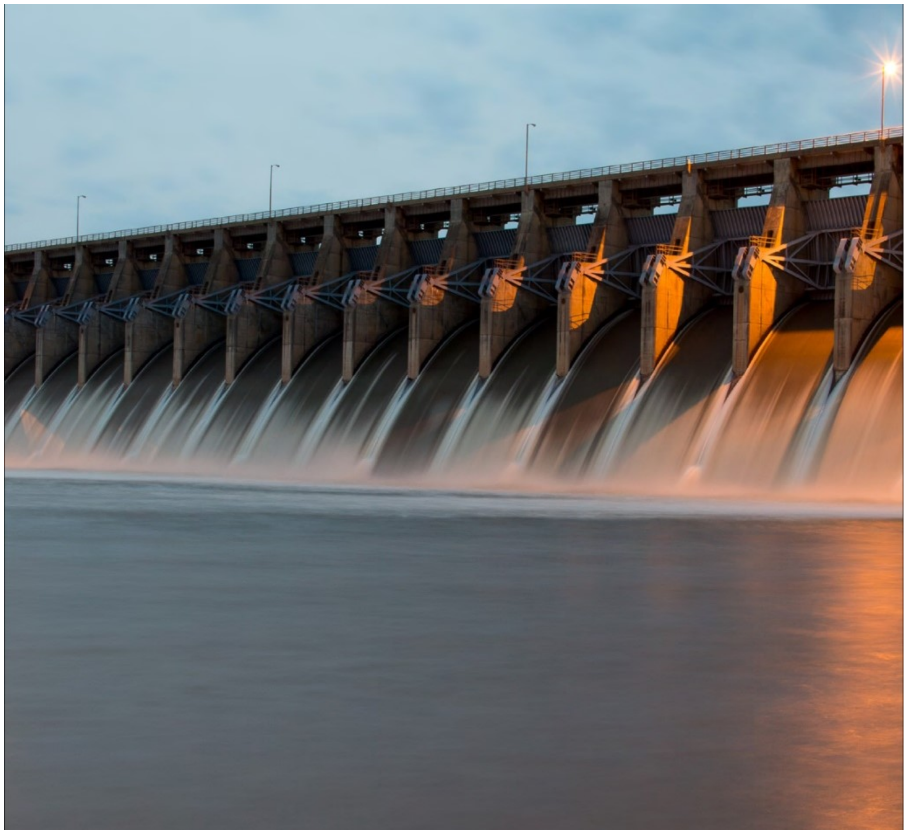
Every day, more than 50,000 drinking water systems distribute 39 billion gallons of potable water—drinking water—to US homes, industries, and other businesses.[4] US Environmental Protection Agency (EPA) and state agencies under the Safe Drinking Water Act, which requires EPA to establish standards for contaminants that could cause negative health effects, regulate these systems. Most people living in the United States receive drinking water from a water utility, either public or investor-owned. Surface water systems, including rivers and lakes, serve approximately two-thirds of US residents, and groundwater systems serve one-third. Over 13 million households rely on private wells for drinking water, which EPA does not regulate.[5]

In addition, approximately 15,000 wastewater utilities serve 75 percent of the US population.[6] These systems collect and treat approximately 32 billion gallons of wastewater daily before returning it to the environment.[7] Some of these systems also manage stormwater services. EPA and state agencies under the Clean Water Act, which sets ambient water quality standards for wastewater that flows out of a treatment plant, sewer, or industrial outfall, regulate wastewater systems. Over the last few decades, the reuse of wastewater through advanced treatment has become more common.[8] Public wastewater systems do not serve about 19 percent of US households, which instead depend on septic tanks.

Large portions of US water and wastewater systems were built over a century ago. As pipes, plants, and pumps reach the end of their expected lifespan, they need to be upgraded, replaced, or fortified. In addition, many systems are not equipped to meet the new demands they face today with growing populations, increased treatment requirements, and the impacts of climate change.

While the majority of people living in the United States have access to high-quality drinking water and wastewater services, more than two million do not have access to adequate drinking water and sanitation. A report from the US Water Alliance and Dig Deep found that Native Americans are 19 times more likely than white households to lack indoor plumbing. This study analyzed data from the American Community Survey and other Census Bureau data sources and then described the water and sanitation crisis in six diverse hot spot communities across the United States.[9]

While not included in this analysis, dams are an important water infrastructure and critical for storage and supply, particularly in water-scarce regions. Capital investment in and operation and maintenance of dams can constitute a significant portion of a utility's annual budget, along with other storage facilities, like tanks, and the pipes, pumps, and treatment plants in drinking water, stormwater, and wastewater systems.



The US Water Infrastructure Gap

To secure the nation's water future, the first step is to assess where it stands today—the current condition, level of investment, and need of the systems that bring water to and from homes and businesses. What follows is a summary of the current state of the nation's water infrastructure. The analysis found that:

1. **The nation's water infrastructure is aging and deteriorating.**
2. **The nation is chronically underinvesting in water infrastructure.**
3. **Federal investment is lagging, placing added pressure on local and state governments.**
4. **New challenges and a growing demand are shaping infrastructure needs.**

The US needs to invest a total of **$109 billion per year** in water infrastructure over the next 20 years in 2019 dollars to close the water infrastructure gap.

The nation's water infrastructure is **aging and deteriorating.**

Cities across the United States constructed water systems at different times. In general, investment in new water infrastructure surged both after World War II and with the federal construction grants program that followed the passage of the Clean Water Act in 1972. Drinking water and wastewater pipes, pumps, and other components last anywhere between 15 and 100 years, depending on the component type, material, and other conditions. AWWA estimates that most of the nation's existing drinking water pipes need to be repaired or replaced before 2040, necessitating a "replacement era" that will dramatically increase costs to utilities and their customers.[10]

The implications of the nation's aging water infrastructure are becoming clear. **Between 2012 and 2018, the rate of water main breaks increased by 27 percent, reaching an estimated 250,000 to 300,000 per year.**[11] This is equivalent to a water main break every two minutes. As these systems age, leaks increase. **Drinking water systems currently lose at least six billion gallons of treated water per day, or 2.1 trillion gallons per year.**[12] The drinking water sector refers to these losses as "non-revenue water loss." Treating and pumping this water is inefficient and costly. The US lost an estimated $7.6 billion of treated water in 2019 due to leaks.

Wastewater systems face a similar challenge. In the 1970s and 1980s, the federal construction grant program enabled communities across the country to build or expand their wastewater systems—from the pipes and pumps that convey wastewater from homes and businesses to the treatment plants that process wastewater flows and safely return water to the environment. Many of these facilities need comprehensive upgrades or replacement now.

This challenge is even more acute for combined stormwater and sewer systems. These systems were designed to convey both stormwater and sewage to a treatment plant. But some storms can flood these systems, causing overflows into lakes and rivers. Combined sewer systems were constructed using models and population projections that are now outdated.[13] As the frequency and intensity of storm events increase with climate change, combined sewer overflows are likely to increase.[14] To date, combined sewer overflows have resulted in more than $32 billion in compliance costs for the nearly 60 consent decrees issued to municipalities nationwide.[15]

On average, **a water main breaks every two minutes somewhere in the US,** totalling an estimated 250,000 to 300,000 breaks per year.

Figure 1

The Useful Lives of Water Infrastructure Components[16]

Component	Useful Life (years)
Reservoirs and dams	50–80
Drinking water treatment plants (concrete structures)	60–70
Wastewater treatment plants (concrete structures)	50
Drinking water and wastewater treatment plant structures (mechanical and electrical)	15–25
Drinking water trunk mains	65–95
Drinking water pumping stations (concrete structures)	60–70
Drinking water pumping stations (mechanical and electrical)	25
Drinking water distribution	60–95
Wastewater collection	80–100
Force mains	25
Wastewater pumping stations (concrete structures)	50
Wastewater pumping stations (mechanical and electrical)	15
Interceptors	90–100

The nation is **chronically underinvesting** in water infrastructure.

There is a growing need for capital investment in the distribution lines, conveyance systems, treatment plants, and storage tanks that keep US water systems working. Investment in these systems, however, has not kept pace with the need. In 2019, the total capital spending on water infrastructure at the local, state, and federal levels was approximately $48 billion, while investment needs totaled $129 billion, creating **an $81 billion gap.**[17] The United States is drastically underinvesting in critical water infrastructure—only meeting 37 percent of the nation's total water infrastructure capital needs in 2019.

If funding needs and infrastructure investment trends continue, the annual gap will grow to $136 billion by 2039. Over 20 years, the cumulative water and wastewater capital investment need will soar to $3.27 trillion, and the cumulative capital investment gap will total $2.2 trillion—nearly $6,000 for every adult and child expected to be living in the United States in 2039.

Operation and maintenance (O&M) costs are also growing and outpacing available funding. Operating and maintaining water infrastructure become costlier as the system components near or exceed their expected lifespans.[18] The limited amount of federal and state funding assistance utilities receive today is primarily used to help fund capital projects, so local utilities primarily cover O&M costs out of their own revenue streams. These costs will rise as systems continue to age, placing smaller or less affluent communities at a relative disadvantage. While utilities historically have been able to fund O&M without major concerns, there is a growing gap between O&M needs and available funding. In 2019, 90 percent of the nation's $104 billion O&M funding need was met, leaving an annual O&M funding gap of $10.5 billion. **If trends continue, the country will face a single-year O&M shortfall of $18 billion in 2039,** and the cumulative gap in O&M funding for the 20-year 2019-2039 period will be $287 billion. Based on current practices, sustainable funding for O&M will become a more pressing issue compounded by age and other factors if it does not address the funding gap.

Figure 2

Water Infrastructure Capital Spending Gap[19,20,21]
($ million)

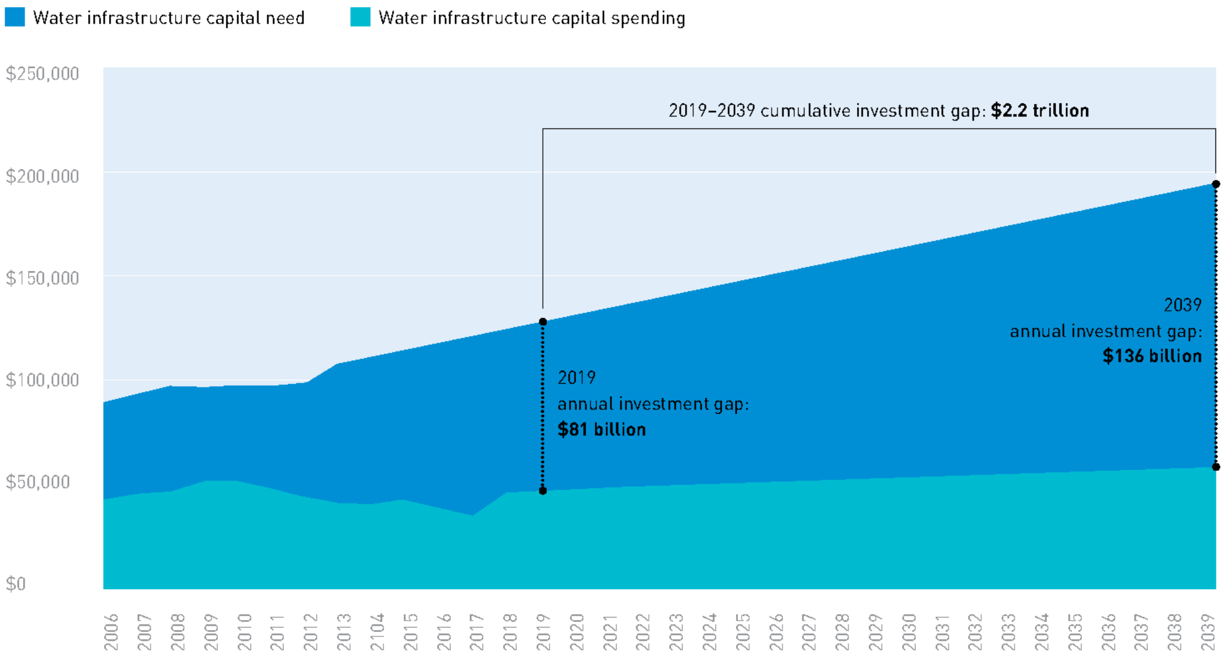
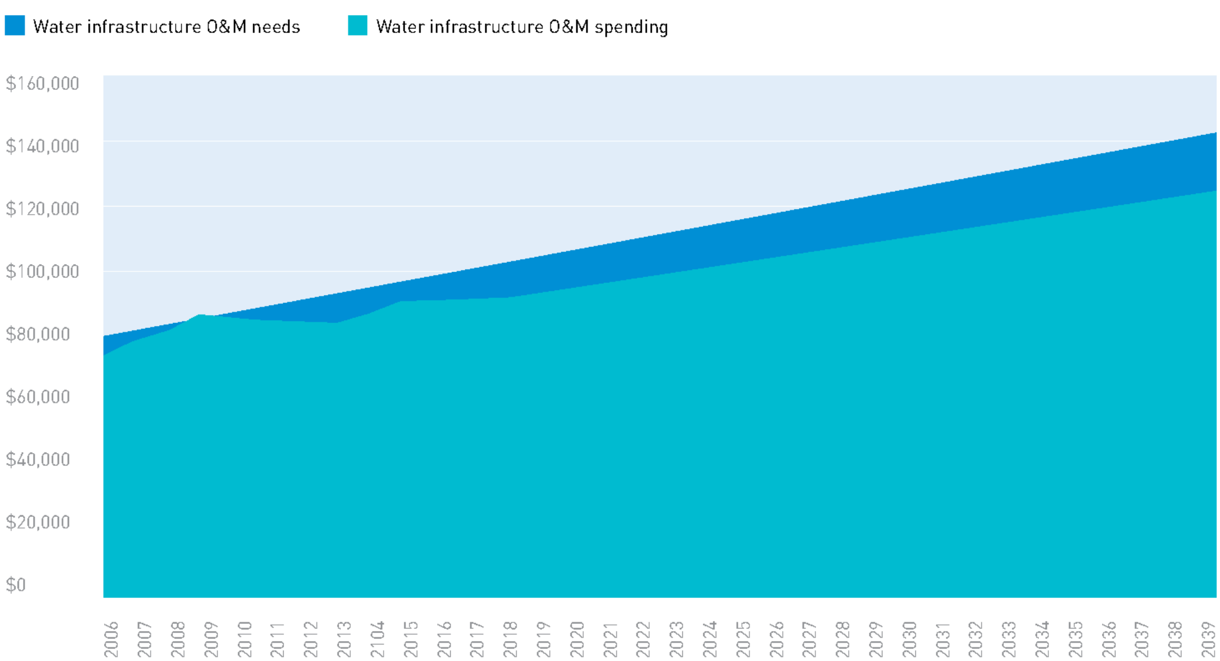


Figure 3

Water Infrastructure O&M Spending Gap[22]
($ million)



Federal investment is lagging, **placing added pressure on local and state governments.**

Meeting the drinking water and wastewater capital needs for communities across the United States will require coordinated investment at the federal, state, and local levels. Despite the growing need for water infrastructure, the federal government's share of capital investment has fallen from 31 percent in 1977 to a mere four percent in 2017.[23] This is a far lower percentage than the federal government's share of total 2016 public spending on other infrastructure sectors like transportation. As federal support for water infrastructure capital needs has declined, local and state spending has provided a much greater share. Across the country, water rates are climbing to meet the costs of upgrading, expanding, and replacing water infrastructure. As costs, however, continue to rise, many communities will struggle to cover them through local rates and fees.

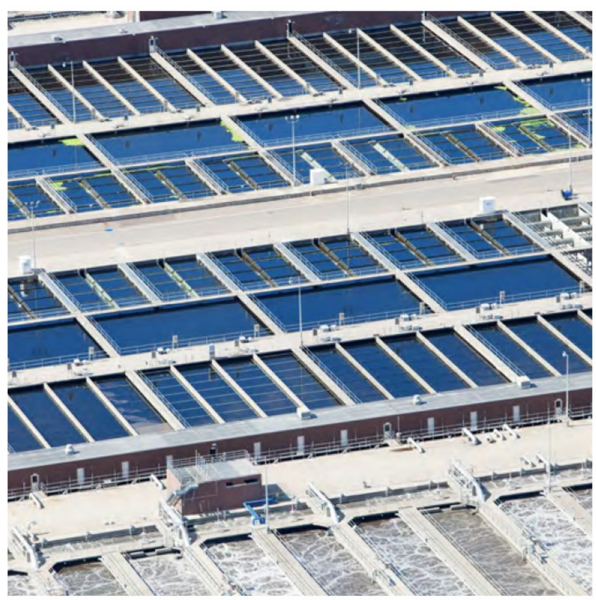


Figure 4

Federal vs. State and Local Spending on Water Capital Investment: 1975–2017[24]

($ billion, 2017 value)

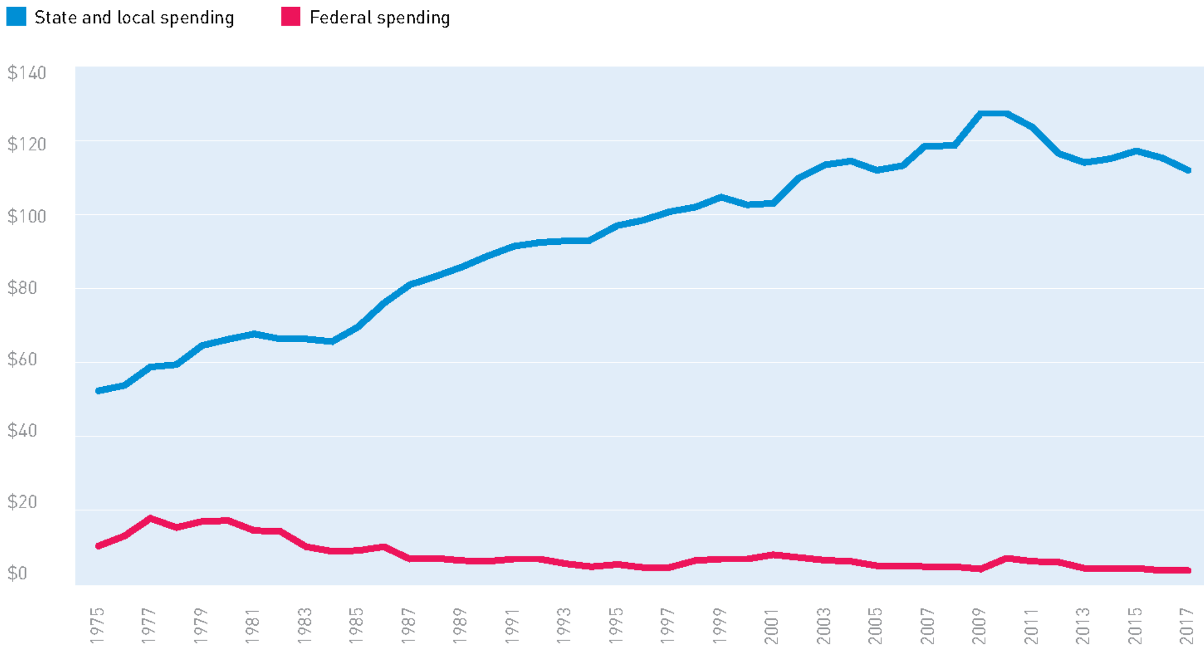
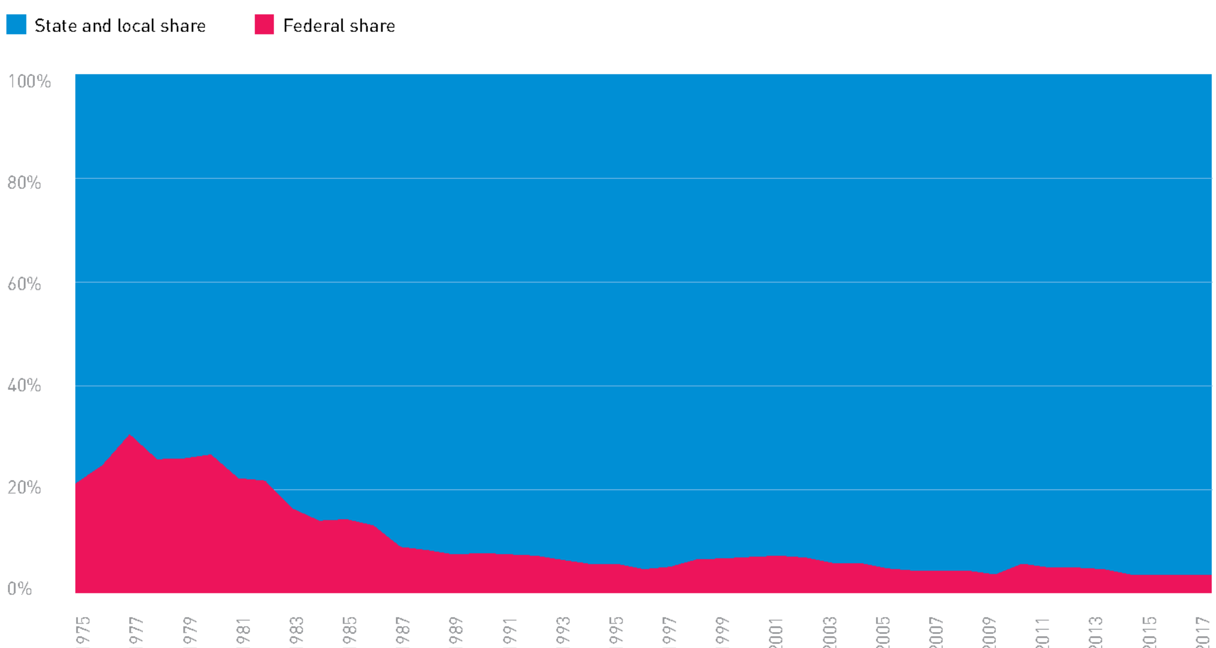


Figure 5

Federal vs. State and Local Share of Water Capital Investment: 1975–2017[25]



New challenges and a growing demand are shaping infrastructure needs.

Water utilities face a variety of constraints and challenges that were not anticipated when most water infrastructure was designed and built. There are an estimated six to 10 million lead service lines in communities across the country. Lead-related health crises like in Flint, Michigan, have increased public attention and a call to remove and replace lead service lines. Fully removing lead service lines is a complex process and can be expensive, costing between $5,000 and $7,500 per service line.[26] Micro-constituents pose another growing challenge. Advances in instrumentation and analytics have allowed scientists to detect and study microconstituents like per- and polyfluoroalkyl substances (PFAS) that were previously unknown. As the health effects of these and other constituents become more fully understood, new regulations or treatment requirements could be imposed. Regulation of wastewater effluent has become more stringent, with many utilities facing the need to build new, more advanced treatment systems.

Finally, most of the nation's water infrastructure was not designed for a changing climate. Water systems are vulnerable to impacts from declining surface water flows and aquifer recharge, sea-level rise, salt-water intrusion, flooding, drought, and wildfire.[27,28,29] Many wastewater systems are in low-lying areas near water sources and especially prone to increased flooding as the impacts of climate change accelerate.[30] The country's water infrastructure needs to be repaired, replaced, and *reimagined* for a new era so it can meet changing conditions. Water infrastructure resilient to these changes is essential for communities to grow and thrive.

For some water systems, one of the biggest stressors is population growth. Managing demand through conservation, water recycling, and addressing non-revenue water loss (leaks) can reduce the need for building new capacity.[31] Although per capita residential water demand decreased over the last two decades due to the widespread adoption of in-home, water-efficient appliances,[32] many utilities still need to develop new water supplies or construct new storage facilities to meet and effectively manage future demand. Many of the nation's fastest-growing communities are in water-scarce regions like the Southwest, elevating the need to identify and develop new supplies.




There Is No Industry Without Water

Water is the essential ingredient that fuels industry. Thermoelectric power and irrigation are the largest users of freshwater resources in the United States.[33] The most water-intensive industry is paint manufacturing, which requires 123 gallons of water per dollar output. Other water-intensive industries include alkalis and chlorine manufacturing (38 gallons per dollar output), paper mills (36 gallons per dollar output), and wineries (34 gallons per dollar output). Most people do not associate a gallon of paint or a glass of wine with their water supplies, but virtually all consumer products rely on water to varying degrees.

Many manufacturing industries get their water supplies through a combination of direct withdrawal from water-bodies and purchase from water utilities. They use water both to produce goods and to dilute the waste products generated in manufacturing processes. Many common consumer products include a variety of components, each of which requires water for production. Smartphones, for example, are made of many smaller components. In aggregate, producing and assembling all these components requires roughly 3,000 gallons of water per phone.[34]

Reliable water service has an enormous effect on industry in indirect ways as well. For example, a disruption in the water supply to the food processing industry would not only reduce productivity in that industry, but it may also lead to a decrease in purchases of industrial machinery and trucking services. Over time, workers in food processing, trucking, and machinery sectors may face wage reductions or lose their jobs. They would then make fewer household purchases of groceries, furniture, cars, clothing, restaurant meals, and other goods and services, amplifying the economic impact of the water supply disruption.

Figure 6

The 10 most water-intensive industrial sectors (excluding agriculture, mining, and electric power generation) in terms of direct water use per dollar output[35]

#1
Paint and coating manufacturing:
123
gallons per $ output

#2
Alkalis and chlorine manufacturing:
38
gallons per $ output

#3
Paperboard mills:
36
gallons per $ output

#4
Wineries:
34
gallons per $ output

#5
Pesticide and other agricultural chemical manufacturing:
30
gallons per $ output

#6
Synthetic dye and pigment manufacturing:
27
gallons per $ output

#7
Adhesive manufacturing:
21
gallons per $ output

#8
Industrial gas manufacturing:
21
gallons per $ output

#9
Distilleries:
14
gallons per $ output

#10
Poultry processing:
14
gallons per $ output

The Cost of Inaction

The current state of water infrastructure is precarious: systems are aging, and current levels of investment are insufficient. This section of the report analyzes what the future will be if these trends continue. This analysis generated 10- and 20-year economic projections, using 2019 baseline data, and addressed key questions: What would the economy look like? What would the effects be on households, public health, and other sectors? Four key findings emerged:

- **Service disruptions would cost water-reliant businesses $250 billion by 2039.**
- **Underinvestment would lead to a cumulative $2.9 trillion decline in the gross domestic product by 2039.**
- **Costs incurred by US households due to water and wastewater failures would be seven times higher in 20 years than they are today.**
- **Failing water infrastructure would result in $7.7 billion in cumulative healthcare costs to households over the next 20 years.**

If the water infrastructure gap is not addressed, deteriorating water infrastructure would cost water-reliant industries **$250 billion in 2039**.

Service disruptions will cost water-reliant businesses **$250 billion by 2039.**

The costs resulting from deteriorating water infrastructure would be particularly burdensome for water-reliant industries. We estimate that water service disruptions led to a $51 billion economic loss for the 11 most water-reliant industries in 2019. These industries include those that people rely on every day—education, health services, retail, construction, manufacturing, and more. Disruptions in water and wastewater service increase the price of goods and services and result in production delays, sales losses, and other effects. If the current trajectory continues, we estimate that service disruptions would cost these water-reliant businesses **$111 billion by 2029, growing to $250 billion by 2039.**

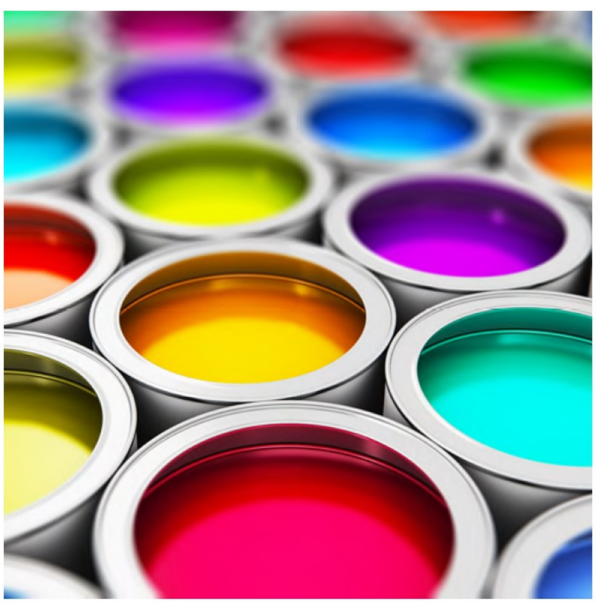
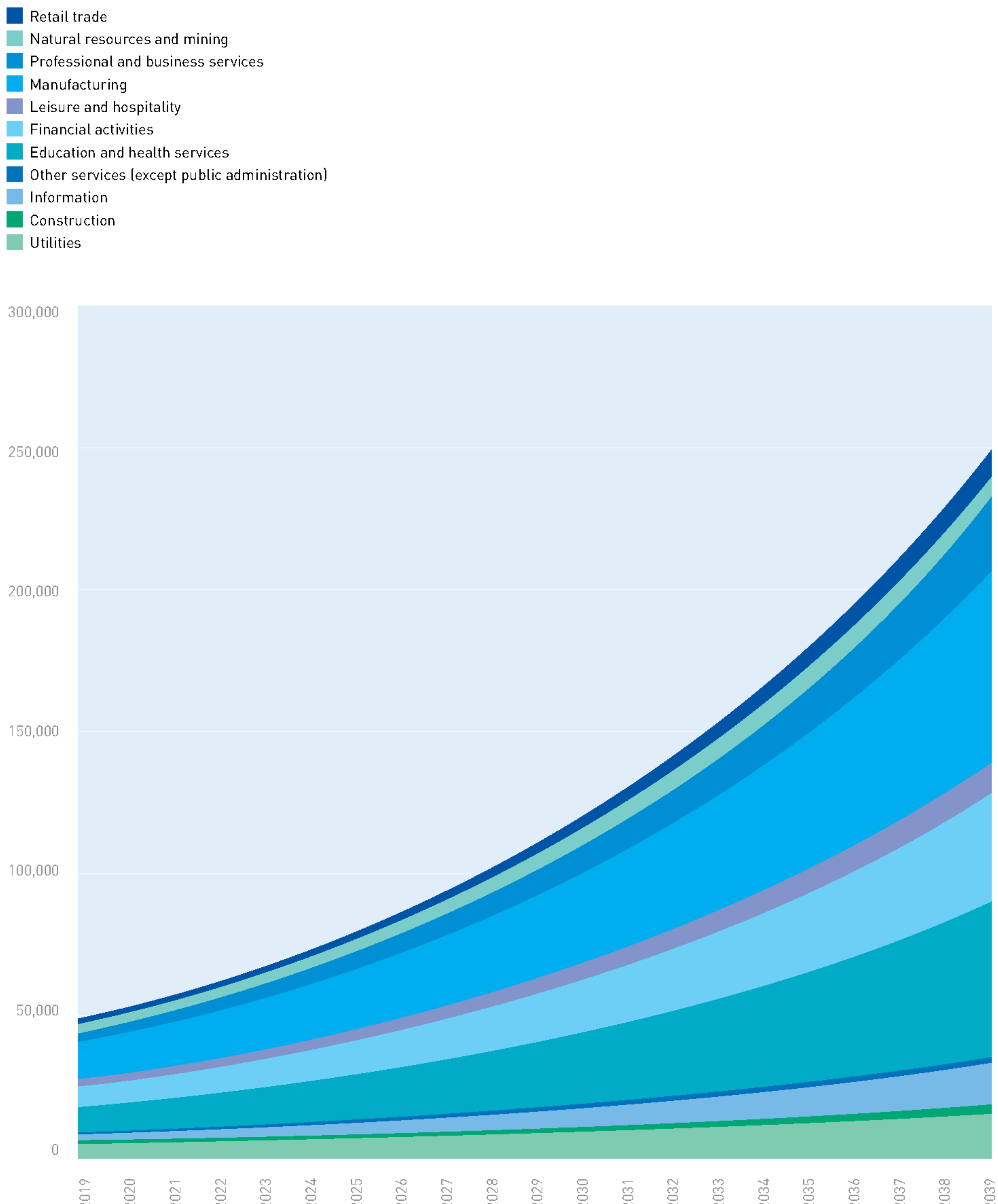


Figure 7

Annual Losses from Water Service Disruptions on Water-Reliant Businesses[36;37]
($ million, 2019 value)



Underinvestment will lead to a **$2.9 trillion decline** in the gross domestic product (GDP) by 2039.

As water infrastructure deteriorates and ruptures, street flooding, shutdowns, and damage from storms would increase. These interruptions would increase production costs for businesses, and prices for consumers would climb. This would lead to a reduction in domestic and possibly foreign demand for manufactured products, which would reduce global competitiveness and produce a domino effect across almost every indicator of economic wellbeing in the United States. By 2039, the cumulative impact on the gross domestic product (GDP) is estimated to be a decline of 1.2 percent, translating to a loss of $2.9 trillion. **Moreover, more than $732 billion in business sales (output) would be lost over the next 10 years. By 2039, that number will exceed $4.5 trillion.**

Output is the gross production of US industries. Generally, output is made up of business sales and budget expenditures of public agencies and nonprofit businesses, along with unsold inventory produced, and the value of breakage and theft.

Gross Domestic Product (GDP) is output minus the cost of goods and services purchased from vendors (known as intermediary goods and services).

As production volumes decline, workers would see reductions in wages and disposable income. **By 2039, 636,000 jobs would be lost annually**. It is important to note that the number of jobs is not always the best indicator of industry health. In some sectors, employment levels do not directly correlate to production volumes, and they may require just as many employees for lower production. Even so, they will lose jobs, ultimately harming workers, industries, and the US economy.

Due to higher costs resulting from unreliable water services, US manufacturing is expected to lose about 89,000 jobs over the next 20 years, about half of them concentrated in fabricated metal industries, machinery, computer and electronics, and motor vehicles. Health care, construction, accommodations, and food services will lose jobs as disposable household income and disposable spending decline. These impacts would radiate through the economy, affecting both low- and high-wage jobs.

As water systems continue to age, water loss will accelerate. Leaks and pipe breaks will be more frequent, wasting more treated water. Leaking pipes lost the equivalent of $7.6 billion worth of treated water in 2019, and this loss is projected to more than double over the next 20 years, reaching $16.7 billion in 2039.

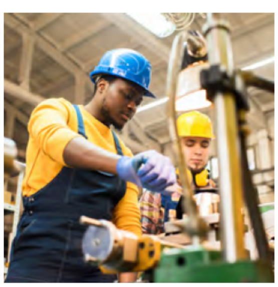


Figure 8

Aggregated Output Impacts by Industry Sector[38]
($ billion, 2019 value)

Sector	2020–2029	2030–2039	2020–2039
Manufacturing	-$227	-$1,089	-$1,316
Finance, insurance and real estate	-$60	-$372	-$432
Professional services	-$83	-$493	-$576
Health care	-$47	-$241	-$288
Other services	-$43	-$224	-$267
Information	-$131	-$631	-$762
Logistics	-$19	-$86	-$106
Retail trade	-$20	-$103	-$122
Mining, utilities, agriculture	-$13	-$70	-$83
Construction	-$15	-$73	-$1,316
Transportation services (excluding truck transportation)	-$22	-$102	-$125
Accommodation, food, and drinking places	-$38	-$222	-$260
Entertainment	-$4	-$21	-$25
Educational services	-$5	-$27	-$32
Social assistance	-$3	-$18	-$21
Total	**-$732**	**-$3,771**	**-$4,503**

Figure 9

Potential Employment Impacts Due to Failing Water and Wastewater Infrastructure, 2029 and 2039[39]

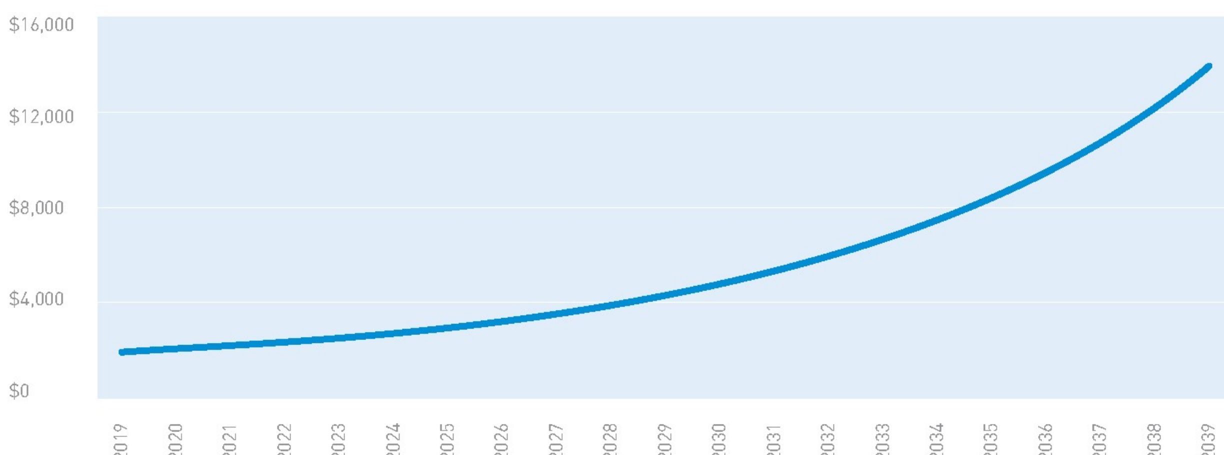
Sector	2029	2039
Professional services	-39,000	-106,000
Manufacturing	-47,000	-89,000
Other services	-38,000	-80,000
Logistics	-34,000	-79,000
Construction	-30,000	-63,000
Health care	-26,000	-56,000
Finance, insurance, and real estate	-24,000	-50,000
Retail trade	-25,000	-31,000
Transportation services (excluding truck transportation)	-11,000	-26,000
Information	-10,000	-19,000
Mining, utilities, agriculture	-8,000	-18,000
Accommodation, food, and drinking places	-16,000	-13,000
Educational services	-10,000	-3,000
Social assistance	-11,000	-3,000
Entertainment	-4,000	-1,000
Total	**-333,000**	**-637,000**

Water and wastewater infrastructure failures cost US households $2 billion in 2019.
In 2039, increasing service disruptions would cost households $14 billion.

Water and wastewater service disruptions to US households can result in large, unexpected personal costs to individuals and families. In 2019, service disruptions and flooding (due to sewer overflows and stormwater drainage problems) cost households an estimated $2 billion. During drinking water outages, household residents need to find alternative water supplies and, in extreme situations, must relocate either temporarily or permanently. Increased climate-related flooding in some areas of the country will increase the cost burden on households from repeated cleanup, rehabilitation, and structural repair. **As infrastructure ages and the rate of infrastructure failures increases, household costs would more than double in 10 years to $4.3 billion, climbing to almost $14 billion by 2039.**

Figure 9

Annual Household Costs from Water-Service Disruptions[40;41;42]
($ million, 2019 value)

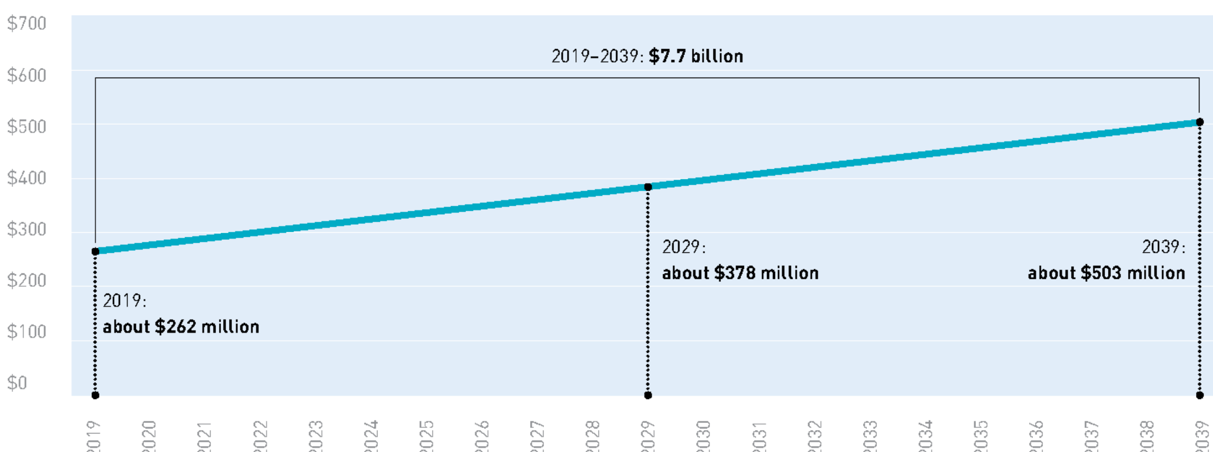


Failing water infrastructure could result in **$7.7 billion in cumulative health-care costs** to households over the next 20 years.

Households must also manage the health and medical costs that can arise when water systems fail. Sewer overflows can expose people to contaminated water, which can cause bacterial infections (e.g., giardia, cryptosporidium). Deteriorating drinking water systems can leach heavy metals into water supplies, which can lead to serious health problems, especially for children and other vulnerable populations. Without adequate investment in water systems, people could see higher incidences of illness, hospitalizations, and lost working days. US households spent an estimated $262 million on health-care costs due to water service disruptions in 2019. If trends continue, US households could spend $378 million in 2029 and $503 million in 2039. **Over the next 20 years, failing to invest in the nation's water infrastructure could lead to medical costs that exceed $7.7 billion in cumulative medical costs to US households.**

Figure 10

Annual Health Costs from Water-Service Disruptions[43;44;45]
($ million, 2019 value)

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The Economic Benefits

The cost of failing to invest in water infrastructure is tremendous. But if the United States proactively invests in water infrastructure and closes the water infrastructure investment gap, the benefits to the economy, trade, and public health will be enormous.

As in the previous section, the INFORUM model was used to generate economic projections using 2019 baseline data. These projections assume that the years, starting in and following 2020, meet 100 percent of capital and O&M water infrastructure needs. It should be noted that 2019 met only 37 percent of capital investment needs. Closing the gap would require spending $2.2 trillion above the baseline projections over the next 20 years.

The study projected the impacts of a 100 percent investment scenario on employment, wages, business sales, and exports. The LIFT model is dynamic, with the ability to show how changes in one industry ripple across the entire economy. As a result, the numbers shown here are dramatically different from earlier studies that used static economic multiplier models.
In assessing the benefits of closing the water infrastructure investment gap, three key findings emerged:

- **Business sales would increase, and the US GDP would grow by $4.5 trillion.**
- **The US trade balance would dramatically improve, making exports more competitive.**
- **Investment would create 800,000 jobs, and disposable income would rise by over $2,000 per household.**

The economic gains from more reliable and efficient water systems would increase business sales (gross output) to **$5.6 trillion.**

Business sales would increase, and **the US GDP would grow by $4.5 trillion.**

Under current investment levels, the nation will spend $1.067 trillion on water infrastructure over the next 20 years, but the total need over this time frame is over $3 trillion. To close the gap, the United States would need to increase its investment in water infrastructure by $2.2 trillion over the next 20 years, or roughly $109 billion per year.

Closing the investment gap would improve the condition and performance of water systems, leading to supply-side and demand-side benefits to the economy. Improved reliability and water quality would increase productivity and efficiency in other sectors and lead to higher capital investment and O&M spending. Over the next 20 years, the national economy would stand to gain **$4.5 trillion in GDP.** The economic gains from more reliable and efficient water systems would build over time; most would accrue in the second decade as households and businesses reap the benefits of improved water reliability. **By 2039, business sales (gross output) would exceed $5.6 trillion.**

Figure 11

Effects on Total US Economy due to Improved Water Delivery and Wastewater Treatment Infrastructure Systems, 2020–2039[46]
($ billion, 2019 value)

Year	Business Sales (Output)	GDP	Household Disposable Income	Jobs
Increases in the Year 2029	$204	$180	$125	444,000
Increases in the Year 2039	$670	$461	$315	798,000
Cumulative Increases 2020-2039	$5,613	$4,480	$2,833	N/A

The US trade balance would dramatically improve, **making exports more competitive.**

As capital infrastructure projects move forward and industrial productivity rises, US businesses would gain **$225 billion in export value.** Four commodities and service industries would see an increased export value of $10 billion or more above the projected baseline: wholesale trade, motor vehicles, aerospace products and parts, and other chemicals.

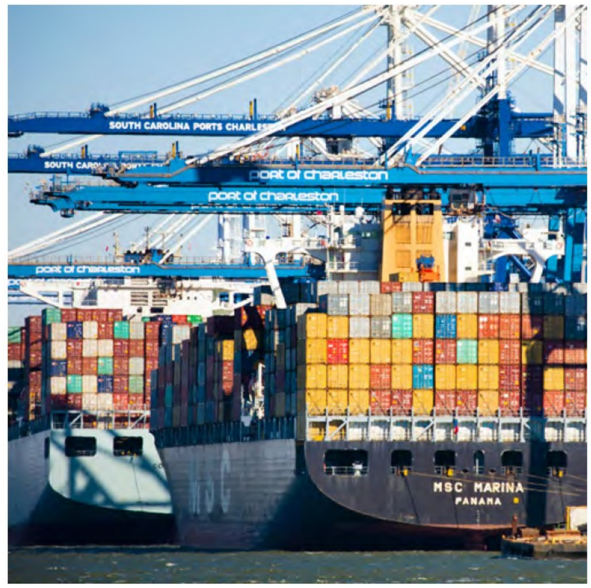

Figure 12

Value of US Exports Generated by 10 Leading Commodities and Services[47]
($ billion, 2019 value)

Commodity/Service	2020–2029	2030–2039	2020–2039
Wholesale trade	$2.2	$18.0	$20.3
Motor vehicles	$6.5	$13.5	$20.0
Other chemicals	$1.3	$12.0	$13.3
Aerospace products and parts	$0.8	$11.5	$12.3
Royalties	$1.0	$8.5	$9.5
Architectural, engineering, and related services	$0.8	$7.8	$8.7
Software	$0.8	$7.6	$8.4
Resin, synthetic rubber, and fibers	$2.5	$4.7	$7.1
Other financial investment activities	$0.7	$6.2	$7.0
Scientific research and development services	$0.7	$6.1	$6.8

Investment would create 800,000 jobs, and **disposable income would rise by $2,000 per household.**

Full funding of water infrastructure needs would create nearly 800,000 new jobs by 2039. Of these new jobs, 61 percent would be in construction and professional services stimulated by the boost in infrastructure spending. Increased reliability and water quality would also increase productivity and efficiency in other sectors like manufacturing, leading to job gains. And wages would rise: US workers would earn more than **$2.8 trillion** in additional disposable household income over 20 years, leading to an increase of over $2,000 per household.

More reliable water services would also help US households avoid up to $7.7 billion in cumulative medical costs over 20 years, $2.6 trillion in cumulative losses incurred from service disruptions and overflows, and $1.4 trillion in cumulative disposable income loss.

While this model cannot generate public health predictions, wages and disposable income are part of a web of interrelated factors that affect health over a lifetime.[48] People with lower incomes tend to have a higher risk of heart disease, diabetes, stroke, and other chronic disorders.[49] Other studies have shown that as jobs, wages, and other indicators of economic prosperity improve, so does public health.[50] The model shows that investing in water infrastructure has a positive effect on the economic conditions of people at many income levels. Adequate investment in water infrastructure protects public health directly by maintaining safe water quality and indirectly by creating economic conditions that enable people to thrive.

Direct, Indirect, and Induced Impacts

Both visions for the future evaluated in this study account for direct, indirect, and induced impacts on the economy.

- **Direct impacts** include the economic implications for companies directly involved in designing, engineering, and constructing water infrastructure.
- **Indirect impacts** include the additional economic implications created by the actions of firms directly involved in water infrastructure. Business to business purchases of goods and services, like machinery for construction of a water infrastructure project, is an indirect impact.
- **Induced impacts** include the purchases in retail, medical, leisure, and other sectors dependent on the income earned by workers in all sectors of the economy that are affected by infrastructure investments. The implications of water infrastructure investment ripple through the US economy through induced impacts.

Figure 13

Potential Employment Impacts Due to Improved Water and Wastewater Infrastructure, 2029 and 2039[51]

Sector	2029	2039
Construction	377,000	442,000
Manufacturing	(17,000)	58,000
Professional services	3,000	52,000
Health care	(6,000)	8,000
Logistics	12,000	38,000
Other services	9,000	37,000
Finance, insurance, and real estate	10,000	31,000
Retail trade	11,000	30,000
Transportation services (excluding truck transportation)	5,000	20,000
Information	7,000	15,000
Accommodation, food, and drinking places	8,000	12,000
Mining, utilities, agriculture	(5,000)	11,000
Educational services	5,000	6,000
Entertainment	(1,000)	4,000
Social assistance	7,000	4,000
Total	**444,000**	**798,000**

Figure 14

Estimated Direct and Multiplier Effects for Scenario Outcomes in 2029 and 2039[52,53]
($ billion, 2019 value)

Failure to Act Scenario 2039				
	Jobs	**Disposable Income**	**GDP**	**Output**
Direct	-240,000	-$67	-$140	-$179
Indirect	-144,000	-$40	-$96	-$144
Induced	-252,000	-$69	-$133	-$193
Total	**-636,000**	**-$175**	**-$369**	**-$516**
100 Percent Scenario 2039				
	Jobs	**Disposable Income**	**GDP**	**Output**
Direct	330,000	$140	$189	$264
Indirect	167,000	$70	$111	$172
Induced	301,000	$104	$162	$233
Total	**798,000**	**$315**	**$461**	**$670**


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Conclusion

Water and wastewater infrastructure are interwoven into every aspect of the US economy. Reliable water service is an enabling force for economic growth and prosperity. Unreliable water service and deteriorating infrastructure, on the other hand, will put the nation's communities and economy at risk.

As the United States confronts a widening gap between capital and O&M spending and investment needs, it faces two possible directions. If chronic underinvestment in the water infrastructure continues, the overall economy will suffer; by 2039, GDP will decline by $2.9 trillion. Families would pay for deferred maintenance—costs incurred by households would be seven times higher in 2040 than they are today. Inaction is a threat to a safe and secure water future. The COVID-19 pandemic only intensifies the need to act and invest across all levels of government. Failing to act now will lead the country into a prolonged era of economic and public health vulnerability.

Conversely, if the United States closes the spending gap, the national economy will stand to gain **$4.5 trillion in GDP by 2039.** All can rise to the challenge. In the 20th century, large investments in water infrastructure spurred economic growth and led to tremendous gains in public health, setting the stage for generations of prosperity. Leaders at all levels must step up and explore policy and funding solutions that will move the nation in the right direction. Local, state, and federal action to increase investment in these critical systems today will lead to a resilient, efficient, and reliable water future and protect the public health of generations to come.

This report, along with the technical appendix, can be found at **TheValueofWater.org/resources.**

Please note: Columns may not total due to rounding. Losses and increases reflect impacts in a given year against total national export projections.

Notes

1 American Water Works Association (AWWA) and Association of Metropolitan Water Agencies (AMWA), *The Financial Impact of the COVID-19 Crisis on U.S. Drinking Water Utilities* (AWWA, April 14, 2020), https://www.awwa.org/Portals/0/AWWA/Communications/AWWA-AMWA-COVID-Report_2020-04.pdf.

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Value of Water CAMPAIGN

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Yucaipa Valley Water District

Director Memorandum 20-130

Date: September 1, 2020

Prepared By: Joseph B. Zoba, General Manager

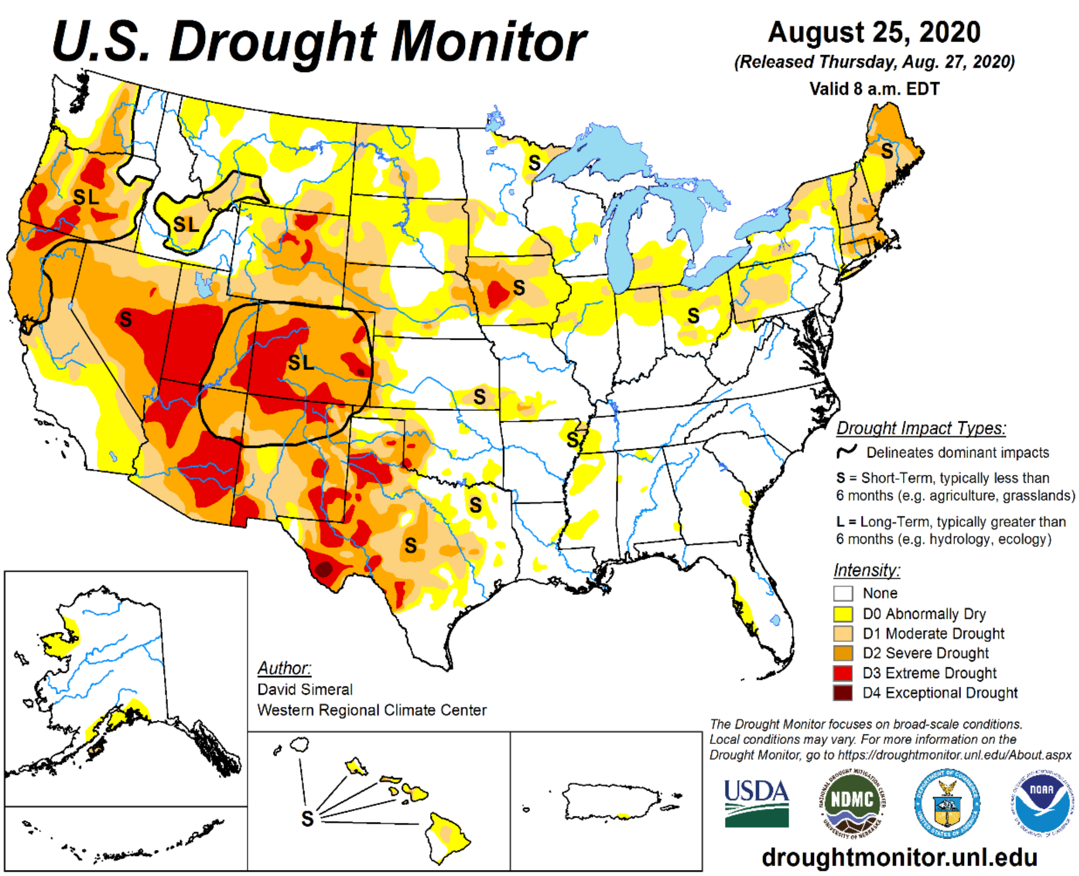
Subject: Consideration of Director District Staff to Prepare Plans for the Construction of Recycled Water Fill Station No. 2

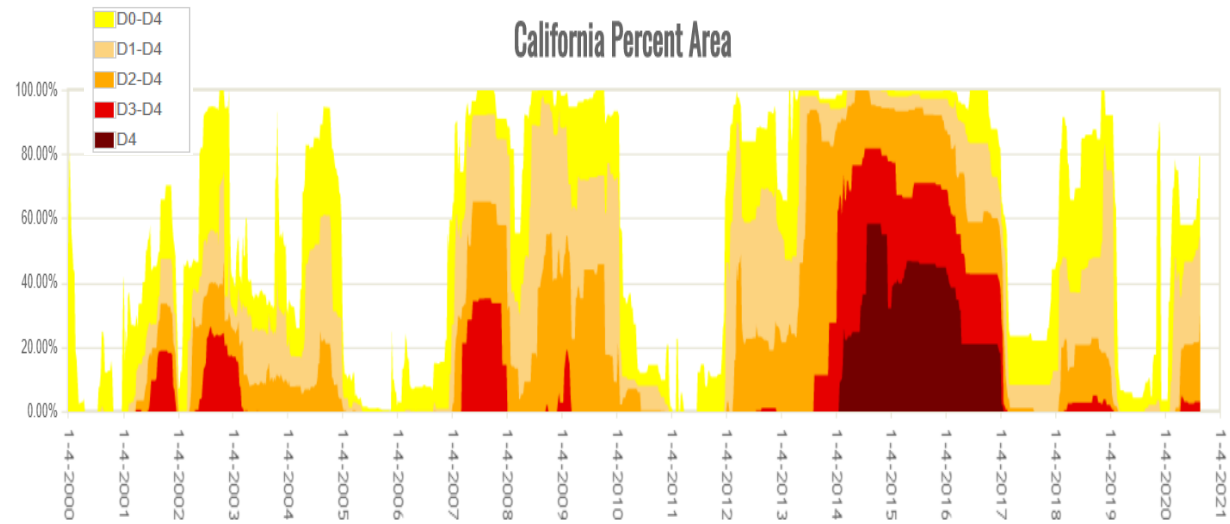
Recommendation: That the Board authorizes the District staff to develop plans for the construction Recycled Water Fill Station No. 2 on 5th Street north of Wildwood Canyon Road, Yucaipa.

Each week the U.S. Drought Monitor releases a status of current drought conditions in the United States. The map below shows the current conditions throughout the United States based on the key to the right.

Intensity and Impacts

- None
- **D0** (Abnormally Dry)
- **D1** (Moderate Drought)
- **D2** (Severe Drought)
- **D3** (Extreme Drought)
- **D4** (Exceptional Drought)
- **No Data**





While our service area did not experience any significant impacts during the 2014-2016 drought, our community was required to meet a 36% water conservation goal by the State Water Resources Control Board. The District staff believes that this water conservation goal was set without appropriately acknowledging the efforts by the District to establish permanent water savings with the use of recycled water throughout our community. Now the community has recycled water infrastructure that has reduced the amount of drinking water needed to sustain our community during the next drought.

Recycled Water Fill Station Number 1

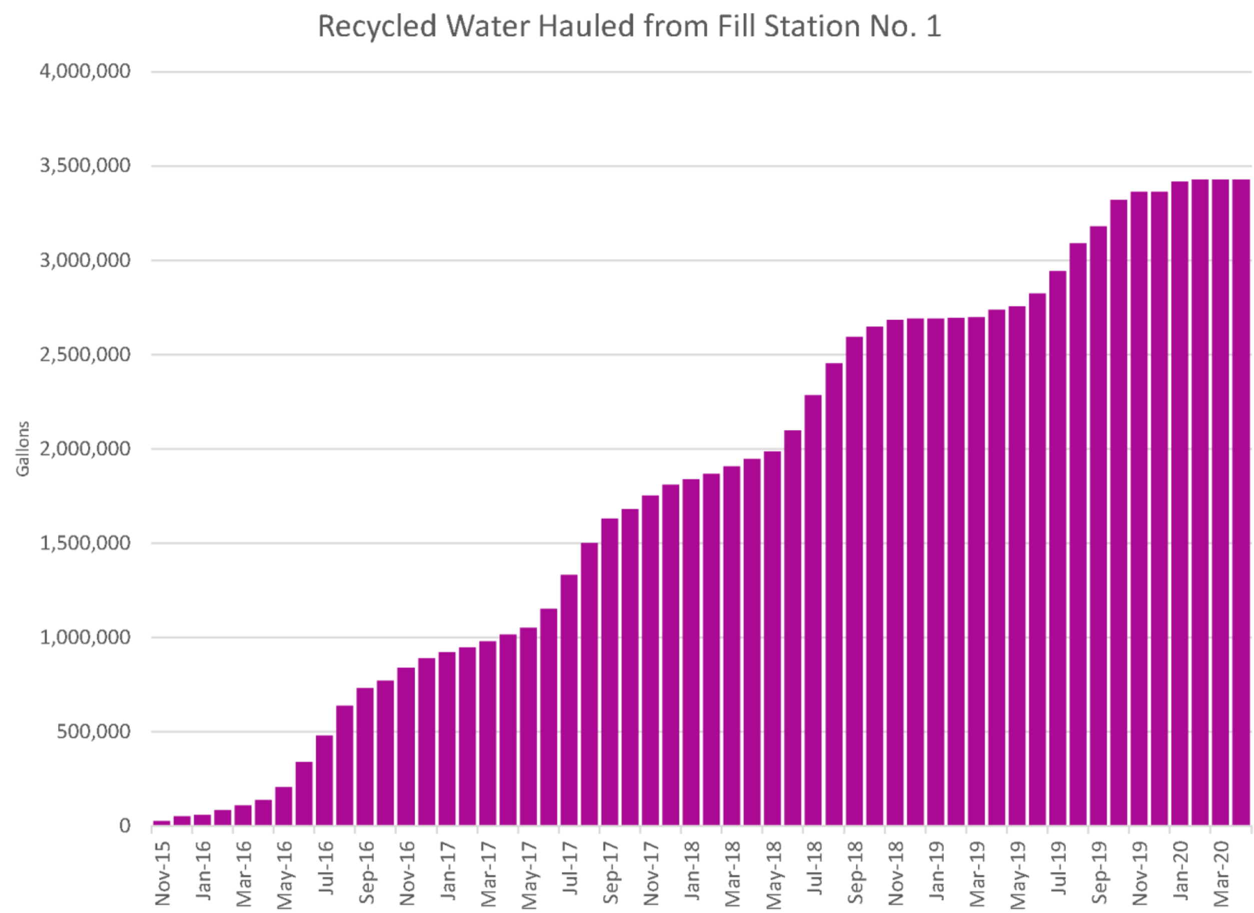
In August 2015, the District staff began to investigate the implementation of a recycled water fill station to meet the needs of customers interested in using recycled water for irrigation use at their homes.

On August 5, 2015, the Board of Directors authorized the District staff to proceed with the implementation of a recycled water filling station.

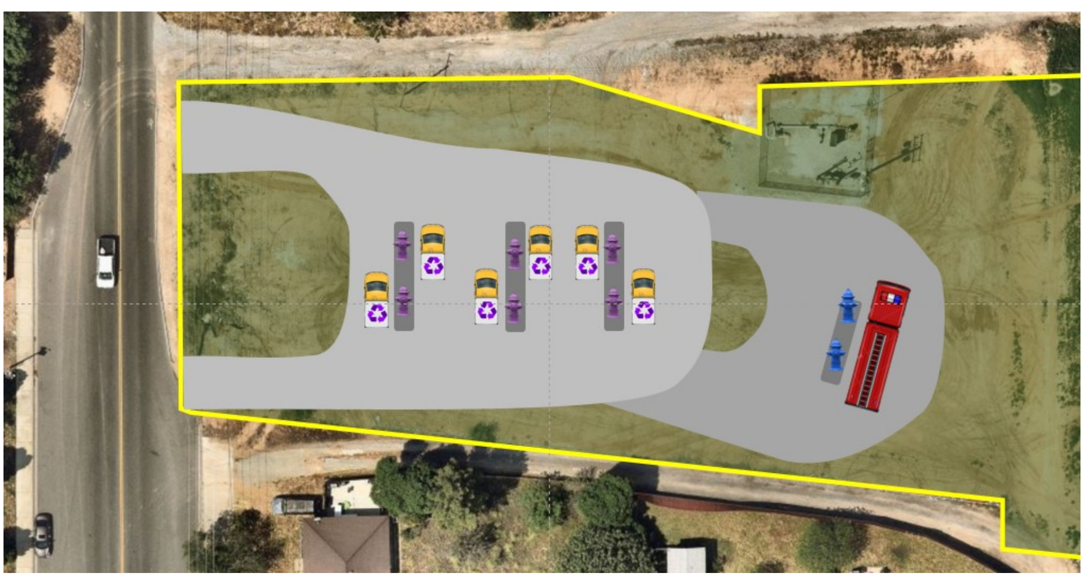
On September 3, 2015, the District hosted a meeting with interested residential customers to determine the interest in customers hauling recycled water from Recycled Water Fill Station No. 1 to their homes.

On November 2, 2015, the District received a permit to operate the Recycled Water Fill Station from the State Water Resources Control Board, Division of Drinking Water.

As of April 2020, the District's customers have hauled nearly 3.5 million gallons of recycled water from Fill Station No. 1 to their homes.



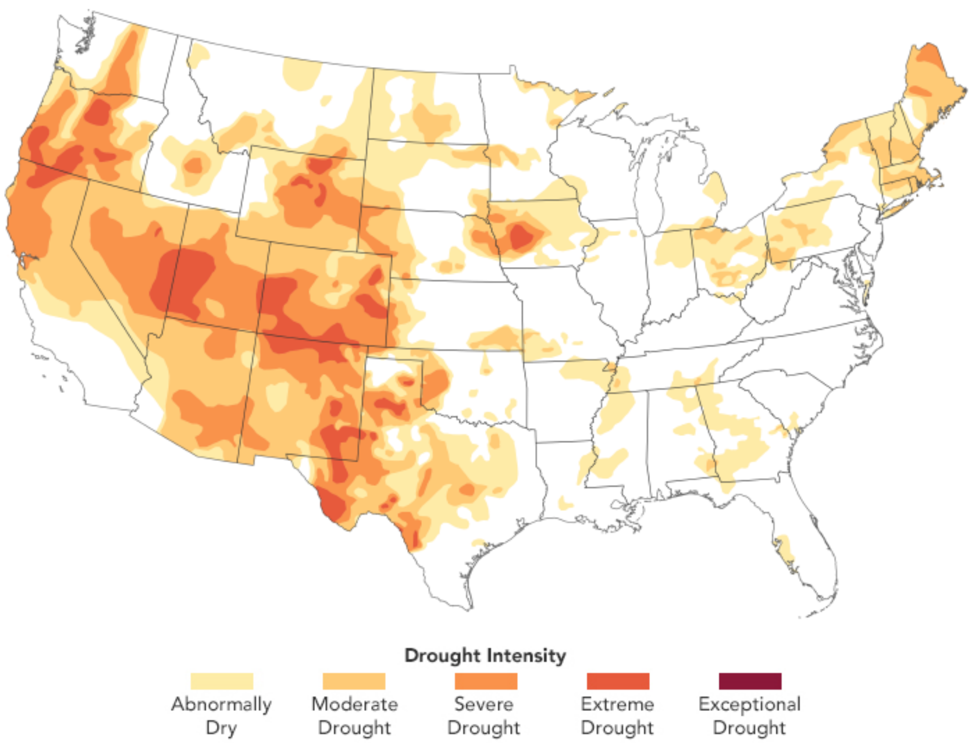
To prepare for the next drought, the District staff is considering a second recycled water fill station on District-owned property near the intersection of Wildwood Canyon Road and 5th Street, Yucaipa. This facility would be designed to provide recycled water to customers that have received training for the safe use of recycled water at their homes.



Source: https://earthobservatory.nasa.gov/images/147118/a-third-of-the-us-faces-drought

A Third of the U.S. Faces Drought

August 11, 2020

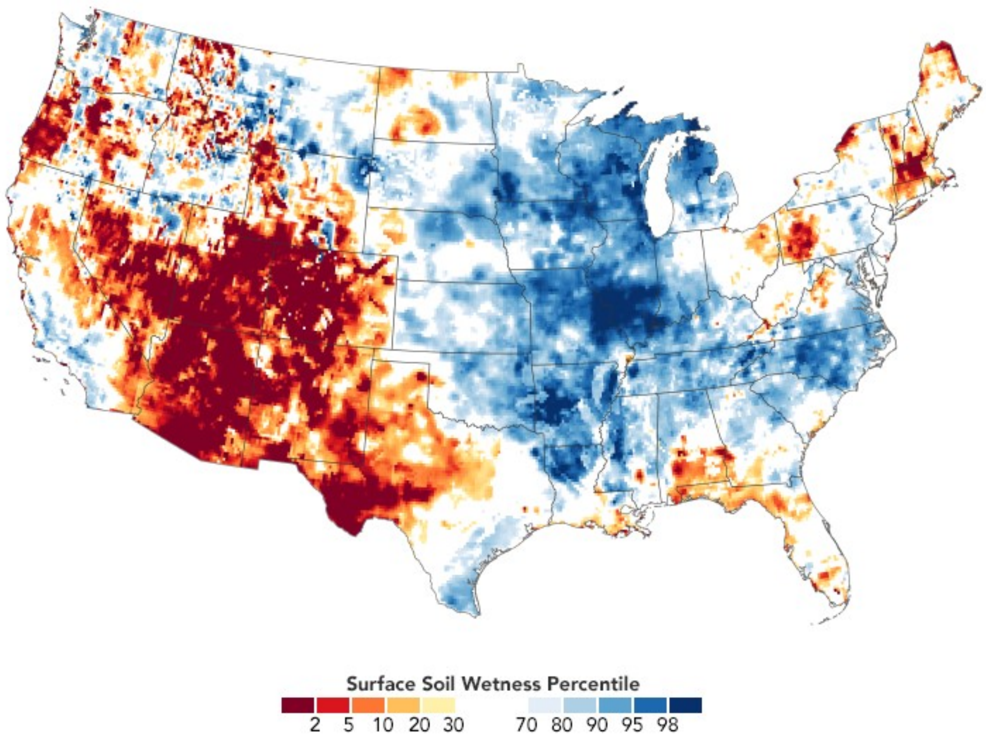


As the United States moves into the last weeks of climatological summer, one-third of the country is experiencing at least a moderate level of drought. Much of the West is approaching severe drought, and New England has been unusually dry and hot. An estimated 53 million people are living in drought-affected areas.

The map above shows conditions in the continental U.S. as of August 11, 2020, as reported by the U.S. Drought Monitor program, a partnership of the U.S. Department of Agriculture, the National Oceanic and Atmospheric Administration, and the University of Nebraska–Lincoln. The map depicts drought intensity in progressive shades of orange to red and is based on measurements of climate, soil, and water conditions from more than 350 federal, state, and local observers around the country. NASA provides experimental measurements and models to this drought monitoring effort.

According to the Drought Monitor, more than 93 percent of the land area in Utah, Colorado, Nevada, and New Mexico is in some level of drought; 69 percent of Utah is in severe drought, as is 61 percent of Colorado. More than three-fourths of Oregon, Arizona, and Wyoming are also in drought. The effects of "severe" drought include stunted and browning crops, limited pasture yields, dust storms, reduced well water levels, and an increase in the number and severity of wildfires. Most of those areas had no sign of drought in the mid-summer of 2019.

The map below shows surface soil moisture as of August 10, 2020, as measured by the Gravity Recovery and Climate Experiment Follow-On (GRACE-FO) satellites. The colors depict the wetness percentile; that is, how the levels of soil moisture compare to long-term records for the month. Blue areas have more abundant water than usual, and orange and red areas have less. The darkest reds represent dry conditions that should occur only 2 percent of the time (about once every 50 years). Note that the Mississippi and Missouri river watersheds are still quite moist from persistent winter and spring rains.



The GRACE-FO satellites detect the movement of water based on subtle shifts in Earth's gravity field from month to month. Variations in land topography or ocean tides change the distribution of Earth's mass and gravity field, as does the addition or subtraction of water. GRACE-FO data are integrated with data from the original GRACE mission (2002-2017) and with current and historical ground-based observations using a sophisticated numerical model of water and energy processes at the land surface.

Warm air temperatures and minimal snowfall in spring set the stage for the advancing drought. A ridge of high pressure over the northeastern Pacific Ocean has sent the jet stream farther north than usual. And meteorologists pointed to another failure of the southwestern monsoon for much of the parched landscape. In a typical summer, atmospheric high pressure over the southern Rocky Mountains draws moisture in from the Gulf of California and Gulf of Mexico and make July and August the rainiest time of year in Arizona, New Mexico, and the Four Corners region—providing half of the year's precipitation in some areas.

But this year the monsoon has failed to deliver. Atmospheric high pressure has been centered farther south than usual, drawing in westerly winds. Extreme heat has baked the region, with several states averaging temperatures 3 to 5 degrees Fahrenheit above normal. Phoenix has already set a record for the most days above 110°F in a calendar year (34), with five months to go. According to the Weather Channel, Las Vegas has not seen measurable rainfall since mid-April, and Cedar City, Utah, has recorded just 0.05 inches of rain this summer, making it the driest on record.

Forecasts from the NOAA Climate Prediction Center suggest that conditions in the West will not get better any time soon. According to NOAA climatologists, hot and dry weather are expected through late October.

NASA Earth Observatory images by Lauren Dauphin, using GRACE data from the National Drought Mitigation Center and data from the United States Drought Monitor at the University of Nebraska-Lincoln.

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Board Reports and Comments

Yucaipa Valley Water District

Yucaipa Valley Water District

FACTS ABOUT THE YUCAIPA VALLEY WATER DISTRICT

Service Area Size: 40 square miles (sphere of influence is 68 square miles)

Elevation Change: 3,140 foot elevation change (from 2,044 to 5,184 feet)

Number of Employees:
5 elected board members
72 full time employees

FY 2019-20 Operating Budget:
Water Division - $14,455,500
Sewer Division - $12,217,712
Recycled Water Division - $1,301,447

Number of Services:
13,794 drinking water connections serving 19,243 units
14,104 sewer connections serving 22,774 units
111 recycled water connections serving 460 units

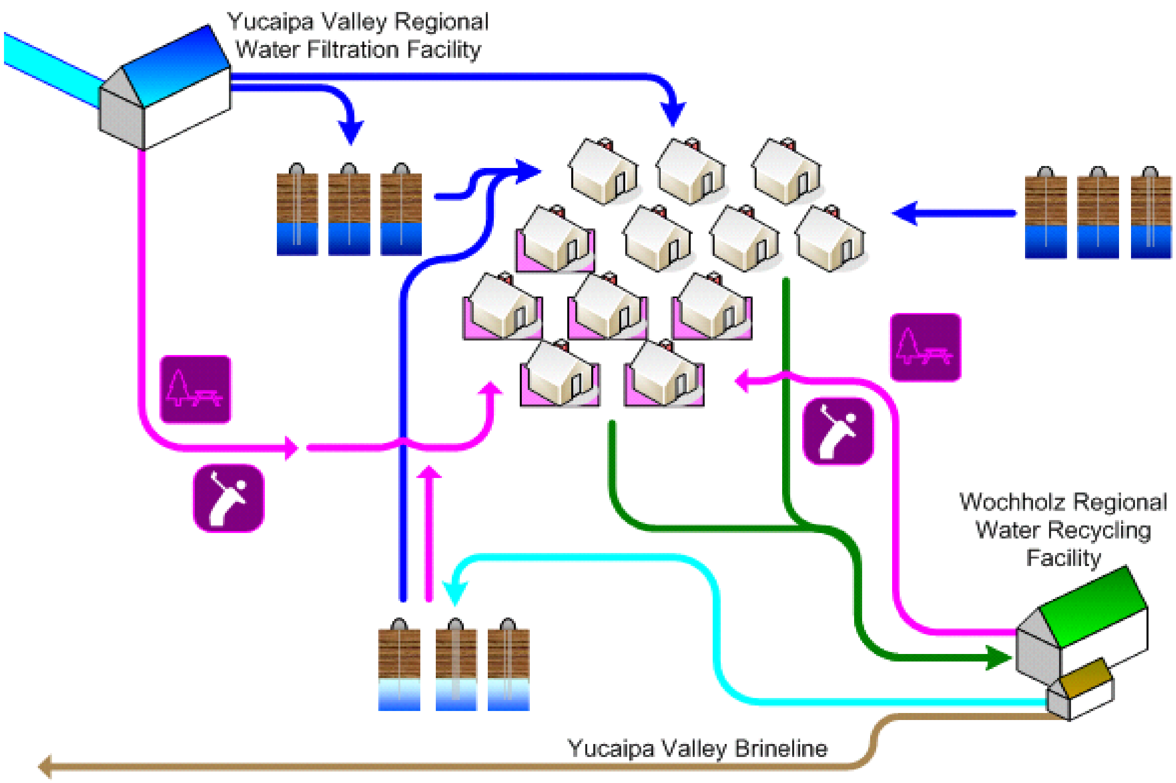
Water System:
223 miles of drinking water pipelines
2,033 fire hydrants
27 reservoirs - 34 million gallons of storage capacity
18 pressure zones
2.958 billion gallon annual drinking water demand
Two water filtration facilities:
- 1 mgd at Oak Glen Surface Water Filtration Facility
- 12 mgd at Yucaipa Valley Regional Water Filtration Facility

Sewer System:
8.0 million gallon treatment capacity - current flow at 3.5 mgd
213 miles of sewer mainlines
4,504 sewer manholes
5 sewer lift stations
1.27 billion gallons of recycled water produced per year

Recycled Water:
22 miles of recycled water pipelines
5 reservoirs - 12 million gallons of storage
0.681 billion gallon annual recycled water demand

Brine Disposal:
2.2 million gallon desalination facility at sewer treatment plant
1.756 million gallons of Inland Empire Brine Line capacity
0.595 million gallons of treatment capacity in Orange County

Sustainability Plan: A Strategic Plan for a Sustainable Future: The Integration and Preservation of Resources, adopted on August 20, 2008.



Typical Rates, Fees and Charges:

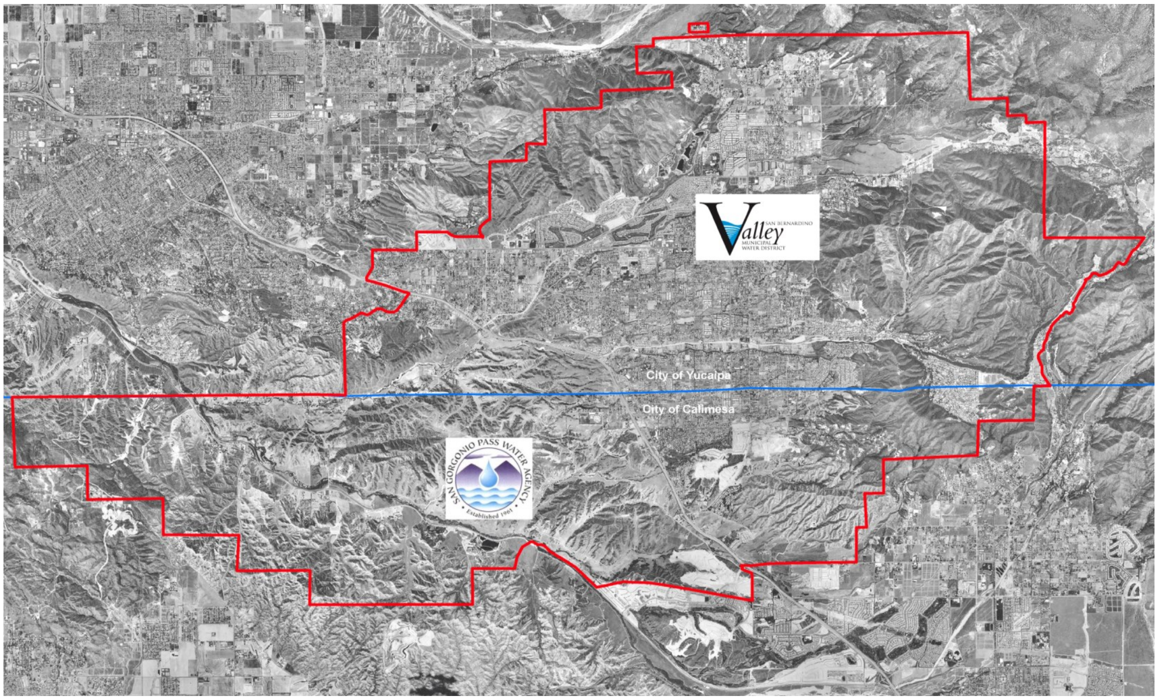
- Drinking Water Commodity Charge:
  - 1,000 gallons to 15,000 gallons — $1.429 per each 1,000 gallons
  - 16,000 gallons to 60,000 gallons — $1.919 per each 1,000 gallons
  - 61,000 gallons to 100,000 gallons — $2.099 per each 1,000 gallons
  - 101,000 gallons or more — $2.429 per each 1,000 gallons

- Recycled Water Commodity Charge:
  - 1,000 gallons or more — $1.425 per each 1,000 gallons

- Water Meter Service Charge (Drinking Water or Recycled Water):
  - 5/8” x 3/4” Water Meter — $14.00 per month
  - 1” Water Meter — $23.38 per month
  - 1-1/2” Water Meter — $46.62 per month

- Sewer Collection and Treatment Charge:
  - Typical Residential Charge — $42.43 per month

State Water Contractors: San Bernardino Valley Municipal Water District
San Gorgonio Pass Water Agency



	San Bernardino Valley Municipal Water District	San Gorgonio Pass Water Agency
Service Area Size	353 square miles	222 square miles
Table "A" Water Entitlement	102,600 acre feet	17,300 acre feet
Imported Water Rate	$125.80 / acre foot	$399 / acre foot
Tax Rates for FY 2019-20	$0.1425 per $100	$0.1775 per $100
Number of Board Members	Five (5)	Seven (7)
Operating Budget FY 2019-20	$58,372,000	$9,551,000

Imported Water Charges (Pass-through State Water Project Charge)

- San Bernardino Valley Municipal Water District - Customers in San Bernardino County or City of Yucaipa pay a pass-through amount of $0.270 per 1,000 gallons.

- San Gorgonio Pass Water Agency - Customers in Riverside County or City of Calimesa pay a pass-through amount of $0.660 per 1,000 gallons. A proposed rate change to $0.857 per 1,000 gallons is pending future consideration by YVWD.

Yucaipa Valley Water District

GLOSSARY OF COMMONLY USED TERMS

Every profession has specialized terms which generally evolve to facilitate communication between individuals. The routine use of these terms tends to exclude those who are unfamiliar with the particular specialized language of the group. Sometimes jargon can create communication cause difficulties where professionals in related fields use different terms for the same phenomena.

Below are commonly used water terms and abbreviations with commonly used definitions. If there is any discrepancy in definitions, the District's Regulations Governing Water Service is the final and binding definition.

Acre Foot of Water - The volume of water (325,850 gallons, or 43,560 cubic feet) that would cover an area of one acre to a depth of 1 foot.

Activated-Sludge Process - A secondary biological wastewater treatment process where bacteria reproduce at a high rate with the introduction of excess air or oxygen and consume dissolved nutrients in the wastewater.

Annual Water Quality Report - The document is prepared annually and provides information on water quality, constituents in the water, compliance with drinking water standards and educational material on tap water. It is also referred to as a Consumer Confidence Report (CCR).

Aquifer - The natural underground area with layers of porous, water-bearing materials (sand, gravel) capable of yielding a supply of water; see Groundwater basin.

Backflow - The reversal of water's normal direction of flow. When water passes through a water meter into a home or business it should not reverse flow back into the water mainline.

Best Management Practices (BMPs) - Methods or techniques found to be the most effective and practical means in achieving an objective. Often used in the context of water conservation.

Biochemical Oxygen Demand (BOD) - The amount of oxygen used when organic matter undergoes decomposition by microorganisms. Testing for BOD is done to assess the amount of organic matter in water.

Biosolids - Biosolids are nutrient rich organic and highly treated solid materials produced by the wastewater treatment process. This high-quality product can be recycled as a soil amendment on farmland or further processed as an earth-like product for commercial and home gardens to improve and maintain fertile soil and stimulate plant growth.

Capital Improvement Program (CIP) - Projects for repair, rehabilitation, and replacement of assets. Also includes treatment improvements, additional capacity, and projects for the support facilities.

Certificate of Participation (COP) – A type of financing where an investor purchases a share of the lease revenues of a program rather than the bond being secured by those revenues.

Coliform Bacteria - A group of bacteria found in the intestines of humans and other animals, but also occasionally found elsewhere used as indicators of sewage pollution. E. coli are the most common bacteria in wastewater.

Collections System - In wastewater, it is the system of typically underground pipes that receive and convey sanitary wastewater or storm water.

Conjunctive Use - The coordinated management of surface water and groundwater supplies to maximize the yield of the overall water resource. Active conjunctive use uses artificial recharge, where surface water is intentionally percolated or injected into aquifers for later use. Passive conjunctive use is to simply rely on surface water in wet years and use groundwater in dry years.

Consumer Confidence Report (CCR) - see Annual Water Quality Report.

Contaminants of Potential Concern (CPC) - Pharmaceuticals, hormones, and other organic wastewater contaminants.

Cross-Connection - The actual or potential connection between a potable water supply and a non-potable source, where it is possible for a contaminant to enter the drinking water supply.

Disinfection by-Products (DBPs) - The category of compounds formed when disinfectants in water systems react with natural organic matter present in the source water supplies. Different disinfectants produce different types or amounts of disinfection byproducts. Disinfection byproducts for which regulations have been established have been identified in drinking water, including trihalomethanes, haloacetic acids, bromate, and chlorite

Drought - a period of below average rainfall causing water supply shortages.

Fire Flow - The ability to have a sufficient quantity of water available to the distribution system to be delivered through fire hydrants or private fire sprinkler systems.

Gallons per Capita per Day (GPCD) - A measurement of the average number of gallons of water use by the number of people served each day in a water system. The calculation is made by dividing the total gallons of water used each day by the total number of people using the water system.

Groundwater Basin - An underground body of water or aquifer defined by physical boundaries.

Groundwater Recharge - The process of placing water in an aquifer. Can be a naturally occurring process or artificially enhanced.

Hard Water - Water having a high concentration of minerals, typically calcium and magnesium ions.

Hydrologic Cycle - The process of evaporation of water into the air and its return to earth in the form of precipitation (rain or snow). This process also includes transpiration from plants, percolation into the ground, groundwater movement, and runoff into rivers, streams, and the ocean; see Water cycle.

Levels of Service (LOS) - Goals to support environmental and public expectations for performance.

Mains, Distribution - A network of pipelines that delivers water (drinking water or recycled water) from transmission mains to residential and commercial properties, usually pipe diameters of 4" to 16".

Mains, Transmission - A system of pipelines that deliver water (drinking water or recycled water) from a source of supply the distribution mains, usually pipe diameters of greater than 16".

Meter - A device capable of measuring, in either gallons or cubic feet, a quantity of water delivered by the District to a service connection.

Overdraft - The pumping of water from a groundwater basin or aquifer in excess of the supply flowing into the basin. This pumping results in a depletion of the groundwater in the basin which has a net effect of lowering the levels of water in the aquifer.

Pipeline - Connected piping that carries water, oil, or other liquids. See Mains, Distribution and Mains, Transmission.

Point of Responsibility, Metered Service - The connection point at the outlet side of a water meter where a landowner's responsibility for all conditions, maintenance, repairs, use and replacement of water service facilities begins, and the District's responsibility ends.

Potable Water - Water that is used for human consumption and regulated by the California Department of Public Health.

Pressure Reducing Valve - A device used to reduce the pressure in a domestic water system when the water pressure exceeds desirable levels.

Pump Station - A drinking water or recycled water facility where pumps are used to push water up to a higher elevation or different location.

Reservoir - A water storage facility where water is stored to be used at a later time for peak demands or emergencies such as fire suppression. Drinking water and recycled water systems will typically use concrete or steel reservoirs. The State Water Project system considers lakes, such as Shasta Lake and Folsom Lake to be water storage reservoirs.

Runoff - Water that travels downward over the earth's surface due to the force of gravity. It includes water running in streams as well as over land.

Santa Ana River Interceptor (SARI) Line - A regional brine line designed to convey 30 million gallons per day (MGD) of non-reclaimable wastewater from the upper Santa Ana River basin to Orange County Sanitation District for treatment, use and/or disposal.

Secondary treatment - Biological wastewater treatment, particularly the activated-sludge process, where bacteria and other microorganisms consume dissolved nutrients in wastewater.

Service Connection - The water piping system connecting a customer's system with a District water main beginning at the outlet side of the point of responsibility, including all plumbing and equipment located on a parcel required for the District's provision of water service to that parcel.

Sludge - Untreated solid material created by the treatment of wastewater.

Smart Irrigation Controller - A device that automatically adjusts the time and frequency which water is applied to landscaping based on real-time weather such as rainfall, wind, temperature, and humidity.

South Coast Air Quality Management District (SCAQMD) - Regional regulatory agency that develops plans and regulations designed to achieve public health standards by reducing emissions from business and industry.

Special district - A form of local government created by a local community to meet a specific need. Yucaipa Valley Water District is a County Water District formed pursuant to Section 30000 of the California Water Code

Supervisory Control and Data Acquisition (SCADA) - A computerized system which provides the ability to remotely monitor and control water system facilities such as reservoirs, pumps, and other elements of water delivery.

Surface Water - Water found in lakes, streams, rivers, oceans, or reservoirs behind dams. In addition to using groundwater, Yucaipa Valley Water District receives surface water from the Oak Glen area.

Sustainable Groundwater Management Act (SGMA) - Pursuant to legislation signed by Governor Jerry Brown in 2014, the Sustainable Groundwater Management Act requires water agencies to manage groundwater extractions to not cause undesirable results from over production.

Transpiration - The process by which water vapor is released into the atmosphere by living plants.

Trickling filter - A biological secondary treatment process in which bacteria and other microorganisms, growing as slime on the surface of rocks or plastic media, consume nutrients in wastewater as it trickles over them.

Underground Service Alert (USA) - A free service (https://www.digalert.org) that notifies utilities such as water, telephone, cable and sewer companies of pending excavations within the area (dial 8-1-1 at least 2 working days before you dig).

Urban runoff - Water from city streets and domestic properties that carry pollutants into the storm drains, rivers, lakes, and oceans.

Valve - A device that regulates, directs, or controls the flow of water by opening, closing, or partially obstructing various passageways.

Wastewater - Any water that enters the sanitary sewer.

Water Banking - The practice of actively storing or exchanging in-lieu surface water supplies in available groundwater basin storage space for later extraction and use by the storing party or for sale or exchange to a third party. Water may be banked as an independent operation or as part of a conjunctive use program.

Water Cycle - The continuous movement water from the earth's surface to the atmosphere and back again.

Water Pressure - Water pressure is created by the weight and elevation of water and/or generated by pumps that deliver water to customers.

Water Service Line - A water service line is used to deliver water from the Yucaipa Valley Water District's mainline distribution system.

Water table - the upper surface of the zone of saturation of groundwater in an unconfined aquifer.

Water transfer - a transaction, in which a holder of a water right or entitlement voluntarily sells/exchanges to a willing buyer the right to use all or a portion of the water under that water right or entitlement.

Watershed - A watershed is the region or land area that contributes to the drainage or catchment area above a specific point on a stream or river.

Water-Wise House Call - a service which provides a custom evaluation of a customer's indoor and outdoor water use and landscape watering requirements.

Well - a hole drilled into the ground to tap an underground aquifer.

Wetlands - lands which are fully saturated or under water at least part of the year, like seasonal vernal pools or swamps.

Yucaipa Valley Water District

COMMONLY USED ABBREVIATIONS

AQMD	Air Quality Management District
BOD	Biochemical Oxygen Demand
CARB	California Air Resources Board
CCTV	Closed Circuit Television
CWA	Clean Water Act
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
FOG	Fats, Oils, and Grease
GPD	Gallons per day
MGD	Million gallons per day
O & M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
POTW	Publicly Owned Treatment Works
PPM	Parts per million
RWQCB	Regional Water Quality Control Board
SARI	Santa Ana River Inceptor
SAWPA	Santa Ana Watershed Project Authority
SBVMWD	San Bernardino Valley Municipal Water District
SCADA	Supervisory Control and Data Acquisition system
SGMA	Sustainable Groundwater Management Act
SSMP	Sanitary Sewer Management Plan
SSO	Sanitary Sewer Overflow
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
WDR	Waste Discharge Requirements
YVWD	Yucaipa Valley Water District