

Covid -19 & Recycled Water: Reassuring an Anxious Public



Mark Millan
May 22, 2020



Sewage Analysis Can Provide Early Warning System for Covid19 Infection, Dutch Researchers Say

Devrupa Raskshit, The Swaddle 4/10/20

Scientists from the Netherlands were able to detect [traces of the novel coronavirus](#) on March 5 at a wastewater treatment plant in Kaatsheuvel, the town where the first Dutch case of Covid19 was reported four days earlier.

Now, scientists are exploring the prospect of wastewater analysis acting as an early warning system for the infection.

Gertjan Medema, PhD

KWR Water Research Institute in Nieuwegein, the Netherlands



The human body sheds traces of any virus that's in our systems through stool, so as more and more people get infected, the virus enters the sewage system.

Monitoring the levels of the virus in the sewage water can provide insights into the magnitude of infected patients in the population, said researchers from the [KWR Water Research Institute](#) in Netherlands.

“The detection of the virus in sewage... indicates that sewage surveillance could be a sensitive tool to monitor the circulation of the virus in the population.”

SARS-CoV-2: Wastewater Epidemiology in Las Vegas

April 28, 2020



Daniel Gerrity, Ph.D.
Southern Nevada Water Authority
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Katerina Papp, Ph.D.
Southern Nevada Water Authority



Implications of Wastewater Detection of SARS-CoV-2 Genetic Material

- **Wastewater detection of RNA \neq Infectivity**
 - Nearly all studies to date have focused on detecting SARS-CoV-2 genetic material
 - Presence of genetic material does not necessarily imply any public health risk
 - Cell culture methods require BSL-3 precautions → limited to specialized labs (future work)
- **Fecal Detection of RNA \neq Infectivity (i.e., clinical samples)**
 - Attempts to isolate infectious SARS-CoV-2 have generally been unsuccessful (similar for SARS-CoV-1)
 - Possible that even untreated wastewater contains only inactivated viruses (more research needed)
- **Implications for Water Reuse**
 - Disinfection processes used in water reuse applications are typically designed for enteric pathogens
 - Enteric pathogens are generally more persistent in the environment and resistant to treatment
 - Conventional treatment practices are expected to be adequately protective of public health^{a,b}
 - UV disinfection^c: 6-log inactivation of a *Coronaviridae* virus = 4 mJ/cm²
 - Chlorine disinfection^d: 3.5-log inactivation of Ebola (enveloped) = free chlorine CT of 0.05 mg-min/L

^a**Source:** WE&T (April 2020)

^b**Source:** Wigginton and Boehm (2020) ES&T

^c**Source:** Lytle and Sagripanti (2005) J. Virol.

^d**Source:** Bibby et al. (2015) ES&T Letters

Daniel Gerrity, Ph.D.

“As a water/wastewater/water reuse agency, there may be opportunities to actively participate in this important research effort...

One option is to freeze at least 1 liter of composite influent wastewater/raw sewage each week—or whatever frequency is practical for a given facility.”

daniel.gerrity@snwa.com

Poop tests in sewage might predict coronavirus surge

The race is on to study wastewater as a possible early warning for COVID-19.



“It’s suspected that the number of infections far exceeds confirmed COVID-19 cases because many of those with the virus display no signs of infection and haven’t been tested.

It’s hoped that the sewage tests can better gauge the magnitude of infection in a given area as well as provide advance notice before swarms of sick people begin showing up at the hospital.”

“Scientists across the nation are examining Southern California’s poop — maybe even yours — with the hope of more quickly identifying COVID-19 hotspots and better preparing for future surges.

The information could also signal when stay-at-home orders can be safely eased in specific communities.”

“Fecal surveillance is like testing an entire city”

<https://coloradosun.com>

Colorado sewage treatment plants are examining your poop for coronavirus clues. Seriously.

Humans begin to shed coronavirus in their feces within three days of infection, which could provide a heads up on outbreaks. At least three Colorado water treatment systems are studying poo for warning signs.

MAY 13, 2020 4:20AM MDT

CORONAVIRUS



Nancy Lofholm @nlofholm

Special to The Colorado Sun
[See more](#)

[f](#) [t](#) [r](#) [v](#) [w](#) [More](#)

Credibility Indicators

These are selected by the writer and confirmed by the editor

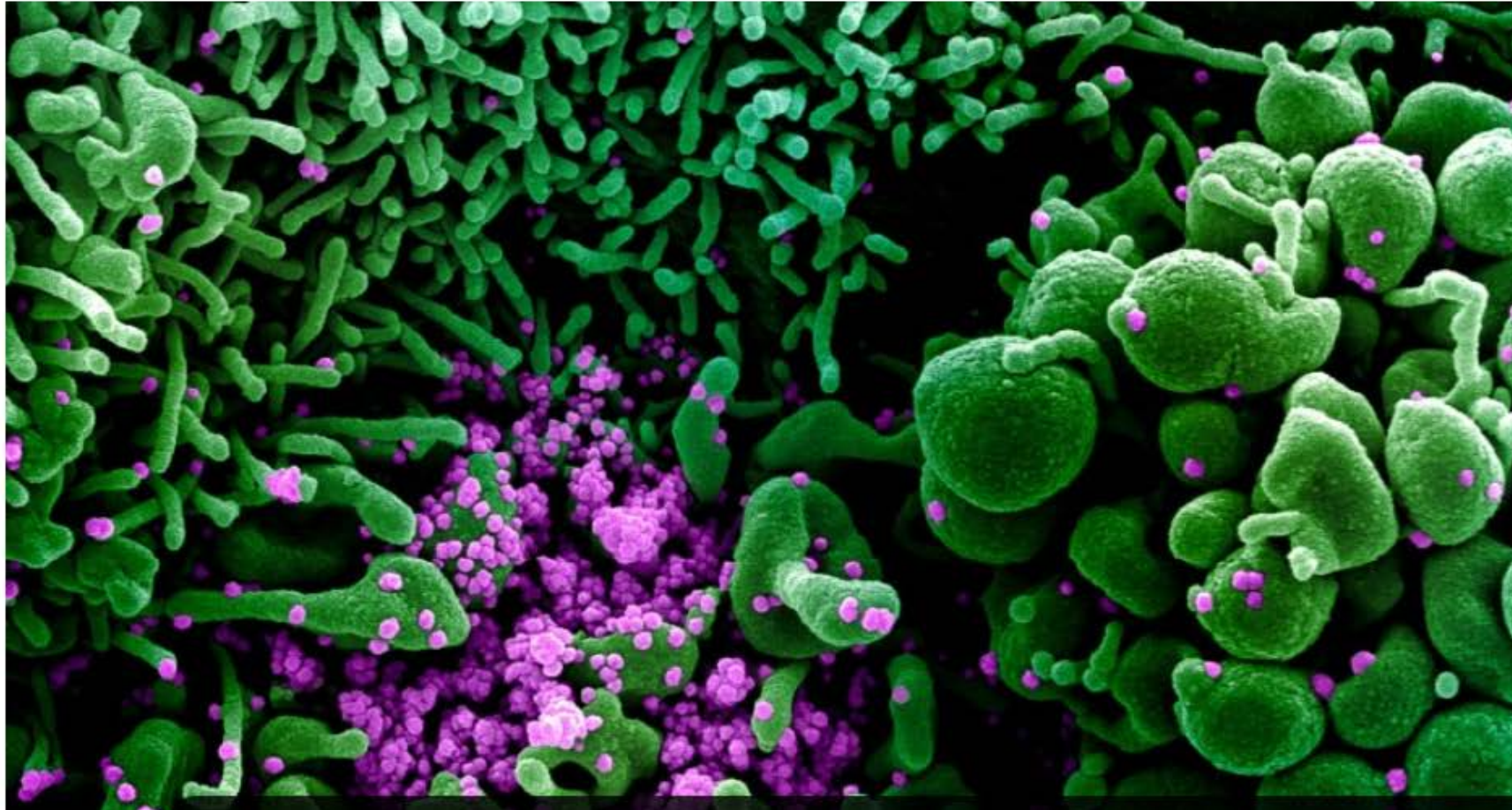
Original Reporting +

For 24 hours starting early every Sunday morning, small pipes suck samples from the river of sewage flowing into the South Platte Water Renewal Partners wastewater treatment plant in Englewood for 24 hours.

April 29, 2020

Los Angeles Times

Poop may tell us when the coronavirus lockdown will end



CORONAVIRUS >

Washington farmers
do with a billion po

Is time flying by od
why you may feel th

'I'm watching a ton
answers coronavirus:

Tracking California's
advice and distracti

Coronavirus live up
emergency must be

New York Times May 1, 2020

Is It Safe to Come Out of Lockdown? Check the Sewer

Wastewater could provide early, painless and localized data about the rise or fall of coronavirus levels.



[Coronavirus Outbreak >](#)

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Building Your Message

Be a Trusted Source of Information



Outreach Attributes:

- Timely
- Authentic, Caring
- Forward Thinking
- Trustworthy
- Science-based
- Factual
- Competent

CAP Principle



Caring: Communicate care, concern, empathy or compassion. Also seriousness of situation.



Action: Communicate what you have done, are doing, or will do to address the issue.



Perspective: Share information that provides context.

"It's been proven that if you show genuine concern off the top, people will be more apt to listen."

This is extremely important in a crisis situation."

Judy Pal



Fact Sheet

Reminder About California's Drinking Water Systems *State-Required Treatment Process Removes Viruses, Including COVID-19*

- California's comprehensive and safe drinking water standards require a multi-step treatment process that includes filtration and disinfection. This process removes and kills viruses, including coronaviruses such as COVID-19, as well as bacteria and other pathogens.
- The State Water Board's [Division of Drinking Water](#) establishes and enforces drinking water standards that ensure the delivery of pure, safe, and potable water. In addition to health-based water quality standards, treatment facilities must comply with stringent performance measures to ensure treatment processes are continuously operating at peak performance.
- The treatment process must destroy at least 99.99% of viruses. The limited number that might pass through the removal process are quickly inactivated in the disinfection process, typically in less than 10 minutes. All treatment facilities for surface water sources in California are required to maintain disinfection facilities sufficient to destroy *giardia* cysts, which are much more resilient than viruses.
- COVID-19 is transmitted person to person, not through water, according to the [Centers for Disease Control and Prevention](#).
- Public water systems that utilize groundwater sources maintain protective physical measures, including soil barriers, to ensure that water sources are protected from pathogens, including viruses. In addition, most of these systems use chlorine disinfection to inactivate viruses or bacteria that might find their way into the water.
- All public water systems in California are routinely monitored for bacteria to ensure that water delivered to customers is free of disease-causing agents. Other parameters, including temperature, pH, turbidity, chlorine residual, electrical conductivity, lead and copper, corrosion indices and disinfection byproducts, are monitored to alert operators about changing water quality conditions and avert potential problems.
- The State Water Board works closely with local water systems to ensure the safety of water that flows through public water systems to residential customers.



CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
STATE WATER RESOURCES CONTROL BOARD
1001 I Street, Sacramento, CA 95814 • Mailing Address: P.O. Box 100, Sacramento, CA 95812-0100 • www.waterboards.ca.gov



Refer to Trusted Sources:

EPA

CDC

State Governor's Office
County Health Dept

“There is no evidence that COVID-19 survives the disinfection process for drinking water or wastewater. California's comprehensive safe drinking water standards include disinfection processes for drinking water which are extremely effective against viruses, including coronaviruses such as COVID-19.”

California Water Board

Incident Action Checklist – Pandemic Incidents

The actions in this checklist are divided up into three “rip & run” sections and are examples of activities the water sector (drinking water and wastewater systems) can take to prepare for, respond to and recover from a pandemic. You can also populate the “My Contacts” sections with critical information that your utility may need during a pandemic.

Coronavirus Pandemic and Water Utilities

For general information from EPA about COVID-19 and water, see www.epa.gov/coronavirus. The risk of transmission of COVID-19 via drinking water is low. However, there are other impacts to drinking water and wastewater utilities, which may include, but are not limited to:

- Staff shortages due to absenteeism;
- Supply chain disruptions (chemicals, materials, personal protective equipment);
- Field operations interruptions (repairs, meter reading, sampling); and
- Inability to maintain all operations.

Many water and wastewater utilities have created pandemic resilience plans based on best practices and experiences from past global outbreaks such as the avian flu in 2003 and swine flu in 2009. Utilities should review and update those plans and stay in close contact with their local health department and regulatory agency as the COVID-19 situation is dynamic and evolving rapidly. Water and wastewater systems need the most up-to-date information in order to make decisions that are right for their utility based on the pandemic impacts to their specific community.





Expert third party statements

Dr. Matthew Arduino, Centers for Disease Control and prevention

“The risk of transmission of the virus that causes COVID-19 from the feces of an infected person is unknown. The risk is expected to be low based on data from previous outbreaks of related coronaviruses, such as SARS and MERS. There has been no confirmed fecal-oral transmission of COVID-19 to date.”

<https://www.cdc.gov/coronavirus/2019-ncov/php/water.html>

Source: <https://www.cdc.gov/coronavirus/2019-ncov/php/water.html>

Cases, Data, & Surveillance +

Communities, Schools & Workplaces +

Healthcare Professionals +

Health Departments -

Support for Health Departments +

Response Corps

Public Health Communicators

Evaluating PUIs Residential

Reporting a Confirmed Case

Travel-Associated Exposures

Community-Related Exposures

Pandemic Preparedness Resources

Households with Pets +

Is the COVID-19 virus found in feces? +

Can the COVID-19 virus spread through pools, hot tubs or spas, and water playgrounds? -

There is no evidence that COVID-19 can be spread to humans through the use of pools, hot tubs or spas, or water playgrounds. Proper operation, maintenance, and disinfection (e.g., with chlorine and bromine) of pools, hot tubs or spas, and water playgrounds should inactivate the virus that causes COVID-19.

While there is [ongoing community spread](#) of COVID-19, there should be appropriate care taken both in and outside the pool, to [protect yourself and others](#). Owners and operators of community pools, hot tubs, or spas should follow the [interim guidance for businesses and employers](#) to plan and respond to COVID-19.

Can the COVID-19 virus spread through sewerage systems? -

CDC is reviewing all data on COVID-19 transmission as information becomes available. At this time, the risk of transmission of the virus that causes COVID-19 through sewerage systems is thought to be low. Although transmission of the virus that causes COVID-19 through sewage may be possible, there is no evidence to date that this has occurred. This guidance will be updated as necessary as new evidence is assessed.

SARS, a similar coronavirus, has been detected in untreated sewage for up to 14 days. In the 2003 SARS outbreak, there was documented transmission associated with sewage aerosols. The available information suggests that standard municipal wastewater system chlorination practices may be sufficient to inactivate coronaviruses, as long as utilities monitor free available chlorine during treatment to ensure it has not been depleted.

Wastewater and sewage workers should use standard practices, practice basic hygiene precautions, and wear personal protective equipment ([PPE](#)) as prescribed for current work tasks.

Expert third party statements



Krista Wigginton, PhD, University of Michigan

"No cases of transmission via the fecal–oral route have been reported"



PPIC

PUBLIC POLICY
INSTITUTE OF CALIFORNIA

Informing and improving public policy through independent, objective, nonpartisan research

Wastewater Treatment Kills Most Pathogens, Including COVID-19 Virus

LORI POTTINGER

APRIL 13, 2020



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Californians reuse treated wastewater as a water supply, to irrigate crops, and to support freshwater ecosystems. To get answers to questions about managing the new coronavirus in the “sewershed,” we talked to two experts: [Kara Nelson](#), an expert in waterborne pathogens at UC Berkeley; and [Adam Link](#), executive director of the California Association of Sanitation Agencies.



Expert third party statements

Kara Nelson, an expert in waterborne pathogens at UC Berkeley

“We now have evidence that infectious coronavirus is excreted in the feces of infected individuals.

The good news is that in the US, we already assume wastewater is full of high concentrations of infectious organisms like viruses, and we have practices in place to deal with them—including ways to protect workers from exposure.”

Expert third party statements



Dr. Allison McGreer, Infectious Disease Specialist, Mount Sinai in Toronto

"There is no need to worry about cooling towers. Legionella is a problem because it grows in the water in cooling towers.

Viruses only grow within living eukaryotic cells. Therefore it cannot grow in cooling towers. Even if one becomes contaminated, the concentration will be too low to cause any damage."

[HOME](#) | [WATER UTILITY MANAGEMENT](#)

Water quality issues, safety concerns are significant drags on water utility customer satisfaction

Results of J.D. Power's 2020 U.S. Water Utility Residential Customer Satisfaction Study show customer satisfaction challenges across the country.

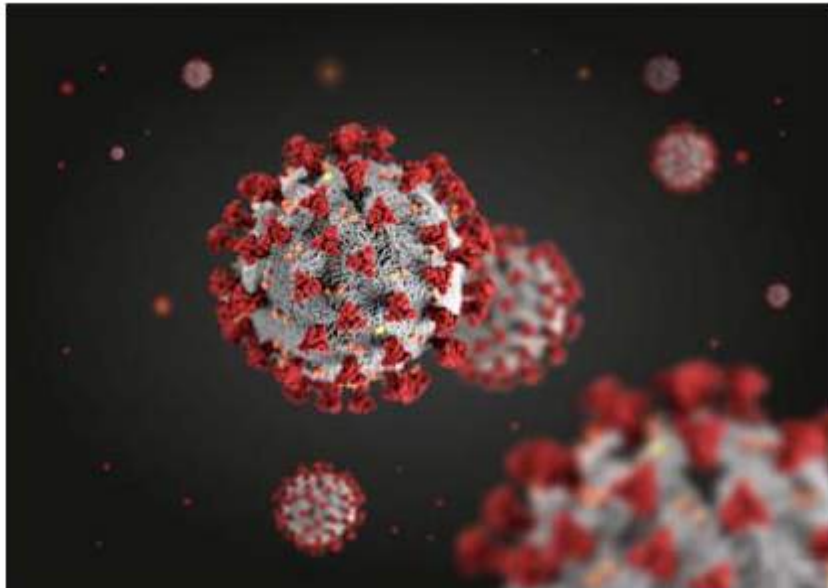
May 6th, 2020

Household water use increases during COVID-19, but misinformation persists: Water consumption has increased significantly during the COVID-19 pandemic, with 36% of households saying they are consuming more water than they did previously, which includes drinking 18% more glasses of water and doubling the number of times they wash their hands. Despite evidence to the contrary provided by the Centers for Disease Control, 41% of water utility customers across the country express concern regarding the transmission of COVID-19 through their drinking water supply.

www.waterworld.com/water-utility-management/article/14175387

- 💧 Proactive communications have powerful effect, but few utilities deliver: Overall satisfaction scores are 106 points higher when customers recall receiving four or more proactive communications from their utility (e.g., phone call, email, text message or social media message) than when customers do not recall a proactive communication.
- 💧 Despite the powerful effect proactive communications have on customer satisfaction, just 5 percent of water utility customers recall receiving four or more communications from their utility. Less than one-third of customers recall receiving any communications from their water utility.

www.waterworld.com/water-utility-management/article/14175387



www.soquelcreekwater.org

We want to reassure our customers with these three vital points during this pandemic:

1. Your drinking water is safe.
2. No one's water will be shut off.
3. We're maintaining social distancing while still providing water service 24/7.

[Visit our website for more information.](http://www.soquelcreekwater.org)



Who We Are ▾

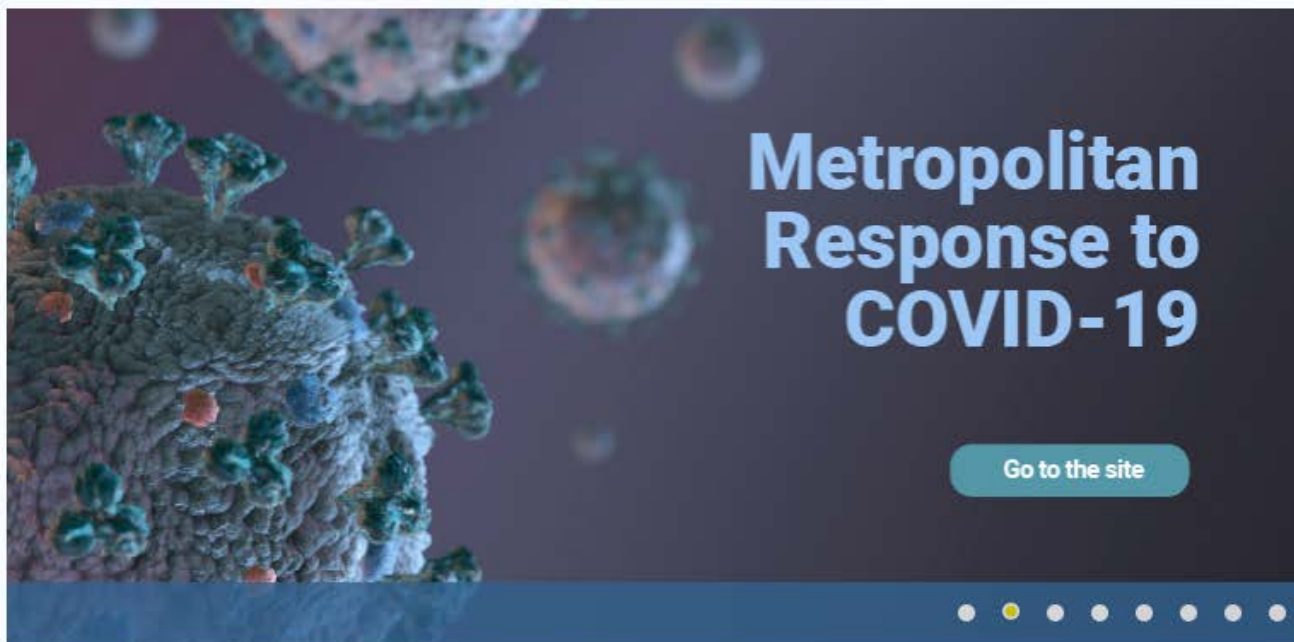
About Your Water ▾

In the Community ▾

Doing Business With Us ▾

Careers ▾

Newsroom ▾



Top Issues

[COVID-19 Water Info.](#)

[Pathways to Water Careers](#)

[PFAS](#)

[Regional Recycled Water](#)

[Integrated Resources Plan](#)

Governance

[Board Meetings](#)

[General Manager](#)

Other News

[Frequently Asked Questions about COVID-19 \(Chinese\)](#) | [Preguntas frecuentes sobre COVID-19 \(Spanish\)](#) | [Frec](#)



Who We Are

Metropolitan Water District is a regional wholesaler that delivers water.

Mission

MWD Act & Code

Board Agendas

► Board

► Management

About Your Water

Metropolitan built and maintains a water supply system that is the cornerstone of the region's economy.

Water Tomorrow

Colorado River

Conservation

Climate Action Plan

Delta Conveyance

In The Community

Metropolitan promotes conservation and sustainability through school programs, activities and events.

► Environment

► Conservation Programs

► Community Outreach

► Education Programs

Rates & Reports

Metropolitan surpasses stringent standards in financial and water quality/resources reporting.

Proposed Budget & Rates

Review of AV Tax Limit

Current AV Tax Rate

Current Budget & Rates

Financial Reports

www.mwdh2o.com



COVID-19: No impact on SFPUC Water, Power, and Sewer Services

[Learn More](#)

Account Services

My Account – Water

- Start or Stop Service
- Water Payment Options
- One-time Payment

My Account – Power

- Start or Stop Service
- Power Payment Options
- One-time Payment

www.sfwater.org

■ CONTRACTS AND BIDS

[PREQUALIFY NOW](#)

Construction & Professional Services Contracts, Contractor/Engineer List for Floodwater Grant

■ ABOUT US

[PUBLIC POWER OPTIONS](#)

City submits offer letter for PG&E assets in San Francisco

■ WATER QUALITY

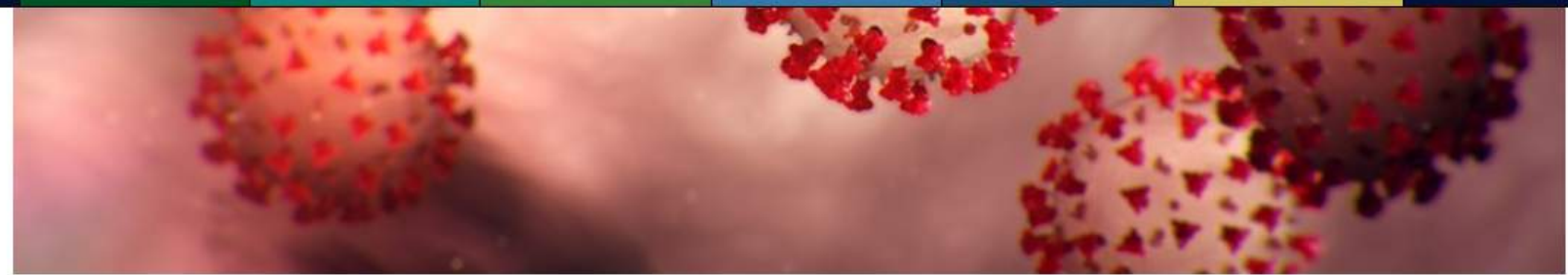
[ANNUAL WATER QUALITY REPORT](#)

Our drinking water sources are tested 100K+ times per year. View our report here.

■ ABOUT US

[PUBLIC NOTICES](#)

Public Notices and Public Meeting Notices can be found here.

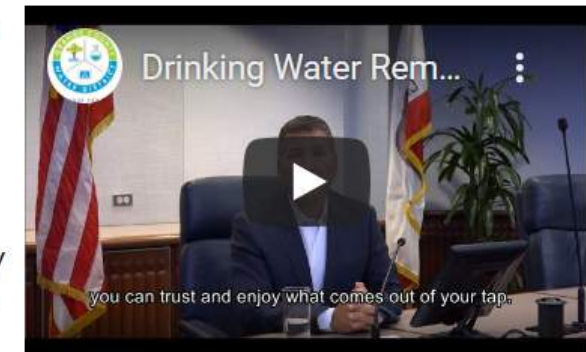
[and studies](#)[Presentations & fact sheets](#)[Reports](#)[News & events](#)[Resources](#)[H2ODrop](#)[› OC Water Hero](#)[How water works in OC](#)[Videos](#)[Water glossary](#)[COVID-19](#)www.ocwd.com

Responding to COVID-19

COVID-19 does not impact the quality or supply of your drinking water. Your tap water meets strict state and federal water quality guidelines. Please see the bottom of this page for additional information regarding water quality.

In an abundance of caution and to safeguard the health and safety of its employees and the community, the Orange County Water District is responding to the novel coronavirus (COVID-19) outbreak by implementing measures to reduce the risk of workplace transmission.

OCWD supports the concept of social distancing to reduce the possibility of contact between individuals who are or may be carrying a contagious disease. As such, OCWD will suspend group tours of all of its facilities (through May 31), suspend all staff travel, cancel and suspend planning for all District events such as the Children's Water Education Festival, suspend staff participation in speakers' bureau engagements and community outreach events, remotely participate in external meetings, and conduct internal meetings either remotely or in a manner that adheres to the appropriate CDC-recommended practice of social distancing.

[Video en Español](#) | [Video bằng tiếng Việt](#)



Coronavirus

Wastewater and Water Recycling

There are no impacts from the Coronavirus to Monterey One Water's wastewater or water recycling treatment processes. We want to reassure the community that Coronavirus, a respiratory illness like the flu or cold, is a prime example of the viruses and other pathogens wastewater treatment plants are designed to treat. Like normal, our state-approved laboratory will continue its regular sampling and testing protocol to ensure all water quality standards are met. The M1W staff is highly trained and prepared to protect public and environmental health and safety. For more information on COVID-19, please visit: <https://www.cdc.gov/coronavirus/2019-ncov/index.html>

Modified business operations are in effect and include the closure of our Ryan Ranch Office to the public. Phone support will be limited and customers are encouraged to email inquires@my1water.org. In addition, our website is available 24/7 with information and secure payment processing: http://montereyonewater.org/billpay_rates_customer_service.html

Administrative Offices



www.montereyonewater.org



The recent outbreak of novel coronaviruses (COVID-19) in Wuhan City, Hubei Province, China is being closely monitored as it causes acute respiratory illness and has the potential to be fatal (CDC, 2020). The COVID-19 and the 2002 SARS-CoV (severe acute respiratory syndrome coronavirus) are examples of how some coronaviruses that infect animals can evolve to infect humans.

Investigations into the COVID-19 outbreak are ongoing, and the information that we have right now may change as we learn more about this virus (WHO, 2020).

As water treatment professionals, we want to inform stakeholders of the current state of knowledge on coronaviruses as it relates to our practice.

Considerations for Water and Wastewater Treatment

Infectious human coronaviruses may be present in raw wastewater that is collected from a population where an infection is occurring. About 20-40% of SARS-CoV infections presented symptoms of diarrhea and the virus is capable of binding to receptors in the intestines as well as in the lungs (Leung et al. 2003). These viruses may be shed in feces and vomit from infected individuals for more than a week (Liu et al., 2003). The persistence of coronaviruses in wastewater and domestic sewage is not well understood (Wang et al., 2005).

Wastewater treatment plants that are receiving sewage from hospitals and isolation centers treating patients for coronaviruses may have elevated concentrations of viruses in the wastewater influent. Further, if wastewater treatment is insufficient to remove or inactivate coronaviruses, or combined sewer overflows/bypasses are operational, the viruses may be released into the environment (Casanova et al., 2009).

Coronaviruses have not been found to be more resistant to water treatment than other microorganisms such as *E. coli*, phage, or human viruses such as poliovirus, which are commonly used as surrogates for treatment performance evaluations (Gundy et al., 2009). Results from bench-scale studies suggest that the survival of coronaviruses is temperature dependent; with greater survival at lower temperatures. Therefore, the persistence of coronaviruses are expected to be reduced in raw wastewater and surface waters in warmer seasons.

Being honest about what you know and don't know

Recycled Water (non-potable):

- No evidence of virus in recycled water
- Treatment process destroys viruses in wastewater
- Describe your testing and monitoring regimen
- Meets or exceeds strict state and federal regulations
- Safely used for landscape, crop irrigation, and industrial uses

Purified Water (potable):

- Meets or exceeds strict state and federal drinking water standards
- Safely used in communities in the U.S. and around the world

We remain vigilant! As we learn more, you'll learn more.

COVID-19 and Water Reuse

Water Reuse 101

How Reuse Works

Where Reuse Happens

Expert Voices

Global Connections Map

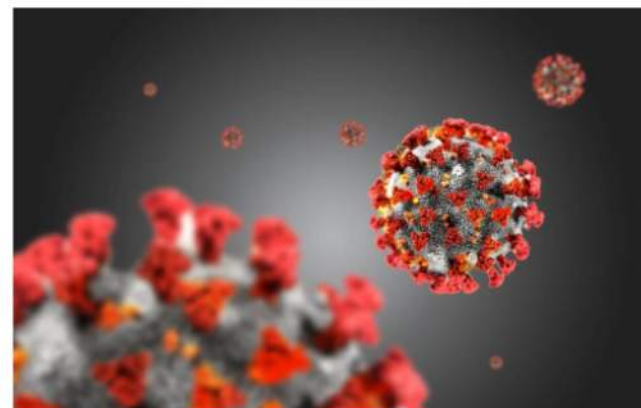
Glossary

Communications Tools & Resources

Public Health and Medical Community Initiative

Coronavirus (COVID-19) and Recycled Water

*Coronaviruses like COVID-19 are spread through the air by coughing or sneezing, through close personal contact (including touching and shaking hands) or through touching your nose, mouth or eyes before washing your hands. Learn more from the Centers for Disease Control and Prevention (CDC) about **how COVID-19 spreads** and **how to protect yourself and your community from getting and spreading respiratory illnesses**.*



What We Know about Recycled Water and COVID-19

Wastewater travels through sewers and pipelines to community wastewater treatment plants. There, it is either cleaned to a level where it is safe to return it to the environment, cleaned further to be used for non-drinking applications, or sent to a water purification facility for additional cleaning to meet drinking water standards.

Do wastewater and recycled water treatment plants treat COVID-19?

Yes, wastewater treatment plants treat viruses and other pathogens. Coronavirus, which causes COVID-19, is a type of virus that is particularly susceptible to disinfection. Standard treatment and disinfectant processes at wastewater treatment plants are expected to

watereuse.org/educate/covid-19-and-water-reuse/

What Works Well for Customers

- 💧 Develop messaging which shows empathy, outlines actions taken, and provides wider perspective
- 💧 Email broadcasts – push out frequent messages that can be further distributed
- 💧 Website, videos, social media, newsletters, bill inserts
- 💧 Virtual tours of your treatment process – emphasize treatment that destroys pathogens
- 💧 Media: use your relationships, engage, educate
- 💧 Work closely with community leaders, keep them informed too

Virtual Water Infrastructure Tour

Do you want to see how our water infrastructure works together to provide safe, clean drinking water for Santa Clara County? Valley Water is now offering virtual tours!

[Sign up for a free virtual tour today.](#)



Be a Trusted Source of Information

Outreach Attributes:

- Timely
- Authentic, Caring
- Forward Thinking
- **Trustworthy!**
- Science-based
- Factual
- Competent

2020 WaterReuse California Virtual Conference

Launching June 24 -25

Virtual conference experience that includes the following highlights:

- 💧 Keynote Presentation: Kristin Peer, Deputy Secretary and Special Counsel for Water Policy at Cal EPA – “COVID-19 Challenges and California’s Water Resilience Portfolio”
- 💧 Live panel discussions w/CA water regulators and leaders in California’s reuse community
- 💧 Interactive sponsor and exhibitor hall
- 💧 More than 50 cutting edge presentations downloadable materials
- 💧 Live President’s reception virtual cocktail party
- 💧 Conference content will be available online until July 31, 2020

WRA CA Virtual Conference - June 25 at Noon

COVID-19 and Recycled Water,

What We Know Now and What We Are Learning“

Panelists	Topic Areas
Kara Nelson, Professor, UC Berkeley	Evidence of Covid-19/Practices in place to deal with it
Brian Bernados PE, Technical Specialist DDW	Disinfection at WT plants & Regulatory concerns/perspectives
Brian Pecson, Principal Engineer, Trussell Tech	Pathogen Monitoring & DPR research projects
Patricia Tennyson, VP, Katz & Associates	Communication recommendations for public & utility staff
Moderator: Mark Millan, Founder, Data Instincts	

Covid -19 & Recycled Water: Reassuring an Anxious Public



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May 22, 2020

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